```
****************************************
Test for Ranlux 24 bit generator ...
****************************************
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
                 Starting BigCrush
                 Version: TestU01 1.2.3
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx


***********************************************************
Test smarsa_SerialOver calling smultin_MultinomialOver

***********************************************************
HOST = compute, Linux

Ranlux24


smultin_MultinomialOver test:
-----------------------------------------------
   N =  1,  n = 1000000000,  r =  0,   d =  256,   t =  3,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =           16777216
       Expected number per cell =   59.604645
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =   0.0083558402,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          : 16711680
Value of the statistic                : 1.67e+7
p-value of test                       :    0.67


-----------------------------------------------
CPU time used                    :  00:06:50.93

Generator state:




***********************************************************
Test smarsa_SerialOver calling smultin_MultinomialOver

***********************************************************
HOST = compute, Linux

Ranlux24


smultin_MultinomialOver test:
-----------------------------------------------
   N =  1,  n = 1000000000,  r = 22,   d =  256,   t =  3,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =           16777216
```

```
       Expected number per cell =   59.604645
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =   0.0083558402,    Sigma =          1

------------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          : 16711680
Value of the statistic                : 1.67e+7
p-value of test                       :  7.4e-3


------------------------------------------------
CPU time used                    :  00:06:51.60

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Ranlux24


smultin_MultinomialOver test:
------------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d = 2097152,   t =  2,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


------------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1416
p-value of test                       :    0.08

----------------------------
Total number of cells containing j balls

  j =  0                              :  1319407953345 36
  j =  1                              :        599997168
  j =  2                              :             1416
  j =  3                              :                0
```

```
  j =  4                              :               0
  j =  5                              :               0

------------------------------------------------
CPU time used                    :  00:06:23.07

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Ranlux24


smultin_MultinomialOver test:
------------------------------------------------
   N = 30,  n = 20000000,  r =  9,   d = 2097152,   t =  2,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


------------------------------------------------
Results of CollisionOver test:

POISSON approximation               :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1314
p-value of test                       :    0.91

------------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334434
  j =  1                              :        599997372
  j =  2                              :             1314
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

------------------------------------------------
CPU time used                    :  00:06:32.32

Generator state:



************************************************************
```

```
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Ranlux24


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d = 16384,   t =  3,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1456
p-value of test                       :  7.2e-3

------------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334576
  j =  1                              :       599997088
  j =  2                              :            1456
  j =  3                              :               0
  j =  4                              :               0
  j =  5                              :               0

-----------------------------------------------
CPU time used                    :  00:07:37.51

Generator state:




************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Ranlux24


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r = 16,   d = 16384,   t =  3,
       Sparse =   TRUE
```

```
       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


------------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1418
p-value of test                       :    0.08

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334538
  j =  1                              :        599997164
  j =  2                              :             1418
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

------------------------------------------------
CPU time used                    :  00:07:40.88

Generator state:




************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Ranlux24


smultin_MultinomialOver test:
------------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d =   64,   t =  7,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47
```

```
-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1406
p-value of test                       :    0.13

----------------------------
Total number of cells containing j balls

  j =  0                              :  1319407953345 26
  j =  1                              :        599997188
  j =  2                              :             1406
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:07:42.48

Generator state:




************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Ranlux24


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r = 24,   d =   64,   t =  7,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1355
p-value of test                       :    0.59

----------------------------
Total number of cells containing j balls
```

```
  j =  0                              :  131940795334475
  j =  1                              :       599997290
  j =  2                              :            1355
  j =  3                              :               0
  j =  4                              :               0
  j =  5                              :               0

-----------------------------------------------
CPU time used                    :  00:07:46.36

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Ranlux24


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d =    8,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation               :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1346
p-value of test                       :    0.68

------------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334466
  j =  1                              :       599997308
  j =  2                              :            1346
  j =  3                              :               0
  j =  4                              :               0
  j =  5                              :               0

-----------------------------------------------
CPU time used                    :  00:07:50.21

Generator state:
```

```
************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Ranlux24


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r = 27,   d =    8,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1369
p-value of test                       :    0.45

------------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334489
  j =  1                              :        599997262
  j =  2                              :             1369
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:07:37.36

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Ranlux24
```

```
smultin_MultinomialOver test:
------------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d =    4,   t = 21,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


------------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1356
p-value of test                       :    0.58

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334476
  j =  1                              :        599997288
  j =  2                              :             1356
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

------------------------------------------------
CPU time used                    :  00:07:43.65

Generator state:




************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Ranlux24


smultin_MultinomialOver test:
------------------------------------------------
   N = 30,  n = 20000000,  r = 28,   d =    4,   t = 21,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test
```

```
       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


------------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1408
p-value of test                       :    0.12

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334528
  j =  1                              :        599997184
  j =  2                              :             1408
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

------------------------------------------------
CPU time used                    :  00:07:43.43

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


smarsa_BirthdaySpacings test:
------------------------------------------------
   N = 100,  n = 10000000,  r =  0,    d = 2147483648,    t = 2,    p = 1


      Number of cells = d^t = 4611686018427387904
      Lambda = Poisson mean =      54.2101


-----------------------------------------------------
Total expected number = N*Lambda      :    5421.01
Total observed number                 :    5427
p-value of test                       :    0.47


------------------------------------------------
CPU time used                    :  00:15:30.42

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24
```

```
smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 20000000,  r =  0,    d = 2097152,    t = 3,    p = 1


      Number of cells = d^t = 9223372036854775808
      Lambda = Poisson mean =     216.8404


-----------------------------------------------------
Total expected number = N*Lambda      :    4336.81
Total observed number                 :    4286
p-value of test                       :    0.78


-----------------------------------------------
CPU time used                    :  00:08:07.38

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 30000000,  r = 14,    d = 65536,    t = 4,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


-----------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7444
p-value of test                       :    0.07


-----------------------------------------------
CPU time used                    :  00:15:44.67

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 20000000,  r =  0,    d = 512,    t = 7,    p = 1
```

```
      Number of cells = d^t = 9223372036854775808
      Lambda = Poisson mean =     216.8404


-----------------------------------------------------
Total expected number = N*Lambda      :    4336.81
Total observed number                 :    4251
p-value of test                       :    0.90


-----------------------------------------------
CPU time used                    :  00:16:56.73

Generator state:



***********************************************************
HOST = compute, Linux

Ranlux24


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 20000000,  r =  7,    d = 512,    t = 7,    p = 1


      Number of cells = d^t = 9223372036854775808
      Lambda = Poisson mean =     216.8404


-----------------------------------------------------
Total expected number = N*Lambda      :    4336.81
Total observed number                 :    4353
p-value of test                       :    0.40


-----------------------------------------------
CPU time used                    :  00:16:52.55

Generator state:



***********************************************************
HOST = compute, Linux

Ranlux24


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 30000000,  r = 14,    d = 256,    t = 8,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


-----------------------------------------------------
```

```
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7176
p-value of test                       :    0.95


------------------------------------------------
CPU time used                    :  00:28:55.04

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


smarsa_BirthdaySpacings test:
------------------------------------------------
   N = 20,  n = 30000000,  r = 22,    d = 256,    t = 8,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


------------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7330
p-value of test                       :    0.45


------------------------------------------------
CPU time used                    :  00:28:19.42

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


smarsa_BirthdaySpacings test:
------------------------------------------------
   N = 20,  n = 30000000,  r =  0,    d = 16,    t = 16,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


------------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7341
p-value of test                       :    0.40


------------------------------------------------
```

```
CPU time used                    :  00:49:08.90

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 30000000,  r = 26,    d = 16,    t = 16,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


-----------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7333
p-value of test                       :    0.43


-----------------------------------------------
CPU time used                    :  00:47:48.27

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


snpair_ClosePairs test:
-----------------------------------------------
   N = 30,  n = 6000000,  r =  0,  t = 3,  p = 0,  m = 30,  Torus =  TRUE


---------------------------------------
Test based on the 2 nearest points (NP):

Stat. AD on the N values (NP)         :    0.38
p-value of test                       :    0.86


A2 test based on the spacings between the
   successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP)    :    1.25
p-value of test                       :    0.25

Test on the Nm values of W_{n,i}(mNP1):    0.30
p-value of test                       :    0.93

Test on the jump times of Y
```

```
   (superposition of Yn):

Expected number of jumps of Y = mN    :     900
Number of jumps of Y                  :     926
p-value of test                       :    0.20

Stat. AD (mNP2)                       :    1.44
p-value of test                       :    0.19

Stat. AD after spacings (mNP2-S)      :    0.39
p-value of test                       :    0.85

-----------------------------------------------
CPU time used                    :  00:05:48.65

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


snpair_ClosePairs test:
-----------------------------------------------
   N = 20,  n = 4000000,  r =  0,  t = 5,  p = 0,  m = 30,  Torus =  TRUE


---------------------------------------
Test based on the 2 nearest points (NP):

Stat. AD on the N values (NP)         :    0.43
p-value of test                       :    0.82


A2 test based on the spacings between the
   successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP)    :    0.38
p-value of test                       :    0.87

Test on the Nm values of W_{n,i}(mNP1):    0.92
p-value of test                       :    0.40

Test on the jump times of Y
   (superposition of Yn):

Expected number of jumps of Y = mN    :     600
Number of jumps of Y                  :     587
p-value of test                       :    0.69

Stat. AD (mNP2)                       :    0.42
p-value of test                       :    0.83

Stat. AD after spacings (mNP2-S)      :    1.09
p-value of test                       :    0.31

-----------------------------------------------
CPU time used                    :  00:04:22.34

Generator state:
```

```
************************************************************
HOST = compute, Linux

Ranlux24


snpair_ClosePairs test:
-----------------------------------------------
   N = 10,  n = 3000000,  r =  0,  t = 9,  p = 0,  m = 30,  Torus =  TRUE


---------------------------------------
Test based on the 2 nearest points (NP):

Stat. AD on the N values (NP)         :    0.85
p-value of test                       :    0.44


A2 test based on the spacings between the
   successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP)    :    1.13
p-value of test                       :    0.29

Test on the Nm values of W_{n,i}(mNP1):    0.41
p-value of test                       :    0.84

Test on the jump times of Y
   (superposition of Yn):

Expected number of jumps of Y = mN    :     300
Number of jumps of Y                  :     309
p-value of test                       :    0.31

Stat. AD (mNP2)                       :    0.37
p-value of test                       :    0.88

Stat. AD after spacings (mNP2-S)      :    0.62
p-value of test                       :    0.63

-------------------------------------------
CPU time used                    :  00:04:49.72

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


snpair_ClosePairs test:
-----------------------------------------------
   N =  5,  n = 2000000,  r =  0,  t = 16,  p = 0,  m = 30,  Torus =  TRUE


---------------------------------------
```

```
Test based on the 2 nearest points (NP):

Stat. AD on the N values (NP)         :    2.51
p-value of test                       :    0.05


A2 test based on the spacings between the
   successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP)    :    0.91
p-value of test                       :    0.40

Test on the Nm values of W_{n,i}(mNP1):    2.17
p-value of test                       :    0.07

Test on the jump times of Y
   (superposition of Yn):

Expected number of jumps of Y = mN    :     150
Number of jumps of Y                  :     124
p-value of test                       :    0.98

Stat. AD (mNP2)                       :    0.74
p-value of test                       :    0.52

Stat. AD after spacings (mNP2-S)      :    0.95
p-value of test                       :    0.38

-----------------------------------------------
CPU time used                    :  00:04:15.13

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


sknuth_SimpPoker test:
-----------------------------------------------
   N =  1,  n = 400000000,  r =  0,   d =    8,   k =    8


-----------------------------------------------
Number of degrees of freedom          :    7
Chi-square statistic                  :   11.01
p-value of test                       :    0.14

-----------------------------------------------
CPU time used                    :  00:16:27.75

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24
```

```
sknuth_SimpPoker test:
------------------------------------------------
   N =  1,  n = 400000000,  r = 27,   d =    8,   k =    8


------------------------------------------------
Number of degrees of freedom          :    7
Chi-square statistic                  :    1.71
p-value of test                       :    0.97

------------------------------------------------
CPU time used                    :  00:17:14.11

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


sknuth_SimpPoker test:
------------------------------------------------
   N =  1,  n = 100000000,  r =  0,   d =   32,   k =   32


------------------------------------------------
Number of degrees of freedom          :   18
Chi-square statistic                  :    8.78
p-value of test                       :    0.96

------------------------------------------------
CPU time used                    :  00:15:14.66

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


sknuth_SimpPoker test:
------------------------------------------------
   N =  1,  n = 100000000,  r = 25,   d =   32,   k =   32


------------------------------------------------
Number of degrees of freedom          :   18
Chi-square statistic                  :   21.40
p-value of test                       :    0.26

------------------------------------------------
CPU time used                    :  00:15:28.52

Generator state:
```

```
************************************************************
HOST = compute, Linux

Ranlux24


sknuth_CouponCollector test:
-----------------------------------------------
   N =  1,  n = 200000000,  r =  0,   d =    8


-----------------------------------------------
Number of degrees of freedom          :   54
Chi-square statistic                  :   53.43
p-value of test                       :    0.50

-----------------------------------------------
CPU time used                    :  00:19:45.93

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


sknuth_CouponCollector test:
-----------------------------------------------
   N =  1,  n = 200000000,  r = 10,   d =    8


-----------------------------------------------
Number of degrees of freedom          :   54
Chi-square statistic                  :   40.09
p-value of test                       :    0.92

-----------------------------------------------
CPU time used                    :  00:20:41.29

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


sknuth_CouponCollector test:
-----------------------------------------------
   N =  1,  n = 200000000,  r = 20,   d =    8


-----------------------------------------------
```

```
Number of degrees of freedom          :   54
Chi-square statistic                  :   42.30
p-value of test                       :    0.88

-----------------------------------------------
CPU time used                    :  00:20:06.45

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


sknuth_CouponCollector test:
-----------------------------------------------
   N =  1,  n = 200000000,  r = 27,   d =    8


-----------------------------------------------
Number of degrees of freedom          :   54
Chi-square statistic                  :   54.00
p-value of test                       :    0.47

-----------------------------------------------
CPU time used                    :  00:19:54.29

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


sknuth_Gap test:
-----------------------------------------------
   N =  1,  n = 500000000,  r =  0,   Alpha =        0,   Beta  =   0.0625


-----------------------------------------------
Number of degrees of freedom          :  232
Chi-square statistic                  :  228.63
p-value of test                       :    0.55

-----------------------------------------------
CPU time used                    :  00:35:52.50

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24
```

```
sknuth_Gap test:
------------------------------------------------
   N =  1,  n = 300000000,  r = 25,   Alpha =        0,   Beta  =  0.03125


------------------------------------------------
Number of degrees of freedom          :  434
Chi-square statistic                  :  426.92
p-value of test                       :    0.59

------------------------------------------------
CPU time used                    :  00:46:06.63

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


sknuth_Gap test:
------------------------------------------------
   N =  1,  n = 100000000,  r =  0,   Alpha =        0,   Beta  = 0.0078125


------------------------------------------------
Number of degrees of freedom          : 1437
Chi-square statistic                  : 1376.96
p-value of test                       :    0.87

------------------------------------------------
CPU time used                    :  01:03:10.44

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


sknuth_Gap test:
------------------------------------------------
   N =  1,  n = 10000000,  r = 20,   Alpha =        0,   Beta  = 0.000976562


------------------------------------------------
Number of degrees of freedom          : 7046
Chi-square statistic                  : 7055.67
p-value of test                       :    0.47

------------------------------------------------
CPU time used                    :  00:54:10.04

Generator state:
```

```
************************************************************
HOST = compute, Linux

Ranlux24


sknuth_Run test:
-----------------------------------------------
   N =  5,  n = 1000000000,  r =  0,   Up = FALSE


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.27
p-value of test                       :    0.41

Kolmogorov-Smirnov- statistic = D-    :    0.21
p-value of test                       :    0.56

Anderson-Darling statistic = A2       :    0.51
p-value of test                       :    0.73

Test on the sum of all N observations
Number of degrees of freedom          :   30
Chi-square statistic                  :   27.85
p-value of test                       :    0.58

-----------------------------------------------
CPU time used                    :  00:26:42.16

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


sknuth_Run test:
-----------------------------------------------
   N = 10,  n = 1000000000,  r = 15,   Up =  TRUE


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.11
p-value of test                       :    0.73

Kolmogorov-Smirnov- statistic = D-    :    0.27
p-value of test                       :    0.20

Anderson-Darling statistic = A2       :    0.46
p-value of test                       :    0.78

Test on the sum of all N observations
Number of degrees of freedom          :   60
Chi-square statistic                  :   62.09
```

```
p-value of test                       :    0.40

------------------------------------------------
CPU time used                     :  00:54:32.27

Generator state:



************************************************************
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Ranlux24


smultin_Multinomial test:
------------------------------------------------
   N =  1,  n = 1000000000,  r =  5,   t =  3,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =                  6
       Expected number per cell =  1.6666667e+08
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =  2.5000002e-09,    Sigma =          1

------------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          :    5
Value of the statistic                :    4.92
p-value of test                       :    0.43


------------------------------------------------
CPU time used                     :  00:16:28.62

Generator state:



************************************************************
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Ranlux24


smultin_Multinomial test:
------------------------------------------------
   N =  1,  n = 1000000000,  r =  5,   t =  5,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
```

```
       Number of cells = t! =                120
       Expected number per cell =   8333333.3
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =  5.9500005e-08,    Sigma =          1

------------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          :  119
Value of the statistic                :  128.66
p-value of test                       :    0.26


------------------------------------------------
CPU time used                    :  00:28:19.01

Generator state:



************************************************************
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Ranlux24


smultin_Multinomial test:
------------------------------------------------
   N =  1,  n = 500000000,  r =  5,   t =  7,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =                5040
       Expected number per cell =   99206.349
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =  5.0390004e-06,    Sigma =          1

------------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          : 5039
Value of the statistic                : 5086.00
p-value of test                       :    0.32


------------------------------------------------
CPU time used                    :  00:19:31.66

Generator state:



************************************************************
```

```
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Ranlux24


smultin_Multinomial test:
-----------------------------------------------
   N =  1,  n = 500000000,  r = 10,   t = 10,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =            3628800
       Expected number per cell =    137.7866
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =   0.0036287993,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          : 3628799
Value of the statistic                : 3.63e+6
p-value of test                       :    0.26


-----------------------------------------------
CPU time used                    :  00:29:23.11

Generator state:




************************************************************
Test sknuth_CollisionPermut calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Ranlux24


smultin_Multinomial test:
-----------------------------------------------
   N = 20,  n = 20000000,  r =  0,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =        87178291200
       Expected number per cell =  1 /  4358.9146
       EColl = n^2 / (2k) =   2294.14912
       Hashing =   TRUE

       Collision test,    Mu =      2293.9736,    Sigma =    47.8841

-----------------------------------------------
Test Results for Collisions

For the total number of collisions, we use
```

```
      the Poisson approximation:
Expected number of collisions = N*Mu  :    45879.47
Observed number of collisions         :    46044
p-value of test                       :    0.22


------------------------------
Total number of cells containing j balls

  j =  0                              :    1743165870044
  j =  1                              :        399907914
  j =  2                              :            46040
  j =  3                              :                2
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:33:20.90

Generator state:



************************************************************
Test sknuth_CollisionPermut calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Ranlux24


smultin_Multinomial test:
-----------------------------------------------
   N = 20,  n = 20000000,  r = 10,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =        87178291200
       Expected number per cell =  1 /  4358.9146
       EColl = n^2 / (2k) =   2294.14912
       Hashing =   TRUE

       Collision test,    Mu =      2293.9736,    Sigma =    47.8841

-----------------------------------------------
Test Results for Collisions

For the total number of collisions, we use
      the Poisson approximation:
Expected number of collisions = N*Mu  :    45879.47
Observed number of collisions         :    45725
p-value of test                       :    0.76


------------------------------
Total number of cells containing j balls

  j =  0                              :    1743165869725
  j =  1                              :        399908551
  j =  2                              :            45723
  j =  3                              :                1
  j =  4                              :                0
```

```
  j =  5                              :               0

-----------------------------------------------
CPU time used                     :  00:33:37.08

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


sknuth_MaxOft test:
-----------------------------------------------
   N = 40,  n = 10000000,  r =  0,   d = 100000,   t =  8

      Number of categories = 100000
      Expected number per category  = 100.00


-----------------------------------------------
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :    0.14
p-value of test                       :    0.17

Kolmogorov-Smirnov- statistic = D-    :   0.043
p-value of test                       :    0.84

Anderson-Darling statistic = A2       :    0.95
p-value of test                       :    0.38

Test on the sum of all N observations
Number of degrees of freedom          : 3999960
Chi-square statistic                  : 4.00e+6
p-value of test                       :    0.80


-----------------------------------------------
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :    0.18
p-value of test                       :    0.07

Kolmogorov-Smirnov- statistic = D-    :   0.064
p-value of test                       :    0.69

Anderson-Darling statistic = A2       :    1.81
p-value of test                       :    0.12


-----------------------------------------------
CPU time used                     :  00:20:08.47

Generator state:



************************************************************
```

```
HOST = compute, Linux

Ranlux24


sknuth_MaxOft test:
-----------------------------------------------
   N = 30,  n = 10000000,  r =  0,   d = 100000,   t = 16

      Number of categories = 100000
      Expected number per category  = 100.00


-----------------------------------------------
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :    0.27
p-value of test                       :    0.01

Kolmogorov-Smirnov- statistic = D-    :   0.024
p-value of test                       :    0.95

Anderson-Darling statistic = A2       :    2.89
p-value of test                       :    0.03

Test on the sum of all N observations
Number of degrees of freedom          : 2999970
Chi-square statistic                  : 3.00e+6
p-value of test                       :    0.98


-----------------------------------------------
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :    0.16
p-value of test                       :    0.21

Kolmogorov-Smirnov- statistic = D-    :   0.059
p-value of test                       :    0.78

Anderson-Darling statistic = A2       :    1.02
p-value of test                       :    0.35


-----------------------------------------------
CPU time used                    :  00:27:29.47

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


sknuth_MaxOft test:
-----------------------------------------------
   N = 20,  n = 10000000,  r =  0,   d = 100000,   t = 24

      Number of categories = 100000
      Expected number per category  = 100.00
```

```
------------------------------------------------
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :    0.24
p-value of test                       :    0.09

Kolmogorov-Smirnov- statistic = D-    :   0.022
p-value of test                       :    0.97

Anderson-Darling statistic = A2       :    1.65
p-value of test                       :    0.14

Test on the sum of all N observations
Number of degrees of freedom          : 1999980
Chi-square statistic                  : 2.00e+6
p-value of test                       :    0.96


------------------------------------------------
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :    0.12
p-value of test                       :    0.50

Kolmogorov-Smirnov- statistic = D-    :   0.082
p-value of test                       :    0.73

Anderson-Darling statistic = A2       :    0.34
p-value of test                       :    0.90


------------------------------------------------
CPU time used                    :  00:26:36.84

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


sknuth_MaxOft test:
------------------------------------------------
   N = 20,  n = 10000000,  r =  0,   d = 100000,   t = 32

      Number of categories = 100000
      Expected number per category  = 100.00


------------------------------------------------
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :    0.15
p-value of test                       :    0.37

Kolmogorov-Smirnov- statistic = D-    :   0.096
p-value of test                       :    0.65
```

```
Anderson-Darling statistic = A2       :    0.59
p-value of test                       :    0.65

Test on the sum of all N observations
Number of degrees of freedom          : 1999980
Chi-square statistic                  : 2.00e+6
p-value of test                       :    0.69


------------------------------------------------
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :    0.25
p-value of test                       :    0.08

Kolmogorov-Smirnov- statistic = D-    :   0.040
p-value of test                       :    0.92

Anderson-Darling statistic = A2       :    1.56
p-value of test                       :    0.16


------------------------------------------------
CPU time used                    :  00:34:30.87

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


svaria_SampleProd test:
------------------------------------------------
   N = 40,  n = 10000000,  r =  0,   t = 8


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.17
p-value of test                       :    0.09

Kolmogorov-Smirnov- statistic = D-    :   0.063
p-value of test                       :    0.70

Anderson-Darling statistic = A2       :    1.94
p-value of test                       :    0.10

------------------------------------------------
CPU time used                    :  00:18:59.94

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24
```

```
svaria_SampleProd test:
------------------------------------------------
   N = 20,  n = 10000000,  r =  0,   t = 16


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.20
p-value of test                       :    0.19

Kolmogorov-Smirnov- statistic = D-    :   0.096
p-value of test                       :    0.65

Anderson-Darling statistic = A2       :    0.73
p-value of test                       :    0.53

------------------------------------------------
CPU time used                    :  00:18:21.87

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


svaria_SampleProd test:
------------------------------------------------
   N = 20,  n = 10000000,  r =  0,   t = 24


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.11
p-value of test                       :    0.59

Kolmogorov-Smirnov- statistic = D-    :    0.11
p-value of test                       :    0.56

Anderson-Darling statistic = A2       :    0.30
p-value of test                       :    0.94

------------------------------------------------
CPU time used                    :  00:27:47.30

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


svaria_SampleMean test:
------------------------------------------------
```

```
   N = 20000000,  n = 30,  r =  0


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 1.28e-4
p-value of test                       :    0.52

Kolmogorov-Smirnov- statistic = D-    : 2.04e-4
p-value of test                       :    0.19

Anderson-Darling statistic = A2       :    0.84
p-value of test                       :    0.45

------------------------------------------------
CPU time used                    :  00:03:36.38

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


svaria_SampleMean test:
------------------------------------------------
   N = 20000000,  n = 30,  r = 10


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 1.98e-4
p-value of test                       :    0.21

Kolmogorov-Smirnov- statistic = D-    : 7.64e-5
p-value of test                       :    0.79

Anderson-Darling statistic = A2       :    0.86
p-value of test                       :    0.44

------------------------------------------------
CPU time used                    :  00:03:23.21

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


svaria_SampleCorr test:
------------------------------------------------
   N =  1,  n = 2000000000,  r =  0,   k = 1


------------------------------------------------
```

```
Normal statistic                      :    1.67
p-value of test                       :    0.05

-----------------------------------------------
CPU time used                     :  00:09:39.71

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


svaria_SampleCorr test:
-----------------------------------------------
   N =  1,  n = 2000000000,  r =  0,   k = 2


-----------------------------------------------
Normal statistic                      :    1.47
p-value of test                       :    0.07

-----------------------------------------------
CPU time used                     :  00:09:59.05

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


svaria_AppearanceSpacings test:
-----------------------------------------------
   N =  1,   Q = 10000000,   K = 1000000000,   r = 0,   s = 3,   L = 15

   Sequences of n = (K + Q)L =  15150000000 bits
   Q = 10000000 initialization blocks
   K = 1000000000 blocks for the test
   the blocks have L = 15 bits



-----------------------------------------------
Normal statistic                      :    2.47
p-value of test                       :  6.7e-3

-----------------------------------------------
CPU time used                     :  00:25:15.61

Generator state:



************************************************************
```

```
HOST = compute, Linux

Ranlux24


svaria_AppearanceSpacings test:
-----------------------------------------------
   N =  1,   Q = 10000000,   K = 1000000000,   r = 27,   s = 3,   L = 15

   Sequences of n = (K + Q)L =  15150000000 bits
   Q = 10000000 initialization blocks
   K = 1000000000 blocks for the test
   the blocks have L = 15 bits



-----------------------------------------------
Normal statistic                      :    1.02
p-value of test                       :    0.15

-----------------------------------------------
CPU time used                    :  00:29:04.77

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


svaria_WeightDistrib test:
-----------------------------------------------
   N =  1,  n = 20000000,  r =  0,  k = 256,  Alpha =      0,  Beta =   0.25


-----------------------------------------------
Number of degrees of freedom          :   67
Chi-square statistic                  :   59.06
p-value of test                       :    0.74

-----------------------------------------------
CPU time used                    :  00:27:57.38

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


svaria_WeightDistrib test:
-----------------------------------------------
   N =  1,  n = 20000000,  r = 20,  k = 256,  Alpha =      0,  Beta =   0.25


-----------------------------------------------
```

```
Number of degrees of freedom          :   67
Chi-square statistic                  :   72.19
p-value of test                       :    0.31

------------------------------------------------
CPU time used                    :  00:28:28.52

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


svaria_WeightDistrib test:
------------------------------------------------
   N =  1,  n = 20000000,  r = 28,  k = 256,  Alpha =      0,  Beta =   0.25


------------------------------------------------
Number of degrees of freedom          :   67
Chi-square statistic                  :   63.22
p-value of test                       :    0.61

------------------------------------------------
CPU time used                    :  00:28:19.66

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


svaria_WeightDistrib test:
------------------------------------------------
   N =  1,  n = 20000000,  r =  0,  k = 256,  Alpha =      0,  Beta = 0.0625


------------------------------------------------
Number of degrees of freedom          :   37
Chi-square statistic                  :   33.93
p-value of test                       :    0.61

------------------------------------------------
CPU time used                    :  00:27:39.05

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24
```

```
svaria_WeightDistrib test:
-------------------------------------------------
   N =  1,  n = 20000000,  r = 10,  k = 256,  Alpha =      0,  Beta = 0.0625


-------------------------------------------------
Number of degrees of freedom          :   37
Chi-square statistic                  :   42.66
p-value of test                       :    0.24

-------------------------------------------------
CPU time used                     :  00:27:36.82

Generator state:




***********************************************************
HOST = compute, Linux

Ranlux24


svaria_WeightDistrib test:
-------------------------------------------------
   N =  1,  n = 20000000,  r = 26,  k = 256,  Alpha =      0,  Beta = 0.0625


-------------------------------------------------
Number of degrees of freedom          :   37
Chi-square statistic                  :   31.07
p-value of test                       :    0.74

-------------------------------------------------
CPU time used                     :  00:27:12.97

Generator state:




***********************************************************
HOST = compute, Linux

Ranlux24


svaria_SumCollector test:
-------------------------------------------------
   N =  1,  n = 500000000,  r =  0,   g = 10


-------------------------------------------------
Number of degrees of freedom          :   29
Chi-square statistic                  :   32.24
p-value of test                       :    0.31

-------------------------------------------------
CPU time used                     :  00:55:03.47

Generator state:
```

```
************************************************************
HOST = compute, Linux

Ranlux24


smarsa_MatrixRank test:
-----------------------------------------------
   N = 10,  n = 1000000,  r =  0,    s = 5,    L = 30,    k = 30


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.089
p-value of test                       :    0.81

Kolmogorov-Smirnov- statistic = D-    :    0.24
p-value of test                       :    0.28

Anderson-Darling statistic = A2       :    0.85
p-value of test                       :    0.45

Test on the sum of all N observations
Number of degrees of freedom          :   40
Chi-square statistic                  :   50.57
p-value of test                       :    0.12

-----------------------------------------------
CPU time used                    :  00:10:38.33

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


smarsa_MatrixRank test:
-----------------------------------------------
   N = 10,  n = 1000000,  r = 25,    s = 5,    L = 30,    k = 30


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.22
p-value of test                       :    0.32

Kolmogorov-Smirnov- statistic = D-    :   0.086
p-value of test                       :    0.82

Anderson-Darling statistic = A2       :    0.79
p-value of test                       :    0.49

Test on the sum of all N observations
Number of degrees of freedom          :   40
Chi-square statistic                  :   36.81
```

```
p-value of test                       :    0.61

-----------------------------------------------
CPU time used                     :  00:10:43.32

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


smarsa_MatrixRank test:
-----------------------------------------------
   N =  1,  n = 5000,  r =  0,    s = 4,    L = 1000,    k = 1000


-----------------------------------------------
Number of degrees of freedom          :    3
Chi-square statistic                  :    1.03
p-value of test                       :    0.79

-----------------------------------------------
CPU time used                     :  00:10:56.71

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


smarsa_MatrixRank test:
-----------------------------------------------
   N =  1,  n = 5000,  r = 26,    s = 4,    L = 1000,    k = 1000


-----------------------------------------------
Number of degrees of freedom          :    3
Chi-square statistic                  :    1.18
p-value of test                       :    0.76

-----------------------------------------------
CPU time used                     :  00:11:03.00

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24
```

```
smarsa_MatrixRank test:
-----------------------------------------------
   N =  1,  n = 80,  r = 15,    s = 15,    L = 5000,    k = 5000


-----------------------------------------------
Number of degrees of freedom          :    2
Chi-square statistic                  :    0.65
p-value of test                       :    0.72

-----------------------------------------------
CPU time used                    :  00:03:59.58

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


smarsa_MatrixRank test:
-----------------------------------------------
   N =  1,  n = 80,  r =  0,    s = 30,    L = 5000,    k = 5000


-----------------------------------------------
Number of degrees of freedom          :    2
Chi-square statistic                  :    0.66
p-value of test                       :    0.72

-----------------------------------------------
CPU time used                    :  00:02:52.08

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


smarsa_Savir2 test:
-----------------------------------------------
   N = 10,  n = 10000000,  r = 10,    m = 1048576,    t = 30


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.22
p-value of test                       :    0.34

Kolmogorov-Smirnov- statistic = D-    :    0.23
p-value of test                       :    0.29

Anderson-Darling statistic = A2       :    0.71
p-value of test                       :    0.54
```

```
Test on the sum of all N observations
Number of degrees of freedom          :  130
Chi-square statistic                  :  126.19
p-value of test                       :    0.58

-----------------------------------------------
CPU time used                    :  00:16:22.02

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


smarsa_GCD test:
-----------------------------------------------
   N = 10,  n = 50000000,  r =  0,   s = 30


-----------------------------------------------
Test results for GCD values:

Kolmogorov-Smirnov+ statistic = D+    :   0.070
p-value of test                       :    0.87

Kolmogorov-Smirnov- statistic = D-    :    0.14
p-value of test                       :    0.63

Anderson-Darling statistic = A2       :    0.29
p-value of test                       :    0.94

Test on the sum of all N observations
Number of degrees of freedom          : 17430
Chi-square statistic                  :17518.53
p-value of test                       :    0.32



-----------------------------------------------
CPU time used                    :  00:07:48.22

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 100000000,  r =  0,   s = 5,   L0 =   50,   L1 =   50



-----------------------------------------------
```

```
Test on the values of the Statistic H

Number of degrees of freedom          :   36
ChiSquare statistic                   :   30.86
p-value of test                       :    0.71


------------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :   35
ChiSquare statistic                   :   31.45
p-value of test                       :    0.64


------------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          :   25
ChiSquare statistic                   :   46.56
p-value of test                       :  5.5e-3


------------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :   24
ChiSquare statistic                   :   20.23
p-value of test                       :    0.68


------------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :   17
ChiSquare statistic                   :   12.29
p-value of test                       :    0.78


------------------------------------------------
CPU time used                    :  00:06:39.02

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


swalk_RandomWalk1 test:
------------------------------------------------
   N =  1,  n = 100000000,  r = 25,   s = 5,   L0 =   50,   L1 =   50



------------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :   36
ChiSquare statistic                   :   29.55
```

```
p-value of test                       :    0.77


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :   35
ChiSquare statistic                   :   24.31
p-value of test                       :    0.91


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          :   25
ChiSquare statistic                   :   24.93
p-value of test                       :    0.47


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :   24
ChiSquare statistic                   :   30.71
p-value of test                       :    0.16


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :   17
ChiSquare statistic                   :    7.01
p-value of test                       :    0.98


-----------------------------------------------
CPU time used                    :  00:06:41.58

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 10000000,  r =  0,   s = 10,   L0 = 1000,   L1 = 1000



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :  146
ChiSquare statistic                   :  167.90
p-value of test                       :    0.10


-----------------------------------------------
```

```
Test on the values of the Statistic M

Number of degrees of freedom          :  146
ChiSquare statistic                   :  133.88
p-value of test                       :    0.76


------------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          :  500
ChiSquare statistic                   :  446.87
p-value of test                       :    0.96


------------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :  136
ChiSquare statistic                   :  132.66
p-value of test                       :    0.56


------------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :   74
ChiSquare statistic                   :   73.03
p-value of test                       :    0.51


------------------------------------------------
CPU time used                    :  00:07:14.58

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


swalk_RandomWalk1 test:
------------------------------------------------
   N =  1,  n = 10000000,  r = 20,   s = 10,   L0 = 1000,   L1 = 1000



------------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :  146
ChiSquare statistic                   :  154.71
p-value of test                       :    0.30


------------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :  146
ChiSquare statistic                   :  151.04
```

```
p-value of test                       :    0.37


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          :  500
ChiSquare statistic                   :  484.75
p-value of test                       :    0.68


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :  136
ChiSquare statistic                   :  116.56
p-value of test                       :    0.88


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :   74
ChiSquare statistic                   :   77.80
p-value of test                       :    0.36


-----------------------------------------------
CPU time used                    :  00:07:18.33

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 1000000,  r =  0,   s = 15,   L0 = 10000,   L1 = 10000



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :  384
ChiSquare statistic                   :  385.60
p-value of test                       :    0.47


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :  384
ChiSquare statistic                   :  344.87
p-value of test                       :    0.92


-----------------------------------------------
```

```
Test on the values of the Statistic J

Number of degrees of freedom          : 5000
ChiSquare statistic                   : 5286.12
p-value of test                       :  2.4e-3


------------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :  378
ChiSquare statistic                   :  412.30
p-value of test                       :    0.11


------------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :  200
ChiSquare statistic                   :  180.71
p-value of test                       :    0.83


------------------------------------------------
CPU time used                    :  00:05:09.50

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


swalk_RandomWalk1 test:
------------------------------------------------
   N =  1,  n = 1000000,  r = 15,   s = 15,   L0 = 10000,   L1 = 10000



------------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :  384
ChiSquare statistic                   :  420.96
p-value of test                       :    0.09


------------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :  384
ChiSquare statistic                   :  374.85
p-value of test                       :    0.62


------------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          : 5000
ChiSquare statistic                   : 5047.16
```

```
p-value of test                       :    0.32


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :  378
ChiSquare statistic                   :  346.09
p-value of test                       :    0.88


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :  200
ChiSquare statistic                   :  207.13
p-value of test                       :    0.35


-----------------------------------------------
CPU time used                    :  00:05:22.47

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


scomp_LinearComp test:
-----------------------------------------------
   N =  1,  n = 400020,  r =  0,    s = 1



-----------------------------------------------
Number of degrees of freedom          :   12
Chi2 statistic for size of jumps      :   11.60
p-value of test                       :    0.48


-----------------------------------------------
Normal statistic for number of jumps  :    0.63
p-value of test                       :    0.26



-----------------------------------------------
CPU time used                    :  00:02:57.25

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24
```

```
scomp_LinearComp test:
------------------------------------------------
   N =  1,  n = 400020,  r = 29,    s = 1



------------------------------------------------
Number of degrees of freedom          :   12
Chi2 statistic for size of jumps      :    6.65
p-value of test                       :    0.88


------------------------------------------------
Normal statistic for number of jumps  :    0.52
p-value of test                       :    0.30



------------------------------------------------
CPU time used                    :  00:02:54.61

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


scomp_LempelZiv test:
------------------------------------------------
   N = 10,  n = 134217728,  r =  0,   s =   30,   k =   27


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.30
p-value of test                       :    0.14

Kolmogorov-Smirnov- statistic = D-    :   0.047
p-value of test                       :    0.93

Anderson-Darling statistic = A2       :    1.04
p-value of test                       :    0.33

Tests on the sum of all N observations
Standardized normal statistic         :   -1.26
p-value of test                       :    0.90

Sample variance                       :    0.72
p-value of test                       :    0.69

------------------------------------------------
CPU time used                    :  00:01:27.78

Generator state:
```

```
************************************************************
HOST = compute, Linux

Ranlux24


scomp_LempelZiv test:
---------------------------------------------
   N = 10,  n = 134217728,  r = 15,   s =   15,   k =   27


---------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.081
p-value of test                       :    0.84

Kolmogorov-Smirnov- statistic = D-    :    0.16
p-value of test                       :    0.55

Anderson-Darling statistic = A2       :    0.23
p-value of test                       :    0.98

Tests on the sum of all N observations
Standardized normal statistic         :    0.25
p-value of test                       :    0.40

Sample variance                       :    0.79
p-value of test                       :    0.62

---------------------------------------------
CPU time used                    :  00:01:31.86

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


sspectral_Fourier3 test:
---------------------------------------------
   N = 100000,  n = 16384,  r =  0,   s =    3,   k =   14


---------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 4.44e-3
p-value of test                       :    0.85

Kolmogorov-Smirnov- statistic = D-    :   0.016
p-value of test                       :    0.12

Anderson-Darling statistic = A2       :    0.92
p-value of test                       :    0.40

---------------------------------------------
CPU time used                    :  00:03:02.33

Generator state:
```

```
************************************************************
HOST = compute, Linux

Ranlux24


sspectral_Fourier3 test:
------------------------------------------------
   N = 100000,  n = 16384,  r = 27,   s =    3,   k =   14


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 8.98e-3
p-value of test                       :    0.51

Kolmogorov-Smirnov- statistic = D-    :   0.015
p-value of test                       :    0.15

Anderson-Darling statistic = A2       :    0.93
p-value of test                       :    0.40

------------------------------------------------
CPU time used                    :  00:03:04.49

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


sstring_LongestHeadRun test:
------------------------------------------------
   N =  1,  n = 1000,  r =  0,   s = 3,   L = 10000020


------------------------------------------------
Number of degrees of freedom          :    8
Chi-square statistic                  :    6.12
p-value of test                       :    0.63

------------------------------------------------
Global longest run of 1               :   31.00
p-value of test                       :    0.69



------------------------------------------------
CPU time used                    :  00:15:05.21

Generator state:



************************************************************
```

```
HOST = compute, Linux

Ranlux24


sstring_LongestHeadRun test:
-----------------------------------------------
   N =  1,  n = 1000,  r = 27,   s = 3,   L = 10000020


-----------------------------------------------
Number of degrees of freedom          :    8
Chi-square statistic                  :    6.03
p-value of test                       :    0.64

-----------------------------------------------
Global longest run of 1               :   33.00
p-value of test                       :    0.44



-----------------------------------------------
CPU time used                    :  00:15:23.38

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


sstring_PeriodsInStrings test:
-----------------------------------------------
   N = 10,  n = 500000000,  r =  0,   s =   10


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.19
p-value of test                       :    0.45

Kolmogorov-Smirnov- statistic = D-    :    0.10
p-value of test                       :    0.75

Anderson-Darling statistic = A2       :    0.30
p-value of test                       :    0.93

Test on the sum of all N observations
Number of degrees of freedom          :  200
Chi-square statistic                  :  192.21
p-value of test                       :    0.64

-----------------------------------------------
CPU time used                    :  00:24:30.03

Generator state:
```

```
************************************************************
HOST = compute, Linux

Ranlux24


sstring_PeriodsInStrings test:
------------------------------------------------
   N = 10,  n = 500000000,  r = 20,   s =   10


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.23
p-value of test                       :    0.30

Kolmogorov-Smirnov- statistic = D-    :    0.15
p-value of test                       :    0.58

Anderson-Darling statistic = A2       :    0.56
p-value of test                       :    0.68

Test on the sum of all N observations
Number of degrees of freedom          :  200
Chi-square statistic                  :  192.35
p-value of test                       :    0.64

------------------------------------------------
CPU time used                    :  00:23:21.25

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


sstring_HammingWeight2 test:
------------------------------------------------
   N = 10,  n = 1000000000,  r =  0,   s = 3,   L = 1000000


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.062
p-value of test                       :    0.89

Kolmogorov-Smirnov- statistic = D-    :    0.28
p-value of test                       :    0.18

Anderson-Darling statistic = A2       :    1.12
p-value of test                       :    0.30

Test on the sum of all N observations
Number of degrees of freedom          : 10000
Chi-square statistic                  :10141.83
p-value of test                       :    0.16

------------------------------------------------
CPU time used                    :  00:15:10.91
```

```
Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


sstring_HammingWeight2 test:
-----------------------------------------------
   N = 10,  n = 1000000000,  r = 27,   s = 3,   L = 1000000


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.17
p-value of test                       :    0.50

Kolmogorov-Smirnov- statistic = D-    :    0.35
p-value of test                       :    0.07

Anderson-Darling statistic = A2       :    1.34
p-value of test                       :    0.22

Test on the sum of all N observations
Number of degrees of freedom          : 10000
Chi-square statistic                  :10113.86
p-value of test                       :    0.21

-----------------------------------------------
CPU time used                    :  00:14:43.66

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


sstring_HammingCorr test:
-----------------------------------------------
   N =  1,  n = 1000000000,  r = 10,   s = 10,   L = 30



-----------------------------------------------
Normal statistic                      :   -0.33
p-value of test                       :    0.63

-----------------------------------------------
CPU time used                    :  00:13:55.13

Generator state:
```

```
************************************************************
HOST = compute, Linux

Ranlux24


sstring_HammingCorr test:
------------------------------------------------
   N =  1,  n = 100000000,  r = 10,   s = 10,   L = 300



------------------------------------------------
Normal statistic                    :   -1.70
p-value of test                     :    0.96

------------------------------------------------
CPU time used                    :  00:13:59.83

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


sstring_HammingCorr test:
------------------------------------------------
   N =  1,  n = 100000000,  r = 10,   s = 10,   L = 1200



------------------------------------------------
Normal statistic                    :   -0.95
p-value of test                     :    0.83

------------------------------------------------
CPU time used                    :  00:56:51.66

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


sstring_HammingIndep test:
------------------------------------------------
   N = 10,  n = 30000000,  r =  0,   s = 3,   L = 30,   d = 0



Counters with expected numbers >= 10
------------------------------------------------
```

```
Kolmogorov-Smirnov+ statistic = D+    :    0.20
p-value of test                       :    0.40

Kolmogorov-Smirnov- statistic = D-    :    0.11
p-value of test                       :    0.74

Anderson-Darling statistic = A2       :    0.52
p-value of test                       :    0.72

Test on the sum of all N observations
Number of degrees of freedom          : 4890
Chi-square statistic                  : 4828.41
p-value of test                       :    0.73

------------------------------------------------
CPU time used                    :  00:28:02.13

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


sstring_HammingIndep test:
------------------------------------------------
   N = 10,  n = 30000000,  r = 27,   s = 3,   L = 30,   d = 0



Counters with expected numbers >= 10
------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.21
p-value of test                       :    0.36

Kolmogorov-Smirnov- statistic = D-    :    0.20
p-value of test                       :    0.39

Anderson-Darling statistic = A2       :    0.73
p-value of test                       :    0.53

Test on the sum of all N observations
Number of degrees of freedom          : 4890
Chi-square statistic                  : 4877.48
p-value of test                       :    0.55

------------------------------------------------
CPU time used                    :  00:27:52.53

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24
```

```
sstring_HammingIndep test:
-------------------------------------------------
   N =  1,  n = 30000000,  r =  0,   s = 4,   L = 300,   d = 0


Counters with expected numbers >= 10
-------------------------------------------------
Number of degrees of freedom          : 4117
Chi-square statistic                  : 4140.52
p-value of test                       :    0.40

-------------------------------------------------
CPU time used                    :  00:21:05.86

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


sstring_HammingIndep test:
-------------------------------------------------
   N =  1,  n = 30000000,  r = 26,   s = 4,   L = 300,   d = 0


Counters with expected numbers >= 10
-------------------------------------------------
Number of degrees of freedom          : 4117
Chi-square statistic                  : 4095.32
p-value of test                       :    0.59

-------------------------------------------------
CPU time used                    :  00:20:44.22

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


sstring_HammingIndep test:
-------------------------------------------------
   N =  1,  n = 10000000,  r =  0,   s = 5,   L = 1200,   d = 0


Counters with expected numbers >= 10
-------------------------------------------------
Number of degrees of freedom          : 11825
Chi-square statistic                  :11891.22
p-value of test                       :    0.33
```

```
-----------------------------------------------
CPU time used                   :  00:22:51.36

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


sstring_HammingIndep test:
-----------------------------------------------
   N =  1,  n = 10000000,  r = 25,   s = 5,   L = 1200,   d = 0



Counters with expected numbers >= 10
-----------------------------------------------
Number of degrees of freedom          : 11825
Chi-square statistic                  :11520.71
p-value of test                       :    0.98

-----------------------------------------------
CPU time used                   :  00:22:26.25

Generator state:




************************************************************
HOST = compute, Linux

Ranlux24


sstring_Run test:
-----------------------------------------------
   N =  1,  n = 2000000000,  r =  0,   s =    3


-----------------------------------------------
Total number of 1 runs:  2000000000

Number of degrees of freedom          :   54
Chi2 statistic for number of runs     :   58.91
p-value of test                       :    0.30


-----------------------------------------------
Total number of bits:  7999883082

Normal statistic for number of bits   :   -0.92
p-value of test                       :    0.82



-----------------------------------------------
CPU time used                   :  00:13:35.72
```

```
Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


sstring_Run test:
------------------------------------------------
   N =  1,  n = 2000000000,  r = 27,   s =    3


------------------------------------------------
Total number of 1 runs:  2000000000

Number of degrees of freedom          :   54
Chi2 statistic for number of runs     :   33.58
p-value of test                       :    0.99


------------------------------------------------
Total number of bits:  7999969992

Normal statistic for number of bits   :   -0.24
p-value of test                       :    0.59



------------------------------------------------
CPU time used                    :  00:13:44.64

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


sstring_AutoCor test:
------------------------------------------------
   N = 10,  n = 1000000030,  r =  0,   s = 3,   d = 1


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.070
p-value of test                       :    0.87

Kolmogorov-Smirnov- statistic = D-    :    0.33
p-value of test                       :    0.09

Anderson-Darling statistic = A2       :    1.31
p-value of test                       :    0.23

Tests on the sum of all N observations
```

```
Standardized normal statistic         :    1.24
p-value of test                       :    0.11

Sample variance                       :    0.41
p-value of test                       :    0.93

-----------------------------------------------
CPU time used                    :  00:17:54.05

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


sstring_AutoCor test:
-----------------------------------------------
   N = 10,  n = 1000000029,  r =  0,   s = 3,   d = 3


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.080
p-value of test                       :    0.84

Kolmogorov-Smirnov- statistic = D-    :    0.12
p-value of test                       :    0.70

Anderson-Darling statistic = A2       :    0.15
p-value of test                       :    0.9987

Tests on the sum of all N observations
Standardized normal statistic         :    0.16
p-value of test                       :    0.44

Sample variance                       :    1.00
p-value of test                       :    0.43

-----------------------------------------------
CPU time used                    :  00:16:05.36

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


sstring_AutoCor test:
-----------------------------------------------
   N = 10,  n = 1000000030,  r = 27,   s = 3,   d = 1


-----------------------------------------------
```

```
Kolmogorov-Smirnov+ statistic = D+    :    0.35
p-value of test                       :    0.07

Kolmogorov-Smirnov- statistic = D-    :    0.19
p-value of test                       :    0.44

Anderson-Darling statistic = A2       :    1.84
p-value of test                       :    0.11

Tests on the sum of all N observations
Standardized normal statistic         :   -1.05
p-value of test                       :    0.85

Sample variance                       :    0.22
p-value of test                       :    0.9919

------------------------------------------------
CPU time used                    :  00:16:36.83

Generator state:



************************************************************
HOST = compute, Linux

Ranlux24


sstring_AutoCor test:
------------------------------------------------
   N = 10,  n = 1000000029,  r = 27,   s = 3,   d = 3


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.17
p-value of test                       :    0.50

Kolmogorov-Smirnov- statistic = D-    :    0.26
p-value of test                       :    0.22

Anderson-Darling statistic = A2       :    0.81
p-value of test                       :    0.47

Tests on the sum of all N observations
Standardized normal statistic         :    0.31
p-value of test                       :    0.38

Sample variance                       :    1.77
p-value of test                       :    0.07

------------------------------------------------
CPU time used                    :  00:17:10.57

Generator state:



========= Summary results of BigCrush =========
```

```
 Version:          TestU01 1.2.3
 Generator:        Ranlux24
 Number of statistics:  160
 Total CPU time:   32:37:16.39

 All tests were passed


****************************************
Test for Ranlux 48 bit generator ...
****************************************
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
                Starting BigCrush
                Version: TestU01 1.2.3
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx


***********************************************************
Test smarsa_SerialOver calling smultin_MultinomialOver

***********************************************************
HOST = compute, Linux

Ranlux48


smultin_MultinomialOver test:
-----------------------------------------------
   N =  1,  n = 1000000000,  r =  0,   d =  256,   t =  3,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =           16777216
       Expected number per cell =   59.604645
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =   0.0083558402,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          : 16711680
Value of the statistic                : 1.67e+7
p-value of test                       :    0.93


-----------------------------------------------
CPU time used                    :  00:10:56.50

Generator state:



***********************************************************
Test smarsa_SerialOver calling smultin_MultinomialOver

***********************************************************
HOST = compute, Linux

Ranlux48
```

```
smultin_MultinomialOver test:
-----------------------------------------------
   N =  1,  n = 1000000000,  r = 22,   d =  256,   t =  3,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =           16777216
       Expected number per cell =   59.604645
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =   0.0083558402,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          : 16711680
Value of the statistic                : 1.67e+7
p-value of test                       :    0.55


-----------------------------------------------
CPU time used                    :  00:11:02.66

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Ranlux48


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d = 2097152,   t =  2,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1342
```

```
p-value of test                       :    0.72

----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334462
  j =  1                              :       599997316
  j =  2                              :            1342
  j =  3                              :               0
  j =  4                              :               0
  j =  5                              :               0

---------------------------------------------
CPU time used                    :  00:08:46.63

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Ranlux48


smultin_MultinomialOver test:
-----------------------------------------
   N = 30,  n = 20000000,  r =  9,   d = 2097152,   t =  2,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


---------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1361
p-value of test                       :    0.53

----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334481
  j =  1                              :       599997278
  j =  2                              :            1361
  j =  3                              :               0
  j =  4                              :               0
  j =  5                              :               0
```

```
-----------------------------------------------
CPU time used                   :  00:08:24.74

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Ranlux48


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d = 16384,   t =  3,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1409
p-value of test                       :    0.12

-----------------------------
Total number of cells containing j balls

  j =  0                              :  1319407953345 29
  j =  1                              :        599997182
  j =  2                              :             1409
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                   :  00:09:31.53

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
```

```
HOST = compute, Linux

Ranlux48


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r = 16,   d = 16384,   t =  3,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


------------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1327
p-value of test                       :    0.84

-----------------------------
Total number of cells containing j balls

  j =  0                              :  1319407953344447
  j =  1                              :        599997346
  j =  2                              :             1327
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:09:39.55

Generator state:




************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Ranlux48


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d =   64,   t =  7,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
```

```
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


------------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1392
p-value of test                       :    0.23

-----------------------------
Total number of cells containing j balls

  j =  0                              :  1319407953345l2
  j =  1                              :        599997216
  j =  2                              :             1392
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

------------------------------------------------
CPU time used                    :  00:09:23.13

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Ranlux48


smultin_MultinomialOver test:
------------------------------------------------
   N = 30,  n = 20000000,  r = 24,   d =   64,   t =  7,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


------------------------------------------------
Results of CollisionOver test:
```

```
POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1400
p-value of test                       :    0.17

-----------------------------
Total number of cells containing j balls

  j =  0                              :  1319407953345 20
  j =  1                              :        599997200
  j =  2                              :             1400
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:09:27.30

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Ranlux48


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d =    8,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1428
p-value of test                       :    0.04

-----------------------------
Total number of cells containing j balls

  j =  0                              :  1319407953345 48
  j =  1                              :        599997144
  j =  2                              :             1428
```

```
  j =  3                              :               0
  j =  4                              :               0
  j =  5                              :               0

-----------------------------------------------
CPU time used                    :  00:09:21.27

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Ranlux48


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r = 27,   d =    8,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation               :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1349
p-value of test                       :    0.65

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334469
  j =  1                              :        599997302
  j =  2                              :             1349
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:09:30.44

Generator state:
```

```
************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Ranlux48


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d =    4,   t = 21,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1332
p-value of test                       :    0.80

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334452
  j =  1                              :        599997336
  j =  2                              :             1332
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:09:20.08

Generator state:




************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Ranlux48


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r = 28,   d =    4,   t = 21,
```

```
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


------------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1286
p-value of test                       :    0.98

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334406
  j =  1                              :        599997428
  j =  2                              :             1286
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

------------------------------------------------
CPU time used                    :  00:09:36.30

Generator state:




************************************************************
HOST = compute, Linux

Ranlux48


smarsa_BirthdaySpacings test:
------------------------------------------------
   N = 100,  n = 10000000,  r =  0,    d = 2147483648,    t = 2,    p = 1


      Number of cells = d^t = 4611686018427387904
      Lambda = Poisson mean =      54.2101


---------------------------------------------------
Total expected number = N*Lambda      :    5421.01
Total observed number                 :    5386
p-value of test                       :    0.68


------------------------------------------------
CPU time used                    :  00:23:33.36
```

```
Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 20000000,  r =  0,    d = 2097152,    t = 3,    p = 1


      Number of cells = d^t = 9223372036854775808
      Lambda = Poisson mean =     216.8404


---------------------------------------------------
Total expected number = N*Lambda      :    4336.81
Total observed number                 :    4280
p-value of test                       :    0.80


-----------------------------------------------
CPU time used                    :  00:13:08.41

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 30000000,  r = 14,    d = 65536,    t = 4,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


---------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7280
p-value of test                       :    0.67


-----------------------------------------------
CPU time used                    :  00:25:22.52

Generator state:



************************************************************
```

```
HOST = compute, Linux

Ranlux48


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 20000000,  r =  0,    d = 512,    t = 7,    p = 1


      Number of cells = d^t = 9223372036854775808
      Lambda = Poisson mean =     216.8404


-----------------------------------------------------
Total expected number = N*Lambda      :    4336.81
Total observed number                 :    4516
p-value of test                       :  3.5e-3


-----------------------------------------------
CPU time used                    :  00:27:41.97

Generator state:




************************************************************
HOST = compute, Linux

Ranlux48


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 20000000,  r =  7,    d = 512,    t = 7,    p = 1


      Number of cells = d^t = 9223372036854775808
      Lambda = Poisson mean =     216.8404


-----------------------------------------------------
Total expected number = N*Lambda      :    4336.81
Total observed number                 :    4381
p-value of test                       :    0.25


-----------------------------------------------
CPU time used                    :  00:27:53.05

Generator state:




************************************************************
HOST = compute, Linux

Ranlux48


smarsa_BirthdaySpacings test:
```

```
-----------------------------------------------
   N = 20,  n = 30000000,  r = 14,    d = 256,    t = 8,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


-----------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7278
p-value of test                       :    0.68


-----------------------------------------------
CPU time used                    :  00:47:04.98

Generator state:




*********************************************************
HOST = compute, Linux

Ranlux48


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 30000000,  r = 22,    d = 256,    t = 8,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


-----------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7281
p-value of test                       :    0.67


-----------------------------------------------
CPU time used                    :  00:47:12.42

Generator state:




*********************************************************
HOST = compute, Linux

Ranlux48


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 30000000,  r =  0,    d = 16,    t = 16,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182
```

```
-------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7270
p-value of test                       :    0.71


-----------------------------------------------
CPU time used                    :  01:35:31.54

Generator state:



*********************************************************
HOST = compute, Linux

Ranlux48


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 30000000,  r = 26,    d = 16,    t = 16,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


-------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7289
p-value of test                       :    0.63


-----------------------------------------------
CPU time used                    :  01:40:10.73

Generator state:



*********************************************************
HOST = compute, Linux

Ranlux48


snpair_ClosePairs test:
-----------------------------------------------
   N = 30,  n = 6000000,  r =  0,  t = 3,  p = 0,  m = 30,  Torus =  TRUE


---------------------------------------
Test based on the 2 nearest points (NP):

Stat. AD on the N values (NP)         :    0.34
p-value of test                       :    0.90


A2 test based on the spacings between the
```

```
   successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP)    :    2.19
p-value of test                       :    0.07

Test on the Nm values of W_{n,i}(mNP1):    0.49
p-value of test                       :    0.76

Test on the jump times of Y
   (superposition of Yn):

Expected number of jumps of Y = mN    :     900
Number of jumps of Y                  :     934
p-value of test                       :    0.13

Stat. AD (mNP2)                       :    0.38
p-value of test                       :    0.87

Stat. AD after spacings (mNP2-S)      :    2.24
p-value of test                       :    0.07

-----------------------------------------------
CPU time used                    :  00:08:21.66

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


snpair_ClosePairs test:
-----------------------------------------------
   N = 20,  n = 4000000,  r =  0,  t = 5,  p = 0,  m = 30,  Torus =  TRUE


---------------------------------------
Test based on the 2 nearest points (NP):

Stat. AD on the N values (NP)         :    0.80
p-value of test                       :    0.48


A2 test based on the spacings between the
   successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP)    :    1.43
p-value of test                       :    0.19

Test on the Nm values of W_{n,i}(mNP1):    0.32
p-value of test                       :    0.92

Test on the jump times of Y
   (superposition of Yn):

Expected number of jumps of Y = mN    :     600
Number of jumps of Y                  :     602
p-value of test                       :    0.47

Stat. AD (mNP2)                       :    1.16
```

```
p-value of test                         :    0.28

Stat. AD after spacings (mNP2-S)        :    0.35
p-value of test                         :    0.90

-----------------------------------------------
CPU time used                     :  00:06:42.20

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


snpair_ClosePairs test:
-----------------------------------------------
   N = 10,  n = 3000000,  r =  0,  t = 9,  p = 0,  m = 30,  Torus =  TRUE


---------------------------------------
Test based on the 2 nearest points (NP):

Stat. AD on the N values (NP)           :    1.22
p-value of test                         :    0.26


A2 test based on the spacings between the
   successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP)      :    1.47
p-value of test                         :    0.18

Test on the Nm values of W_{n,i}(mNP1):    0.33
p-value of test                         :    0.91

Test on the jump times of Y
   (superposition of Yn):

Expected number of jumps of Y = mN      :     300
Number of jumps of Y                    :     299
p-value of test                         :    0.51

Stat. AD (mNP2)                         :    0.78
p-value of test                         :    0.49

Stat. AD after spacings (mNP2-S)        :    0.45
p-value of test                         :    0.80

-----------------------------------------------
CPU time used                     :  00:06:03.82

Generator state:



************************************************************
HOST = compute, Linux
```

Ranlux48

snpair_ClosePairs test:

N = 5, n = 2000000, r = 0, t = 16, p = 0, m = 30, Torus = TRUE

Test based on the 2 nearest points (NP):

Stat. AD on the N values (NP) : 1.35
p-value of test : 0.22

A2 test based on the spacings between the
successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP) : 0.61
p-value of test : 0.63

Test on the Nm values of W_{n,i}(mNP1): 0.98
p-value of test : 0.37

Test on the jump times of Y
(superposition of Yn):

Expected number of jumps of Y = mN : 150
Number of jumps of Y : 154
p-value of test : 0.38

Stat. AD (mNP2) : 1.15
p-value of test : 0.29

Stat. AD after spacings (mNP2-S) : 2.39
p-value of test : 0.06

CPU time used : 00:05:16.19

Generator state:

****
HOST = compute, Linux

Ranlux48

sknuth_SimpPoker test:

N = 1, n = 400000000, r = 0, d = 8, k = 8

Number of degrees of freedom : 7
Chi-square statistic : 3.65
p-value of test : 0.82

CPU time used : 00:33:22.48

```
Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sknuth_SimpPoker test:
-----------------------------------------------
   N =  1,  n = 400000000,  r = 27,   d =    8,   k =    8


-----------------------------------------------
Number of degrees of freedom          :    7
Chi-square statistic                  :    3.15
p-value of test                       :    0.87

-----------------------------------------------
CPU time used                    :  00:32:54.07

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sknuth_SimpPoker test:
-----------------------------------------------
   N =  1,  n = 100000000,  r =  0,   d =   32,   k =   32


-----------------------------------------------
Number of degrees of freedom          :   18
Chi-square statistic                  :   11.53
p-value of test                       :    0.87

-----------------------------------------------
CPU time used                    :  00:32:59.44

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sknuth_SimpPoker test:
-----------------------------------------------
   N =  1,  n = 100000000,  r = 25,   d =   32,   k =   32
```

```
-----------------------------------------------
Number of degrees of freedom          :   18
Chi-square statistic                  :   28.13
p-value of test                       :    0.06

-----------------------------------------------
CPU time used                    :  00:31:54.51

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sknuth_CouponCollector test:
-----------------------------------------------
   N =  1,  n = 200000000,  r =  0,   d =    8


-----------------------------------------------
Number of degrees of freedom          :   54
Chi-square statistic                  :   51.73
p-value of test                       :    0.56

-----------------------------------------------
CPU time used                    :  00:41:26.73

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sknuth_CouponCollector test:
-----------------------------------------------
   N =  1,  n = 200000000,  r = 10,   d =    8


-----------------------------------------------
Number of degrees of freedom          :   54
Chi-square statistic                  :   48.54
p-value of test                       :    0.68

-----------------------------------------------
CPU time used                    :  00:43:03.23

Generator state:



************************************************************
HOST = compute, Linux
```

```
Ranlux48


sknuth_CouponCollector test:
-----------------------------------------------
   N =  1,  n = 200000000,  r = 20,   d =    8


-----------------------------------------------
Number of degrees of freedom          :   54
Chi-square statistic                  :   55.74
p-value of test                       :    0.41

-----------------------------------------------
CPU time used                    :  00:42:35.98

Generator state:




************************************************************
HOST = compute, Linux

Ranlux48


sknuth_CouponCollector test:
-----------------------------------------------
   N =  1,  n = 200000000,  r = 27,   d =    8


-----------------------------------------------
Number of degrees of freedom          :   54
Chi-square statistic                  :   51.86
p-value of test                       :    0.56

-----------------------------------------------
CPU time used                    :  00:42:21.11

Generator state:




************************************************************
HOST = compute, Linux

Ranlux48


sknuth_Gap test:
-----------------------------------------------
   N =  1,  n = 500000000,  r =  0,   Alpha =        0,   Beta  =   0.0625


-----------------------------------------------
Number of degrees of freedom          :  232
Chi-square statistic                  :  237.18
p-value of test                       :    0.39

-----------------------------------------------
CPU time used                    :  01:17:08.70
```

```
Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sknuth_Gap test:
-----------------------------------------------
   N =  1,  n = 300000000,  r = 25,   Alpha =        0,   Beta  =  0.03125


-----------------------------------------------
Number of degrees of freedom          :  434
Chi-square statistic                  :  446.36
p-value of test                       :    0.33

-----------------------------------------------
CPU time used                    :  01:33:56.32

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sknuth_Gap test:
-----------------------------------------------
   N =  1,  n = 100000000,  r =  0,   Alpha =        0,   Beta  = 0.0078125


-----------------------------------------------
Number of degrees of freedom          : 1437
Chi-square statistic                  : 1411.40
p-value of test                       :    0.68

-----------------------------------------------
CPU time used                    :  02:02:40.88

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sknuth_Gap test:
-----------------------------------------------
   N =  1,  n = 10000000,  r = 20,   Alpha =        0,   Beta  = 0.000976562
```

```
-----------------------------------------------
Number of degrees of freedom          : 7046
Chi-square statistic                  : 7054.62
p-value of test                       :    0.47

-----------------------------------------------
CPU time used                    :  01:38:30.51

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sknuth_Run test:
-----------------------------------------------
   N =  5,  n = 1000000000,  r =  0,   Up = FALSE


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.058
p-value of test                       :    0.93

Kolmogorov-Smirnov- statistic = D-    :    0.54
p-value of test                       :    0.03

Anderson-Darling statistic = A2       :    2.93
p-value of test                       :    0.03

Test on the sum of all N observations
Number of degrees of freedom          :   30
Chi-square statistic                  :   49.47
p-value of test                       :    0.01

-----------------------------------------------
CPU time used                    :  00:49:53.48

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sknuth_Run test:
-----------------------------------------------
   N = 10,  n = 1000000000,  r = 15,   Up =  TRUE


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.49
p-value of test                       :  5.3e-3
```

```
Kolmogorov-Smirnov- statistic = D-    :    0.16
p-value of test                       :    0.54

Anderson-Darling statistic = A2       :    2.34
p-value of test                       :    0.06

Test on the sum of all N observations
Number of degrees of freedom          :   60
Chi-square statistic                  :   44.45
p-value of test                       :    0.93

-----------------------------------------------
CPU time used                    :  01:48:16.13

Generator state:



************************************************************
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Ranlux48


smultin_Multinomial test:
-------------------------------------------------
   N =  1,  n = 1000000000,  r =  5,   t =  3,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =                  6
       Expected number per cell =  1.6666667e+08
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =  2.5000002e-09,    Sigma =          1

-------------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          :    5
Value of the statistic                :    2.69
p-value of test                       :    0.75


-------------------------------------------------
CPU time used                    :  00:30:42.14

Generator state:



************************************************************
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
HOST = compute, Linux
```

```
Ranlux48


smultin_Multinomial test:
-----------------------------------------------
   N =  1,  n = 1000000000,  r =  5,   t =  5,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =                120
       Expected number per cell =   8333333.3
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =  5.9500005e-08,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          :  119
Value of the statistic                :  120.12
p-value of test                       :    0.45


-----------------------------------------------
CPU time used                    :  00:45:34.32

Generator state:




************************************************************
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Ranlux48


smultin_Multinomial test:
-----------------------------------------------
   N =  1,  n = 500000000,  r =  5,   t =  7,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =               5040
       Expected number per cell =   99206.349
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =  5.0390004e-06,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          : 5039
Value of the statistic                : 5084.59
p-value of test                       :    0.32
```

```
-----------------------------------------------
CPU time used                   :  00:33:18.39

Generator state:



************************************************************
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Ranlux48


smultin_Multinomial test:
-----------------------------------------------
   N =  1,  n = 500000000,  r = 10,   t = 10,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =            3628800
       Expected number per cell =    137.7866
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =   0.0036287993,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          : 3628799
Value of the statistic                : 3.63e+6
p-value of test                       :    0.13


-----------------------------------------------
CPU time used                   :  00:48:06.00

Generator state:



************************************************************
Test sknuth_CollisionPermut calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Ranlux48


smultin_Multinomial test:
-----------------------------------------------
   N = 20,  n = 20000000,  r =  0,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =        87178291200
       Expected number per cell =  1 /  4358.9146
```

```
       EColl = n^2 / (2k) =   2294.14912
       Hashing =   TRUE

       Collision test,    Mu =      2293.9736,    Sigma =    47.8841

------------------------------------------------
Test Results for Collisions

For the total number of collisions, we use
      the Poisson approximation:
Expected number of collisions = N*Mu  :    45879.47
Observed number of collisions         :    45845
p-value of test                       :    0.56


-----------------------------
Total number of cells containing j balls

  j =  0                              :    1743165869845
  j =  1                              :        399908314
  j =  2                              :            45837
  j =  3                              :                4
  j =  4                              :                0
  j =  5                              :                0

------------------------------------------------
CPU time used                    :  00:57:35.48

Generator state:



************************************************************
Test sknuth_CollisionPermut calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Ranlux48


smultin_Multinomial test:
------------------------------------------------
   N = 20,  n = 20000000,  r = 10,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =        87178291200
       Expected number per cell =  1 /  4358.9146
       EColl = n^2 / (2k) =   2294.14912
       Hashing =   TRUE

       Collision test,    Mu =      2293.9736,    Sigma =    47.8841

------------------------------------------------
Test Results for Collisions

For the total number of collisions, we use
      the Poisson approximation:
Expected number of collisions = N*Mu  :    45879.47
Observed number of collisions         :    46045
p-value of test                       :    0.22
```

```
----------------------------
Total number of cells containing j balls

  j =  0                              :    1743165870045
  j =  1                              :        399907915
  j =  2                              :            46035
  j =  3                              :                5
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:55:01.51

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sknuth_MaxOft test:
-----------------------------------------------
   N = 40,  n = 10000000,  r =  0,   d = 100000,   t =  8

      Number of categories = 100000
      Expected number per category  = 100.00


-----------------------------------------------
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :    0.13
p-value of test                       :    0.22

Kolmogorov-Smirnov- statistic = D-    :   0.036
p-value of test                       :    0.88

Anderson-Darling statistic = A2       :    0.53
p-value of test                       :    0.71

Test on the sum of all N observations
Number of degrees of freedom          : 3999960
Chi-square statistic                  : 4.00e+6
p-value of test                       :    0.72


-----------------------------------------------
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :   0.014
p-value of test                       :    0.98

Kolmogorov-Smirnov- statistic = D-    :    0.12
p-value of test                       :    0.28

Anderson-Darling statistic = A2       :    1.09
p-value of test                       :    0.31
```

```
------------------------------------------------
CPU time used                   :  00:31:59.64

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sknuth_MaxOft test:
------------------------------------------------
   N = 30,  n = 10000000,  r =  0,   d = 100000,   t = 16

      Number of categories = 100000
      Expected number per category  = 100.00


------------------------------------------------
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :   0.069
p-value of test                       :    0.72

Kolmogorov-Smirnov- statistic = D-    :    0.14
p-value of test                       :    0.30

Anderson-Darling statistic = A2       :    0.51
p-value of test                       :    0.74

Test on the sum of all N observations
Number of degrees of freedom          : 2999970
Chi-square statistic                  : 3.00e+6
p-value of test                       :    0.29


------------------------------------------------
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :    0.16
p-value of test                       :    0.20

Kolmogorov-Smirnov- statistic = D-    :   0.033
p-value of test                       :    0.92

Anderson-Darling statistic = A2       :    0.76
p-value of test                       :    0.51


------------------------------------------------
CPU time used                   :  00:46:36.42

Generator state:



************************************************************
HOST = compute, Linux
```

```
Ranlux48


sknuth_MaxOft test:
-----------------------------------------------
   N = 20,  n = 10000000,  r =  0,   d = 100000,   t = 24

      Number of categories = 100000
      Expected number per category  = 100.00


-----------------------------------------------
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :    0.25
p-value of test                       :    0.08

Kolmogorov-Smirnov- statistic = D-    :   0.100
p-value of test                       :    0.63

Anderson-Darling statistic = A2       :    1.02
p-value of test                       :    0.34

Test on the sum of all N observations
Number of degrees of freedom          : 1999980
Chi-square statistic                  : 2.00e+6
p-value of test                       :    0.74


-----------------------------------------------
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :    0.19
p-value of test                       :    0.21

Kolmogorov-Smirnov- statistic = D-    :    0.10
p-value of test                       :    0.60

Anderson-Darling statistic = A2       :    0.73
p-value of test                       :    0.53


-----------------------------------------------
CPU time used                    :  00:45:17.07

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sknuth_MaxOft test:
-----------------------------------------------
   N = 20,  n = 10000000,  r =  0,   d = 100000,   t = 32

      Number of categories = 100000
      Expected number per category  = 100.00
```

```
------------------------------------------------
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :    0.12
p-value of test                       :    0.53

Kolmogorov-Smirnov- statistic = D-    :   0.083
p-value of test                       :    0.72

Anderson-Darling statistic = A2       :    0.35
p-value of test                       :    0.90

Test on the sum of all N observations
Number of degrees of freedom          : 1999980
Chi-square statistic                  : 2.00e+6
p-value of test                       :    0.54


------------------------------------------------
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :    0.19
p-value of test                       :    0.22

Kolmogorov-Smirnov- statistic = D-    :   0.033
p-value of test                       :    0.94

Anderson-Darling statistic = A2       :    0.81
p-value of test                       :    0.47


------------------------------------------------
CPU time used                    :  00:59:12.51

Generator state:




************************************************************
HOST = compute, Linux

Ranlux48


svaria_SampleProd test:
------------------------------------------------
   N = 40,  n = 10000000,  r =  0,   t = 8


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.037
p-value of test                       :    0.88

Kolmogorov-Smirnov- statistic = D-    :    0.11
p-value of test                       :    0.37

Anderson-Darling statistic = A2       :    0.48
p-value of test                       :    0.76

------------------------------------------------
CPU time used                    :  00:31:12.33
```

```
Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


svaria_SampleProd test:
-----------------------------------------------
   N = 20,  n = 10000000,  r =  0,   t = 16


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.15
p-value of test                       :    0.36

Kolmogorov-Smirnov- statistic = D-    :    0.17
p-value of test                       :    0.30

Anderson-Darling statistic = A2       :    0.60
p-value of test                       :    0.65

-----------------------------------------------
CPU time used                    :  00:29:23.10

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


svaria_SampleProd test:
-----------------------------------------------
   N = 20,  n = 10000000,  r =  0,   t = 24


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.16
p-value of test                       :    0.32

Kolmogorov-Smirnov- statistic = D-    :    0.10
p-value of test                       :    0.61

Anderson-Darling statistic = A2       :    0.67
p-value of test                       :    0.58

-----------------------------------------------
CPU time used                    :  00:43:31.04

Generator state:
```

```
************************************************************
HOST = compute, Linux

Ranlux48


svaria_SampleMean test:
-----------------------------------------------
   N = 20000000,  n = 30,  r =  0


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 1.58e-4
p-value of test                       :    0.37

Kolmogorov-Smirnov- statistic = D-    : 9.14e-5
p-value of test                       :    0.72

Anderson-Darling statistic = A2       :    0.53
p-value of test                       :    0.71

-----------------------------------------------
CPU time used                    :  00:05:40.52

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


svaria_SampleMean test:
-----------------------------------------------
   N = 20000000,  n = 30,  r = 10


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 1.33e-4
p-value of test                       :    0.49

Kolmogorov-Smirnov- statistic = D-    : 1.07e-4
p-value of test                       :    0.63

Anderson-Darling statistic = A2       :    0.38
p-value of test                       :    0.87

-----------------------------------------------
CPU time used                    :  00:05:40.14

Generator state:



************************************************************
HOST = compute, Linux
```

```
Ranlux48


svaria_SampleCorr test:
-----------------------------------------------
   N =  1,  n = 2000000000,  r =  0,   k = 1


-----------------------------------------------
Normal statistic                      :   -0.38
p-value of test                       :    0.65

-----------------------------------------------
CPU time used                    :  00:17:51.44

Generator state:




************************************************************
HOST = compute, Linux

Ranlux48


svaria_SampleCorr test:
-----------------------------------------------
   N =  1,  n = 2000000000,  r =  0,   k = 2


-----------------------------------------------
Normal statistic                      :    0.54
p-value of test                       :    0.29

-----------------------------------------------
CPU time used                    :  00:18:01.35

Generator state:




************************************************************
HOST = compute, Linux

Ranlux48


svaria_AppearanceSpacings test:
-----------------------------------------------
   N =  1,   Q = 10000000,   K = 1000000000,   r = 0,   s = 3,   L = 15

   Sequences of n = (K + Q)L =  15150000000 bits
   Q = 10000000 initialization blocks
   K = 1000000000 blocks for the test
   the blocks have L = 15 bits



-----------------------------------------------
Normal statistic                      :    0.88
p-value of test                       :    0.19
```

```
------------------------------------------------
CPU time used                   :  00:45:36.76

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


svaria_AppearanceSpacings test:
------------------------------------------------
   N =  1,   Q = 10000000,   K = 1000000000,   r = 27,   s = 3,   L = 15

   Sequences of n = (K + Q)L =  15150000000 bits
   Q = 10000000 initialization blocks
   K = 1000000000 blocks for the test
   the blocks have L = 15 bits



------------------------------------------------
Normal statistic                :  -0.033
p-value of test                 :   0.51

------------------------------------------------
CPU time used                   :  00:45:36.64

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


svaria_WeightDistrib test:
------------------------------------------------
   N =  1,  n = 20000000,  r =  0,  k = 256,  Alpha =      0,  Beta =   0.25


------------------------------------------------
Number of degrees of freedom    :   67
Chi-square statistic            :   53.83
p-value of test                 :    0.88

------------------------------------------------
CPU time used                   :  00:44:58.01

Generator state:



************************************************************
HOST = compute, Linux
```

```
Ranlux48


svaria_WeightDistrib test:
-------------------------------------------------
   N =  1,  n = 20000000,  r = 20,  k = 256,  Alpha =      0,  Beta =   0.25


-------------------------------------------------
Number of degrees of freedom          :   67
Chi-square statistic                  :   77.03
p-value of test                       :    0.19

-------------------------------------------------
CPU time used                     :  00:47:36.70

Generator state:




************************************************************
HOST = compute, Linux

Ranlux48


svaria_WeightDistrib test:
-------------------------------------------------
   N =  1,  n = 20000000,  r = 28,  k = 256,  Alpha =      0,  Beta =   0.25


-------------------------------------------------
Number of degrees of freedom          :   67
Chi-square statistic                  :   65.08
p-value of test                       :    0.54

-------------------------------------------------
CPU time used                     :  00:48:19.29

Generator state:




************************************************************
HOST = compute, Linux

Ranlux48


svaria_WeightDistrib test:
-------------------------------------------------
   N =  1,  n = 20000000,  r =  0,  k = 256,  Alpha =      0,  Beta = 0.0625


-------------------------------------------------
Number of degrees of freedom          :   37
Chi-square statistic                  :   51.89
p-value of test                       :    0.05

-------------------------------------------------
CPU time used                     :  00:48:00.79
```

```
Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


svaria_WeightDistrib test:
------------------------------------------------
   N =  1,  n = 20000000,  r = 10,  k = 256,  Alpha =      0,  Beta = 0.0625


------------------------------------------------
Number of degrees of freedom          :   37
Chi-square statistic                  :   21.80
p-value of test                       :    0.98

------------------------------------------------
CPU time used                    :  00:45:55.19

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


svaria_WeightDistrib test:
------------------------------------------------
   N =  1,  n = 20000000,  r = 26,  k = 256,  Alpha =      0,  Beta = 0.0625


------------------------------------------------
Number of degrees of freedom          :   37
Chi-square statistic                  :   34.85
p-value of test                       :    0.57

------------------------------------------------
CPU time used                    :  00:46:35.76

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


svaria_SumCollector test:
------------------------------------------------
   N =  1,  n = 500000000,  r =  0,   g = 10
```

```
-----------------------------------------------
Number of degrees of freedom          :   29
Chi-square statistic                  :   24.59
p-value of test                       :    0.70

-----------------------------------------------
CPU time used                    :  01:33:18.96

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


smarsa_MatrixRank test:
-----------------------------------------------
   N = 10,  n = 1000000,  r =  0,    s = 5,    L = 30,    k = 30


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.13
p-value of test                       :    0.64

Kolmogorov-Smirnov- statistic = D-    :    0.16
p-value of test                       :    0.55

Anderson-Darling statistic = A2       :    0.36
p-value of test                       :    0.88

Test on the sum of all N observations
Number of degrees of freedom          :   40
Chi-square statistic                  :   43.43
p-value of test                       :    0.33

-----------------------------------------------
CPU time used                    :  00:17:11.59

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


smarsa_MatrixRank test:
-----------------------------------------------
   N = 10,  n = 1000000,  r = 25,    s = 5,    L = 30,    k = 30


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.17
p-value of test                       :    0.49
```

```
Kolmogorov-Smirnov- statistic = D-    :    0.15
p-value of test                       :    0.59

Anderson-Darling statistic = A2       :    0.40
p-value of test                       :    0.84

Test on the sum of all N observations
Number of degrees of freedom          :   40
Chi-square statistic                  :   35.81
p-value of test                       :    0.66

-----------------------------------------------
CPU time used                    :  00:17:36.45

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


smarsa_MatrixRank test:
-----------------------------------------------
   N =  1,  n = 5000,  r =  0,    s = 4,    L = 1000,    k = 1000


-----------------------------------------------
Number of degrees of freedom          :    3
Chi-square statistic                  :    1.89
p-value of test                       :    0.60

-----------------------------------------------
CPU time used                    :  00:14:51.51

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


smarsa_MatrixRank test:
-----------------------------------------------
   N =  1,  n = 5000,  r = 26,    s = 4,    L = 1000,    k = 1000


-----------------------------------------------
Number of degrees of freedom          :    3
Chi-square statistic                  :    3.25
p-value of test                       :    0.36

-----------------------------------------------
CPU time used                    :  00:14:48.95

Generator state:
```

```
************************************************************
HOST = compute, Linux

Ranlux48


smarsa_MatrixRank test:
-----------------------------------------------
   N =  1,  n = 80,  r = 15,    s = 15,    L = 5000,    k = 5000


-----------------------------------------------
Number of degrees of freedom          :    2
Chi-square statistic                  :    1.06
p-value of test                       :    0.59

-----------------------------------------------
CPU time used                    :  00:03:51.45

Generator state:




************************************************************
HOST = compute, Linux

Ranlux48


smarsa_MatrixRank test:
-----------------------------------------------
   N =  1,  n = 80,  r =  0,    s = 30,    L = 5000,    k = 5000


-----------------------------------------------
Number of degrees of freedom          :    2
Chi-square statistic                  :    1.82
p-value of test                       :    0.40

-----------------------------------------------
CPU time used                    :  00:02:36.78

Generator state:




************************************************************
HOST = compute, Linux

Ranlux48


smarsa_Savir2 test:
-----------------------------------------------
   N = 10,  n = 10000000,  r = 10,    m = 1048576,    t = 30


-----------------------------------------------
```

```
Kolmogorov-Smirnov+ statistic = D+    :    0.13
p-value of test                       :    0.67

Kolmogorov-Smirnov- statistic = D-    :    0.38
p-value of test                       :    0.04

Anderson-Darling statistic = A2       :    1.54
p-value of test                       :    0.17

Test on the sum of all N observations
Number of degrees of freedom          :  130
Chi-square statistic                  :  148.74
p-value of test                       :    0.12

-----------------------------------------------
CPU time used                    :  00:26:35.28

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


smarsa_GCD test:
-----------------------------------------------
   N = 10,  n = 50000000,  r =  0,   s = 30


-----------------------------------------------
Test results for GCD values:

Kolmogorov-Smirnov+ statistic = D+    :   0.084
p-value of test                       :    0.83

Kolmogorov-Smirnov- statistic = D-    :    0.18
p-value of test                       :    0.46

Anderson-Darling statistic = A2       :    0.37
p-value of test                       :    0.88

Test on the sum of all N observations
Number of degrees of freedom          : 17430
Chi-square statistic                  :17523.77
p-value of test                       :    0.31



-----------------------------------------------
CPU time used                    :  00:10:45.21

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48
```

```
swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 100000000,  r =  0,   s = 5,   L0 =   50,   L1 =   50



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :   36
ChiSquare statistic                   :   35.14
p-value of test                       :    0.51


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :   35
ChiSquare statistic                   :   23.71
p-value of test                       :    0.93


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          :   25
ChiSquare statistic                   :   22.09
p-value of test                       :    0.63


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :   24
ChiSquare statistic                   :   26.89
p-value of test                       :    0.31


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :   17
ChiSquare statistic                   :   25.09
p-value of test                       :    0.09


-----------------------------------------------
CPU time used                    :  00:09:45.03

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


swalk_RandomWalk1 test:
-----------------------------------------------
```

```
   N =  1,  n = 100000000,  r = 25,   s = 5,   L0 =   50,   L1 =   50


-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :   36
ChiSquare statistic                   :   36.59
p-value of test                       :    0.44


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :   35
ChiSquare statistic                   :   39.27
p-value of test                       :    0.28


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          :   25
ChiSquare statistic                   :   29.27
p-value of test                       :    0.25


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :   24
ChiSquare statistic                   :   31.77
p-value of test                       :    0.13


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :   17
ChiSquare statistic                   :   15.74
p-value of test                       :    0.54


-----------------------------------------------
CPU time used                    :  00:09:51.36

Generator state:




************************************************************
HOST = compute, Linux

Ranlux48


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 10000000,  r =  0,   s = 10,   L0 = 1000,   L1 = 1000
```

```
-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :  146
ChiSquare statistic                   :  126.48
p-value of test                       :    0.88


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :  146
ChiSquare statistic                   :  162.56
p-value of test                       :    0.17


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          :  500
ChiSquare statistic                   :  488.96
p-value of test                       :    0.63


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :  136
ChiSquare statistic                   :  139.24
p-value of test                       :    0.41


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :   74
ChiSquare statistic                   :   81.50
p-value of test                       :    0.26


-----------------------------------------------
CPU time used                    :  00:10:20.89

Generator state:




************************************************************
HOST = compute, Linux

Ranlux48


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 10000000,  r = 20,   s = 10,   L0 = 1000,   L1 = 1000



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :  146
```

```
ChiSquare statistic                  :  151.83
p-value of test                      :    0.35


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom         :  146
ChiSquare statistic                  :  138.78
p-value of test                      :    0.65


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom         :  500
ChiSquare statistic                  :  448.04
p-value of test                      :    0.95


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom         :  136
ChiSquare statistic                  :  130.57
p-value of test                      :    0.62


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom         :   74
ChiSquare statistic                  :   71.59
p-value of test                      :    0.56


-----------------------------------------------
CPU time used                    :  00:10:43.26

Generator state:




************************************************************
HOST = compute, Linux

Ranlux48


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 1000000,  r =  0,   s = 15,   L0 = 10000,   L1 = 10000



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom         :  384
ChiSquare statistic                  :  365.82
p-value of test                      :    0.74
```

```
-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :  384
ChiSquare statistic                   :  374.75
p-value of test                       :    0.62


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          : 5000
ChiSquare statistic                   : 4849.75
p-value of test                       :    0.93


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :  378
ChiSquare statistic                   :  390.58
p-value of test                       :    0.32


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :  200
ChiSquare statistic                   :  182.71
p-value of test                       :    0.80


-----------------------------------------------
CPU time used                    :  00:07:49.34

Generator state:




************************************************************
HOST = compute, Linux

Ranlux48


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 1000000,  r = 15,   s = 15,   L0 = 10000,   L1 = 10000



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :  384
ChiSquare statistic                   :  387.70
p-value of test                       :    0.44


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :  384
```

```
ChiSquare statistic                  :  425.79
p-value of test                      :    0.07


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom         : 5000
ChiSquare statistic                  : 4862.80
p-value of test                      :    0.92


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom         :  378
ChiSquare statistic                  :  397.33
p-value of test                      :    0.24


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom         :  200
ChiSquare statistic                  :  184.67
p-value of test                      :    0.77


-----------------------------------------------
CPU time used                    :  00:08:20.84

Generator state:




************************************************************
HOST = compute, Linux

Ranlux48


scomp_LinearComp test:
-----------------------------------------------
   N =  1,  n = 400020,  r =  0,    s = 1



-----------------------------------------------
Number of degrees of freedom         :   12
Chi2 statistic for size of jumps     :    9.78
p-value of test                      :    0.64


-----------------------------------------------
Normal statistic for number of jumps  :    0.14
p-value of test                      :    0.44



-----------------------------------------------
CPU time used                    :  00:03:25.53

Generator state:
```

```
************************************************************
HOST = compute, Linux

Ranlux48


scomp_LinearComp test:
------------------------------------------------
   N =  1,  n = 400020,  r = 29,    s = 1



------------------------------------------------
Number of degrees of freedom          :   12
Chi2 statistic for size of jumps      :    4.94
p-value of test                       :    0.96


------------------------------------------------
Normal statistic for number of jumps  :   -0.75
p-value of test                       :    0.77



------------------------------------------------
CPU time used                    :  00:03:30.07

Generator state:




************************************************************
HOST = compute, Linux

Ranlux48


scomp_LempelZiv test:
------------------------------------------------
   N = 10,  n = 134217728,  r =  0,   s =   30,   k =   27


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.51
p-value of test                       :  2.8e-3

Kolmogorov-Smirnov- statistic = D-    :   0.018
p-value of test                       :    0.98

Anderson-Darling statistic = A2       :    5.58
p-value of test                       :  1.6e-3

Tests on the sum of all N observations
Standardized normal statistic         :   -3.12
p-value of test                       :    0.9991    *****

Sample variance                       :    0.50
p-value of test                       :    0.88
```

```
-----------------------------------------------
CPU time used                    :  00:01:31.29

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


scomp_LempelZiv test:
-----------------------------------------------
   N = 10,  n = 134217728,  r = 15,   s =   15,   k =   27


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.036
p-value of test                       :    0.95

Kolmogorov-Smirnov- statistic = D-    :    0.26
p-value of test                       :    0.22

Anderson-Darling statistic = A2       :    0.91
p-value of test                       :    0.40

Tests on the sum of all N observations
Standardized normal statistic         :    1.20
p-value of test                       :    0.11

Sample variance                       :    0.80
p-value of test                       :    0.61

-----------------------------------------------
CPU time used                    :  00:02:05.65

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sspectral_Fourier3 test:
-----------------------------------------------
   N = 100000,  n = 16384,  r =  0,   s =    3,   k =   14


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 5.41e-3
p-value of test                       :    0.78

Kolmogorov-Smirnov- statistic = D-    :   0.018
p-value of test                       :    0.07
```

```
Anderson-Darling statistic = A2       :    1.21
p-value of test                       :    0.26

------------------------------------------------
CPU time used                    :  00:05:54.34

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sspectral_Fourier3 test:
------------------------------------------------
   N = 100000,  n = 16384,  r = 27,   s =    3,   k =   14


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.018
p-value of test                       :    0.08

Kolmogorov-Smirnov- statistic = D-    : 2.39e-3
p-value of test                       :    0.95

Anderson-Darling statistic = A2       :    1.13
p-value of test                       :    0.29

------------------------------------------------
CPU time used                    :  00:06:08.65

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sstring_LongestHeadRun test:
------------------------------------------------
   N =  1,  n = 1000,  r =  0,   s = 3,   L = 10000020


------------------------------------------------
Number of degrees of freedom          :    8
Chi-square statistic                  :    8.37
p-value of test                       :    0.40

------------------------------------------------
Global longest run of 1               :   32.00
p-value of test                       :    0.50
```

```
-----------------------------------------------
CPU time used                   :  00:31:45.71

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sstring_LongestHeadRun test:
-----------------------------------------------
   N =  1,  n = 1000,  r = 27,   s = 3,   L = 10000020


-----------------------------------------------
Number of degrees of freedom          :    8
Chi-square statistic                  :    4.71
p-value of test                       :    0.79

-----------------------------------------------
Global longest run of 1               :   31.00
p-value of test                       :    0.69



-----------------------------------------------
CPU time used                   :  00:31:00.92

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sstring_PeriodsInStrings test:
-----------------------------------------------
   N = 10,  n = 500000000,  r =  0,   s =   10


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.38
p-value of test                       :    0.04

Kolmogorov-Smirnov- statistic = D-    :   0.022
p-value of test                       :    0.97

Anderson-Darling statistic = A2       :    2.64
p-value of test                       :    0.04

Test on the sum of all N observations
Number of degrees of freedom          :  200
Chi-square statistic                  :  160.19
p-value of test                       :    0.98
```

```
-------------------------------------------
CPU time used                   :  00:46:36.83

Generator state:



***********************************************************
HOST = compute, Linux

Ranlux48


sstring_PeriodsInStrings test:
-------------------------------------------
   N = 10,  n = 500000000,  r = 20,   s =   10


-------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.34
p-value of test                       :    0.07

Kolmogorov-Smirnov- statistic = D-    :    0.10
p-value of test                       :    0.76

Anderson-Darling statistic = A2       :    1.03
p-value of test                       :    0.34

Test on the sum of all N observations
Number of degrees of freedom          :  200
Chi-square statistic                  :  182.13
p-value of test                       :    0.81

-------------------------------------------
CPU time used                   :  00:46:32.39

Generator state:



***********************************************************
HOST = compute, Linux

Ranlux48


sstring_HammingWeight2 test:
-------------------------------------------
   N = 10,  n = 1000000000,  r =  0,   s = 3,   L = 1000000


-------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.19
p-value of test                       :    0.44

Kolmogorov-Smirnov- statistic = D-    :    0.13
p-value of test                       :    0.67

Anderson-Darling statistic = A2       :    0.85
```

```
p-value of test                       :    0.45

Test on the sum of all N observations
Number of degrees of freedom          : 10000
Chi-square statistic                  : 9876.16
p-value of test                       :    0.81

-----------------------------------------------
CPU time used                    :  00:30:00.14

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sstring_HammingWeight2 test:
-----------------------------------------------
   N = 10,  n = 1000000000,  r = 27,   s = 3,   L = 1000000


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.27
p-value of test                       :    0.19

Kolmogorov-Smirnov- statistic = D-    :   0.056
p-value of test                       :    0.91

Anderson-Darling statistic = A2       :    0.79
p-value of test                       :    0.49

Test on the sum of all N observations
Number of degrees of freedom          : 10000
Chi-square statistic                  : 9868.69
p-value of test                       :    0.82

-----------------------------------------------
CPU time used                    :  00:30:02.82

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sstring_HammingCorr test:
-----------------------------------------------
   N =  1,  n = 1000000000,  r = 10,   s = 10,   L = 30



-----------------------------------------------
Normal statistic                      :    0.22
```

```
p-value of test                       :    0.41

-----------------------------------------------
CPU time used                     :  00:27:46.01

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sstring_HammingCorr test:
-----------------------------------------------
   N =  1,  n = 100000000,  r = 10,   s = 10,   L = 300



-----------------------------------------------
Normal statistic                      :    0.28
p-value of test                       :    0.39

-----------------------------------------------
CPU time used                     :  00:27:44.29

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sstring_HammingCorr test:
-----------------------------------------------
   N =  1,  n = 100000000,  r = 10,   s = 10,   L = 1200



-----------------------------------------------
Normal statistic                      :   0.022
p-value of test                       :    0.49

-----------------------------------------------
CPU time used                     :  01:51:19.72

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48
```

```
sstring_HammingIndep test:
-------------------------------------------
   N = 10,  n = 30000000,  r =  0,   s = 3,   L = 30,   d = 0


Counters with expected numbers >= 10
-------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.078
p-value of test                       :    0.85

Kolmogorov-Smirnov- statistic = D-    :    0.15
p-value of test                       :    0.58

Anderson-Darling statistic = A2       :    0.30
p-value of test                       :    0.94

Test on the sum of all N observations
Number of degrees of freedom          : 4890
Chi-square statistic                  : 4940.82
p-value of test                       :    0.30

-------------------------------------------
CPU time used                    :  00:58:56.46

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sstring_HammingIndep test:
-------------------------------------------
   N = 10,  n = 30000000,  r = 27,   s = 3,   L = 30,   d = 0


Counters with expected numbers >= 10
-------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.25
p-value of test                       :    0.25

Kolmogorov-Smirnov- statistic = D-    :   0.022
p-value of test                       :    0.97

Anderson-Darling statistic = A2       :    1.04
p-value of test                       :    0.34

Test on the sum of all N observations
Number of degrees of freedom          : 4890
Chi-square statistic                  : 4751.43
p-value of test                       :    0.92

-------------------------------------------
CPU time used                    :  00:54:52.44

Generator state:
```

```
************************************************************
HOST = compute, Linux

Ranlux48


sstring_HammingIndep test:
-------------------------------------------------
   N =  1,  n = 30000000,  r =  0,   s = 4,   L = 300,   d = 0



Counters with expected numbers >= 10
-------------------------------------------------
Number of degrees of freedom          : 4117
Chi-square statistic                  : 4104.25
p-value of test                       :    0.55

-------------------------------------------------
CPU time used                    :  00:40:57.58

Generator state:




************************************************************
HOST = compute, Linux

Ranlux48


sstring_HammingIndep test:
-------------------------------------------------
   N =  1,  n = 30000000,  r = 26,   s = 4,   L = 300,   d = 0



Counters with expected numbers >= 10
-------------------------------------------------
Number of degrees of freedom          : 4117
Chi-square statistic                  : 4071.95
p-value of test                       :    0.69

-------------------------------------------------
CPU time used                    :  00:41:26.23

Generator state:




************************************************************
HOST = compute, Linux

Ranlux48


sstring_HammingIndep test:
-------------------------------------------------
```

```
   N =  1,  n = 10000000,  r =  0,   s = 5,   L = 1200,   d = 0


Counters with expected numbers >= 10
-----------------------------------------------
Number of degrees of freedom          : 11825
Chi-square statistic                  :12002.12
p-value of test                       :    0.13

-----------------------------------------------
CPU time used                    :  00:44:15.61

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sstring_HammingIndep test:
-----------------------------------------------
   N =  1,  n = 10000000,  r = 25,   s = 5,   L = 1200,   d = 0


Counters with expected numbers >= 10
-----------------------------------------------
Number of degrees of freedom          : 11825
Chi-square statistic                  :12027.80
p-value of test                       :    0.09

-----------------------------------------------
CPU time used                    :  00:48:59.45

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sstring_Run test:
-----------------------------------------------
   N =  1,  n = 2000000000,  r =  0,   s =    3


-----------------------------------------------
Total number of 1 runs:  2000000000

Number of degrees of freedom          :   54
Chi2 statistic for number of runs     :   53.09
p-value of test                       :    0.51


-----------------------------------------------
```

```
Total number of bits:  8000040771

Normal statistic for number of bits   :    0.32
p-value of test                       :    0.37



-----------------------------------------------
CPU time used                    :  00:26:26.44

Generator state:




************************************************************
HOST = compute, Linux

Ranlux48


sstring_Run test:
-----------------------------------------------
   N =  1,  n = 2000000000,  r = 27,   s =    3


-----------------------------------------------
Total number of 1 runs:  2000000000

Number of degrees of freedom          :   54
Chi2 statistic for number of runs     :   48.38
p-value of test                       :    0.69


-----------------------------------------------
Total number of bits:  8000139210

Normal statistic for number of bits   :    1.10
p-value of test                       :    0.14



-----------------------------------------------
CPU time used                    :  00:25:12.53

Generator state:




************************************************************
HOST = compute, Linux

Ranlux48


sstring_AutoCor test:
-----------------------------------------------
   N = 10,  n = 1000000030,  r =  0,   s = 3,   d = 1


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.011
```

```
p-value of test                       :    0.99

Kolmogorov-Smirnov- statistic = D-    :    0.58
p-value of test                       :  5.5e-4    *****

Anderson-Darling statistic = A2       :    5.12
p-value of test                       :  2.7e-3

Tests on the sum of all N observations
Standardized normal statistic         :    3.07
p-value of test                       :  1.1e-3

Sample variance                       :    0.57
p-value of test                       :    0.83

-----------------------------------------------
CPU time used                    :  00:31:48.21

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sstring_AutoCor test:
-----------------------------------------------
   N = 10,  n = 1000000029,  r =  0,   s = 3,   d = 3


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.21
p-value of test                       :    0.37

Kolmogorov-Smirnov- statistic = D-    :    0.19
p-value of test                       :    0.43

Anderson-Darling statistic = A2       :    0.41
p-value of test                       :    0.83

Tests on the sum of all N observations
Standardized normal statistic         :   0.066
p-value of test                       :    0.47

Sample variance                       :    0.65
p-value of test                       :    0.75

-----------------------------------------------
CPU time used                    :  00:33:39.78

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48
```

```
sstring_AutoCor test:
-----------------------------------------------
   N = 10,  n = 1000000030,  r = 27,   s = 3,   d = 1


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.078
p-value of test                       :    0.85

Kolmogorov-Smirnov- statistic = D-    :    0.41
p-value of test                       :    0.02

Anderson-Darling statistic = A2       :    2.00
p-value of test                       :    0.09

Tests on the sum of all N observations
Standardized normal statistic         :    1.47
p-value of test                       :    0.07

Sample variance                       :    0.62
p-value of test                       :    0.78

-----------------------------------------------
CPU time used                    :  00:33:56.65

Generator state:



************************************************************
HOST = compute, Linux

Ranlux48


sstring_AutoCor test:
-----------------------------------------------
   N = 10,  n = 1000000029,  r = 27,   s = 3,   d = 3


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.38
p-value of test                       :    0.04

Kolmogorov-Smirnov- statistic = D-    :   0.098
p-value of test                       :    0.77

Anderson-Darling statistic = A2       :    1.67
p-value of test                       :    0.14

Tests on the sum of all N observations
Standardized normal statistic         :   -1.37
p-value of test                       :    0.92

Sample variance                       :    0.39
p-value of test                       :    0.94

-----------------------------------------------
CPU time used                    :  00:32:11.02
```

Generator state:

========= Summary results of BigCrush =========

 Version: TestU01 1.2.3
 Generator: Ranlux48
 Number of statistics: 160
 Total CPU time: 58:34:03.71
 The following tests gave p-values outside [0.001, 0.9990]:
 (eps means a value < 1.0e-300):
 (eps1 means a value < 1.0e-15):

       Test   p-value
 ----
 82 LempelZiv, r = 0   0.9991

 All other tests were passed

```
*****************************************
Test for Mersenne Twister 32 bit generator ...
*****************************************
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
                 Starting BigCrush
                 Version: TestU01 1.2.3
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx


***********************************************************
Test smarsa_SerialOver calling smultin_MultinomialOver

***********************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smultin_MultinomialOver test:
-----------------------------------------------
   N =  1,  n = 1000000000,  r =  0,   d =  256,   t =  3,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =           16777216
       Expected number per cell =   59.604645
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =   0.0083558402,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          : 16711680
Value of the statistic                : 1.67e+7
p-value of test                       :    0.24
```

```
-----------------------------------------------
CPU time used                    :  00:01:33.96

Generator state:



************************************************************
Test smarsa_SerialOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smultin_MultinomialOver test:
-----------------------------------------------
   N =  1,  n = 1000000000,  r = 22,   d =  256,   t =  3,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =           16777216
       Expected number per cell =   59.604645
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =   0.0083558402,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          : 16711680
Value of the statistic                : 1.67e+7
p-value of test                       :    0.25


-----------------------------------------------
CPU time used                    :  00:01:42.52

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d = 2097152,   t =  2,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
```

```
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


------------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1341
p-value of test                       :    0.73

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334461
  j =  1                              :        599997318
  j =  2                              :             1341
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

------------------------------------------------
CPU time used                    :  00:02:56.84

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  9,   d = 2097152,   t =  2,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


------------------------------------------------
Results of CollisionOver test:
```

```
POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1466
p-value of test                       :  3.3e-3

-----------------------------
Total number of cells containing j balls

  j =  0                              :  1319407953345 86
  j =  1                              :        599997068
  j =  2                              :             1466
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                     :  00:02:59.02

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d = 16384,   t =  3,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1313
p-value of test                       :    0.92

-----------------------------
Total number of cells containing j balls

  j =  0                              :  1319407953344 33
  j =  1                              :        599997374
  j =  2                              :             1313
```

```
  j =  3                              :               0
  j =  4                              :               0
  j =  5                              :               0

-----------------------------------------------
CPU time used                    :  00:04:00.26

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r = 16,   d = 16384,   t =  3,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation               :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1358
p-value of test                       :    0.56

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334478
  j =  1                              :        599997284
  j =  2                              :             1358
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:04:00.46

Generator state:
```

```
************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d =   64,   t =  7,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1356
p-value of test                       :    0.58

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334476
  j =  1                              :        599997288
  j =  2                              :             1356
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:03:56.02

Generator state:




************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r = 24,   d =   64,   t =  7,
```

```
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1235
p-value of test                       :    0.9998    *****

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334355
  j =  1                              :        599997530
  j =  2                              :             1235
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:04:04.46

Generator state:




************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d =    8,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47
```

```
-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1405
p-value of test                       :    0.14

----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334525
  j =  1                              :        599997190
  j =  2                              :             1405
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:04:22.40

Generator state:




************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r = 27,   d =    8,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1440
p-value of test                       :    0.02

----------------------------
Total number of cells containing j balls
```

```
  j =  0                              :  131940795334560
  j =  1                              :       599997120
  j =  2                              :            1440
  j =  3                              :               0
  j =  4                              :               0
  j =  5                              :               0

-----------------------------------------------
CPU time used                    :  00:04:02.85

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d =    4,   t = 21,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation               :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1318
p-value of test                       :    0.89

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334438
  j =  1                              :       599997364
  j =  2                              :            1318
  j =  3                              :               0
  j =  4                              :               0
  j =  5                              :               0

-----------------------------------------------
CPU time used                    :  00:04:04.51

Generator state:
```

```
************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r = 28,   d =    4,   t = 21,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1305
p-value of test                       :    0.94

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334425
  j =  1                              :        599997390
  j =  2                              :             1305
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:04:02.46

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smarsa_BirthdaySpacings test:
-----------------------------------------------
```

```
   N = 100,  n = 10000000,  r =  0,    d = 2147483648,    t = 2,    p = 1


      Number of cells = d^t = 4611686018427387904
      Lambda = Poisson mean =      54.2101


------------------------------------------------
Total expected number = N*Lambda      :    5421.01
Total observed number                 :    5409
p-value of test                       :    0.56


------------------------------------------------
CPU time used                    :  00:04:35.59

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smarsa_BirthdaySpacings test:
------------------------------------------------
   N = 20,  n = 20000000,  r =  0,    d = 2097152,    t = 3,    p = 1


      Number of cells = d^t = 9223372036854775808
      Lambda = Poisson mean =     216.8404


------------------------------------------------------
Total expected number = N*Lambda      :    4336.81
Total observed number                 :    4200
p-value of test                       :    0.98


------------------------------------------------
CPU time used                    :  00:02:00.04

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smarsa_BirthdaySpacings test:
------------------------------------------------
   N = 20,  n = 30000000,  r = 14,    d = 65536,    t = 4,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182
```

```
-------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7280
p-value of test                       :    0.67


-----------------------------------------------
CPU time used                    :  00:03:20.90

Generator state:



*********************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 20000000,  r =  0,    d = 512,    t = 7,    p = 1


      Number of cells = d^t = 9223372036854775808
      Lambda = Poisson mean =     216.8404


-------------------------------------------------
Total expected number = N*Lambda      :    4336.81
Total observed number                 :    4424
p-value of test                       :    0.09


-----------------------------------------------
CPU time used                    :  00:02:28.51

Generator state:



*********************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 20000000,  r =  7,    d = 512,    t = 7,    p = 1


      Number of cells = d^t = 9223372036854775808
      Lambda = Poisson mean =     216.8404


-------------------------------------------------
Total expected number = N*Lambda      :    4336.81
Total observed number                 :    4230
p-value of test                       :    0.95
```

```
-----------------------------------------------
CPU time used                   :  00:02:35.60

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 30000000,  r = 14,    d = 256,    t = 8,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


---------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7279
p-value of test                       :    0.67


-----------------------------------------------
CPU time used                   :  00:04:12.90

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 30000000,  r = 22,    d = 256,    t = 8,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


---------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7297
p-value of test                       :    0.60


-----------------------------------------------
CPU time used                   :  00:04:17.03

Generator state:
```

```
************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 30000000,  r =  0,    d = 16,    t = 16,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


---------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7259
p-value of test                       :    0.75


-----------------------------------------------
CPU time used                    :  00:05:39.71

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 30000000,  r = 26,    d = 16,    t = 16,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


---------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7452
p-value of test                       :    0.06


-----------------------------------------------
CPU time used                    :  00:06:09.15

Generator state:




************************************************************
HOST = compute, Linux
```

```
Mersenne Twister 32 bit


snpair_ClosePairs test:
-----------------------------------------------
   N = 30,  n = 6000000,  r =  0,  t = 3,  p = 0,  m = 30,  Torus =  TRUE


---------------------------------------
Test based on the 2 nearest points (NP):

Stat. AD on the N values (NP)         :    1.37
p-value of test                       :    0.21


A2 test based on the spacings between the
   successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP)    :    0.72
p-value of test                       :    0.54

Test on the Nm values of W_{n,i}(mNP1):    0.85
p-value of test                       :    0.45

Test on the jump times of Y
   (superposition of Yn):

Expected number of jumps of Y = mN    :     900
Number of jumps of Y                  :     933
p-value of test                       :    0.14

Stat. AD (mNP2)                       :    1.18
p-value of test                       :    0.28

Stat. AD after spacings (mNP2-S)      :    1.60
p-value of test                       :    0.16

-----------------------------------------------
CPU time used                    :  00:02:52.66

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


snpair_ClosePairs test:
-----------------------------------------------
   N = 20,  n = 4000000,  r =  0,  t = 5,  p = 0,  m = 30,  Torus =  TRUE


---------------------------------------
Test based on the 2 nearest points (NP):

Stat. AD on the N values (NP)         :    0.87
p-value of test                       :    0.43


A2 test based on the spacings between the
```

```
   successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP)    :    0.93
p-value of test                       :    0.39

Test on the Nm values of W_{n,i}(mNP1):    1.54
p-value of test                       :    0.17

Test on the jump times of Y
   (superposition of Yn):

Expected number of jumps of Y = mN    :     600
Number of jumps of Y                  :     547
p-value of test                       :    0.98

Stat. AD (mNP2)                       :    0.32
p-value of test                       :    0.92

Stat. AD after spacings (mNP2-S)      :    0.84
p-value of test                       :    0.45

-----------------------------------------------
CPU time used                    :  00:02:04.70

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


snpair_ClosePairs test:
-----------------------------------------------
   N = 10,  n = 3000000,  r =  0,  t = 9,  p = 0,  m = 30,  Torus =  TRUE


---------------------------------------
Test based on the 2 nearest points (NP):

Stat. AD on the N values (NP)         :    0.91
p-value of test                       :    0.41


A2 test based on the spacings between the
   successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP)    :    0.33
p-value of test                       :    0.91

Test on the Nm values of W_{n,i}(mNP1):    2.66
p-value of test                       :    0.04

Test on the jump times of Y
   (superposition of Yn):

Expected number of jumps of Y = mN    :     300
Number of jumps of Y                  :     273
p-value of test                       :    0.94

Stat. AD (mNP2)                       :    2.96
```

```
p-value of test                       :    0.03

Stat. AD after spacings (mNP2-S)      :    0.89
p-value of test                       :    0.42

-----------------------------------------------
CPU time used                    :  00:03:12.71

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


snpair_ClosePairs test:
-----------------------------------------------
   N =  5,  n = 2000000,  r =  0,  t = 16,  p = 0,  m = 30,  Torus =  TRUE


---------------------------------------
Test based on the 2 nearest points (NP):

Stat. AD on the N values (NP)         :    1.41
p-value of test                       :    0.20


A2 test based on the spacings between the
   successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP)    :    2.55
p-value of test                       :    0.05

Test on the Nm values of W_{n,i}(mNP1):    0.26
p-value of test                       :    0.97

Test on the jump times of Y
   (superposition of Yn):

Expected number of jumps of Y = mN    :     150
Number of jumps of Y                  :     162
p-value of test                       :    0.17

Stat. AD (mNP2)                       :    1.45
p-value of test                       :    0.19

Stat. AD after spacings (mNP2-S)      :    0.43
p-value of test                       :    0.81

-----------------------------------------------
CPU time used                    :  00:03:35.63

Generator state:



************************************************************
HOST = compute, Linux
```

```
Mersenne Twister 32 bit


sknuth_SimpPoker test:
-----------------------------------------------
   N =  1,  n = 400000000,  r =  0,   d =    8,   k =    8


-----------------------------------------------
Number of degrees of freedom          :    7
Chi-square statistic                  :    9.67
p-value of test                       :    0.21

-----------------------------------------------
CPU time used                     :  00:01:36.80

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sknuth_SimpPoker test:
-----------------------------------------------
   N =  1,  n = 400000000,  r = 27,   d =    8,   k =    8


-----------------------------------------------
Number of degrees of freedom          :    7
Chi-square statistic                  :    4.82
p-value of test                       :    0.68

-----------------------------------------------
CPU time used                     :  00:01:44.02

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sknuth_SimpPoker test:
-----------------------------------------------
   N =  1,  n = 100000000,  r =  0,   d =   32,   k =   32


-----------------------------------------------
Number of degrees of freedom          :   18
Chi-square statistic                  :   17.89
p-value of test                       :    0.46

-----------------------------------------------
CPU time used                     :  00:01:36.85
```

```
Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sknuth_SimpPoker test:
-----------------------------------------------
   N =  1,  n = 100000000,  r = 25,   d =   32,   k =   32


-----------------------------------------------
Number of degrees of freedom          :   18
Chi-square statistic                  :   13.64
p-value of test                       :    0.75

-----------------------------------------------
CPU time used                    :  00:01:50.46

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sknuth_CouponCollector test:
-----------------------------------------------
   N =  1,  n = 200000000,  r =  0,   d =    8


-----------------------------------------------
Number of degrees of freedom          :   54
Chi-square statistic                  :   48.79
p-value of test                       :    0.67

-----------------------------------------------
CPU time used                    :  00:02:08.30

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sknuth_CouponCollector test:
-----------------------------------------------
   N =  1,  n = 200000000,  r = 10,   d =    8
```

```
-----------------------------------------------
Number of degrees of freedom          :   54
Chi-square statistic                  :   54.70
p-value of test                       :    0.45

-----------------------------------------------
CPU time used                     :  00:02:26.88

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sknuth_CouponCollector test:
-----------------------------------------------
   N =  1,  n = 200000000,  r = 20,   d =    8


-----------------------------------------------
Number of degrees of freedom          :   54
Chi-square statistic                  :   57.21
p-value of test                       :    0.36

-----------------------------------------------
CPU time used                     :  00:02:17.21

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sknuth_CouponCollector test:
-----------------------------------------------
   N =  1,  n = 200000000,  r = 27,   d =    8


-----------------------------------------------
Number of degrees of freedom          :   54
Chi-square statistic                  :   45.72
p-value of test                       :    0.78

-----------------------------------------------
CPU time used                     :  00:02:17.82

Generator state:



************************************************************
HOST = compute, Linux
```

```
Mersenne Twister 32 bit


sknuth_Gap test:
-----------------------------------------------
   N =  1,  n = 500000000,  r =  0,   Alpha =        0,   Beta  =   0.0625


-----------------------------------------------
Number of degrees of freedom          :  232
Chi-square statistic                  :  236.77
p-value of test                       :    0.40

-----------------------------------------------
CPU time used                    :  00:02:48.03

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sknuth_Gap test:
-----------------------------------------------
   N =  1,  n = 300000000,  r = 25,   Alpha =        0,   Beta  =  0.03125


-----------------------------------------------
Number of degrees of freedom          :  434
Chi-square statistic                  :  396.47
p-value of test                       :    0.90

-----------------------------------------------
CPU time used                    :  00:03:34.46

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sknuth_Gap test:
-----------------------------------------------
   N =  1,  n = 100000000,  r =  0,   Alpha =        0,   Beta  = 0.0078125


-----------------------------------------------
Number of degrees of freedom          : 1437
Chi-square statistic                  : 1458.31
p-value of test                       :    0.34

-----------------------------------------------
CPU time used                    :  00:03:52.80
```

```
Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sknuth_Gap test:
-----------------------------------------------
   N =  1,  n = 10000000,  r = 20,   Alpha =        0,   Beta  = 0.000976562


-----------------------------------------------
Number of degrees of freedom          : 7046
Chi-square statistic                  : 6977.56
p-value of test                       :    0.72

-----------------------------------------------
CPU time used                    :  00:03:38.94

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sknuth_Run test:
-----------------------------------------------
   N =  5,  n = 1000000000,  r =  0,   Up = FALSE


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.28
p-value of test                       :    0.39

Kolmogorov-Smirnov- statistic = D-    :    0.44
p-value of test                       :    0.11

Anderson-Darling statistic = A2       :    1.07
p-value of test                       :    0.32

Test on the sum of all N observations
Number of degrees of freedom          :   30
Chi-square statistic                  :   30.72
p-value of test                       :    0.43

-----------------------------------------------
CPU time used                    :  00:02:25.21

Generator state:
```

```
************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sknuth_Run test:
-----------------------------------------------
   N = 10,  n = 1000000000,  r = 15,   Up =  TRUE


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.17
p-value of test                       :    0.51

Kolmogorov-Smirnov- statistic = D-    :    0.28
p-value of test                       :    0.17

Anderson-Darling statistic = A2       :    1.12
p-value of test                       :    0.30

Test on the sum of all N observations
Number of degrees of freedom          :   60
Chi-square statistic                  :   66.87
p-value of test                       :    0.25

-----------------------------------------------
CPU time used                    :  00:05:04.82

Generator state:



************************************************************
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smultin_Multinomial test:
-----------------------------------------------
   N =  1,  n = 1000000000,  r =  5,   t =  3,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =                  6
       Expected number per cell =  1.6666667e+08
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =  2.5000002e-09,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          :    5
Value of the statistic                :   12.39
p-value of test                       :    0.03
```

```
------------------------------------------------
CPU time used                    :  00:01:26.02

Generator state:



************************************************************
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smultin_Multinomial test:
------------------------------------------------
   N =  1,  n = 1000000000,  r =  5,   t =  5,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =                120
       Expected number per cell =   8333333.3
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =  5.9500005e-08,    Sigma =          1

------------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          :  119
Value of the statistic                :  108.08
p-value of test                       :    0.75


------------------------------------------------
CPU time used                    :  00:02:26.55

Generator state:



************************************************************
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smultin_Multinomial test:
------------------------------------------------
   N =  1,  n = 500000000,  r =  5,   t =  7,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
```

```
       Number of cells = t! =               5040
       Expected number per cell =   99206.349
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =  5.0390004e-06,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          : 5039
Value of the statistic                : 4855.34
p-value of test                       :    0.97


-----------------------------------------------
CPU time used                    :  00:01:46.67

Generator state:



************************************************************
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smultin_Multinomial test:
-----------------------------------------------
   N =  1,  n = 500000000,  r = 10,   t = 10,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =            3628800
       Expected number per cell =    137.7866
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =   0.0036287993,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          : 3628799
Value of the statistic                : 3.63e+6
p-value of test                       :    0.72


-----------------------------------------------
CPU time used                    :  00:03:31.38

Generator state:



************************************************************
```

```
Test sknuth_CollisionPermut calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smultin_Multinomial test:
-------------------------------------------------
   N = 20,  n = 20000000,  r =  0,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =        87178291200
       Expected number per cell =  1 /  4358.9146
       EColl = n^2 / (2k) =   2294.14912
       Hashing =   TRUE

       Collision test,    Mu =      2293.9736,    Sigma =    47.8841

-------------------------------------------------
Test Results for Collisions

For the total number of collisions, we use
      the Poisson approximation:
Expected number of collisions = N*Mu  :    45879.47
Observed number of collisions         :    45901
p-value of test                       :    0.46


------------------------------
Total number of cells containing j balls

  j =  0                              :    1743165869901
  j =  1                              :        399908199
  j =  2                              :            45899
  j =  3                              :                1
  j =  4                              :                0
  j =  5                              :                0

-------------------------------------------------
CPU time used                    :  00:05:02.98

Generator state:




************************************************************
Test sknuth_CollisionPermut calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smultin_Multinomial test:
-------------------------------------------------
   N = 20,  n = 20000000,  r = 10,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellPermut
```

```
       Number of cells = t! =        87178291200
       Expected number per cell =  1 /  4358.9146
       EColl = n^2 / (2k) =   2294.14912
       Hashing =   TRUE

       Collision test,    Mu =      2293.9736,    Sigma =    47.8841

-----------------------------------------------
Test Results for Collisions

For the total number of collisions, we use
      the Poisson approximation:
Expected number of collisions = N*Mu  :    45879.47
Observed number of collisions         :    45868
p-value of test                       :    0.52


-----------------------------
Total number of cells containing j balls

  j =  0                              :    1743165869868
  j =  1                              :        399908268
  j =  2                              :            45860
  j =  3                              :                4
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:05:18.64

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sknuth_MaxOft test:
-----------------------------------------------
   N = 40,  n = 10000000,  r =  0,   d = 100000,   t =  8

      Number of categories = 100000
      Expected number per category  = 100.00


-----------------------------------------------
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :    0.22
p-value of test                       :    0.02

Kolmogorov-Smirnov- statistic = D-    : 6.31e-3
p-value of test                       :    0.9919

Anderson-Darling statistic = A2       :    2.71
p-value of test                       :    0.04

Test on the sum of all N observations
Number of degrees of freedom          : 3999960
Chi-square statistic                  : 3.99e+6
```

```
p-value of test                       :    0.98


-----------------------------------------------
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :   0.087
p-value of test                       :    0.51

Kolmogorov-Smirnov- statistic = D-    :    0.10
p-value of test                       :    0.41

Anderson-Darling statistic = A2       :    0.54
p-value of test                       :    0.71


-----------------------------------------------
CPU time used                    :  00:03:29.19

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sknuth_MaxOft test:
-----------------------------------------------
   N = 30,  n = 10000000,  r =  0,   d = 100000,   t = 16

      Number of categories = 100000
      Expected number per category  = 100.00


-----------------------------------------------
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :    0.23
p-value of test                       :    0.03

Kolmogorov-Smirnov- statistic = D-    :   0.022
p-value of test                       :    0.96

Anderson-Darling statistic = A2       :    2.20
p-value of test                       :    0.07

Test on the sum of all N observations
Number of degrees of freedom          : 2999970
Chi-square statistic                  : 3.00e+6
p-value of test                       :    0.97


-----------------------------------------------
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :    0.16
p-value of test                       :    0.20

Kolmogorov-Smirnov- statistic = D-    :   0.039
p-value of test                       :    0.89
```

```
Anderson-Darling statistic = A2       :    0.98
p-value of test                       :    0.37


------------------------------------------------
CPU time used                    :  00:03:18.19

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sknuth_MaxOft test:
------------------------------------------------
   N = 20,  n = 10000000,  r =  0,   d = 100000,   t = 24

      Number of categories = 100000
      Expected number per category  = 100.00


------------------------------------------------
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :    0.14
p-value of test                       :    0.40

Kolmogorov-Smirnov- statistic = D-    :    0.14
p-value of test                       :    0.43

Anderson-Darling statistic = A2       :    0.51
p-value of test                       :    0.73

Test on the sum of all N observations
Number of degrees of freedom          : 1999980
Chi-square statistic                  : 2.00e+6
p-value of test                       :    0.69


------------------------------------------------
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :    0.24
p-value of test                       :    0.09

Kolmogorov-Smirnov- statistic = D-    :   0.020
p-value of test                       :    0.97

Anderson-Darling statistic = A2       :    1.23
p-value of test                       :    0.26


------------------------------------------------
CPU time used                    :  00:02:39.16

Generator state:
```

```
************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sknuth_MaxOft test:
-----------------------------------------------
   N = 20,  n = 10000000,  r =  0,   d = 100000,   t = 32

      Number of categories = 100000
      Expected number per category  = 100.00


-----------------------------------------------
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :    0.10
p-value of test                       :    0.61

Kolmogorov-Smirnov- statistic = D-    :   0.079
p-value of test                       :    0.74

Anderson-Darling statistic = A2       :    0.26
p-value of test                       :    0.96

Test on the sum of all N observations
Number of degrees of freedom          : 1999980
Chi-square statistic                  : 2.00e+6
p-value of test                       :    0.51


-----------------------------------------------
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :    0.18
p-value of test                       :    0.24

Kolmogorov-Smirnov- statistic = D-    :    0.12
p-value of test                       :    0.50

Anderson-Darling statistic = A2       :    1.29
p-value of test                       :    0.24


-----------------------------------------------
CPU time used                    :  00:03:03.91

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


svaria_SampleProd test:
-----------------------------------------------
   N = 40,  n = 10000000,  r =  0,   t = 8
```

```
-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.11
p-value of test                       :    0.36

Kolmogorov-Smirnov- statistic = D-    :   0.071
p-value of test                       :    0.64

Anderson-Darling statistic = A2       :    0.61
p-value of test                       :    0.64

-----------------------------------------------
CPU time used                    :  00:02:41.69

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


svaria_SampleProd test:
-----------------------------------------------
   N = 20,  n = 10000000,  r =  0,   t = 16


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.23
p-value of test                       :    0.10

Kolmogorov-Smirnov- statistic = D-    :    0.15
p-value of test                       :    0.39

Anderson-Darling statistic = A2       :    0.87
p-value of test                       :    0.43

-----------------------------------------------
CPU time used                    :  00:02:08.27

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


svaria_SampleProd test:
-----------------------------------------------
   N = 20,  n = 10000000,  r =  0,   t = 24


-----------------------------------------------
```

```
Kolmogorov-Smirnov+ statistic = D+    :    0.20
p-value of test                       :    0.19

Kolmogorov-Smirnov- statistic = D-    :   0.048
p-value of test                       :    0.88

Anderson-Darling statistic = A2       :    0.92
p-value of test                       :    0.40

------------------------------------------------
CPU time used                    :  00:02:52.42

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


svaria_SampleMean test:
------------------------------------------------
   N = 20000000,  n = 30,  r =  0


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 7.81e-5
p-value of test                       :    0.78

Kolmogorov-Smirnov- statistic = D-    : 2.19e-4
p-value of test                       :    0.15

Anderson-Darling statistic = A2       :    0.90
p-value of test                       :    0.42

------------------------------------------------
CPU time used                    :  00:00:36.22

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


svaria_SampleMean test:
------------------------------------------------
   N = 20000000,  n = 30,  r = 10


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 7.31e-5
p-value of test                       :    0.81

Kolmogorov-Smirnov- statistic = D-    : 1.60e-4
```

```
p-value of test                         :    0.36

Anderson-Darling statistic = A2         :    0.59
p-value of test                         :    0.66

------------------------------------------------
CPU time used                     :  00:00:37.90

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


svaria_SampleCorr test:
------------------------------------------------
   N =  1,  n = 2000000000,  r =  0,   k = 1


------------------------------------------------
Normal statistic                        :   -0.29
p-value of test                         :    0.62

------------------------------------------------
CPU time used                     :  00:00:40.40

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


svaria_SampleCorr test:
------------------------------------------------
   N =  1,  n = 2000000000,  r =  0,   k = 2


------------------------------------------------
Normal statistic                        :   -0.63
p-value of test                         :    0.74

------------------------------------------------
CPU time used                     :  00:00:40.47

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit
```

```
svaria_AppearanceSpacings test:
------------------------------------------------
   N =  1,   Q = 10000000,   K = 1000000000,   r = 0,   s = 3,   L = 15

   Sequences of n = (K + Q)L =  15150000000 bits
   Q = 10000000 initialization blocks
   K = 1000000000 blocks for the test
   the blocks have L = 15 bits



------------------------------------------------
Normal statistic                     :    0.80
p-value of test                      :    0.21

------------------------------------------------
CPU time used                    :  00:02:49.25

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


svaria_AppearanceSpacings test:
------------------------------------------------
   N =  1,   Q = 10000000,   K = 1000000000,   r = 27,   s = 3,   L = 15

   Sequences of n = (K + Q)L =  15150000000 bits
   Q = 10000000 initialization blocks
   K = 1000000000 blocks for the test
   the blocks have L = 15 bits



------------------------------------------------
Normal statistic                     :    0.10
p-value of test                      :    0.46

------------------------------------------------
CPU time used                    :  00:02:58.45

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


svaria_WeightDistrib test:
------------------------------------------------
   N =  1,  n = 20000000,  r =  0,  k = 256,  Alpha =      0,  Beta =   0.25
```

```
-----------------------------------------------
Number of degrees of freedom          :   67
Chi-square statistic                  :   75.68
p-value of test                       :    0.22

-----------------------------------------------
CPU time used                    :  00:01:33.46

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


svaria_WeightDistrib test:
-----------------------------------------------
   N =  1,  n = 20000000,  r = 20,  k = 256,  Alpha =      0,  Beta =   0.25


-----------------------------------------------
Number of degrees of freedom          :   67
Chi-square statistic                  :   76.87
p-value of test                       :    0.19

-----------------------------------------------
CPU time used                    :  00:01:52.00

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


svaria_WeightDistrib test:
-----------------------------------------------
   N =  1,  n = 20000000,  r = 28,  k = 256,  Alpha =      0,  Beta =   0.25


-----------------------------------------------
Number of degrees of freedom          :   67
Chi-square statistic                  :   69.87
p-value of test                       :    0.38

-----------------------------------------------
CPU time used                    :  00:01:52.46

Generator state:



************************************************************
HOST = compute, Linux
```

```
Mersenne Twister 32 bit


svaria_WeightDistrib test:
-----------------------------------------------
   N =  1,  n = 20000000,  r =  0,  k = 256,  Alpha =      0,  Beta = 0.0625


-----------------------------------------------
Number of degrees of freedom          :   37
Chi-square statistic                  :   35.34
p-value of test                       :    0.55

-----------------------------------------------
CPU time used                    :  00:01:33.07

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


svaria_WeightDistrib test:
-----------------------------------------------
   N =  1,  n = 20000000,  r = 10,  k = 256,  Alpha =      0,  Beta = 0.0625


-----------------------------------------------
Number of degrees of freedom          :   37
Chi-square statistic                  :   40.02
p-value of test                       :    0.34

-----------------------------------------------
CPU time used                    :  00:01:51.59

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


svaria_WeightDistrib test:
-----------------------------------------------
   N =  1,  n = 20000000,  r = 26,  k = 256,  Alpha =      0,  Beta = 0.0625


-----------------------------------------------
Number of degrees of freedom          :   37
Chi-square statistic                  :   22.57
p-value of test                       :    0.97

-----------------------------------------------
CPU time used                    :  00:01:51.65
```

```
Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


svaria_SumCollector test:
-----------------------------------------------
   N =  1,  n = 500000000,  r =  0,   g = 10


-----------------------------------------------
Number of degrees of freedom          :   29
Chi-square statistic                  :   29.32
p-value of test                       :    0.45

-----------------------------------------------
CPU time used                    :  00:03:10.91

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smarsa_MatrixRank test:
-----------------------------------------------
   N = 10,  n = 1000000,  r =  0,    s = 5,    L = 30,    k = 30


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.27
p-value of test                       :    0.21

Kolmogorov-Smirnov- statistic = D-    :    0.20
p-value of test                       :    0.38

Anderson-Darling statistic = A2       :    0.89
p-value of test                       :    0.42

Test on the sum of all N observations
Number of degrees of freedom          :   40
Chi-square statistic                  :   33.09
p-value of test                       :    0.77

-----------------------------------------------
CPU time used                    :  00:01:36.05

Generator state:
```

```
************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smarsa_MatrixRank test:
-----------------------------------------------
   N = 10,  n = 1000000,  r = 25,    s = 5,    L = 30,    k = 30


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.14
p-value of test                       :    0.61

Kolmogorov-Smirnov- statistic = D-    :    0.29
p-value of test                       :    0.15

Anderson-Darling statistic = A2       :    0.91
p-value of test                       :    0.40

Test on the sum of all N observations
Number of degrees of freedom          :   40
Chi-square statistic                  :   42.33
p-value of test                       :    0.37

-----------------------------------------------
CPU time used                    :  00:01:38.78

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smarsa_MatrixRank test:
-----------------------------------------------
   N =  1,  n = 5000,  r =  0,    s = 4,    L = 1000,    k = 1000


-----------------------------------------------
Number of degrees of freedom          :    3
Chi-square statistic                  :    3.18
p-value of test                       :    0.36

-----------------------------------------------
CPU time used                    :  00:03:40.10

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit
```

```
smarsa_MatrixRank test:
-----------------------------------------------
   N =  1,  n = 5000,  r = 26,    s = 4,    L = 1000,    k = 1000


-----------------------------------------------
Number of degrees of freedom          :    3
Chi-square statistic                  :    9.12
p-value of test                       :    0.03

-----------------------------------------------
CPU time used                    :  00:03:40.27

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smarsa_MatrixRank test:
-----------------------------------------------
   N =  1,  n = 80,  r = 15,    s = 15,    L = 5000,    k = 5000


-----------------------------------------------
Number of degrees of freedom          :    2
Chi-square statistic                  :   0.059
p-value of test                       :    0.97

-----------------------------------------------
CPU time used                    :  00:02:36.90

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smarsa_MatrixRank test:
-----------------------------------------------
   N =  1,  n = 80,  r =  0,    s = 30,    L = 5000,    k = 5000


-----------------------------------------------
Number of degrees of freedom          :    2
Chi-square statistic                  :    3.76
p-value of test                       :    0.15

-----------------------------------------------
CPU time used                    :  00:02:00.10

Generator state:
```

```
************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smarsa_Savir2 test:
-----------------------------------------------
   N = 10,  n = 10000000,  r = 10,    m = 1048576,    t = 30


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.34
p-value of test                       :    0.08

Kolmogorov-Smirnov- statistic = D-    :   0.053
p-value of test                       :    0.91

Anderson-Darling statistic = A2       :    1.60
p-value of test                       :    0.16

Test on the sum of all N observations
Number of degrees of freedom          :  130
Chi-square statistic                  :  108.31
p-value of test                       :    0.92

-----------------------------------------------
CPU time used                    :  00:01:06.59

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


smarsa_GCD test:
-----------------------------------------------
   N = 10,  n = 50000000,  r =  0,   s = 30


-----------------------------------------------
Test results for GCD values:

Kolmogorov-Smirnov+ statistic = D+    :    0.28
p-value of test                       :    0.16

Kolmogorov-Smirnov- statistic = D-    :    0.16
p-value of test                       :    0.53

Anderson-Darling statistic = A2       :    1.36
p-value of test                       :    0.21

Test on the sum of all N observations
Number of degrees of freedom          : 17430
Chi-square statistic                  :17400.18
```

```
p-value of test                       :    0.56


-----------------------------------------------
CPU time used                    :  00:02:11.98

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 100000000,  r =  0,   s = 5,   L0 =   50,   L1 =   50



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :   36
ChiSquare statistic                   :   31.93
p-value of test                       :    0.66


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :   35
ChiSquare statistic                   :   32.69
p-value of test                       :    0.58


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          :   25
ChiSquare statistic                   :   10.47
p-value of test                       :    0.9952


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :   24
ChiSquare statistic                   :   21.59
p-value of test                       :    0.60


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :   17
ChiSquare statistic                   :   14.89
p-value of test                       :    0.60
```

```
------------------------------------------------
CPU time used                   :  00:01:13.91

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


swalk_RandomWalk1 test:
------------------------------------------------
   N =  1,  n = 100000000,  r = 25,   s = 5,   L0 =   50,   L1 =   50



------------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :   36
ChiSquare statistic                   :   45.58
p-value of test                       :    0.13


------------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :   35
ChiSquare statistic                   :   37.65
p-value of test                       :    0.35


------------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          :   25
ChiSquare statistic                   :   11.24
p-value of test                       :    0.9917


------------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :   24
ChiSquare statistic                   :   25.67
p-value of test                       :    0.37


------------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :   17
ChiSquare statistic                   :   13.44
p-value of test                       :    0.71


------------------------------------------------
CPU time used                   :  00:01:15.40

Generator state:
```

```
************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 10000000,  r =  0,   s = 10,   L0 = 1000,   L1 = 1000



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :  146
ChiSquare statistic                   :  153.94
p-value of test                       :    0.31


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :  146
ChiSquare statistic                   :  147.79
p-value of test                       :    0.44


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          :  500
ChiSquare statistic                   :  503.04
p-value of test                       :    0.45


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :  136
ChiSquare statistic                   :  132.81
p-value of test                       :    0.56


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :   74
ChiSquare statistic                   :   47.04
p-value of test                       :    0.9939


-----------------------------------------------
CPU time used                    :  00:01:50.27

Generator state:
```

```
************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 10000000,  r = 20,   s = 10,   L0 = 1000,   L1 = 1000



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :  146
ChiSquare statistic                   :  166.96
p-value of test                       :    0.11


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :  146
ChiSquare statistic                   :  151.39
p-value of test                       :    0.36


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          :  500
ChiSquare statistic                   :  445.06
p-value of test                       :    0.96


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :  136
ChiSquare statistic                   :  112.47
p-value of test                       :    0.93


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :   74
ChiSquare statistic                   :   71.67
p-value of test                       :    0.56


-----------------------------------------------
CPU time used                    :  00:01:52.00

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit
```

```
swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 1000000,  r =  0,   s = 15,   L0 = 10000,   L1 = 10000



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :  384
ChiSquare statistic                   :  413.95
p-value of test                       :    0.14


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :  384
ChiSquare statistic                   :  399.52
p-value of test                       :    0.28


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          : 5000
ChiSquare statistic                   : 4879.58
p-value of test                       :    0.89


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :  378
ChiSquare statistic                   :  367.38
p-value of test                       :    0.64


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :  200
ChiSquare statistic                   :  216.16
p-value of test                       :    0.21


-----------------------------------------------
CPU time used                    :  00:01:36.46

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


swalk_RandomWalk1 test:
-----------------------------------------------
```

```
   N =  1,  n = 1000000,  r = 15,   s = 15,   L0 = 10000,   L1 = 10000


-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :  384
ChiSquare statistic                   :  392.43
p-value of test                       :    0.37


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :  384
ChiSquare statistic                   :  432.88
p-value of test                       :    0.04


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          : 5000
ChiSquare statistic                   : 4938.85
p-value of test                       :    0.73


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :  378
ChiSquare statistic                   :  321.52
p-value of test                       :    0.98


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :  200
ChiSquare statistic                   :  202.19
p-value of test                       :    0.44


-----------------------------------------------
CPU time used                    :  00:01:37.40

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


scomp_LinearComp test:
-----------------------------------------------
   N =  1,  n = 400020,  r =  0,    s = 1
```

```
-----------------------------------------------
Number of degrees of freedom          :   12
Chi2 statistic for size of jumps      :    5.45
p-value of test                       :    0.94


-----------------------------------------------
Normal statistic for number of jumps  : -402.49
p-value of test                       : 1 - eps1    *****



-----------------------------------------------
CPU time used                    :  00:00:07.96

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


scomp_LinearComp test:
-----------------------------------------------
   N =  1,  n = 400020,  r = 29,    s = 1



-----------------------------------------------
Number of degrees of freedom          :   12
Chi2 statistic for size of jumps      :   12.99
p-value of test                       :    0.37


-----------------------------------------------
Normal statistic for number of jumps  : -403.02
p-value of test                       : 1 - eps1    *****



-----------------------------------------------
CPU time used                    :  00:00:07.90

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


scomp_LempelZiv test:
-----------------------------------------------
   N = 10,  n = 134217728,  r =  0,   s =   30,   k =   27


-----------------------------------------------
```

```
Kolmogorov-Smirnov+ statistic = D+    :    0.23
p-value of test                       :    0.31

Kolmogorov-Smirnov- statistic = D-    :    0.14
p-value of test                       :    0.62

Anderson-Darling statistic = A2       :    0.54
p-value of test                       :    0.71

Tests on the sum of all N observations
Standardized normal statistic         :   -0.59
p-value of test                       :    0.72

Sample variance                       :    1.26
p-value of test                       :    0.26

------------------------------------------------
CPU time used                    :  00:00:59.73

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


scomp_LempelZiv test:
------------------------------------------------
   N = 10,  n = 134217728,  r = 15,   s =   15,   k =   27


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.087
p-value of test                       :    0.81

Kolmogorov-Smirnov- statistic = D-    :    0.24
p-value of test                       :    0.28

Anderson-Darling statistic = A2       :    0.43
p-value of test                       :    0.81

Tests on the sum of all N observations
Standardized normal statistic         :    0.52
p-value of test                       :    0.30

Sample variance                       :    0.82
p-value of test                       :    0.60

------------------------------------------------
CPU time used                    :  00:01:02.44

Generator state:



************************************************************
HOST = compute, Linux
```

```
Mersenne Twister 32 bit


sspectral_Fourier3 test:
-----------------------------------------------
   N = 100000,  n = 16384,  r =  0,   s =    3,   k =   14


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 7.27e-3
p-value of test                       :    0.65

Kolmogorov-Smirnov- statistic = D-    :   0.012
p-value of test                       :    0.30

Anderson-Darling statistic = A2       :    0.63
p-value of test                       :    0.62

-----------------------------------------------
CPU time used                    :  00:00:58.60

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sspectral_Fourier3 test:
-----------------------------------------------
   N = 100000,  n = 16384,  r = 27,   s =    3,   k =   14


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 6.03e-3
p-value of test                       :    0.74

Kolmogorov-Smirnov- statistic = D-    :   0.011
p-value of test                       :    0.35

Anderson-Darling statistic = A2       :    0.53
p-value of test                       :    0.72

-----------------------------------------------
CPU time used                    :  00:00:57.96

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit
```

```
sstring_LongestHeadRun test:
------------------------------------------------
   N =  1,  n = 1000,  r =  0,   s = 3,   L = 10000020


------------------------------------------------
Number of degrees of freedom          :    8
Chi-square statistic                  :    8.12
p-value of test                       :    0.42

------------------------------------------------
Global longest run of 1               :   37.00
p-value of test                       :    0.04



------------------------------------------------
CPU time used                    :  00:02:31.59

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sstring_LongestHeadRun test:
------------------------------------------------
   N =  1,  n = 1000,  r = 27,   s = 3,   L = 10000020


------------------------------------------------
Number of degrees of freedom          :    8
Chi-square statistic                  :    3.79
p-value of test                       :    0.88

------------------------------------------------
Global longest run of 1               :   32.00
p-value of test                       :    0.50



------------------------------------------------
CPU time used                    :  00:02:38.17

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sstring_PeriodsInStrings test:
------------------------------------------------
   N = 10,  n = 500000000,  r =  0,   s =   10
```

```
-------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.25
p-value of test                       :    0.24

Kolmogorov-Smirnov- statistic = D-    :   0.096
p-value of test                       :    0.78

Anderson-Darling statistic = A2       :    0.53
p-value of test                       :    0.71

Test on the sum of all N observations
Number of degrees of freedom          :  200
Chi-square statistic                  :  184.42
p-value of test                       :    0.78

-------------------------------------------
CPU time used                    :  00:03:57.54

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sstring_PeriodsInStrings test:
-----------------------------------------------
   N = 10,  n = 500000000,  r = 20,   s =   10


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.37
p-value of test                       :    0.05

Kolmogorov-Smirnov- statistic = D-    :   0.096
p-value of test                       :    0.78

Anderson-Darling statistic = A2       :    1.09
p-value of test                       :    0.31

Test on the sum of all N observations
Number of degrees of freedom          :  200
Chi-square statistic                  :  185.87
p-value of test                       :    0.75

-------------------------------------------
CPU time used                    :  00:04:04.11

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit
```

```
sstring_HammingWeight2 test:
-----------------------------------------------
   N = 10,  n = 1000000000,  r =  0,   s = 3,   L = 1000000


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.15
p-value of test                       :    0.60

Kolmogorov-Smirnov- statistic = D-    :    0.13
p-value of test                       :    0.64

Anderson-Darling statistic = A2       :    0.38
p-value of test                       :    0.86

Test on the sum of all N observations
Number of degrees of freedom          : 10000
Chi-square statistic                  : 9999.40
p-value of test                       :    0.50

-----------------------------------------------
CPU time used                    :  00:01:55.53

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sstring_HammingWeight2 test:
-----------------------------------------------
   N = 10,  n = 1000000000,  r = 27,   s = 3,   L = 1000000


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.14
p-value of test                       :    0.62

Kolmogorov-Smirnov- statistic = D-    :    0.19
p-value of test                       :    0.44

Anderson-Darling statistic = A2       :    0.36
p-value of test                       :    0.88

Test on the sum of all N observations
Number of degrees of freedom          : 10000
Chi-square statistic                  :10047.12
p-value of test                       :    0.37

-----------------------------------------------
CPU time used                    :  00:01:58.39

Generator state:
```

```
************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sstring_HammingCorr test:
-----------------------------------------------
   N =  1,  n = 1000000000,  r = 10,   s = 10,   L = 30



-----------------------------------------------
Normal statistic                     :   -0.57
p-value of test                      :    0.71

-----------------------------------------------
CPU time used                    :  00:02:16.57

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sstring_HammingCorr test:
-----------------------------------------------
   N =  1,  n = 100000000,  r = 10,   s = 10,   L = 300



-----------------------------------------------
Normal statistic                     :   -1.31
p-value of test                      :    0.91

-----------------------------------------------
CPU time used                    :  00:02:10.21

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sstring_HammingCorr test:
-----------------------------------------------
   N =  1,  n = 100000000,  r = 10,   s = 10,   L = 1200



-----------------------------------------------
Normal statistic                     :    0.54
```

```
p-value of test                       :    0.29

-----------------------------------------------
CPU time used                     :  00:08:38.40

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sstring_HammingIndep test:
-----------------------------------------------
   N = 10,  n = 30000000,  r =  0,   s = 3,   L = 30,   d = 0



Counters with expected numbers >= 10
-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.078
p-value of test                       :    0.85

Kolmogorov-Smirnov- statistic = D-    :    0.20
p-value of test                       :    0.40

Anderson-Darling statistic = A2       :    0.41
p-value of test                       :    0.83

Test on the sum of all N observations
Number of degrees of freedom          : 4890
Chi-square statistic                  : 4963.50
p-value of test                       :    0.23

-----------------------------------------------
CPU time used                     :  00:03:37.95

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sstring_HammingIndep test:
-----------------------------------------------
   N = 10,  n = 30000000,  r = 27,   s = 3,   L = 30,   d = 0



Counters with expected numbers >= 10
-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.090
p-value of test                       :    0.80
```

```
Kolmogorov-Smirnov- statistic = D-    :    0.20
p-value of test                       :    0.41

Anderson-Darling statistic = A2       :    0.36
p-value of test                       :    0.89

Test on the sum of all N observations
Number of degrees of freedom          : 4890
Chi-square statistic                  : 4943.02
p-value of test                       :    0.29

------------------------------------------------
CPU time used                    :  00:03:43.69

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sstring_HammingIndep test:
------------------------------------------------
   N =  1,  n = 30000000,  r =  0,   s = 4,   L = 300,   d = 0



Counters with expected numbers >= 10
------------------------------------------------
Number of degrees of freedom          : 4117
Chi-square statistic                  : 4089.34
p-value of test                       :    0.62

------------------------------------------------
CPU time used                    :  00:02:44.48

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sstring_HammingIndep test:
------------------------------------------------
   N =  1,  n = 30000000,  r = 26,   s = 4,   L = 300,   d = 0



Counters with expected numbers >= 10
------------------------------------------------
Number of degrees of freedom          : 4117
Chi-square statistic                  : 4130.86
p-value of test                       :    0.44
```

```
------------------------------------------------
CPU time used                   :  00:02:51.46

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sstring_HammingIndep test:
------------------------------------------------
   N =  1,  n = 10000000,  r =  0,   s = 5,   L = 1200,   d = 0



Counters with expected numbers >= 10
------------------------------------------------
Number of degrees of freedom          : 11825
Chi-square statistic                  :11921.91
p-value of test                       :    0.26

------------------------------------------------
CPU time used                   :  00:02:59.71

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sstring_HammingIndep test:
------------------------------------------------
   N =  1,  n = 10000000,  r = 25,   s = 5,   L = 1200,   d = 0



Counters with expected numbers >= 10
------------------------------------------------
Number of degrees of freedom          : 11825
Chi-square statistic                  :11992.74
p-value of test                       :    0.14

------------------------------------------------
CPU time used                   :  00:03:09.38

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit
```

```
sstring_Run test:
------------------------------------------------
   N =  1,  n = 2000000000,  r =  0,   s =    3


------------------------------------------------
Total number of 1 runs:  2000000000

Number of degrees of freedom          :   54
Chi2 statistic for number of runs     :   44.70
p-value of test                       :    0.81


------------------------------------------------
Total number of bits:  8000007138

Normal statistic for number of bits   :   0.056
p-value of test                       :    0.48



------------------------------------------------
CPU time used                    :  00:02:02.46

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sstring_Run test:
------------------------------------------------
   N =  1,  n = 2000000000,  r = 27,   s =    3


------------------------------------------------
Total number of 1 runs:  2000000000

Number of degrees of freedom          :   54
Chi2 statistic for number of runs     :   29.78
p-value of test                       :    0.9970


------------------------------------------------
Total number of bits:  7999998474

Normal statistic for number of bits   :  -0.012
p-value of test                       :    0.50



------------------------------------------------
CPU time used                    :  00:02:08.00

Generator state:
```

```
************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sstring_AutoCor test:
------------------------------------------------
   N = 10,  n = 1000000030,  r =  0,   s = 3,   d = 1


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.29
p-value of test                       :    0.15

Kolmogorov-Smirnov- statistic = D-    :   0.045
p-value of test                       :    0.93

Anderson-Darling statistic = A2       :    1.56
p-value of test                       :    0.16

Tests on the sum of all N observations
Standardized normal statistic         :   -1.58
p-value of test                       :    0.94

Sample variance                       :    0.64
p-value of test                       :    0.76

------------------------------------------------
CPU time used                    :  00:03:21.35

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sstring_AutoCor test:
------------------------------------------------
   N = 10,  n = 1000000029,  r =  0,   s = 3,   d = 3


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.084
p-value of test                       :    0.83

Kolmogorov-Smirnov- statistic = D-    :    0.20
p-value of test                       :    0.40

Anderson-Darling statistic = A2       :    0.64
p-value of test                       :    0.61

Tests on the sum of all N observations
Standardized normal statistic         :    0.85
p-value of test                       :    0.20
```

```
Sample variance                       :    0.64
p-value of test                       :    0.77

------------------------------------------------
CPU time used                    :  00:03:02.92

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sstring_AutoCor test:
------------------------------------------------
   N = 10,  n = 1000000030,  r = 27,   s = 3,   d = 1


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.34
p-value of test                       :    0.08

Kolmogorov-Smirnov- statistic = D-    :    0.18
p-value of test                       :    0.47

Anderson-Darling statistic = A2       :    1.53
p-value of test                       :    0.17

Tests on the sum of all N observations
Standardized normal statistic         :   -0.93
p-value of test                       :    0.82

Sample variance                       :    2.31
p-value of test                       :    0.01

------------------------------------------------
CPU time used                    :  00:03:25.44

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 32 bit


sstring_AutoCor test:
------------------------------------------------
   N = 10,  n = 1000000029,  r = 27,   s = 3,   d = 3


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.14
p-value of test                       :    0.63
```

```
Kolmogorov-Smirnov- statistic = D-    :    0.24
p-value of test                       :    0.26

Anderson-Darling statistic = A2       :    0.93
p-value of test                       :    0.40

Tests on the sum of all N observations
Standardized normal statistic         :    0.41
p-value of test                       :    0.34

Sample variance                       :    1.92
p-value of test                       :    0.04

------------------------------------------------
CPU time used                    :  00:03:08.14

Generator state:
```

```
========= Summary results of BigCrush =========

 Version:          TestU01 1.2.3
 Generator:        Mersenne Twister 32 bit
 Number of statistics:  160
 Total CPU time:   04:46:43.71
 The following tests gave p-values outside [0.001, 0.9990]:
 (eps  means a value < 1.0e-300):
 (eps1 means a value < 1.0e-15):

       Test                          p-value
 ----------------------------------------------
  8  CollisionOver, t = 7            0.9998
 80  LinearComp, r = 0              1 - eps1
 81  LinearComp, r = 29             1 - eps1
 ----------------------------------------------
 All other tests were passed
```

```
*****************************************
Test for Mersenne Twister 64 bit generator ...
*****************************************
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
                 Starting BigCrush
                 Version: TestU01 1.2.3
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx


*************************************************************
Test smarsa_SerialOver calling smultin_MultinomialOver

*************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smultin_MultinomialOver test:
-----------------------------------------------
   N =  1,  n = 1000000000,  r =  0,   d =  256,   t =  3,
```

```
       Sparse =  FALSE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =           16777216
       Expected number per cell =   59.604645
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =   0.0083558402,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          : 16711680
Value of the statistic                : 1.67e+7
p-value of test                       :    0.46


-----------------------------------------------
CPU time used                    :  00:01:01.01

Generator state:




************************************************************
Test smarsa_SerialOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smultin_MultinomialOver test:
-----------------------------------------------
   N =  1,  n = 1000000000,  r = 22,   d =  256,   t =  3,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =           16777216
       Expected number per cell =   59.604645
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =   0.0083558402,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          : 16711680
Value of the statistic                : 1.67e+7
p-value of test                       :    0.21


-----------------------------------------------
CPU time used                    :  00:01:05.38

Generator state:
```

```
*********************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

*********************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d = 2097152,   t =  2,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1357
p-value of test                       :    0.57

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334477
  j =  1                              :        599997286
  j =  2                              :             1357
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:02:36.22

Generator state:



*********************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

*********************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smultin_MultinomialOver test:
```

```
------------------------------------------------
   N = 30,  n = 20000000,  r =  9,   d = 2097152,   t =  2,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


------------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1398
p-value of test                       :    0.18

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334518
  j =  1                              :        599997204
  j =  2                              :             1398
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

------------------------------------------------
CPU time used                    :  00:02:37.46

Generator state:




************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smultin_MultinomialOver test:
------------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d = 16384,   t =  3,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test
```

```
       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1334
p-value of test                       :    0.79

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334454
  j =  1                              :        599997332
  j =  2                              :             1334
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:03:45.23

Generator state:




************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r = 16,   d = 16384,   t =  3,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1376
p-value of test                       :    0.38
```

```
----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334496
  j =  1                              :       599997248
  j =  2                              :            1376
  j =  3                              :               0
  j =  4                              :               0
  j =  5                              :               0

-----------------------------------------------
CPU time used                    :  00:03:48.41

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d =   64,   t =  7,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation               :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1391
p-value of test                       :    0.24

----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334511
  j =  1                              :       599997218
  j =  2                              :            1391
  j =  3                              :               0
  j =  4                              :               0
  j =  5                              :               0

-----------------------------------------------
CPU time used                    :  00:03:49.91
```

```
Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smultin_MultinomialOver test:
----------------------------------------------
   N = 30,  n = 20000000,  r = 24,   d =   64,   t =  7,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1327
p-value of test                       :    0.84

-----------------------------
Total number of cells containing j balls

  j =  0                              :  1319407953344447
  j =  1                              :        599997346
  j =  2                              :             1327
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

----------------------------------------------
CPU time used                    :  00:03:50.45

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux
```

```
Mersenne Twister 64 bit


smultin_MultinomialOver test:
------------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d =    8,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


------------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1437
p-value of test                       :    0.03

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334557
  j =  1                              :        599997126
  j =  2                              :             1437
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

------------------------------------------------
CPU time used                    :  00:03:48.03

Generator state:




************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smultin_MultinomialOver test:
------------------------------------------------
   N = 30,  n = 20000000,  r = 27,   d =    8,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
```

```
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1340
p-value of test                       :    0.74

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334460
  j =  1                              :        599997320
  j =  2                              :             1340
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:03:49.73

Generator state:




************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d =    4,   t = 21,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
```

```
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1362
p-value of test                       :    0.52

----------------------------
Total number of cells containing j balls

  j =  0                              :  1319407953344 82
  j =  1                              :        599997276
  j =  2                              :             1362
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:03:48.36

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r = 28,   d =    4,   t = 21,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1244
p-value of test                       :    0.9995    *****

----------------------------
Total number of cells containing j balls

  j =  0                              :  1319407953343 64
  j =  1                              :        599997512
  j =  2                              :             1244
  j =  3                              :                0
  j =  4                              :                0
```

```
  j =  5                              :               0

-----------------------------------------------
CPU time used                     :  00:03:51.14

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 100,  n = 10000000,  r =  0,    d = 2147483648,    t = 2,    p = 1


      Number of cells = d^t = 4611686018427387904
      Lambda = Poisson mean =      54.2101


-----------------------------------------------------
Total expected number = N*Lambda      :    5421.01
Total observed number                 :    5435
p-value of test                       :    0.43


-----------------------------------------------
CPU time used                     :  00:04:21.10

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 20000000,  r =  0,    d = 2097152,    t = 3,    p = 1


      Number of cells = d^t = 9223372036854775808
      Lambda = Poisson mean =     216.8404


-----------------------------------------------------
Total expected number = N*Lambda      :    4336.81
Total observed number                 :    4417
p-value of test                       :    0.11


-----------------------------------------------
CPU time used                     :  00:01:55.09

Generator state:
```

```
************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 30000000,  r = 14,    d = 65536,    t = 4,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


---------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7339
p-value of test                       :    0.41


-----------------------------------------------
CPU time used                    :  00:03:08.98

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 20000000,  r =  0,    d = 512,    t = 7,    p = 1


      Number of cells = d^t = 9223372036854775808
      Lambda = Poisson mean =     216.8404


---------------------------------------------------
Total expected number = N*Lambda      :    4336.81
Total observed number                 :    4290
p-value of test                       :    0.76


-----------------------------------------------
CPU time used                    :  00:02:24.97

Generator state:




************************************************************
HOST = compute, Linux
```

```
Mersenne Twister 64 bit


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 20000000,  r =  7,    d = 512,    t = 7,    p = 1


      Number of cells = d^t = 9223372036854775808
      Lambda = Poisson mean =     216.8404


---------------------------------------------------
Total expected number = N*Lambda      :    4336.81
Total observed number                 :    4386
p-value of test                       :    0.23


-----------------------------------------------
CPU time used                    :  00:02:28.34

Generator state:




***********************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 30000000,  r = 14,    d = 256,    t = 8,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


---------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7177
p-value of test                       :    0.95


-----------------------------------------------
CPU time used                    :  00:03:57.57

Generator state:




***********************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smarsa_BirthdaySpacings test:
-----------------------------------------------
```

```
   N = 20,  n = 30000000,  r = 22,    d = 256,    t = 8,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


-------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7250
p-value of test                       :    0.79


-----------------------------------------------
CPU time used                    :  00:03:57.09

Generator state:



*********************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 30000000,  r =  0,    d = 16,    t = 16,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


-------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7358
p-value of test                       :    0.32


-----------------------------------------------
CPU time used                    :  00:05:21.90

Generator state:



*********************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 30000000,  r = 26,    d = 16,    t = 16,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182
```

```
------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7146
p-value of test                       :    0.98


-----------------------------------------------
CPU time used                    :  00:05:29.63

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


snpair_ClosePairs test:
-----------------------------------------------
   N = 30,  n = 6000000,  r =  0,  t = 3,  p = 0,  m = 30,  Torus =  TRUE


---------------------------------------
Test based on the 2 nearest points (NP):

Stat. AD on the N values (NP)         :    0.57
p-value of test                       :    0.67


A2 test based on the spacings between the
   successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP)    :    0.70
p-value of test                       :    0.56

Test on the Nm values of W_{n,i}(mNP1):    0.77
p-value of test                       :    0.50

Test on the jump times of Y
   (superposition of Yn):

Expected number of jumps of Y = mN    :     900
Number of jumps of Y                  :     900
p-value of test                       :    0.50

Stat. AD (mNP2)                       :    1.14
p-value of test                       :    0.29

Stat. AD after spacings (mNP2-S)      :    1.31
p-value of test                       :    0.23

-----------------------------------------------
CPU time used                    :  00:02:47.28

Generator state:



************************************************************
```

```
HOST = compute, Linux

Mersenne Twister 64 bit


snpair_ClosePairs test:
-----------------------------------------------
   N = 20,  n = 4000000,  r =  0,  t = 5,  p = 0,  m = 30,  Torus =  TRUE


---------------------------------------
Test based on the 2 nearest points (NP):

Stat. AD on the N values (NP)         :    2.91
p-value of test                       :    0.03


A2 test based on the spacings between the
   successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP)    :    1.14
p-value of test                       :    0.29

Test on the Nm values of W_{n,i}(mNP1):    1.11
p-value of test                       :    0.31

Test on the jump times of Y
   (superposition of Yn):

Expected number of jumps of Y = mN    :     600
Number of jumps of Y                  :     564
p-value of test                       :    0.93

Stat. AD (mNP2)                       :    0.86
p-value of test                       :    0.44

Stat. AD after spacings (mNP2-S)      :    0.37
p-value of test                       :    0.88

-----------------------------------------------
CPU time used                    :  00:02:05.53

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


snpair_ClosePairs test:
-----------------------------------------------
   N = 10,  n = 3000000,  r =  0,  t = 9,  p = 0,  m = 30,  Torus =  TRUE


---------------------------------------
Test based on the 2 nearest points (NP):

Stat. AD on the N values (NP)         :    4.42
p-value of test                       :  5.8e-3
```

```
A2 test based on the spacings between the
   successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP)    :    0.64
p-value of test                       :    0.61

Test on the Nm values of W_{n,i}(mNP1):    0.31
p-value of test                       :    0.93

Test on the jump times of Y
   (superposition of Yn):

Expected number of jumps of Y = mN    :     300
Number of jumps of Y                  :     297
p-value of test                       :    0.55

Stat. AD (mNP2)                       :    0.83
p-value of test                       :    0.46

Stat. AD after spacings (mNP2-S)      :    0.77
p-value of test                       :    0.50

-----------------------------------------------
CPU time used                    :  00:03:03.35

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


snpair_ClosePairs test:
-----------------------------------------------
   N =  5,  n = 2000000,  r =  0,  t = 16,  p = 0,  m = 30,  Torus =  TRUE


---------------------------------------
Test based on the 2 nearest points (NP):

Stat. AD on the N values (NP)         :    1.60
p-value of test                       :    0.16


A2 test based on the spacings between the
   successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP)    :    0.53
p-value of test                       :    0.70

Test on the Nm values of W_{n,i}(mNP1):    2.30
p-value of test                       :    0.06

Test on the jump times of Y
   (superposition of Yn):

Expected number of jumps of Y = mN    :     150
Number of jumps of Y                  :     163
p-value of test                       :    0.15
```

```
Stat. AD (mNP2)                       :    1.36
p-value of test                       :    0.21

Stat. AD after spacings (mNP2-S)      :    1.78
p-value of test                       :    0.12

------------------------------------------------
CPU time used                    :  00:03:20.39

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sknuth_SimpPoker test:
------------------------------------------------
   N =  1,  n = 400000000,  r =  0,   d =    8,   k =    8


------------------------------------------------
Number of degrees of freedom          :    7
Chi-square statistic                  :    6.01
p-value of test                       :    0.54

------------------------------------------------
CPU time used                    :  00:01:22.71

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sknuth_SimpPoker test:
------------------------------------------------
   N =  1,  n = 400000000,  r = 27,   d =    8,   k =    8


------------------------------------------------
Number of degrees of freedom          :    7
Chi-square statistic                  :    7.22
p-value of test                       :    0.41

------------------------------------------------
CPU time used                    :  00:01:32.28

Generator state:



************************************************************
```

```
HOST = compute, Linux

Mersenne Twister 64 bit


sknuth_SimpPoker test:
-----------------------------------------------
   N =  1,  n = 100000000,  r =  0,   d =   32,   k =   32


-----------------------------------------------
Number of degrees of freedom          :   18
Chi-square statistic                  :   22.48
p-value of test                       :    0.21

-----------------------------------------------
CPU time used                    :  00:01:24.11

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sknuth_SimpPoker test:
-----------------------------------------------
   N =  1,  n = 100000000,  r = 25,   d =   32,   k =   32


-----------------------------------------------
Number of degrees of freedom          :   18
Chi-square statistic                  :    8.53
p-value of test                       :    0.97

-----------------------------------------------
CPU time used                    :  00:01:32.52

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sknuth_CouponCollector test:
-----------------------------------------------
   N =  1,  n = 200000000,  r =  0,   d =    8


-----------------------------------------------
Number of degrees of freedom          :   54
Chi-square statistic                  :   59.55
p-value of test                       :    0.28

-----------------------------------------------
```

```
CPU time used                   :  00:01:46.55

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sknuth_CouponCollector test:
-----------------------------------------------
   N =  1,  n = 200000000,  r = 10,   d =    8


-----------------------------------------------
Number of degrees of freedom          :   54
Chi-square statistic                  :   33.43
p-value of test                       :    0.99

-----------------------------------------------
CPU time used                   :  00:01:57.23

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sknuth_CouponCollector test:
-----------------------------------------------
   N =  1,  n = 200000000,  r = 20,   d =    8


-----------------------------------------------
Number of degrees of freedom          :   54
Chi-square statistic                  :   50.50
p-value of test                       :    0.61

-----------------------------------------------
CPU time used                   :  00:01:58.10

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sknuth_CouponCollector test:
-----------------------------------------------
   N =  1,  n = 200000000,  r = 27,   d =    8
```

```
-----------------------------------------------
Number of degrees of freedom          :   54
Chi-square statistic                  :   43.32
p-value of test                       :    0.85

-----------------------------------------------
CPU time used                    :  00:01:58.13

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sknuth_Gap test:
-----------------------------------------------
   N =  1,  n = 500000000,  r =  0,   Alpha =        0,   Beta  =   0.0625


-----------------------------------------------
Number of degrees of freedom          :  232
Chi-square statistic                  :  222.51
p-value of test                       :    0.66

-----------------------------------------------
CPU time used                    :  00:02:29.59

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sknuth_Gap test:
-----------------------------------------------
   N =  1,  n = 300000000,  r = 25,   Alpha =        0,   Beta  =  0.03125


-----------------------------------------------
Number of degrees of freedom          :  434
Chi-square statistic                  :  505.18
p-value of test                       :    0.01

-----------------------------------------------
CPU time used                    :  00:03:09.14

Generator state:



************************************************************
```

```
HOST = compute, Linux

Mersenne Twister 64 bit


sknuth_Gap test:
-----------------------------------------------
   N =  1,  n = 100000000,  r =  0,   Alpha =        0,   Beta  = 0.0078125


-----------------------------------------------
Number of degrees of freedom          : 1437
Chi-square statistic                  : 1464.11
p-value of test                       :    0.30

-----------------------------------------------
CPU time used                    :  00:03:46.09

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sknuth_Gap test:
-----------------------------------------------
   N =  1,  n = 10000000,  r = 20,   Alpha =        0,   Beta  = 0.000976562


-----------------------------------------------
Number of degrees of freedom          : 7046
Chi-square statistic                  : 7150.91
p-value of test                       :    0.19

-----------------------------------------------
CPU time used                    :  00:03:14.52

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sknuth_Run test:
-----------------------------------------------
   N =  5,  n = 1000000000,  r =  0,   Up = FALSE


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.42
p-value of test                       :    0.13

Kolmogorov-Smirnov- statistic = D-    :   0.048
```

```
p-value of test                       :    0.94

Anderson-Darling statistic = A2       :    1.41
p-value of test                       :    0.20

Test on the sum of all N observations
Number of degrees of freedom          :   30
Chi-square statistic                  :   18.87
p-value of test                       :    0.94

-----------------------------------------------
CPU time used                    :  00:01:46.38

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sknuth_Run test:
-----------------------------------------------
   N = 10,  n = 1000000000,  r = 15,   Up =  TRUE


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.22
p-value of test                       :    0.32

Kolmogorov-Smirnov- statistic = D-    :   0.061
p-value of test                       :    0.90

Anderson-Darling statistic = A2       :    0.85
p-value of test                       :    0.44

Test on the sum of all N observations
Number of degrees of freedom          :   60
Chi-square statistic                  :   50.91
p-value of test                       :    0.79

-----------------------------------------------
CPU time used                    :  00:04:17.45

Generator state:



************************************************************
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smultin_Multinomial test:
-----------------------------------------------
```

```
   N =  1,  n = 1000000000,  r =  5,   t =  3,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =                  6
       Expected number per cell =  1.6666667e+08
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =  2.5000002e-09,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          :    5
Value of the statistic                :    3.08
p-value of test                       :    0.69


-----------------------------------------------
CPU time used                    :  00:01:18.40

Generator state:




************************************************************
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smultin_Multinomial test:
-----------------------------------------------
   N =  1,  n = 1000000000,  r =  5,   t =  5,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =                120
       Expected number per cell =   8333333.3
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =  5.9500005e-08,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          :  119
Value of the statistic                :  121.40
p-value of test                       :    0.42


-----------------------------------------------
CPU time used                    :  00:02:20.90

Generator state:
```

```
************************************************************
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smultin_Multinomial test:
-----------------------------------------------
   N =  1,  n = 500000000,  r =  5,   t =  7,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =               5040
       Expected number per cell =   99206.349
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =  5.0390004e-06,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          : 5039
Value of the statistic                : 4982.67
p-value of test                       :    0.71


-----------------------------------------------
CPU time used                    :  00:01:45.03

Generator state:




************************************************************
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smultin_Multinomial test:
-----------------------------------------------
   N =  1,  n = 500000000,  r = 10,   t = 10,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =            3628800
       Expected number per cell =    137.7866
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =   0.0036287993,    Sigma =          1
```

```
-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          : 3628799
Value of the statistic                : 3.62e+6
p-value of test                       :    0.98


-----------------------------------------------
CPU time used                    :  00:03:19.28

Generator state:



************************************************************
Test sknuth_CollisionPermut calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smultin_Multinomial test:
-----------------------------------------------
   N = 20,  n = 20000000,  r =  0,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =        87178291200
       Expected number per cell =  1 /  4358.9146
       EColl = n^2 / (2k) =   2294.14912
       Hashing =   TRUE

       Collision test,    Mu =      2293.9736,    Sigma =    47.8841

-----------------------------------------------
Test Results for Collisions

For the total number of collisions, we use
      the Poisson approximation:
Expected number of collisions = N*Mu  :    45879.47
Observed number of collisions         :    45991
p-value of test                       :    0.30


------------------------------
Total number of cells containing j balls

  j =  0                              :    1743165869991
  j =  1                              :        399908021
  j =  2                              :            45985
  j =  3                              :                3
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:04:57.04

Generator state:
```

```
************************************************************
Test sknuth_CollisionPermut calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smultin_Multinomial test:
-----------------------------------------------
   N = 20,  n = 20000000,  r = 10,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =        87178291200
       Expected number per cell =  1 /  4358.9146
       EColl = n^2 / (2k) =   2294.14912
       Hashing =   TRUE

       Collision test,    Mu =      2293.9736,    Sigma =    47.8841

-----------------------------------------------
Test Results for Collisions

For the total number of collisions, we use
      the Poisson approximation:
Expected number of collisions = N*Mu  :    45879.47
Observed number of collisions         :    46138
p-value of test                       :    0.11


------------------------------
Total number of cells containing j balls

  j =  0                              :    1743165870138
  j =  1                              :        399907728
  j =  2                              :            46130
  j =  3                              :                4
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:05:05.90

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sknuth_MaxOft test:
-----------------------------------------------
   N = 40,  n = 10000000,  r =  0,   d = 100000,   t =  8

      Number of categories = 100000
```

```
      Expected number per category  = 100.00


------------------------------------------------
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :    0.17
p-value of test                       :    0.09

Kolmogorov-Smirnov- statistic = D-    :   0.040
p-value of test                       :    0.85

Anderson-Darling statistic = A2       :    1.54
p-value of test                       :    0.17

Test on the sum of all N observations
Number of degrees of freedom          : 3999960
Chi-square statistic                  : 4.00e+6
p-value of test                       :    0.92


------------------------------------------------
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :    0.19
p-value of test                       :    0.05

Kolmogorov-Smirnov- statistic = D-    :   0.040
p-value of test                       :    0.86

Anderson-Darling statistic = A2       :    1.84
p-value of test                       :    0.11


------------------------------------------------
CPU time used                    :  00:03:21.53

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sknuth_MaxOft test:
------------------------------------------------
   N = 30,  n = 10000000,  r =  0,   d = 100000,   t = 16

      Number of categories = 100000
      Expected number per category  = 100.00


------------------------------------------------
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :   0.081
p-value of test                       :    0.64

Kolmogorov-Smirnov- statistic = D-    :   0.071
p-value of test                       :    0.70
```

```
Anderson-Darling statistic = A2       :    0.24
p-value of test                       :    0.98

Test on the sum of all N observations
Number of degrees of freedom          : 2999970
Chi-square statistic                  : 3.00e+6
p-value of test                       :    0.57


------------------------------------------------
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :   0.065
p-value of test                       :    0.74

Kolmogorov-Smirnov- statistic = D-    :    0.21
p-value of test                       :    0.07

Anderson-Darling statistic = A2       :    0.87
p-value of test                       :    0.43


------------------------------------------------
CPU time used                    :  00:03:13.30

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sknuth_MaxOft test:
------------------------------------------------
   N = 20,  n = 10000000,  r =  0,   d = 100000,   t = 24

      Number of categories = 100000
      Expected number per category  = 100.00


------------------------------------------------
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :    0.14
p-value of test                       :    0.40

Kolmogorov-Smirnov- statistic = D-    :   0.095
p-value of test                       :    0.66

Anderson-Darling statistic = A2       :    0.57
p-value of test                       :    0.67

Test on the sum of all N observations
Number of degrees of freedom          : 1999980
Chi-square statistic                  : 2.00e+6
p-value of test                       :    0.59


------------------------------------------------
```

```
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :   0.094
p-value of test                       :    0.66

Kolmogorov-Smirnov- statistic = D-    :   0.097
p-value of test                       :    0.64

Anderson-Darling statistic = A2       :    0.28
p-value of test                       :    0.95


------------------------------------------------
CPU time used                    :  00:02:36.03

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sknuth_MaxOft test:
------------------------------------------------
   N = 20,  n = 10000000,  r =  0,   d = 100000,   t = 32

      Number of categories = 100000
      Expected number per category  = 100.00


------------------------------------------------
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :    0.30
p-value of test                       :    0.02

Kolmogorov-Smirnov- statistic = D-    :   0.065
p-value of test                       :    0.81

Anderson-Darling statistic = A2       :    2.16
p-value of test                       :    0.08

Test on the sum of all N observations
Number of degrees of freedom          : 1999980
Chi-square statistic                  : 2.00e+6
p-value of test                       :    0.95


------------------------------------------------
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :    0.20
p-value of test                       :    0.18

Kolmogorov-Smirnov- statistic = D-    :   0.076
p-value of test                       :    0.75

Anderson-Darling statistic = A2       :    0.83
p-value of test                       :    0.46
```

```
-----------------------------------------------
CPU time used                    :  00:03:03.42

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


svaria_SampleProd test:
-----------------------------------------------
   N = 40,  n = 10000000,  r =  0,   t = 8


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.054
p-value of test                       :    0.76

Kolmogorov-Smirnov- statistic = D-    :    0.16
p-value of test                       :    0.13

Anderson-Darling statistic = A2       :    0.81
p-value of test                       :    0.47

-----------------------------------------------
CPU time used                    :  00:02:46.92

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


svaria_SampleProd test:
-----------------------------------------------
   N = 20,  n = 10000000,  r =  0,   t = 16


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.10
p-value of test                       :    0.62

Kolmogorov-Smirnov- statistic = D-    :    0.24
p-value of test                       :    0.09

Anderson-Darling statistic = A2       :    1.18
p-value of test                       :    0.28

-----------------------------------------------
CPU time used                    :  00:02:08.78
```

```
Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


svaria_SampleProd test:
-----------------------------------------------
   N = 20,  n = 10000000,  r =  0,   t = 24


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.032
p-value of test                       :    0.94

Kolmogorov-Smirnov- statistic = D-    :    0.25
p-value of test                       :    0.06

Anderson-Darling statistic = A2       :    3.11
p-value of test                       :    0.02

-----------------------------------------------
CPU time used                    :  00:02:53.84

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


svaria_SampleMean test:
-----------------------------------------------
   N = 20000000,  n = 30,  r =  0


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 6.80e-5
p-value of test                       :    0.83

Kolmogorov-Smirnov- statistic = D-    : 1.77e-4
p-value of test                       :    0.29

Anderson-Darling statistic = A2       :    0.93
p-value of test                       :    0.40

-----------------------------------------------
CPU time used                    :  00:00:36.34

Generator state:
```

```
************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


svaria_SampleMean test:
------------------------------------------------
   N = 20000000,  n = 30,  r = 10


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 2.24e-4
p-value of test                       :    0.13

Kolmogorov-Smirnov- statistic = D-    : 1.24e-4
p-value of test                       :    0.54

Anderson-Darling statistic = A2       :    1.18
p-value of test                       :    0.28

------------------------------------------------
CPU time used                    :  00:00:37.03

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


svaria_SampleCorr test:
------------------------------------------------
   N =  1,  n = 2000000000,  r =  0,   k = 1


------------------------------------------------
Normal statistic                      :    0.62
p-value of test                       :    0.27

------------------------------------------------
CPU time used                    :  00:00:37.55

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


svaria_SampleCorr test:
------------------------------------------------
   N =  1,  n = 2000000000,  r =  0,   k = 2
```

```
-----------------------------------------------
Normal statistic                      :   -0.89
p-value of test                       :    0.81

-----------------------------------------------
CPU time used                     :  00:00:37.67

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


svaria_AppearanceSpacings test:
-----------------------------------------------
   N =  1,   Q = 10000000,   K = 1000000000,   r = 0,   s = 3,   L = 15

   Sequences of n = (K + Q)L =  15150000000 bits
   Q = 10000000 initialization blocks
   K = 1000000000 blocks for the test
   the blocks have L = 15 bits



-----------------------------------------------
Normal statistic                      :  -0.033
p-value of test                       :    0.51

-----------------------------------------------
CPU time used                     :  00:02:38.98

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


svaria_AppearanceSpacings test:
-----------------------------------------------
   N =  1,   Q = 10000000,   K = 1000000000,   r = 27,   s = 3,   L = 15

   Sequences of n = (K + Q)L =  15150000000 bits
   Q = 10000000 initialization blocks
   K = 1000000000 blocks for the test
   the blocks have L = 15 bits



-----------------------------------------------
Normal statistic                      :   -1.22
p-value of test                       :    0.89

-----------------------------------------------
```

```
CPU time used                   :  00:02:47.84

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


svaria_WeightDistrib test:
-----------------------------------------------
   N =  1,  n = 20000000,  r =  0,  k = 256,  Alpha =      0,  Beta =   0.25


-----------------------------------------------
Number of degrees of freedom          :   67
Chi-square statistic                  :   63.28
p-value of test                       :    0.61

-----------------------------------------------
CPU time used                   :  00:01:32.30

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


svaria_WeightDistrib test:
-----------------------------------------------
   N =  1,  n = 20000000,  r = 20,  k = 256,  Alpha =      0,  Beta =   0.25


-----------------------------------------------
Number of degrees of freedom          :   67
Chi-square statistic                  :   68.46
p-value of test                       :    0.43

-----------------------------------------------
CPU time used                   :  00:01:40.54

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


svaria_WeightDistrib test:
-----------------------------------------------
   N =  1,  n = 20000000,  r = 28,  k = 256,  Alpha =      0,  Beta =   0.25
```

```
------------------------------------------------
Number of degrees of freedom          :   67
Chi-square statistic                  :   70.95
p-value of test                       :    0.35

------------------------------------------------
CPU time used                    :  00:01:40.54

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


svaria_WeightDistrib test:
------------------------------------------------
   N =  1,  n = 20000000,  r =  0,  k = 256,  Alpha =      0,  Beta = 0.0625


------------------------------------------------
Number of degrees of freedom          :   37
Chi-square statistic                  :   41.36
p-value of test                       :    0.29

------------------------------------------------
CPU time used                    :  00:01:32.90

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


svaria_WeightDistrib test:
------------------------------------------------
   N =  1,  n = 20000000,  r = 10,  k = 256,  Alpha =      0,  Beta = 0.0625


------------------------------------------------
Number of degrees of freedom          :   37
Chi-square statistic                  :   27.54
p-value of test                       :    0.87

------------------------------------------------
CPU time used                    :  00:01:40.45

Generator state:



************************************************************
```

```
HOST = compute, Linux

Mersenne Twister 64 bit


svaria_WeightDistrib test:
-----------------------------------------------
   N =  1,  n = 20000000,  r = 26,  k = 256,  Alpha =      0,  Beta = 0.0625


-----------------------------------------------
Number of degrees of freedom          :   37
Chi-square statistic                  :   33.18
p-value of test                       :    0.65

-----------------------------------------------
CPU time used                     :  00:01:40.40

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


svaria_SumCollector test:
-----------------------------------------------
   N =  1,  n = 500000000,  r =  0,   g = 10


-----------------------------------------------
Number of degrees of freedom          :   29
Chi-square statistic                  :   21.94
p-value of test                       :    0.82

-----------------------------------------------
CPU time used                     :  00:03:08.71

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smarsa_MatrixRank test:
-----------------------------------------------
   N = 10,  n = 1000000,  r =  0,    s = 5,    L = 30,    k = 30


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.24
p-value of test                       :    0.27

Kolmogorov-Smirnov- statistic = D-    :    0.21
```

```
p-value of test                       :    0.35

Anderson-Darling statistic = A2       :    1.43
p-value of test                       :    0.19

Test on the sum of all N observations
Number of degrees of freedom          :   40
Chi-square statistic                  :   50.59
p-value of test                       :    0.12

-----------------------------------------------
CPU time used                    :  00:01:37.48

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smarsa_MatrixRank test:
-----------------------------------------------
   N = 10,  n = 1000000,  r = 25,    s = 5,    L = 30,    k = 30


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.23
p-value of test                       :    0.29

Kolmogorov-Smirnov- statistic = D-    :    0.11
p-value of test                       :    0.73

Anderson-Darling statistic = A2       :    0.62
p-value of test                       :    0.63

Test on the sum of all N observations
Number of degrees of freedom          :   40
Chi-square statistic                  :   37.31
p-value of test                       :    0.59

-----------------------------------------------
CPU time used                    :  00:01:37.57

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smarsa_MatrixRank test:
-----------------------------------------------
   N =  1,  n = 5000,  r =  0,    s = 4,    L = 1000,    k = 1000
```

```
-----------------------------------------------
Number of degrees of freedom          :    3
Chi-square statistic                  :    0.92
p-value of test                       :    0.82

-----------------------------------------------
CPU time used                    :  00:03:40.25

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smarsa_MatrixRank test:
-----------------------------------------------
   N =  1,  n = 5000,  r = 26,    s = 4,    L = 1000,    k = 1000


-----------------------------------------------
Number of degrees of freedom          :    3
Chi-square statistic                  :    0.52
p-value of test                       :    0.91

-----------------------------------------------
CPU time used                    :  00:03:39.98

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smarsa_MatrixRank test:
-----------------------------------------------
   N =  1,  n = 80,  r = 15,    s = 15,    L = 5000,    k = 5000


-----------------------------------------------
Number of degrees of freedom          :    2
Chi-square statistic                  :    2.34
p-value of test                       :    0.31

-----------------------------------------------
CPU time used                    :  00:02:37.77

Generator state:



************************************************************
HOST = compute, Linux
```

```
Mersenne Twister 64 bit


smarsa_MatrixRank test:
-----------------------------------------------
   N =  1,  n = 80,  r =  0,    s = 30,    L = 5000,    k = 5000


-----------------------------------------------
Number of degrees of freedom          :    2
Chi-square statistic                  :    1.30
p-value of test                       :    0.52

-----------------------------------------------
CPU time used                     :  00:02:01.21

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smarsa_Savir2 test:
-----------------------------------------------
   N = 10,  n = 10000000,  r = 10,    m = 1048576,    t = 30


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.14
p-value of test                       :    0.62

Kolmogorov-Smirnov- statistic = D-    :    0.25
p-value of test                       :    0.25

Anderson-Darling statistic = A2       :    0.52
p-value of test                       :    0.72

Test on the sum of all N observations
Number of degrees of freedom          :  130
Chi-square statistic                  :  136.29
p-value of test                       :    0.34

-----------------------------------------------
CPU time used                     :  00:00:58.35

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


smarsa_GCD test:
-----------------------------------------------
```

```
   N = 10,  n = 50000000,  r =  0,   s = 30


-----------------------------------------------
Test results for GCD values:

Kolmogorov-Smirnov+ statistic = D+    :    0.35
p-value of test                       :    0.07

Kolmogorov-Smirnov- statistic = D-    :   0.074
p-value of test                       :    0.86

Anderson-Darling statistic = A2       :    3.01
p-value of test                       :    0.03

Test on the sum of all N observations
Number of degrees of freedom          : 17430
Chi-square statistic                  :17041.95
p-value of test                       :    0.98



-----------------------------------------------
CPU time used                    :  00:02:08.09

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 100000000,  r =  0,   s = 5,   L0 =   50,   L1 =   50



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :   36
ChiSquare statistic                   :   55.07
p-value of test                       :    0.02


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :   35
ChiSquare statistic                   :   33.39
p-value of test                       :    0.55


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          :   25
ChiSquare statistic                   :   19.23
p-value of test                       :    0.79
```

```
-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :   24
ChiSquare statistic                   :   37.28
p-value of test                       :    0.04


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :   17
ChiSquare statistic                   :   19.82
p-value of test                       :    0.28


-----------------------------------------------
CPU time used                    :  00:01:02.22

Generator state:




***********************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 100000000,  r = 25,   s = 5,   L0 =   50,   L1 =   50



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :   36
ChiSquare statistic                   :   29.26
p-value of test                       :    0.78


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :   35
ChiSquare statistic                   :   26.71
p-value of test                       :    0.84


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          :   25
ChiSquare statistic                   :   14.23
p-value of test                       :    0.96


-----------------------------------------------
Test on the values of the Statistic R
```

```
Number of degrees of freedom          :   24
ChiSquare statistic                   :   14.83
p-value of test                       :    0.93


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :   17
ChiSquare statistic                   :   14.96
p-value of test                       :    0.60


-----------------------------------------------
CPU time used                    :  00:01:10.73

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 10000000,  r =  0,   s = 10,   L0 = 1000,   L1 = 1000



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :  146
ChiSquare statistic                   :  167.85
p-value of test                       :    0.10


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :  146
ChiSquare statistic                   :  168.22
p-value of test                       :    0.10


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          :  500
ChiSquare statistic                   :  449.43
p-value of test                       :    0.95


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :  136
ChiSquare statistic                   :  126.32
p-value of test                       :    0.71
```

```
-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :   74
ChiSquare statistic                   :   82.07
p-value of test                       :    0.24


-----------------------------------------------
CPU time used                    :  00:01:39.04

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 10000000,  r = 20,   s = 10,   L0 = 1000,   L1 = 1000



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :  146
ChiSquare statistic                   :  164.61
p-value of test                       :    0.14


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :  146
ChiSquare statistic                   :  134.15
p-value of test                       :    0.75


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          :  500
ChiSquare statistic                   :  485.34
p-value of test                       :    0.67


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :  136
ChiSquare statistic                   :  125.04
p-value of test                       :    0.74


-----------------------------------------------
Test on the values of the Statistic C
```

```
Number of degrees of freedom          :   74
ChiSquare statistic                   :   61.56
p-value of test                       :    0.85


-----------------------------------------------
CPU time used                    :  00:01:46.98

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 1000000,  r =  0,   s = 15,   L0 = 10000,   L1 = 10000



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :  384
ChiSquare statistic                   :  392.21
p-value of test                       :    0.38


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :  384
ChiSquare statistic                   :  391.36
p-value of test                       :    0.39


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          : 5000
ChiSquare statistic                   : 5181.50
p-value of test                       :    0.04


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :  378
ChiSquare statistic                   :  359.13
p-value of test                       :    0.75


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :  200
ChiSquare statistic                   :  173.04
p-value of test                       :    0.92
```

```
------------------------------------------------
CPU time used                   :  00:01:29.10

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


swalk_RandomWalk1 test:
------------------------------------------------
   N =  1,  n = 1000000,  r = 15,   s = 15,   L0 = 10000,   L1 = 10000



------------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :  384
ChiSquare statistic                   :  343.40
p-value of test                       :    0.93


------------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :  384
ChiSquare statistic                   :  426.38
p-value of test                       :    0.07


------------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          : 5000
ChiSquare statistic                   : 4997.62
p-value of test                       :    0.51


------------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :  378
ChiSquare statistic                   :  354.10
p-value of test                       :    0.81


------------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :  200
ChiSquare statistic                   :  212.75
p-value of test                       :    0.26


------------------------------------------------
CPU time used                   :  00:01:33.94
```

```
Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


scomp_LinearComp test:
------------------------------------------------
   N =  1,  n = 400020,  r =  0,    s = 1



------------------------------------------------
Number of degrees of freedom          :   12
Chi2 statistic for size of jumps      :    4.35
p-value of test                       :    0.98


------------------------------------------------
Normal statistic for number of jumps  : -402.69
p-value of test                       : 1 - eps1    *****



------------------------------------------------
CPU time used                    :  00:00:07.96

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


scomp_LinearComp test:
------------------------------------------------
   N =  1,  n = 400020,  r = 29,    s = 1



------------------------------------------------
Number of degrees of freedom          :   12
Chi2 statistic for size of jumps      :    9.79
p-value of test                       :    0.63


------------------------------------------------
Normal statistic for number of jumps  : -402.59
p-value of test                       : 1 - eps1    *****



------------------------------------------------
CPU time used                    :  00:00:07.96
```

```
Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


scomp_LempelZiv test:
------------------------------------------------
   N = 10,  n = 134217728,  r =  0,   s =   30,   k =   27


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.18
p-value of test                       :    0.47

Kolmogorov-Smirnov- statistic = D-    :    0.11
p-value of test                       :    0.71

Anderson-Darling statistic = A2       :    0.32
p-value of test                       :    0.92

Tests on the sum of all N observations
Standardized normal statistic         :   0.011
p-value of test                       :    0.50

Sample variance                       :    0.76
p-value of test                       :    0.65

------------------------------------------------
CPU time used                    :  00:01:01.67

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


scomp_LempelZiv test:
------------------------------------------------
   N = 10,  n = 134217728,  r = 15,   s =   15,   k =   27


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.18
p-value of test                       :    0.45

Kolmogorov-Smirnov- statistic = D-    :    0.23
p-value of test                       :    0.30

Anderson-Darling statistic = A2       :    0.55
p-value of test                       :    0.69
```

```
Tests on the sum of all N observations
Standardized normal statistic         :    0.12
p-value of test                       :    0.45

Sample variance                       :    1.32
p-value of test                       :    0.22

-----------------------------------------------
CPU time used                    :  00:01:03.88

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sspectral_Fourier3 test:
-----------------------------------------------
   N = 100000,  n = 16384,  r =  0,   s =    3,   k =   14


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.016
p-value of test                       :    0.13

Kolmogorov-Smirnov- statistic = D-    :   0.010
p-value of test                       :    0.43

Anderson-Darling statistic = A2       :    1.55
p-value of test                       :    0.17

-----------------------------------------------
CPU time used                    :  00:00:52.61

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sspectral_Fourier3 test:
-----------------------------------------------
   N = 100000,  n = 16384,  r = 27,   s =    3,   k =   14


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 8.54e-3
p-value of test                       :    0.55

Kolmogorov-Smirnov- statistic = D-    : 9.96e-3
p-value of test                       :    0.44
```

```
Anderson-Darling statistic = A2       :    0.71
p-value of test                       :    0.55

------------------------------------------------
CPU time used                    :  00:00:54.90

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sstring_LongestHeadRun test:
------------------------------------------------
   N =  1,  n = 1000,  r =  0,   s = 3,   L = 10000020


------------------------------------------------
Number of degrees of freedom          :    8
Chi-square statistic                  :    5.72
p-value of test                       :    0.68

------------------------------------------------
Global longest run of 1               :   40.00
p-value of test                       :  4.5e-3



------------------------------------------------
CPU time used                    :  00:01:56.78

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sstring_LongestHeadRun test:
------------------------------------------------
   N =  1,  n = 1000,  r = 27,   s = 3,   L = 10000020


------------------------------------------------
Number of degrees of freedom          :    8
Chi-square statistic                  :   11.40
p-value of test                       :    0.18

------------------------------------------------
Global longest run of 1               :   39.00
p-value of test                       :  9.1e-3
```

```
------------------------------------------------
CPU time used                   :  00:02:19.84

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sstring_PeriodsInStrings test:
------------------------------------------------
   N = 10,  n = 500000000,  r =  0,   s =   10


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.048
p-value of test                       :    0.93

Kolmogorov-Smirnov- statistic = D-    :    0.21
p-value of test                       :    0.36

Anderson-Darling statistic = A2       :    0.79
p-value of test                       :    0.48

Test on the sum of all N observations
Number of degrees of freedom          :  200
Chi-square statistic                  :  220.27
p-value of test                       :    0.16

------------------------------------------------
CPU time used                   :  00:03:29.52

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sstring_PeriodsInStrings test:
------------------------------------------------
   N = 10,  n = 500000000,  r = 20,   s =   10


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.17
p-value of test                       :    0.52

Kolmogorov-Smirnov- statistic = D-    :    0.23
p-value of test                       :    0.30

Anderson-Darling statistic = A2       :    0.66
p-value of test                       :    0.59
```

```
Test on the sum of all N observations
Number of degrees of freedom          :  200
Chi-square statistic                  :  195.87
p-value of test                       :    0.57

-----------------------------------------------
CPU time used                    :  00:03:36.55

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sstring_HammingWeight2 test:
-----------------------------------------------
   N = 10,  n = 1000000000,  r =  0,   s = 3,   L = 1000000


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.26
p-value of test                       :    0.21

Kolmogorov-Smirnov- statistic = D-    :    0.18
p-value of test                       :    0.46

Anderson-Darling statistic = A2       :    0.94
p-value of test                       :    0.39

Test on the sum of all N observations
Number of degrees of freedom          : 10000
Chi-square statistic                  :10015.70
p-value of test                       :    0.45

-----------------------------------------------
CPU time used                    :  00:01:57.08

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sstring_HammingWeight2 test:
-----------------------------------------------
   N = 10,  n = 1000000000,  r = 27,   s = 3,   L = 1000000


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.16
p-value of test                       :    0.55
```

```
Kolmogorov-Smirnov- statistic = D-    :    0.23
p-value of test                       :    0.30

Anderson-Darling statistic = A2       :    0.60
p-value of test                       :    0.64

Test on the sum of all N observations
Number of degrees of freedom          : 10000
Chi-square statistic                  :10057.15
p-value of test                       :    0.34

------------------------------------------------
CPU time used                    :  00:02:07.63

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sstring_HammingCorr test:
------------------------------------------------
   N =  1,  n = 1000000000,  r = 10,   s = 10,   L = 30



------------------------------------------------
Normal statistic                      :    0.13
p-value of test                       :    0.45

------------------------------------------------
CPU time used                    :  00:01:58.34

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sstring_HammingCorr test:
------------------------------------------------
   N =  1,  n = 100000000,  r = 10,   s = 10,   L = 300



------------------------------------------------
Normal statistic                      :   -0.47
p-value of test                       :    0.68

------------------------------------------------
CPU time used                    :  00:01:53.98

Generator state:
```

```
************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sstring_HammingCorr test:
-----------------------------------------------
   N =  1,  n = 100000000,  r = 10,   s = 10,   L = 1200



-----------------------------------------------
Normal statistic                      :    0.23
p-value of test                       :    0.41

-----------------------------------------------
CPU time used                    :  00:07:34.10

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sstring_HammingIndep test:
-----------------------------------------------
   N = 10,  n = 30000000,  r =  0,   s = 3,   L = 30,   d = 0



Counters with expected numbers >= 10
-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.083
p-value of test                       :    0.83

Kolmogorov-Smirnov- statistic = D-    :    0.30
p-value of test                       :    0.14

Anderson-Darling statistic = A2       :    1.11
p-value of test                       :    0.30

Test on the sum of all N observations
Number of degrees of freedom          : 4890
Chi-square statistic                  : 5003.92
p-value of test                       :    0.13

-----------------------------------------------
CPU time used                    :  00:02:58.65

Generator state:
```

```
************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sstring_HammingIndep test:
-------------------------------------------------
   N = 10,  n = 30000000,  r = 27,   s = 3,   L = 30,   d = 0



Counters with expected numbers >= 10
-------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.30
p-value of test                       :    0.14

Kolmogorov-Smirnov- statistic = D-    :   0.052
p-value of test                       :    0.92

Anderson-Darling statistic = A2       :    1.40
p-value of test                       :    0.20

Test on the sum of all N observations
Number of degrees of freedom          : 4890
Chi-square statistic                  : 4744.37
p-value of test                       :    0.93

-------------------------------------------------
CPU time used                    :  00:03:18.09

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sstring_HammingIndep test:
-------------------------------------------------
   N =  1,  n = 30000000,  r =  0,   s = 4,   L = 300,   d = 0



Counters with expected numbers >= 10
-------------------------------------------------
Number of degrees of freedom          : 4117
Chi-square statistic                  : 4080.92
p-value of test                       :    0.65

-------------------------------------------------
CPU time used                    :  00:02:20.61

Generator state:
```

```
************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sstring_HammingIndep test:
-------------------------------------------------
   N =  1,  n = 30000000,  r = 26,   s = 4,   L = 300,   d = 0



Counters with expected numbers >= 10
-------------------------------------------------
Number of degrees of freedom          : 4117
Chi-square statistic                  : 4092.64
p-value of test                       :    0.60

-------------------------------------------------
CPU time used                    :  00:02:30.40

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sstring_HammingIndep test:
-------------------------------------------------
   N =  1,  n = 10000000,  r =  0,   s = 5,   L = 1200,   d = 0



Counters with expected numbers >= 10
-------------------------------------------------
Number of degrees of freedom          : 11825
Chi-square statistic                  :11984.38
p-value of test                       :    0.15

-------------------------------------------------
CPU time used                    :  00:02:32.92

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sstring_HammingIndep test:
-------------------------------------------------
   N =  1,  n = 10000000,  r = 25,   s = 5,   L = 1200,   d = 0
```

```
Counters with expected numbers >= 10
-------------------------------------------
Number of degrees of freedom          : 11825
Chi-square statistic                  :11814.58
p-value of test                       :    0.53

-------------------------------------------
CPU time used                    :  00:02:45.92

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sstring_Run test:
-------------------------------------------
   N =  1,  n = 2000000000,  r =  0,   s =    3


-------------------------------------------
Total number of 1 runs:  2000000000

Number of degrees of freedom          :   54
Chi2 statistic for number of runs     :   42.11
p-value of test                       :    0.88


-------------------------------------------
Total number of bits:  7999984143

Normal statistic for number of bits   :   -0.13
p-value of test                       :    0.55



-------------------------------------------
CPU time used                    :  00:01:35.96

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sstring_Run test:
-------------------------------------------
   N =  1,  n = 2000000000,  r = 27,   s =    3


-------------------------------------------
Total number of 1 runs:  2000000000

Number of degrees of freedom          :   54
```

```
Chi2 statistic for number of runs     :   49.08
p-value of test                       :    0.66


------------------------------------------------
Total number of bits:  8000123646

Normal statistic for number of bits   :    0.98
p-value of test                       :    0.16



------------------------------------------------
CPU time used                    :  00:01:52.89

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sstring_AutoCor test:
------------------------------------------------
   N = 10,  n = 1000000030,  r =  0,   s = 3,   d = 1


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.18
p-value of test                       :    0.46

Kolmogorov-Smirnov- statistic = D-    :    0.16
p-value of test                       :    0.55

Anderson-Darling statistic = A2       :    0.41
p-value of test                       :    0.84

Tests on the sum of all N observations
Standardized normal statistic         :   -0.23
p-value of test                       :    0.59

Sample variance                       :    0.61
p-value of test                       :    0.79

------------------------------------------------
CPU time used                    :  00:02:51.77

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sstring_AutoCor test:
```

```
-----------------------------------------------
   N = 10,  n = 1000000029,  r =  0,   s = 3,   d = 3


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.35
p-value of test                       :    0.06

Kolmogorov-Smirnov- statistic = D-    :    0.10
p-value of test                       :    0.76

Anderson-Darling statistic = A2       :    1.15
p-value of test                       :    0.29

Tests on the sum of all N observations
Standardized normal statistic         :   -0.79
p-value of test                       :    0.79

Sample variance                       :    0.34
p-value of test                       :    0.96

-----------------------------------------------
CPU time used                    :  00:02:57.41

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sstring_AutoCor test:
-----------------------------------------------
   N = 10,  n = 1000000030,  r = 27,   s = 3,   d = 1


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.29
p-value of test                       :    0.15

Kolmogorov-Smirnov- statistic = D-    :    0.17
p-value of test                       :    0.50

Anderson-Darling statistic = A2       :    0.84
p-value of test                       :    0.45

Tests on the sum of all N observations
Standardized normal statistic         :   -0.61
p-value of test                       :    0.73

Sample variance                       :    0.72
p-value of test                       :    0.69

-----------------------------------------------
CPU time used                    :  00:03:17.73

Generator state:
```

```
***********************************************************
HOST = compute, Linux

Mersenne Twister 64 bit


sstring_AutoCor test:
-----------------------------------------------
   N = 10,  n = 1000000029,  r = 27,   s = 3,   d = 3


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.24
p-value of test                       :    0.28

Kolmogorov-Smirnov- statistic = D-    :   0.075
p-value of test                       :    0.86

Anderson-Darling statistic = A2       :    0.72
p-value of test                       :    0.54

Tests on the sum of all N observations
Standardized normal statistic         :   -0.84
p-value of test                       :    0.80

Sample variance                       :    0.67
p-value of test                       :    0.73

-----------------------------------------------
CPU time used                    :  00:02:58.76

Generator state:




========= Summary results of BigCrush =========

 Version:          TestU01 1.2.3
 Generator:        Mersenne Twister 64 bit
 Number of statistics:  160
 Total CPU time:   04:24:16.76
 The following tests gave p-values outside [0.001, 0.9990]:
 (eps  means a value < 1.0e-300):
 (eps1 means a value < 1.0e-15):

       Test                          p-value
 ----------------------------------------------
 12  CollisionOver, t = 21           0.9995
 80  LinearComp, r = 0              1 - eps1
 81  LinearComp, r = 29             1 - eps1
 ----------------------------------------------
 All other tests were passed



***************************************
Test for Mersenne Twister (ROOT) generator ...
***************************************
```

```
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
                Starting BigCrush
                Version: TestU01 1.2.3
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx


***********************************************************
Test smarsa_SerialOver calling smultin_MultinomialOver

***********************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smultin_MultinomialOver test:
-----------------------------------------------
   N =  1,  n = 1000000000,  r =  0,   d =  256,   t =  3,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =           16777216
       Expected number per cell =   59.604645
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =   0.0083558402,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          : 16711680
Value of the statistic                : 1.67e+7
p-value of test                       :    0.39


-----------------------------------------------
CPU time used                    :  00:00:55.73

Generator state:




***********************************************************
Test smarsa_SerialOver calling smultin_MultinomialOver

***********************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smultin_MultinomialOver test:
-----------------------------------------------
   N =  1,  n = 1000000000,  r = 22,   d =  256,   t =  3,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =           16777216
       Expected number per cell =   59.604645
       Hashing =  FALSE
```

```
   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =   0.0083558402,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          : 16711680
Value of the statistic                : 1.67e+7
p-value of test                       :    0.83


-----------------------------------------------
CPU time used                    :  00:00:59.40

Generator state:




************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d = 2097152,   t =  2,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1365
p-value of test                       :    0.50

------------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334485
  j =  1                              :       599997270
  j =  2                              :            1365
  j =  3                              :               0
  j =  4                              :               0
  j =  5                              :               0
```

```
-----------------------------------------------
CPU time used                    :  00:02:29.19

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  9,   d = 2097152,   t =  2,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1390
p-value of test                       :    0.25

------------------------------
Total number of cells containing j balls

  j =  0                             :  1319407953345l0
  j =  1                             :        599997220
  j =  2                             :             1390
  j =  3                             :                0
  j =  4                             :                0
  j =  5                             :                0

-----------------------------------------------
CPU time used                    :  00:02:32.19

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
```

```
HOST = compute, Linux

Mersenne Twister(ROOT)


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d = 16384,   t =  3,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


------------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1365
p-value of test                       :    0.50

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334485
  j =  1                              :        599997270
  j =  2                              :             1365
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:03:43.02

Generator state:




************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r = 16,   d = 16384,   t =  3,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
```

```
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


------------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1307
p-value of test                       :    0.94

-----------------------------
Total number of cells containing j balls

  j =  0                              :  1319407953344427
  j =  1                              :        599997386
  j =  2                              :             1307
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

------------------------------------------------
CPU time used                    :  00:03:46.64

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smultin_MultinomialOver test:
------------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d =   64,   t =  7,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


------------------------------------------------
Results of CollisionOver test:
```

```
POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1337
p-value of test                       :    0.76

-----------------------------
Total number of cells containing j balls

  j =  0                              :  1319407953344457
  j =  1                              :        599997326
  j =  2                              :             1337
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                     :  00:03:45.96

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r = 24,   d =   64,   t =  7,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1378
p-value of test                       :    0.36

-----------------------------
Total number of cells containing j balls

  j =  0                              :  1319407953344498
  j =  1                              :        599997244
  j =  2                              :             1378
```

```
  j =  3                              :               0
  j =  4                              :               0
  j =  5                              :               0

-----------------------------------------------
CPU time used                    :  00:03:49.01

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d =    8,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1367
p-value of test                       :    0.47

------------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334487
  j =  1                              :        599997266
  j =  2                              :             1367
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:03:45.52

Generator state:
```

```
************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r = 27,   d =    8,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1373
p-value of test                       :    0.41

------------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334493
  j =  1                              :        599997254
  j =  2                              :             1373
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:03:49.89

Generator state:




************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d =    4,   t = 21,
```

```
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


------------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1350
p-value of test                       :    0.64

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334470
  j =  1                              :        599997300
  j =  2                              :             1350
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

------------------------------------------------
CPU time used                    :  00:03:45.54

Generator state:




************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smultin_MultinomialOver test:
------------------------------------------------
   N = 30,  n = 20000000,  r = 28,   d =    4,   t = 21,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47
```

```
-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1379
p-value of test                       :    0.35

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334499
  j =  1                              :        599997242
  j =  2                              :             1379
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:03:47.46

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 100,  n = 10000000,  r =  0,    d = 2147483648,    t = 2,    p = 1


      Number of cells = d^t = 4611686018427387904
      Lambda = Poisson mean =      54.2101


---------------------------------------------------
Total expected number = N*Lambda      :    5421.01
Total observed number                 :    5501
p-value of test                       :    0.14


-----------------------------------------------
CPU time used                    :  00:04:04.96

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smarsa_BirthdaySpacings test:
```

```
-----------------------------------------------
   N = 20,  n = 20000000,  r =  0,    d = 2097152,    t = 3,    p = 1


      Number of cells = d^t = 9223372036854775808
      Lambda = Poisson mean =     216.8404


-------------------------------------------------------
Total expected number = N*Lambda      :    4336.81
Total observed number                 :    4364
p-value of test                       :    0.34


-----------------------------------------------
CPU time used                    :  00:01:45.28

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 30000000,  r = 14,    d = 65536,    t = 4,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


-------------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7298
p-value of test                       :    0.59


-----------------------------------------------
CPU time used                    :  00:02:52.20

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 20000000,  r =  0,    d = 512,    t = 7,    p = 1


      Number of cells = d^t = 9223372036854775808
      Lambda = Poisson mean =     216.8404
```

```
-------------------------------------------------
Total expected number = N*Lambda      :    4336.81
Total observed number                 :    4349
p-value of test                       :    0.43


-----------------------------------------------
CPU time used                    :  00:02:00.90

Generator state:



***********************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 20000000,  r =  7,    d = 512,    t = 7,    p = 1


      Number of cells = d^t = 9223372036854775808
      Lambda = Poisson mean =     216.8404


-------------------------------------------------------
Total expected number = N*Lambda      :    4336.81
Total observed number                 :    4393
p-value of test                       :    0.20


-----------------------------------------------
CPU time used                    :  00:02:07.45

Generator state:



***********************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 30000000,  r = 14,    d = 256,    t = 8,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


-------------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7130
p-value of test                       :    0.99
```

```
-----------------------------------------------
CPU time used                   :  00:03:21.46

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 30000000,  r = 22,    d = 256,    t = 8,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


-----------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7375
p-value of test                       :    0.26


-----------------------------------------------
CPU time used                   :  00:03:21.51

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 30000000,  r =  0,    d = 16,    t = 16,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


-----------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7238
p-value of test                       :    0.82


-----------------------------------------------
CPU time used                   :  00:04:00.70

Generator state:
```

```
************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 30000000,  r = 26,    d = 16,    t = 16,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


-----------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7424
p-value of test                       :    0.11


-----------------------------------------------
CPU time used                    :  00:04:22.39

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


snpair_ClosePairs test:
-----------------------------------------------
   N = 30,  n = 6000000,  r =  0,  t = 3,  p = 0,  m = 30,  Torus =  TRUE


---------------------------------------
Test based on the 2 nearest points (NP):

Stat. AD on the N values (NP)         :    0.95
p-value of test                       :    0.38


A2 test based on the spacings between the
   successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP)    :    1.94
p-value of test                       :    0.10

Test on the Nm values of W_{n,i}(mNP1):    0.41
p-value of test                       :    0.84

Test on the jump times of Y
   (superposition of Yn):

Expected number of jumps of Y = mN    :     900
```

```
Number of jumps of Y                  :     943
p-value of test                       :    0.08

Stat. AD (mNP2)                       :    0.32
p-value of test                       :    0.92

Stat. AD after spacings (mNP2-S)      :    0.79
p-value of test                       :    0.49

-----------------------------------------------
CPU time used                    :  00:02:48.21

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


snpair_ClosePairs test:
-----------------------------------------------
   N = 20,  n = 4000000,  r =  0,  t = 5,  p = 0,  m = 30,  Torus =  TRUE


---------------------------------------
Test based on the 2 nearest points (NP):

Stat. AD on the N values (NP)         :    0.55
p-value of test                       :    0.70


A2 test based on the spacings between the
   successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP)    :    1.41
p-value of test                       :    0.20

Test on the Nm values of W_{n,i}(mNP1):    0.47
p-value of test                       :    0.78

Test on the jump times of Y
   (superposition of Yn):

Expected number of jumps of Y = mN    :     600
Number of jumps of Y                  :     566
p-value of test                       :    0.92

Stat. AD (mNP2)                       :    0.52
p-value of test                       :    0.72

Stat. AD after spacings (mNP2-S)      :    0.83
p-value of test                       :    0.46

-----------------------------------------------
CPU time used                    :  00:02:04.96

Generator state:
```

```
************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


snpair_ClosePairs test:
----------------------------------------------
   N = 10,  n = 3000000,  r =  0,  t = 9,  p = 0,  m = 30,  Torus =  TRUE


---------------------------------------
Test based on the 2 nearest points (NP):

Stat. AD on the N values (NP)         :    0.52
p-value of test                       :    0.73


A2 test based on the spacings between the
   successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP)    :    1.10
p-value of test                       :    0.31

Test on the Nm values of W_{n,i}(mNP1):    0.28
p-value of test                       :    0.95

Test on the jump times of Y
   (superposition of Yn):

Expected number of jumps of Y = mN    :     300
Number of jumps of Y                  :     304
p-value of test                       :    0.42

Stat. AD (mNP2)                       :    1.43
p-value of test                       :    0.19

Stat. AD after spacings (mNP2-S)      :    0.63
p-value of test                       :    0.62

-----------------------------------------------
CPU time used                    :  00:03:01.05

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


snpair_ClosePairs test:
----------------------------------------------
   N =  5,  n = 2000000,  r =  0,  t = 16,  p = 0,  m = 30,  Torus =  TRUE


---------------------------------------
Test based on the 2 nearest points (NP):

Stat. AD on the N values (NP)         :    0.53
```

```
p-value of test                       :    0.71


A2 test based on the spacings between the
   successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP)    :    0.72
p-value of test                       :    0.53

Test on the Nm values of W_{n,i}(mNP1):    0.70
p-value of test                       :    0.56

Test on the jump times of Y
   (superposition of Yn):

Expected number of jumps of Y = mN    :     150
Number of jumps of Y                  :     141
p-value of test                       :    0.75

Stat. AD (mNP2)                       :    0.53
p-value of test                       :    0.72

Stat. AD after spacings (mNP2-S)      :    0.97
p-value of test                       :    0.37

-----------------------------------------------
CPU time used                    :  00:03:21.65

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sknuth_SimpPoker test:
-----------------------------------------------
   N =  1,  n = 400000000,  r =  0,   d =    8,   k =    8


-----------------------------------------------
Number of degrees of freedom          :    7
Chi-square statistic                  :    1.76
p-value of test                       :    0.97

-----------------------------------------------
CPU time used                    :  00:00:57.21

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sknuth_SimpPoker test:
```

```
-----------------------------------------------
   N =  1,  n = 400000000,  r = 27,   d =    8,   k =    8


-----------------------------------------------
Number of degrees of freedom          :    7
Chi-square statistic                  :   11.15
p-value of test                       :    0.13

-----------------------------------------------
CPU time used                    :  00:01:07.61

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sknuth_SimpPoker test:
-----------------------------------------------
   N =  1,  n = 100000000,  r =  0,   d =   32,   k =   32


-----------------------------------------------
Number of degrees of freedom          :   18
Chi-square statistic                  :   23.63
p-value of test                       :    0.17

-----------------------------------------------
CPU time used                    :  00:01:00.15

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sknuth_SimpPoker test:
-----------------------------------------------
   N =  1,  n = 100000000,  r = 25,   d =   32,   k =   32


-----------------------------------------------
Number of degrees of freedom          :   18
Chi-square statistic                  :   24.52
p-value of test                       :    0.14

-----------------------------------------------
CPU time used                    :  00:01:12.27

Generator state:
```

```
************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sknuth_CouponCollector test:
-----------------------------------------------
   N =  1,  n = 200000000,  r =  0,   d =    8


-----------------------------------------------
Number of degrees of freedom          :   54
Chi-square statistic                  :   55.15
p-value of test                       :    0.43

-----------------------------------------------
CPU time used                    :  00:01:11.41

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sknuth_CouponCollector test:
-----------------------------------------------
   N =  1,  n = 200000000,  r = 10,   d =    8


-----------------------------------------------
Number of degrees of freedom          :   54
Chi-square statistic                  :   56.42
p-value of test                       :    0.38

-----------------------------------------------
CPU time used                    :  00:01:26.21

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sknuth_CouponCollector test:
-----------------------------------------------
   N =  1,  n = 200000000,  r = 20,   d =    8


-----------------------------------------------
Number of degrees of freedom          :   54
Chi-square statistic                  :   71.54
p-value of test                       :    0.06
```

```
------------------------------------------
CPU time used                   :  00:01:26.20

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sknuth_CouponCollector test:
------------------------------------------
   N =  1,  n = 200000000,  r = 27,   d =    8


------------------------------------------
Number of degrees of freedom          :   54
Chi-square statistic                  :   55.28
p-value of test                       :    0.43

------------------------------------------
CPU time used                   :  00:01:26.17

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sknuth_Gap test:
------------------------------------------
   N =  1,  n = 500000000,  r =  0,   Alpha =        0,   Beta  =   0.0625


------------------------------------------
Number of degrees of freedom          :  232
Chi-square statistic                  :  226.58
p-value of test                       :    0.59

------------------------------------------
CPU time used                   :  00:01:18.90

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sknuth_Gap test:
```

```
------------------------------------------------
   N =  1,  n = 300000000,  r = 25,   Alpha =        0,   Beta  =  0.03125


------------------------------------------------
Number of degrees of freedom          :  434
Chi-square statistic                  :  374.83
p-value of test                       :    0.98

------------------------------------------------
CPU time used                    :  00:02:01.30

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sknuth_Gap test:
------------------------------------------------
   N =  1,  n = 100000000,  r =  0,   Alpha =        0,   Beta  = 0.0078125


------------------------------------------------
Number of degrees of freedom          : 1437
Chi-square statistic                  : 1486.29
p-value of test                       :    0.18

------------------------------------------------
CPU time used                    :  00:01:51.97

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sknuth_Gap test:
------------------------------------------------
   N =  1,  n = 10000000,  r = 20,   Alpha =        0,   Beta  = 0.000976562


------------------------------------------------
Number of degrees of freedom          : 7046
Chi-square statistic                  : 6981.49
p-value of test                       :    0.71

------------------------------------------------
CPU time used                    :  00:02:02.94

Generator state:
```

```
************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sknuth_Run test:
-----------------------------------------------
   N =  5,  n = 1000000000,  r =  0,   Up = FALSE


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.37
p-value of test                       :    0.20

Kolmogorov-Smirnov- statistic = D-    :    0.11
p-value of test                       :    0.83

Anderson-Darling statistic = A2       :    0.89
p-value of test                       :    0.41

Test on the sum of all N observations
Number of degrees of freedom          :   30
Chi-square statistic                  :   21.30
p-value of test                       :    0.88

-----------------------------------------------
CPU time used                    :  00:01:16.75

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sknuth_Run test:
-----------------------------------------------
   N = 10,  n = 1000000000,  r = 15,   Up =  TRUE


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.15
p-value of test                       :    0.59

Kolmogorov-Smirnov- statistic = D-    :    0.18
p-value of test                       :    0.47

Anderson-Darling statistic = A2       :    0.55
p-value of test                       :    0.69

Test on the sum of all N observations
Number of degrees of freedom          :   60
Chi-square statistic                  :   60.79
p-value of test                       :    0.45

-----------------------------------------------
```

```
CPU time used                    :  00:03:07.72

Generator state:



************************************************************
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smultin_Multinomial test:
------------------------------------------------
   N =  1,  n = 1000000000,  r =  5,   t =  3,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =                  6
       Expected number per cell =  1.6666667e+08
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =  2.5000002e-09,    Sigma =          1

------------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          :    5
Value of the statistic                :    5.90
p-value of test                       :    0.32


------------------------------------------------
CPU time used                    :  00:00:54.34

Generator state:



************************************************************
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smultin_Multinomial test:
------------------------------------------------
   N =  1,  n = 1000000000,  r =  5,   t =  5,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =                120
       Expected number per cell =   8333333.3
       Hashing =  FALSE
```

```
   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =  5.9500005e-08,    Sigma =          1

------------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          :  119
Value of the statistic                :  139.05
p-value of test                       :    0.10


------------------------------------------------
CPU time used                    :  00:01:37.59

Generator state:



************************************************************
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smultin_Multinomial test:
------------------------------------------------
   N =  1,  n = 500000000,  r =  5,   t =  7,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =               5040
       Expected number per cell =   99206.349
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =  5.0390004e-06,    Sigma =          1

------------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          : 5039
Value of the statistic                : 5168.32
p-value of test                       :    0.10


------------------------------------------------
CPU time used                    :  00:01:15.41

Generator state:



************************************************************
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
```

```
HOST = compute, Linux

Mersenne Twister(ROOT)


smultin_Multinomial test:
-----------------------------------------------
   N =  1,  n = 500000000,  r = 10,   t = 10,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =            3628800
       Expected number per cell =    137.7866
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =   0.0036287993,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          : 3628799
Value of the statistic                : 3.63e+6
p-value of test                       :    0.46


-----------------------------------------------
CPU time used                    :  00:02:38.38

Generator state:




************************************************************
Test sknuth_CollisionPermut calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smultin_Multinomial test:
-----------------------------------------------
   N = 20,  n = 20000000,  r =  0,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =        87178291200
       Expected number per cell =  1 /  4358.9146
       EColl = n^2 / (2k) =   2294.14912
       Hashing =   TRUE

       Collision test,    Mu =      2293.9736,    Sigma =    47.8841

-----------------------------------------------
Test Results for Collisions

For the total number of collisions, we use
      the Poisson approximation:
Expected number of collisions = N*Mu  :    45879.47
Observed number of collisions         :    45865
```

```
p-value of test                         :    0.53


----------------------------
Total number of cells containing j balls

  j =  0                                :    1743165869865
  j =  1                                :        399908274
  j =  2                                :            45857
  j =  3                                :                4
  j =  4                                :                0
  j =  5                                :                0

-----------------------------------------------
CPU time used                     :  00:04:10.86

Generator state:



************************************************************
Test sknuth_CollisionPermut calling smultin_Multinomial

************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smultin_Multinomial test:
-----------------------------------------------
   N = 20,  n = 20000000,  r = 10,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =        87178291200
       Expected number per cell =  1 /  4358.9146
       EColl = n^2 / (2k) =   2294.14912
       Hashing =   TRUE

       Collision test,    Mu =      2293.9736,    Sigma =    47.8841

-----------------------------------------------
Test Results for Collisions

For the total number of collisions, we use
      the Poisson approximation:
Expected number of collisions = N*Mu  :    45879.47
Observed number of collisions         :    46063
p-value of test                       :    0.20


----------------------------
Total number of cells containing j balls

  j =  0                                :    1743165870063
  j =  1                                :        399907875
  j =  2                                :            46061
  j =  3                                :                1
  j =  4                                :                0
  j =  5                                :                0

-----------------------------------------------
```

```
CPU time used                    :  00:04:22.02

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sknuth_MaxOft test:
-----------------------------------------------
   N = 40,  n = 10000000,  r =  0,   d = 100000,   t =  8

      Number of categories = 100000
      Expected number per category  = 100.00


-----------------------------------------------
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :   0.058
p-value of test                       :    0.74

Kolmogorov-Smirnov- statistic = D-    :    0.21
p-value of test                       :    0.02

Anderson-Darling statistic = A2       :    1.74
p-value of test                       :    0.13

Test on the sum of all N observations
Number of degrees of freedom          : 3999960
Chi-square statistic                  : 4.00e+6
p-value of test                       :    0.21


-----------------------------------------------
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :   0.046
p-value of test                       :    0.82

Kolmogorov-Smirnov- statistic = D-    :   0.094
p-value of test                       :    0.46

Anderson-Darling statistic = A2       :    0.66
p-value of test                       :    0.59


-----------------------------------------------
CPU time used                    :  00:02:55.71

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)
```

```
sknuth_MaxOft test:
-----------------------------------------------
   N = 30,  n = 10000000,  r =  0,   d = 100000,   t = 16

      Number of categories = 100000
      Expected number per category  = 100.00


-----------------------------------------------
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :   0.085
p-value of test                       :    0.62

Kolmogorov-Smirnov- statistic = D-    :   0.073
p-value of test                       :    0.70

Anderson-Darling statistic = A2       :    0.49
p-value of test                       :    0.76

Test on the sum of all N observations
Number of degrees of freedom          : 2999970
Chi-square statistic                  : 3.00e+6
p-value of test                       :    0.47


-----------------------------------------------
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :    0.21
p-value of test                       :    0.06

Kolmogorov-Smirnov- statistic = D-    :   0.078
p-value of test                       :    0.66

Anderson-Darling statistic = A2       :    1.55
p-value of test                       :    0.16


-----------------------------------------------
CPU time used                    :  00:02:33.21

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sknuth_MaxOft test:
-----------------------------------------------
   N = 20,  n = 10000000,  r =  0,   d = 100000,   t = 24

      Number of categories = 100000
      Expected number per category  = 100.00


-----------------------------------------------
```

```
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :    0.26
p-value of test                       :    0.06

Kolmogorov-Smirnov- statistic = D-    :   0.038
p-value of test                       :    0.92

Anderson-Darling statistic = A2       :    1.91
p-value of test                       :    0.10

Test on the sum of all N observations
Number of degrees of freedom          : 1999980
Chi-square statistic                  : 2.00e+6
p-value of test                       :    0.96


------------------------------------------------
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :   0.070
p-value of test                       :    0.79

Kolmogorov-Smirnov- statistic = D-    :    0.10
p-value of test                       :    0.61

Anderson-Darling statistic = A2       :    0.20
p-value of test                       :    0.9913


------------------------------------------------
CPU time used                    :  00:01:54.66

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sknuth_MaxOft test:
------------------------------------------------
   N = 20,  n = 10000000,  r =  0,   d = 100000,   t = 32

      Number of categories = 100000
      Expected number per category  = 100.00


------------------------------------------------
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :    0.23
p-value of test                       :    0.11

Kolmogorov-Smirnov- statistic = D-    :   0.039
p-value of test                       :    0.92

Anderson-Darling statistic = A2       :    0.95
p-value of test                       :    0.38
```

```
Test on the sum of all N observations
Number of degrees of freedom          : 1999980
Chi-square statistic                  : 2.00e+6
p-value of test                       :    0.89


------------------------------------------------
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :   0.037
p-value of test                       :    0.92

Kolmogorov-Smirnov- statistic = D-    :    0.28
p-value of test                       :    0.04

Anderson-Darling statistic = A2       :    1.80
p-value of test                       :    0.12


------------------------------------------------
CPU time used                    :  00:02:07.60

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


svaria_SampleProd test:
------------------------------------------------
   N = 40,  n = 10000000,  r =  0,   t = 8


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.019
p-value of test                       :    0.96

Kolmogorov-Smirnov- statistic = D-    :    0.18
p-value of test                       :    0.07

Anderson-Darling statistic = A2       :    1.55
p-value of test                       :    0.16

------------------------------------------------
CPU time used                    :  00:02:16.23

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


svaria_SampleProd test:
```

```
-----------------------------------------------
   N = 20,  n = 10000000,  r =  0,   t = 16


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.20
p-value of test                       :    0.19

Kolmogorov-Smirnov- statistic = D-    :    0.21
p-value of test                       :    0.15

Anderson-Darling statistic = A2       :    1.54
p-value of test                       :    0.17

-----------------------------------------------
CPU time used                    :  00:01:40.20

Generator state:



*********************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


svaria_SampleProd test:
-----------------------------------------------
   N = 20,  n = 10000000,  r =  0,   t = 24


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 9.09e-3
p-value of test                       :    0.99

Kolmogorov-Smirnov- statistic = D-    :    0.27
p-value of test                       :    0.04

Anderson-Darling statistic = A2       :    2.84
p-value of test                       :    0.03

-----------------------------------------------
CPU time used                    :  00:02:10.85

Generator state:



*********************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


svaria_SampleMean test:
-----------------------------------------------
   N = 20000000,  n = 30,  r =  0
```

```
-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 2.02e-4
p-value of test                       :    0.20

Kolmogorov-Smirnov- statistic = D-    : 8.47e-5
p-value of test                       :    0.75

Anderson-Darling statistic = A2       :    0.80
p-value of test                       :    0.48

-----------------------------------------------
CPU time used                    :  00:00:30.96

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


svaria_SampleMean test:
-----------------------------------------------
   N = 20000000,  n = 30,  r = 10


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 8.23e-5
p-value of test                       :    0.76

Kolmogorov-Smirnov- statistic = D-    : 1.08e-4
p-value of test                       :    0.63

Anderson-Darling statistic = A2       :    0.30
p-value of test                       :    0.94

-----------------------------------------------
CPU time used                    :  00:00:32.41

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


svaria_SampleCorr test:
-----------------------------------------------
   N =  1,  n = 2000000000,  r =  0,   k = 1


-----------------------------------------------
Normal statistic                      :    1.08
p-value of test                       :    0.14
```

```
------------------------------------------------
CPU time used                   :  00:00:22.00

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


svaria_SampleCorr test:
------------------------------------------------
   N =  1,  n = 2000000000,  r =  0,   k = 2


------------------------------------------------
Normal statistic                :    0.15
p-value of test                 :    0.44

------------------------------------------------
CPU time used                   :  00:00:22.47

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


svaria_AppearanceSpacings test:
------------------------------------------------
   N =  1,   Q = 10000000,   K = 1000000000,   r = 0,   s = 3,   L = 15

   Sequences of n = (K + Q)L =  15150000000 bits
   Q = 10000000 initialization blocks
   K = 1000000000 blocks for the test
   the blocks have L = 15 bits



------------------------------------------------
Normal statistic                :    1.39
p-value of test                 :    0.08

------------------------------------------------
CPU time used                   :  00:02:09.34

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)
```

```
svaria_AppearanceSpacings test:
------------------------------------------------
   N =  1,   Q = 10000000,   K = 1000000000,   r = 27,   s = 3,   L = 15

   Sequences of n = (K + Q)L =  15150000000 bits
   Q = 10000000 initialization blocks
   K = 1000000000 blocks for the test
   the blocks have L = 15 bits



------------------------------------------------
Normal statistic                    :    1.50
p-value of test                     :    0.07

------------------------------------------------
CPU time used                    :  00:02:14.02

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


svaria_WeightDistrib test:
------------------------------------------------
   N =  1,  n = 20000000,  r =  0,  k = 256,  Alpha =      0,  Beta =   0.25


------------------------------------------------
Number of degrees of freedom          :   67
Chi-square statistic                  :   67.18
p-value of test                       :    0.47

------------------------------------------------
CPU time used                    :  00:00:48.00

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


svaria_WeightDistrib test:
------------------------------------------------
   N =  1,  n = 20000000,  r = 20,  k = 256,  Alpha =      0,  Beta =   0.25


------------------------------------------------
Number of degrees of freedom          :   67
Chi-square statistic                  :   77.05
p-value of test                       :    0.19
```

```
-------------------------------------------
CPU time used                    :  00:01:05.85

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


svaria_WeightDistrib test:
-------------------------------------------
   N =  1,  n = 20000000,  r = 28,  k = 256,  Alpha =      0,  Beta =   0.25


-------------------------------------------
Number of degrees of freedom          :   67
Chi-square statistic                  :   48.39
p-value of test                       :    0.96

-------------------------------------------
CPU time used                    :  00:01:05.92

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


svaria_WeightDistrib test:
-------------------------------------------
   N =  1,  n = 20000000,  r =  0,  k = 256,  Alpha =      0,  Beta = 0.0625


-------------------------------------------
Number of degrees of freedom          :   37
Chi-square statistic                  :   32.63
p-value of test                       :    0.67

-------------------------------------------
CPU time used                    :  00:00:47.97

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


svaria_WeightDistrib test:
```

```
------------------------------------------------
   N =  1,  n = 20000000,  r = 10,  k = 256,  Alpha =      0,  Beta = 0.0625


------------------------------------------------
Number of degrees of freedom          :   37
Chi-square statistic                  :   50.85
p-value of test                       :    0.06

------------------------------------------------
CPU time used                    :  00:01:05.96

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


svaria_WeightDistrib test:
------------------------------------------------
   N =  1,  n = 20000000,  r = 26,  k = 256,  Alpha =      0,  Beta = 0.0625


------------------------------------------------
Number of degrees of freedom          :   37
Chi-square statistic                  :   38.25
p-value of test                       :    0.41

------------------------------------------------
CPU time used                    :  00:01:05.95

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


svaria_SumCollector test:
------------------------------------------------
   N =  1,  n = 500000000,  r =  0,   g = 10


------------------------------------------------
Number of degrees of freedom          :   29
Chi-square statistic                  :   23.00
p-value of test                       :    0.78

------------------------------------------------
CPU time used                    :  00:01:37.21

Generator state:
```

```
************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smarsa_MatrixRank test:
-----------------------------------------------
   N = 10,  n = 1000000,  r =  0,    s = 5,    L = 30,    k = 30


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.057
p-value of test                       :    0.91

Kolmogorov-Smirnov- statistic = D-    :    0.31
p-value of test                       :    0.12

Anderson-Darling statistic = A2       :    1.58
p-value of test                       :    0.16

Test on the sum of all N observations
Number of degrees of freedom          :   40
Chi-square statistic                  :   51.66
p-value of test                       :    0.10

-----------------------------------------------
CPU time used                    :  00:01:20.07

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smarsa_MatrixRank test:
-----------------------------------------------
   N = 10,  n = 1000000,  r = 25,    s = 5,    L = 30,    k = 30


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.14
p-value of test                       :    0.61

Kolmogorov-Smirnov- statistic = D-    :    0.16
p-value of test                       :    0.54

Anderson-Darling statistic = A2       :    0.28
p-value of test                       :    0.95

Test on the sum of all N observations
Number of degrees of freedom          :   40
Chi-square statistic                  :   37.53
p-value of test                       :    0.58

-----------------------------------------------
```

```
CPU time used                   :  00:01:20.01

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smarsa_MatrixRank test:
---------------------------------------------
   N =  1,  n = 5000,  r =  0,    s = 4,    L = 1000,    k = 1000


---------------------------------------------
Number of degrees of freedom          :    3
Chi-square statistic                  :    2.29
p-value of test                       :    0.51

---------------------------------------------
CPU time used                   :  00:03:33.42

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smarsa_MatrixRank test:
---------------------------------------------
   N =  1,  n = 5000,  r = 26,    s = 4,    L = 1000,    k = 1000


---------------------------------------------
Number of degrees of freedom          :    3
Chi-square statistic                  :    1.26
p-value of test                       :    0.74

---------------------------------------------
CPU time used                   :  00:03:33.65

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smarsa_MatrixRank test:
---------------------------------------------
   N =  1,  n = 80,  r = 15,    s = 15,    L = 5000,    k = 5000
```

```
-----------------------------------------------
Number of degrees of freedom          :    2
Chi-square statistic                  :    1.65
p-value of test                       :    0.44

-----------------------------------------------
CPU time used                    :  00:02:36.10

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smarsa_MatrixRank test:
-----------------------------------------------
   N =  1,  n = 80,  r =  0,    s = 30,    L = 5000,    k = 5000


-----------------------------------------------
Number of degrees of freedom          :    2
Chi-square statistic                  :    3.42
p-value of test                       :    0.18

-----------------------------------------------
CPU time used                    :  00:02:00.04

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smarsa_Savir2 test:
-----------------------------------------------
   N = 10,  n = 10000000,  r = 10,    m = 1048576,    t = 30


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.33
p-value of test                       :    0.10

Kolmogorov-Smirnov- statistic = D-    :   0.017
p-value of test                       :    0.98

Anderson-Darling statistic = A2       :    1.68
p-value of test                       :    0.14

Test on the sum of all N observations
Number of degrees of freedom          :  130
Chi-square statistic                  :  106.53
```

```
p-value of test                       :    0.93

-----------------------------------------------
CPU time used                     :  00:00:39.42

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


smarsa_GCD test:
-----------------------------------------------
   N = 10,  n = 50000000,  r =  0,   s = 30


-----------------------------------------------
Test results for GCD values:

Kolmogorov-Smirnov+ statistic = D+    :   0.099
p-value of test                       :    0.77

Kolmogorov-Smirnov- statistic = D-    :    0.23
p-value of test                       :    0.31

Anderson-Darling statistic = A2       :    0.57
p-value of test                       :    0.68

Test on the sum of all N observations
Number of degrees of freedom          : 17430
Chi-square statistic                  :17528.68
p-value of test                       :    0.30



-----------------------------------------------
CPU time used                     :  00:02:01.34

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 100000000,  r =  0,   s = 5,   L0 =   50,   L1 =   50



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :   36
```

```
ChiSquare statistic                  :   33.40
p-value of test                      :    0.59


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom         :   35
ChiSquare statistic                  :   31.16
p-value of test                      :    0.65


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom         :   25
ChiSquare statistic                  :   16.66
p-value of test                      :    0.89


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom         :   24
ChiSquare statistic                  :   30.45
p-value of test                      :    0.17


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom         :   17
ChiSquare statistic                  :   14.08
p-value of test                      :    0.66


-----------------------------------------------
CPU time used                    :  00:01:01.29

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 100000000,  r = 25,   s = 5,   L0 =   50,   L1 =   50



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom         :   36
ChiSquare statistic                  :   46.70
p-value of test                      :    0.11
```

```
-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :   35
ChiSquare statistic                   :   34.09
p-value of test                       :    0.51


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          :   25
ChiSquare statistic                   :   20.52
p-value of test                       :    0.72


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :   24
ChiSquare statistic                   :   24.26
p-value of test                       :    0.45


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :   17
ChiSquare statistic                   :   22.82
p-value of test                       :    0.16


-----------------------------------------------
CPU time used                    :  00:01:03.10

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 10000000,  r =  0,   s = 10,   L0 = 1000,   L1 = 1000



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :  146
ChiSquare statistic                   :  129.25
p-value of test                       :    0.84


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :  146
```

```
ChiSquare statistic                  :  156.93
p-value of test                      :    0.25


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom         :  500
ChiSquare statistic                  :  509.36
p-value of test                      :    0.38


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom         :  136
ChiSquare statistic                  :  110.75
p-value of test                      :    0.94


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom         :   74
ChiSquare statistic                  :   87.50
p-value of test                      :    0.14


-----------------------------------------------
CPU time used                    :  00:01:38.13

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 10000000,  r = 20,   s = 10,   L0 = 1000,   L1 = 1000



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom         :  146
ChiSquare statistic                  :  162.53
p-value of test                      :    0.17


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom         :  146
ChiSquare statistic                  :  186.13
p-value of test                      :    0.01
```

```
-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          :  500
ChiSquare statistic                   :  531.86
p-value of test                       :    0.16


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :  136
ChiSquare statistic                   :  117.88
p-value of test                       :    0.87


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :   74
ChiSquare statistic                   :   73.67
p-value of test                       :    0.49


-----------------------------------------------
CPU time used                    :  00:01:39.90

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 1000000,  r =  0,   s = 15,   L0 = 10000,   L1 = 10000



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :  384
ChiSquare statistic                   :  352.66
p-value of test                       :    0.87


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :  384
ChiSquare statistic                   :  344.54
p-value of test                       :    0.93


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          : 5000
```

```
ChiSquare statistic                  : 5124.42
p-value of test                      :    0.11


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom         :  378
ChiSquare statistic                  :  430.61
p-value of test                      :    0.03


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom         :  200
ChiSquare statistic                  :  175.94
p-value of test                      :    0.89


-----------------------------------------------
CPU time used                    :  00:01:28.34

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 1000000,  r = 15,   s = 15,   L0 = 10000,   L1 = 10000



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom         :  384
ChiSquare statistic                  :  287.97
p-value of test                      : 1 -  7.8e-5    *****


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom         :  384
ChiSquare statistic                  :  393.77
p-value of test                      :    0.35


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom         : 5000
ChiSquare statistic                  : 4963.98
p-value of test                      :    0.64
```

```
------------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :  378
ChiSquare statistic                   :  409.26
p-value of test                       :    0.13


------------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :  200
ChiSquare statistic                   :  167.45
p-value of test                       :    0.95


------------------------------------------------
CPU time used                    :  00:01:29.46

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


scomp_LinearComp test:
------------------------------------------------
   N =  1,  n = 400020,  r =  0,    s = 1



------------------------------------------------
Number of degrees of freedom          :   12
Chi2 statistic for size of jumps      :    9.44
p-value of test                       :    0.67


------------------------------------------------
Normal statistic for number of jumps  : -402.67
p-value of test                       : 1 - eps1    *****



------------------------------------------------
CPU time used                    :  00:00:07.96

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


scomp_LinearComp test:
------------------------------------------------
```

```
   N =  1,  n = 400020,  r = 29,    s = 1


-----------------------------------------------
Number of degrees of freedom          :   12
Chi2 statistic for size of jumps      :   20.33
p-value of test                       :    0.06


-----------------------------------------------
Normal statistic for number of jumps  : -402.61
p-value of test                       : 1 - eps1    *****



-----------------------------------------------
CPU time used                    :  00:00:07.96

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


scomp_LempelZiv test:
-----------------------------------------------
   N = 10,  n = 134217728,  r =  0,   s =   30,   k =   27


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.025
p-value of test                       :    0.97

Kolmogorov-Smirnov- statistic = D-    :    0.24
p-value of test                       :    0.27

Anderson-Darling statistic = A2       :    0.82
p-value of test                       :    0.47

Tests on the sum of all N observations
Standardized normal statistic         :    1.19
p-value of test                       :    0.12

Sample variance                       :    0.83
p-value of test                       :    0.59

-----------------------------------------------
CPU time used                    :  00:00:59.63

Generator state:



************************************************************
HOST = compute, Linux
```

```
Mersenne Twister(ROOT)


scomp_LempelZiv test:
------------------------------------------------
   N = 10,  n = 134217728,  r = 15,   s =   15,   k =   27


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.55
p-value of test                       :  1.0e-3

Kolmogorov-Smirnov- statistic = D-    :   0.077
p-value of test                       :    0.85

Anderson-Darling statistic = A2       :    5.94
p-value of test                       :  1.1e-3

Tests on the sum of all N observations
Standardized normal statistic         :   -2.87
p-value of test                       :    0.9980

Sample variance                       :    0.20
p-value of test                       :    0.9945

------------------------------------------------
CPU time used                    :  00:01:01.84

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sspectral_Fourier3 test:
------------------------------------------------
   N = 100000,  n = 16384,  r =  0,   s =    3,   k =   14


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 8.65e-3
p-value of test                       :    0.54

Kolmogorov-Smirnov- statistic = D-    :   0.012
p-value of test                       :    0.32

Anderson-Darling statistic = A2       :    0.52
p-value of test                       :    0.73

------------------------------------------------
CPU time used                    :  00:00:51.46

Generator state:
```

```
************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sspectral_Fourier3 test:
-----------------------------------------------
   N = 100000,  n = 16384,  r = 27,   s =    3,   k =   14


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 9.80e-3
p-value of test                       :    0.45

Kolmogorov-Smirnov- statistic = D-    : 9.50e-3
p-value of test                       :    0.47

Anderson-Darling statistic = A2       :    0.56
p-value of test                       :    0.68

-----------------------------------------------
CPU time used                    :  00:00:51.17

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sstring_LongestHeadRun test:
-----------------------------------------------
   N =  1,  n = 1000,  r =  0,   s = 3,   L = 10000020


-----------------------------------------------
Number of degrees of freedom          :    8
Chi-square statistic                  :    9.81
p-value of test                       :    0.28

-----------------------------------------------
Global longest run of 1               :   35.00
p-value of test                       :    0.14



-----------------------------------------------
CPU time used                    :  00:01:50.22

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)
```

```
sstring_LongestHeadRun test:
------------------------------------------------
   N =  1,  n = 1000,  r = 27,   s = 3,   L = 10000020


------------------------------------------------
Number of degrees of freedom          :    8
Chi-square statistic                  :    3.35
p-value of test                       :    0.91

------------------------------------------------
Global longest run of 1               :   30.00
p-value of test                       :    0.90



------------------------------------------------
CPU time used                    :  00:01:56.97

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sstring_PeriodsInStrings test:
------------------------------------------------
   N = 10,  n = 500000000,  r =  0,   s =   10


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.011
p-value of test                       :    0.99

Kolmogorov-Smirnov- statistic = D-    :    0.39
p-value of test                       :    0.03

Anderson-Darling statistic = A2       :    2.79
p-value of test                       :    0.04

Test on the sum of all N observations
Number of degrees of freedom          :  200
Chi-square statistic                  :  248.90
p-value of test                       :    0.01

------------------------------------------------
CPU time used                    :  00:02:55.88

Generator state:




************************************************************
HOST = compute, Linux
```

```
Mersenne Twister(ROOT)


sstring_PeriodsInStrings test:
-----------------------------------------------
   N = 10,  n = 500000000,  r = 20,   s =   10


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.050
p-value of test                       :    0.92

Kolmogorov-Smirnov- statistic = D-    :    0.35
p-value of test                       :    0.07

Anderson-Darling statistic = A2       :    1.02
p-value of test                       :    0.35

Test on the sum of all N observations
Number of degrees of freedom          :  200
Chi-square statistic                  :  219.02
p-value of test                       :    0.17

-----------------------------------------------
CPU time used                    :  00:03:00.59

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sstring_HammingWeight2 test:
-----------------------------------------------
   N = 10,  n = 1000000000,  r =  0,   s = 3,   L = 1000000


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.17
p-value of test                       :    0.52

Kolmogorov-Smirnov- statistic = D-    :    0.17
p-value of test                       :    0.52

Anderson-Darling statistic = A2       :    0.43
p-value of test                       :    0.81

Test on the sum of all N observations
Number of degrees of freedom          : 10000
Chi-square statistic                  :10008.09
p-value of test                       :    0.48

-----------------------------------------------
CPU time used                    :  00:01:16.26

Generator state:
```

```
************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sstring_HammingWeight2 test:
-----------------------------------------------
   N = 10,  n = 1000000000,  r = 27,   s = 3,   L = 1000000


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.25
p-value of test                       :    0.26

Kolmogorov-Smirnov- statistic = D-    :   0.039
p-value of test                       :    0.95

Anderson-Darling statistic = A2       :    0.88
p-value of test                       :    0.43

Test on the sum of all N observations
Number of degrees of freedom          : 10000
Chi-square statistic                  : 9838.49
p-value of test                       :    0.87

-----------------------------------------------
CPU time used                    :  00:01:20.50

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sstring_HammingCorr test:
-----------------------------------------------
   N =  1,  n = 1000000000,  r = 10,   s = 10,   L = 30



-----------------------------------------------
Normal statistic                      :    0.32
p-value of test                       :    0.37

-----------------------------------------------
CPU time used                    :  00:01:34.84

Generator state:



************************************************************
HOST = compute, Linux
```

```
Mersenne Twister(ROOT)


sstring_HammingCorr test:
-------------------------------------------
   N =  1,  n = 100000000,  r = 10,   s = 10,   L = 300



-------------------------------------------
Normal statistic                    :   -0.17
p-value of test                     :    0.57

-------------------------------------------
CPU time used                   :  00:01:32.40

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sstring_HammingCorr test:
-------------------------------------------
   N =  1,  n = 100000000,  r = 10,   s = 10,   L = 1200



-------------------------------------------
Normal statistic                    :   -0.12
p-value of test                     :    0.55

-------------------------------------------
CPU time used                   :  00:06:07.03

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sstring_HammingIndep test:
-------------------------------------------
   N = 10,  n = 30000000,  r =  0,   s = 3,   L = 30,   d = 0



Counters with expected numbers >= 10
-------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.27
p-value of test                     :    0.19
```

```
Kolmogorov-Smirnov- statistic = D-    :   0.034
p-value of test                       :    0.95

Anderson-Darling statistic = A2       :    1.04
p-value of test                       :    0.33

Test on the sum of all N observations
Number of degrees of freedom          : 4890
Chi-square statistic                  : 4755.53
p-value of test                       :    0.91

------------------------------------------------
CPU time used                    :  00:02:27.36

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sstring_HammingIndep test:
------------------------------------------------
   N = 10,  n = 30000000,  r = 27,   s = 3,   L = 30,   d = 0



Counters with expected numbers >= 10
------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.44
p-value of test                       :    0.01

Kolmogorov-Smirnov- statistic = D-    : 8.44e-3
p-value of test                       :    0.9909

Anderson-Darling statistic = A2       :    4.12
p-value of test                       :  8.0e-3

Test on the sum of all N observations
Number of degrees of freedom          : 4890
Chi-square statistic                  : 4618.64
p-value of test                       :    0.9974

------------------------------------------------
CPU time used                    :  00:02:34.15

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sstring_HammingIndep test:
------------------------------------------------
```

```
   N =  1,  n = 30000000,  r =  0,   s = 4,   L = 300,   d = 0


Counters with expected numbers >= 10
-----------------------------------------------
Number of degrees of freedom          : 4117
Chi-square statistic                  : 4144.97
p-value of test                       :    0.38

-----------------------------------------------
CPU time used                    :  00:01:51.22

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sstring_HammingIndep test:
-----------------------------------------------
   N =  1,  n = 30000000,  r = 26,   s = 4,   L = 300,   d = 0


Counters with expected numbers >= 10
-----------------------------------------------
Number of degrees of freedom          : 4117
Chi-square statistic                  : 4183.78
p-value of test                       :    0.23

-----------------------------------------------
CPU time used                    :  00:01:57.11

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sstring_HammingIndep test:
-----------------------------------------------
   N =  1,  n = 10000000,  r =  0,   s = 5,   L = 1200,   d = 0


Counters with expected numbers >= 10
-----------------------------------------------
Number of degrees of freedom          : 11825
Chi-square statistic                  :12056.57
p-value of test                       :    0.07

-----------------------------------------------
CPU time used                    :  00:02:03.27
```

```
Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sstring_HammingIndep test:
-------------------------------------------------
   N =  1,  n = 10000000,  r = 25,   s = 5,   L = 1200,   d = 0



Counters with expected numbers >= 10
-------------------------------------------------
Number of degrees of freedom          : 11825
Chi-square statistic                  :12075.73
p-value of test                       :    0.05

-------------------------------------------------
CPU time used                    :  00:02:10.50

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sstring_Run test:
-------------------------------------------------
   N =  1,  n = 2000000000,  r =  0,   s =    3


-------------------------------------------------
Total number of 1 runs:  2000000000

Number of degrees of freedom          :   54
Chi2 statistic for number of runs     :   49.84
p-value of test                       :    0.64


-------------------------------------------------
Total number of bits:  7999937766

Normal statistic for number of bits   :   -0.49
p-value of test                       :    0.69



-------------------------------------------------
CPU time used                    :  00:01:29.47

Generator state:
```

```
************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sstring_Run test:
------------------------------------------------
   N =  1,  n = 2000000000,  r = 27,   s =    3


------------------------------------------------
Total number of 1 runs:  2000000000

Number of degrees of freedom          :   54
Chi2 statistic for number of runs     :   52.75
p-value of test                       :    0.52


------------------------------------------------
Total number of bits:  8000008497

Normal statistic for number of bits   :   0.067
p-value of test                       :    0.47



------------------------------------------------
CPU time used                    :  00:01:34.59

Generator state:




************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sstring_AutoCor test:
------------------------------------------------
   N = 10,  n = 1000000030,  r =  0,   s = 3,   d = 1


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.35
p-value of test                       :    0.07

Kolmogorov-Smirnov- statistic = D-    :   0.042
p-value of test                       :    0.94

Anderson-Darling statistic = A2       :    2.08
p-value of test                       :    0.08

Tests on the sum of all N observations
Standardized normal statistic         :   -1.85
p-value of test                       :    0.97
```

```
Sample variance                       :    0.58
p-value of test                       :    0.81

------------------------------------------------
CPU time used                    :  00:02:45.34

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sstring_AutoCor test:
------------------------------------------------
   N = 10,  n = 1000000029,  r =  0,   s = 3,   d = 3


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.16
p-value of test                       :    0.56

Kolmogorov-Smirnov- statistic = D-    :    0.21
p-value of test                       :    0.36

Anderson-Darling statistic = A2       :    0.42
p-value of test                       :    0.83

Tests on the sum of all N observations
Standardized normal statistic         :  -0.022
p-value of test                       :    0.51

Sample variance                       :    1.31
p-value of test                       :    0.23

------------------------------------------------
CPU time used                    :  00:02:28.98

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sstring_AutoCor test:
------------------------------------------------
   N = 10,  n = 1000000030,  r = 27,   s = 3,   d = 1


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.34
p-value of test                       :    0.08
```

```
Kolmogorov-Smirnov- statistic = D-    :   0.093
p-value of test                       :    0.79

Anderson-Darling statistic = A2       :    1.18
p-value of test                       :    0.27

Tests on the sum of all N observations
Standardized normal statistic         :   -1.09
p-value of test                       :    0.86

Sample variance                       :    0.73
p-value of test                       :    0.68

-----------------------------------------------
CPU time used                    :  00:02:51.45

Generator state:



************************************************************
HOST = compute, Linux

Mersenne Twister(ROOT)


sstring_AutoCor test:
-----------------------------------------------
   N = 10,  n = 1000000029,  r = 27,   s = 3,   d = 3


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 1.16e-3
p-value of test                       :    0.9988

Kolmogorov-Smirnov- statistic = D-    :    0.40
p-value of test                       :    0.03

Anderson-Darling statistic = A2       :    3.47
p-value of test                       :    0.02

Tests on the sum of all N observations
Standardized normal statistic         :    2.73
p-value of test                       :  3.2e-3

Sample variance                       :    1.02
p-value of test                       :    0.42

-----------------------------------------------
CPU time used                    :  00:02:30.67

Generator state:




========= Summary results of BigCrush =========

 Version:          TestU01 1.2.3
 Generator:        Mersenne Twister(ROOT)
 Number of statistics:  160
```

```
 Total CPU time:   03:39:58.32
 The following tests gave p-values outside [0.001, 0.9990]:
 (eps  means a value < 1.0e-300):
 (eps1 means a value < 1.0e-15):

       Test                          p-value
 ----------------------------------------------
 79  RandomWalk1 H (L=10000, r=15)  1 -  7.8e-5
 80  LinearComp, r = 0              1 - eps1
 81  LinearComp, r = 29             1 - eps1
 ----------------------------------------------
 All other tests were passed


*****************************************
Test for MIXMAX generator ...
*****************************************
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
                 Starting BigCrush
                 Version: TestU01 1.2.3
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx


*************************************************************
Test smarsa_SerialOver calling smultin_MultinomialOver

*************************************************************
HOST = compute, Linux

MIXMAX


smultin_MultinomialOver test:
-----------------------------------------------
   N =  1,  n = 1000000000,  r =  0,   d =  256,   t =  3,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =           16777216
       Expected number per cell =   59.604645
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =   0.0083558402,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          : 16711680
Value of the statistic                : 1.67e+7
p-value of test                       :    0.14


-----------------------------------------------
CPU time used                    :  00:00:51.47

Generator state:



*************************************************************
```

```
Test smarsa_SerialOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

MIXMAX


smultin_MultinomialOver test:
-----------------------------------------------
   N =  1,  n = 1000000000,  r = 22,   d =  256,   t =  3,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =           16777216
       Expected number per cell =   59.604645
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =   0.0083558402,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          : 16711680
Value of the statistic                : 1.67e+7
p-value of test                       :    0.04


-----------------------------------------------
CPU time used                    :  00:00:55.25

Generator state:




************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

MIXMAX


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d = 2097152,   t =  2,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47
```

```
-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1316
p-value of test                       :    0.90

-----------------------------
Total number of cells containing j balls

  j =  0                              :  1319407953344436
  j =  1                              :        599997368
  j =  2                              :             1316
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:02:38.00

Generator state:




************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

MIXMAX


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  9,   d = 2097152,   t =  2,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1402
p-value of test                       :    0.16

-----------------------------
Total number of cells containing j balls

  j =  0                              :  1319407953345222
```

```
  j =  1                                :        599997196
  j =  2                                :             1402
  j =  3                                :                0
  j =  4                                :                0
  j =  5                                :                0

------------------------------------------------
CPU time used                    :  00:02:36.42

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

MIXMAX


smultin_MultinomialOver test:
------------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d = 16384,   t =  3,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


------------------------------------------------
Results of CollisionOver test:

POISSON approximation                :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1381
p-value of test                       :    0.33

------------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334501
  j =  1                              :        599997238
  j =  2                              :             1381
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

------------------------------------------------
CPU time used                    :  00:03:50.05

Generator state:
```

```
************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

MIXMAX


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r = 16,   d = 16384,   t =  3,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1339
p-value of test                       :    0.75

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334459
  j =  1                              :        599997322
  j =  2                              :             1339
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:03:51.98

Generator state:




************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

MIXMAX


smultin_MultinomialOver test:
```

```
-----------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d =   64,   t =  7,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1369
p-value of test                       :    0.45

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334489
  j =  1                              :        599997262
  j =  2                              :             1369
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:04:05.77

Generator state:




************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

MIXMAX


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r = 24,   d =   64,   t =  7,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test
```

```
       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1362
p-value of test                       :    0.52

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334482
  j =  1                              :        599997276
  j =  2                              :             1362
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:03:55.10

Generator state:




************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

MIXMAX


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d =    8,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1324
p-value of test                       :    0.86
```

```
----------------------------
Total number of cells containing j balls

  j =  0                            :  1319407953334444
  j =  1                            :        599997352
  j =  2                            :             1324
  j =  3                            :                0
  j =  4                            :                0
  j =  5                            :                0

-----------------------------------------------
CPU time used                    :  00:04:06.22

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

MIXMAX


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r = 27,   d =    8,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1323
p-value of test                       :    0.87

----------------------------
Total number of cells containing j balls

  j =  0                            :  1319407953334443
  j =  1                            :        599997354
  j =  2                            :             1323
  j =  3                            :                0
  j =  4                            :                0
  j =  5                            :                0

-----------------------------------------------
CPU time used                    :  00:03:55.17
```

```
Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux

MIXMAX


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r =  0,   d =    4,   t = 21,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1414
p-value of test                       :    0.09

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334534
  j =  1                              :        599997172
  j =  2                              :             1414
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:04:06.40

Generator state:



************************************************************
Test smarsa_CollisionOver calling smultin_MultinomialOver

************************************************************
HOST = compute, Linux
```

```
MIXMAX


smultin_MultinomialOver test:
-----------------------------------------------
   N = 30,  n = 20000000,  r = 28,   d =    4,   t = 21,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellSerial
       Number of cells = d^t =      4398046511104
       Expected number per cell =  1 /  219902.33
       EColl = n^2 / (2k) =  45.47473509
       Hashing =   TRUE

       Collision test

       CollisionOver:   density = n / k =  1 /  219902.33
       Expected number of collisions = Mu =      45.47


-----------------------------------------------
Results of CollisionOver test:

POISSON approximation                 :
Expected number of collisions = N*Mu  :     1364.24
Observed number of collisions         :     1369
p-value of test                       :    0.45

-----------------------------
Total number of cells containing j balls

  j =  0                              :  131940795334489
  j =  1                              :        599997262
  j =  2                              :             1369
  j =  3                              :                0
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:03:55.40

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 100,  n = 10000000,  r =  0,    d = 2147483648,    t = 2,    p = 1


      Number of cells = d^t = 4611686018427387904
      Lambda = Poisson mean =      54.2101


---------------------------------------------------
Total expected number = N*Lambda      :    5421.01
Total observed number                 :    5500
```

```
p-value of test                       :    0.14


-----------------------------------------------
CPU time used                     :  00:04:01.90

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 20000000,  r =  0,    d = 2097152,    t = 3,    p = 1


      Number of cells = d^t = 9223372036854775808
      Lambda = Poisson mean =     216.8404


---------------------------------------------------
Total expected number = N*Lambda      :    4336.81
Total observed number                 :    4320
p-value of test                       :    0.60


-----------------------------------------------
CPU time used                     :  00:01:43.65

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 30000000,  r = 14,    d = 65536,    t = 4,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


---------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7423
p-value of test                       :    0.11


-----------------------------------------------
CPU time used                     :  00:02:48.35
```

```
Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 20000000,  r =  0,    d = 512,    t = 7,    p = 1


      Number of cells = d^t = 9223372036854775808
      Lambda = Poisson mean =     216.8404


---------------------------------------------------
Total expected number = N*Lambda      :    4336.81
Total observed number                 :    4232
p-value of test                       :    0.94


-----------------------------------------------
CPU time used                    :  00:01:57.47

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 20000000,  r =  7,    d = 512,    t = 7,    p = 1


      Number of cells = d^t = 9223372036854775808
      Lambda = Poisson mean =     216.8404


---------------------------------------------------
Total expected number = N*Lambda      :    4336.81
Total observed number                 :    4460
p-value of test                       :    0.03


-----------------------------------------------
CPU time used                    :  00:02:01.90

Generator state:



************************************************************
```

```
HOST = compute, Linux

MIXMAX


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 30000000,  r = 14,    d = 256,    t = 8,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


---------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7300
p-value of test                       :    0.58


-----------------------------------------------
CPU time used                    :  00:03:12.73

Generator state:




***********************************************************
HOST = compute, Linux

MIXMAX


smarsa_BirthdaySpacings test:
-----------------------------------------------
   N = 20,  n = 30000000,  r = 22,    d = 256,    t = 8,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


---------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7355
p-value of test                       :    0.34


-----------------------------------------------
CPU time used                    :  00:03:15.83

Generator state:




***********************************************************
HOST = compute, Linux

MIXMAX


smarsa_BirthdaySpacings test:
```

```
------------------------------------------------
   N = 20,  n = 30000000,  r =  0,    d = 16,    t = 16,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


-----------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7222
p-value of test                       :    0.87


------------------------------------------------
CPU time used                    :  00:03:50.65

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


smarsa_BirthdaySpacings test:
------------------------------------------------
   N = 20,  n = 30000000,  r = 26,    d = 16,    t = 16,    p = 1


      Number of cells = d^t = 18446744073709551616
      Lambda = Poisson mean =     365.9182


-----------------------------------------------------
Total expected number = N*Lambda      :    7318.36
Total observed number                 :    7330
p-value of test                       :    0.45


------------------------------------------------
CPU time used                    :  00:04:10.28

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


snpair_ClosePairs test:
------------------------------------------------
   N = 30,  n = 6000000,  r =  0,  t = 3,  p = 0,  m = 30,  Torus =  TRUE


--------------------------------------
Test based on the 2 nearest points (NP):
```

```
Stat. AD on the N values (NP)         :    0.83
p-value of test                       :    0.46


A2 test based on the spacings between the
   successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP)    :    0.38
p-value of test                       :    0.87

Test on the Nm values of W_{n,i}(mNP1):    0.51
p-value of test                       :    0.73

Test on the jump times of Y
   (superposition of Yn):

Expected number of jumps of Y = mN    :     900
Number of jumps of Y                  :     891
p-value of test                       :    0.61

Stat. AD (mNP2)                       :    1.21
p-value of test                       :    0.26

Stat. AD after spacings (mNP2-S)      :    0.27
p-value of test                       :    0.96

-----------------------------------------------
CPU time used                    :  00:02:31.03

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


snpair_ClosePairs test:
-----------------------------------------------
   N = 20,  n = 4000000,  r =  0,  t = 5,  p = 0,  m = 30,  Torus =  TRUE


---------------------------------------
Test based on the 2 nearest points (NP):

Stat. AD on the N values (NP)         :    0.72
p-value of test                       :    0.54


A2 test based on the spacings between the
   successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP)    :    1.00
p-value of test                       :    0.36

Test on the Nm values of W_{n,i}(mNP1):    2.09
p-value of test                       :    0.08

Test on the jump times of Y
   (superposition of Yn):
```

```
Expected number of jumps of Y = mN    :     600
Number of jumps of Y                  :     626
p-value of test                       :    0.15

Stat. AD (mNP2)                       :    0.45
p-value of test                       :    0.79

Stat. AD after spacings (mNP2-S)      :    0.94
p-value of test                       :    0.39

-----------------------------------------------
CPU time used                    :  00:01:28.21

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


snpair_ClosePairs test:
-----------------------------------------------
   N = 10,  n = 3000000,  r =  0,  t = 9,  p = 0,  m = 30,  Torus =  TRUE


---------------------------------------
Test based on the 2 nearest points (NP):

Stat. AD on the N values (NP)         :    1.55
p-value of test                       :    0.17


A2 test based on the spacings between the
   successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP)    :    0.42
p-value of test                       :    0.83

Test on the Nm values of W_{n,i}(mNP1):    2.13
p-value of test                       :    0.08

Test on the jump times of Y
   (superposition of Yn):

Expected number of jumps of Y = mN    :     300
Number of jumps of Y                  :     259
p-value of test                       :   0.9914

Stat. AD (mNP2)                       :    0.82
p-value of test                       :    0.46

Stat. AD after spacings (mNP2-S)      :    0.77
p-value of test                       :    0.50

-----------------------------------------------
CPU time used                    :  00:02:41.19

Generator state:
```

```
************************************************************
HOST = compute, Linux

MIXMAX


snpair_ClosePairs test:
----------------------------------------------
   N =  5,  n = 2000000,  r =  0,  t = 16,  p = 0,  m = 30,  Torus =  TRUE


--------------------------------------
Test based on the 2 nearest points (NP):

Stat. AD on the N values (NP)         :    2.48
p-value of test                       :    0.05


A2 test based on the spacings between the
   successive jump times of process Y_n(t):

A2 test on the values of A2 (m-NP)    :    3.10
p-value of test                       :    0.03

Test on the Nm values of W_{n,i}(mNP1):    1.44
p-value of test                       :    0.19

Test on the jump times of Y
   (superposition of Yn):

Expected number of jumps of Y = mN    :     150
Number of jumps of Y                  :     135
p-value of test                       :    0.88

Stat. AD (mNP2)                       :    0.65
p-value of test                       :    0.60

Stat. AD after spacings (mNP2-S)      :    1.66
p-value of test                       :    0.14

-----------------------------------------------
CPU time used                    :  00:03:22.33

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


sknuth_SimpPoker test:
----------------------------------------------
   N =  1,  n = 400000000,  r =  0,   d =    8,   k =    8


-----------------------------------------------
Number of degrees of freedom          :    7
```

```
Chi-square statistic                  :    4.94
p-value of test                       :    0.67

-----------------------------------------------
CPU time used                     :  00:00:52.53

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


sknuth_SimpPoker test:
-----------------------------------------------
   N =  1,  n = 400000000,  r = 27,   d =    8,   k =    8


-----------------------------------------------
Number of degrees of freedom          :    7
Chi-square statistic                  :   10.36
p-value of test                       :    0.17

-----------------------------------------------
CPU time used                     :  00:01:01.83

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


sknuth_SimpPoker test:
-----------------------------------------------
   N =  1,  n = 100000000,  r =  0,   d =   32,   k =   32


-----------------------------------------------
Number of degrees of freedom          :   18
Chi-square statistic                  :   12.92
p-value of test                       :    0.80

-----------------------------------------------
CPU time used                     :  00:00:53.96

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX
```

```
sknuth_SimpPoker test:
-----------------------------------------------
   N =  1,  n = 100000000,  r = 25,   d =   32,   k =   32


-----------------------------------------------
Number of degrees of freedom          :   18
Chi-square statistic                  :   15.68
p-value of test                       :    0.62

-----------------------------------------------
CPU time used                    :  00:01:04.17

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


sknuth_CouponCollector test:
-----------------------------------------------
   N =  1,  n = 200000000,  r =  0,   d =    8


-----------------------------------------------
Number of degrees of freedom          :   54
Chi-square statistic                  :   62.09
p-value of test                       :    0.21

-----------------------------------------------
CPU time used                    :  00:01:04.98

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


sknuth_CouponCollector test:
-----------------------------------------------
   N =  1,  n = 200000000,  r = 10,   d =    8


-----------------------------------------------
Number of degrees of freedom          :   54
Chi-square statistic                  :   89.16
p-value of test                       :  1.8e-3

-----------------------------------------------
CPU time used                    :  00:01:18.00

Generator state:
```

```
************************************************************
HOST = compute, Linux

MIXMAX


sknuth_CouponCollector test:
-----------------------------------------------
   N =  1,  n = 200000000,  r = 20,   d =    8


-----------------------------------------------
Number of degrees of freedom          :   54
Chi-square statistic                  :   58.87
p-value of test                       :    0.30

-----------------------------------------------
CPU time used                    :  00:01:18.29

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


sknuth_CouponCollector test:
-----------------------------------------------
   N =  1,  n = 200000000,  r = 27,   d =    8


-----------------------------------------------
Number of degrees of freedom          :   54
Chi-square statistic                  :   71.83
p-value of test                       :    0.05

-----------------------------------------------
CPU time used                    :  00:01:18.30

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


sknuth_Gap test:
-----------------------------------------------
   N =  1,  n = 500000000,  r =  0,   Alpha =        0,   Beta  =   0.0625


-----------------------------------------------
Number of degrees of freedom          :  232
```

```
Chi-square statistic                  :  229.54
p-value of test                       :    0.53

-----------------------------------------------
CPU time used                     :  00:01:11.47

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


sknuth_Gap test:
-----------------------------------------------
   N =  1,  n = 300000000,  r = 25,   Alpha =        0,   Beta  =  0.03125


-----------------------------------------------
Number of degrees of freedom          :  434
Chi-square statistic                  :  424.14
p-value of test                       :    0.62

-----------------------------------------------
CPU time used                     :  00:01:52.08

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


sknuth_Gap test:
-----------------------------------------------
   N =  1,  n = 100000000,  r =  0,   Alpha =        0,   Beta  = 0.0078125


-----------------------------------------------
Number of degrees of freedom          : 1437
Chi-square statistic                  : 1509.40
p-value of test                       :    0.09

-----------------------------------------------
CPU time used                     :  00:01:43.07

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX
```

```
sknuth_Gap test:
-----------------------------------------------
   N =  1,  n = 10000000,  r = 20,   Alpha =        0,   Beta  = 0.000976562


-----------------------------------------------
Number of degrees of freedom          : 7046
Chi-square statistic                  : 6990.34
p-value of test                       :    0.68

-----------------------------------------------
CPU time used                    :  00:01:54.59

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


sknuth_Run test:
-----------------------------------------------
   N =  5,  n = 1000000000,  r =  0,   Up = FALSE


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.080
p-value of test                       :    0.89

Kolmogorov-Smirnov- statistic = D-    :    0.37
p-value of test                       :    0.20

Anderson-Darling statistic = A2       :    1.06
p-value of test                       :    0.32

Test on the sum of all N observations
Number of degrees of freedom          :   30
Chi-square statistic                  :   39.23
p-value of test                       :    0.12

-----------------------------------------------
CPU time used                    :  00:01:10.22

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


sknuth_Run test:
-----------------------------------------------
   N = 10,  n = 1000000000,  r = 15,   Up =  TRUE
```

```
-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.16
p-value of test                       :    0.56

Kolmogorov-Smirnov- statistic = D-    :    0.26
p-value of test                       :    0.23

Anderson-Darling statistic = A2       :    0.84
p-value of test                       :    0.45

Test on the sum of all N observations
Number of degrees of freedom          :   60
Chi-square statistic                  :   61.98
p-value of test                       :    0.41

-----------------------------------------------
CPU time used                    :  00:02:51.20

Generator state:



************************************************************
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
HOST = compute, Linux

MIXMAX


smultin_Multinomial test:
-----------------------------------------------
   N =  1,  n = 1000000000,  r =  5,   t =  3,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =                 6
       Expected number per cell =  1.6666667e+08
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =  2.5000002e-09,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          :    5
Value of the statistic                :   10.92
p-value of test                       :    0.05


-----------------------------------------------
CPU time used                    :  00:00:53.60

Generator state:
```

```
************************************************************
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
HOST = compute, Linux

MIXMAX


smultin_Multinomial test:
-----------------------------------------------
   N =  1,  n = 1000000000,  r =  5,   t =  5,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =                120
       Expected number per cell =   8333333.3
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =  5.9500005e-08,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          :  119
Value of the statistic                :  147.02
p-value of test                       :    0.04


-----------------------------------------------
CPU time used                    :  00:01:34.28

Generator state:




************************************************************
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
HOST = compute, Linux

MIXMAX


smultin_Multinomial test:
-----------------------------------------------
   N =  1,  n = 500000000,  r =  5,   t =  7,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =              5040
       Expected number per cell =   99206.349
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =  5.0390004e-06,    Sigma =          1

-----------------------------------------------
Test Results for Delta =   1.0000
```

```
Number of degrees of freedom          : 5039
Value of the statistic                : 5024.96
p-value of test                       :    0.55


------------------------------------------------
CPU time used                    :  00:01:13.86

Generator state:



************************************************************
Test sknuth_Permutation calling smultin_Multinomial

************************************************************
HOST = compute, Linux

MIXMAX


smultin_Multinomial test:
------------------------------------------------
   N =  1,  n = 500000000,  r = 10,   t = 10,
       Sparse =  FALSE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =            3628800
       Expected number per cell =    137.7866
       Hashing =  FALSE

   For Delta > -1, we use the ChiSquare approximation
   Correction factor of the ChiSquare:
       Delta =     1,    Mu =   0.0036287993,    Sigma =          1

------------------------------------------------
Test Results for Delta =   1.0000

Number of degrees of freedom          : 3628799
Value of the statistic                : 3.63e+6
p-value of test                       :    0.31


------------------------------------------------
CPU time used                    :  00:02:37.92

Generator state:



************************************************************
Test sknuth_CollisionPermut calling smultin_Multinomial

************************************************************
HOST = compute, Linux

MIXMAX


smultin_Multinomial test:
------------------------------------------------
```

```
   N = 20,  n = 20000000,  r =  0,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =        87178291200
       Expected number per cell =  1 /  4358.9146
       EColl = n^2 / (2k) =   2294.14912
       Hashing =   TRUE

       Collision test,    Mu =      2293.9736,    Sigma =    47.8841

-----------------------------------------------
Test Results for Collisions

For the total number of collisions, we use
      the Poisson approximation:
Expected number of collisions = N*Mu  :    45879.47
Observed number of collisions         :    45966
p-value of test                       :    0.34


-----------------------------
Total number of cells containing j balls

  j =  0                              :    1743165869966
  j =  1                              :        399908074
  j =  2                              :            45954
  j =  3                              :                6
  j =  4                              :                0
  j =  5                              :                0

-----------------------------------------------
CPU time used                    :  00:04:05.21

Generator state:




************************************************************
Test sknuth_CollisionPermut calling smultin_Multinomial

************************************************************
HOST = compute, Linux

MIXMAX


smultin_Multinomial test:
-----------------------------------------------
   N = 20,  n = 20000000,  r = 10,   t = 14,
       Sparse =   TRUE

       GenerCell = smultin_GenerCellPermut
       Number of cells = t! =        87178291200
       Expected number per cell =  1 /  4358.9146
       EColl = n^2 / (2k) =   2294.14912
       Hashing =   TRUE

       Collision test,    Mu =      2293.9736,    Sigma =    47.8841

-----------------------------------------------
Test Results for Collisions
```

```
For the total number of collisions, we use
      the Poisson approximation:
Expected number of collisions = N*Mu  :    45879.47
Observed number of collisions         :    45509
p-value of test                       :    0.96


----------------------------
Total number of cells containing j balls

  j =  0                              :    1743165869509
  j =  1                              :        399908987
  j =  2                              :            45499
  j =  3                              :                5
  j =  4                              :                0
  j =  5                              :                0

------------------------------------------------
CPU time used                    :  00:04:17.38

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


sknuth_MaxOft test:
------------------------------------------------
   N = 40,  n = 10000000,  r =  0,   d = 100000,   t =  8

      Number of categories = 100000
      Expected number per category  = 100.00


------------------------------------------------
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :   0.076
p-value of test                       :    0.60

Kolmogorov-Smirnov- statistic = D-    :   0.063
p-value of test                       :    0.70

Anderson-Darling statistic = A2       :    0.47
p-value of test                       :    0.78

Test on the sum of all N observations
Number of degrees of freedom          : 3999960
Chi-square statistic                  : 4.00e+6
p-value of test                       :    0.63


------------------------------------------------
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :    0.14
p-value of test                       :    0.17

Kolmogorov-Smirnov- statistic = D-    :   0.036
```

```
p-value of test                       :    0.88

Anderson-Darling statistic = A2       :    1.43
p-value of test                       :    0.19


-----------------------------------------------
CPU time used                    :  00:02:54.01

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


sknuth_MaxOft test:
-----------------------------------------------
   N = 30,  n = 10000000,  r =  0,   d = 100000,   t = 16

      Number of categories = 100000
      Expected number per category  = 100.00


-----------------------------------------------
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :    0.10
p-value of test                       :    0.50

Kolmogorov-Smirnov- statistic = D-    :   0.099
p-value of test                       :    0.52

Anderson-Darling statistic = A2       :    0.44
p-value of test                       :    0.81

Test on the sum of all N observations
Number of degrees of freedom          : 2999970
Chi-square statistic                  : 3.00e+6
p-value of test                       :    0.41


-----------------------------------------------
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :   0.077
p-value of test                       :    0.67

Kolmogorov-Smirnov- statistic = D-    :    0.11
p-value of test                       :    0.47

Anderson-Darling statistic = A2       :    0.40
p-value of test                       :    0.85


-----------------------------------------------
CPU time used                    :  00:02:30.21

Generator state:
```

```
************************************************************
HOST = compute, Linux

MIXMAX


sknuth_MaxOft test:
-----------------------------------------------
   N = 20,  n = 10000000,  r =  0,   d = 100000,   t = 24

      Number of categories = 100000
      Expected number per category  = 100.00


-----------------------------------------------
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :   0.047
p-value of test                       :    0.89

Kolmogorov-Smirnov- statistic = D-    :    0.21
p-value of test                       :    0.15

Anderson-Darling statistic = A2       :    1.01
p-value of test                       :    0.35

Test on the sum of all N observations
Number of degrees of freedom          : 1999980
Chi-square statistic                  : 2.00e+6
p-value of test                       :    0.12


-----------------------------------------------
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :   0.049
p-value of test                       :    0.88

Kolmogorov-Smirnov- statistic = D-    :    0.23
p-value of test                       :    0.10

Anderson-Darling statistic = A2       :    1.17
p-value of test                       :    0.28


-----------------------------------------------
CPU time used                    :  00:01:52.65

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


sknuth_MaxOft test:
-----------------------------------------------
```

```
   N = 20,  n = 10000000,  r =  0,   d = 100000,   t = 32

      Number of categories = 100000
      Expected number per category  = 100.00


------------------------------------------------
Test results for chi2 with 99999 degrees of freedom:

Kolmogorov-Smirnov+ statistic = D+    :    0.10
p-value of test                       :    0.63

Kolmogorov-Smirnov- statistic = D-    :    0.23
p-value of test                       :    0.10

Anderson-Darling statistic = A2       :    0.62
p-value of test                       :    0.63

Test on the sum of all N observations
Number of degrees of freedom          : 1999980
Chi-square statistic                  : 2.00e+6
p-value of test                       :    0.40


------------------------------------------------
Test results for Anderson-Darling:

Kolmogorov-Smirnov+ statistic = D+    :    0.18
p-value of test                       :    0.26

Kolmogorov-Smirnov- statistic = D-    :   0.054
p-value of test                       :    0.86

Anderson-Darling statistic = A2       :    0.88
p-value of test                       :    0.42


------------------------------------------------
CPU time used                    :  00:02:04.53

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


svaria_SampleProd test:
------------------------------------------------
   N = 40,  n = 10000000,  r =  0,   t = 8


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.14
p-value of test                       :    0.18

Kolmogorov-Smirnov- statistic = D-    :   0.060
p-value of test                       :    0.72
```

```
Anderson-Darling statistic = A2       :    0.77
p-value of test                       :    0.50

-----------------------------------------------
CPU time used                    :  00:02:15.04

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


svaria_SampleProd test:
-----------------------------------------------
   N = 20,  n = 10000000,  r =  0,   t = 16


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.19
p-value of test                       :    0.21

Kolmogorov-Smirnov- statistic = D-    :    0.15
p-value of test                       :    0.35

Anderson-Darling statistic = A2       :    0.77
p-value of test                       :    0.50

-----------------------------------------------
CPU time used                    :  00:01:38.53

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


svaria_SampleProd test:
-----------------------------------------------
   N = 20,  n = 10000000,  r =  0,   t = 24


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.083
p-value of test                       :    0.72

Kolmogorov-Smirnov- statistic = D-    :    0.18
p-value of test                       :    0.25

Anderson-Darling statistic = A2       :    1.26
p-value of test                       :    0.24

-----------------------------------------------
```

```
CPU time used                    :  00:02:08.48

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


svaria_SampleMean test:
-----------------------------------------------
   N = 20000000,  n = 30,  r =  0


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 1.19e-4
p-value of test                       :    0.57

Kolmogorov-Smirnov- statistic = D-    : 1.50e-4
p-value of test                       :    0.40

Anderson-Darling statistic = A2       :    0.41
p-value of test                       :    0.84

-----------------------------------------------
CPU time used                    :  00:00:30.73

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


svaria_SampleMean test:
-----------------------------------------------
   N = 20000000,  n = 30,  r = 10


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 3.20e-4
p-value of test                       :    0.02

Kolmogorov-Smirnov- statistic = D-    : 2.08e-5
p-value of test                       :    0.98

Anderson-Darling statistic = A2       :    2.55
p-value of test                       :    0.05

-----------------------------------------------
CPU time used                    :  00:00:32.44

Generator state:
```

```
************************************************************
HOST = compute, Linux

MIXMAX


svaria_SampleCorr test:
-----------------------------------------------
   N =  1,  n = 2000000000,  r =  0,   k = 1


-----------------------------------------------
Normal statistic                      :   -0.86
p-value of test                       :    0.81

-----------------------------------------------
CPU time used                    :  00:00:20.34

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


svaria_SampleCorr test:
-----------------------------------------------
   N =  1,  n = 2000000000,  r =  0,   k = 2


-----------------------------------------------
Normal statistic                      :   -0.66
p-value of test                       :    0.75

-----------------------------------------------
CPU time used                    :  00:00:20.94

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


svaria_AppearanceSpacings test:
-----------------------------------------------
   N =  1,   Q = 10000000,   K = 1000000000,   r = 0,   s = 3,   L = 15

   Sequences of n = (K + Q)L =  15150000000 bits
   Q = 10000000 initialization blocks
   K = 1000000000 blocks for the test
   the blocks have L = 15 bits
```

```
-----------------------------------------------
Normal statistic                      :    1.13
p-value of test                       :    0.13

-----------------------------------------------
CPU time used                     :  00:01:52.75

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


svaria_AppearanceSpacings test:
-----------------------------------------------
   N =  1,   Q = 10000000,   K = 1000000000,   r = 27,   s = 3,   L = 15

   Sequences of n = (K + Q)L =  15150000000 bits
   Q = 10000000 initialization blocks
   K = 1000000000 blocks for the test
   the blocks have L = 15 bits



-----------------------------------------------
Normal statistic                      :   -0.54
p-value of test                       :    0.71

-----------------------------------------------
CPU time used                     :  00:01:56.53

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


svaria_WeightDistrib test:
-----------------------------------------------
   N =  1,  n = 20000000,  r =  0,  k = 256,  Alpha =      0,  Beta =   0.25


-----------------------------------------------
Number of degrees of freedom          :   67
Chi-square statistic                  :   81.51
p-value of test                       :    0.11

-----------------------------------------------
CPU time used                     :  00:00:44.19

Generator state:
```

```
************************************************************
HOST = compute, Linux

MIXMAX


svaria_WeightDistrib test:
------------------------------------------------
   N =  1,  n = 20000000,  r = 20,  k = 256,  Alpha =      0,  Beta =   0.25


------------------------------------------------
Number of degrees of freedom          :   67
Chi-square statistic                  :   56.79
p-value of test                       :    0.81

------------------------------------------------
CPU time used                    :  00:00:56.71

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


svaria_WeightDistrib test:
------------------------------------------------
   N =  1,  n = 20000000,  r = 28,  k = 256,  Alpha =      0,  Beta =   0.25


------------------------------------------------
Number of degrees of freedom          :   67
Chi-square statistic                  :   56.24
p-value of test                       :    0.82

------------------------------------------------
CPU time used                    :  00:00:56.65

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


svaria_WeightDistrib test:
------------------------------------------------
   N =  1,  n = 20000000,  r =  0,  k = 256,  Alpha =      0,  Beta = 0.0625


------------------------------------------------
Number of degrees of freedom          :   37
```

```
Chi-square statistic                  :   21.85
p-value of test                       :    0.98

-----------------------------------------------
CPU time used                     :  00:00:44.17

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


svaria_WeightDistrib test:
-----------------------------------------------
   N =  1,  n = 20000000,  r = 10,  k = 256,  Alpha =      0,  Beta = 0.0625


-----------------------------------------------
Number of degrees of freedom          :   37
Chi-square statistic                  :   31.20
p-value of test                       :    0.74

-----------------------------------------------
CPU time used                     :  00:00:56.65

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


svaria_WeightDistrib test:
-----------------------------------------------
   N =  1,  n = 20000000,  r = 26,  k = 256,  Alpha =      0,  Beta = 0.0625


-----------------------------------------------
Number of degrees of freedom          :   37
Chi-square statistic                  :   39.59
p-value of test                       :    0.36

-----------------------------------------------
CPU time used                     :  00:00:56.67

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX
```

```
svaria_SumCollector test:
------------------------------------------------
   N =  1,  n = 500000000,  r =  0,   g = 10


------------------------------------------------
Number of degrees of freedom          :   29
Chi-square statistic                  :   21.54
p-value of test                       :    0.84

------------------------------------------------
CPU time used                    :  00:01:30.03

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


smarsa_MatrixRank test:
------------------------------------------------
   N = 10,  n = 1000000,  r =  0,    s = 5,    L = 30,    k = 30


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 3.06e-3
p-value of test                       :    0.9969

Kolmogorov-Smirnov- statistic = D-    :    0.39
p-value of test                       :    0.03

Anderson-Darling statistic = A2       :    2.93
p-value of test                       :    0.03

Test on the sum of all N observations
Number of degrees of freedom          :   40
Chi-square statistic                  :   66.27
p-value of test                       :  5.6e-3

------------------------------------------------
CPU time used                    :  00:01:17.38

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


smarsa_MatrixRank test:
------------------------------------------------
   N = 10,  n = 1000000,  r = 25,    s = 5,    L = 30,    k = 30
```

```
-------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.14
p-value of test                       :    0.62

Kolmogorov-Smirnov- statistic = D-    :    0.14
p-value of test                       :    0.62

Anderson-Darling statistic = A2       :    0.29
p-value of test                       :    0.94

Test on the sum of all N observations
Number of degrees of freedom          :   40
Chi-square statistic                  :   42.60
p-value of test                       :    0.36

-------------------------------------------
CPU time used                    :  00:01:17.28

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


smarsa_MatrixRank test:
-------------------------------------------
   N =  1,  n = 5000,  r =  0,    s = 4,    L = 1000,    k = 1000


-------------------------------------------
Number of degrees of freedom          :    3
Chi-square statistic                  :    1.99
p-value of test                       :    0.57

-------------------------------------------
CPU time used                    :  00:03:28.57

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


smarsa_MatrixRank test:
-------------------------------------------
   N =  1,  n = 5000,  r = 26,    s = 4,    L = 1000,    k = 1000


-------------------------------------------
Number of degrees of freedom          :    3
Chi-square statistic                  :    1.73
p-value of test                       :    0.63
```

```
-----------------------------------------------
CPU time used                   :  00:03:29.84

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


smarsa_MatrixRank test:
-----------------------------------------------
   N =  1,  n = 80,  r = 15,    s = 15,    L = 5000,    k = 5000


-----------------------------------------------
Number of degrees of freedom          :    2
Chi-square statistic                  :    0.85
p-value of test                       :    0.65

-----------------------------------------------
CPU time used                   :  00:02:36.89

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


smarsa_MatrixRank test:
-----------------------------------------------
   N =  1,  n = 80,  r =  0,    s = 30,    L = 5000,    k = 5000


-----------------------------------------------
Number of degrees of freedom          :    2
Chi-square statistic                  :    0.32
p-value of test                       :    0.85

-----------------------------------------------
CPU time used                   :  00:02:00.51

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


smarsa_Savir2 test:
```

```
------------------------------------------------
   N = 10,  n = 10000000,  r = 10,    m = 1048576,    t = 30


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.19
p-value of test                       :    0.43

Kolmogorov-Smirnov- statistic = D-    :    0.20
p-value of test                       :    0.38

Anderson-Darling statistic = A2       :    0.46
p-value of test                       :    0.78

Test on the sum of all N observations
Number of degrees of freedom          :  130
Chi-square statistic                  :  135.98
p-value of test                       :    0.34

------------------------------------------------
CPU time used                    :  00:00:41.27

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


smarsa_GCD test:
------------------------------------------------
   N = 10,  n = 50000000,  r =  0,   s = 30


------------------------------------------------
Test results for GCD values:

Kolmogorov-Smirnov+ statistic = D+    :    0.21
p-value of test                       :    0.38

Kolmogorov-Smirnov- statistic = D-    :   0.096
p-value of test                       :    0.78

Anderson-Darling statistic = A2       :    0.52
p-value of test                       :    0.72

Test on the sum of all N observations
Number of degrees of freedom          : 17430
Chi-square statistic                  :17376.04
p-value of test                       :    0.61



------------------------------------------------
CPU time used                    :  00:01:58.19

Generator state:
```

```
************************************************************
HOST = compute, Linux

MIXMAX


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 100000000,  r =  0,   s = 5,   L0 =   50,   L1 =   50



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :   36
ChiSquare statistic                   :   36.82
p-value of test                       :    0.43


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :   35
ChiSquare statistic                   :   40.13
p-value of test                       :    0.25


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          :   25
ChiSquare statistic                   :   21.87
p-value of test                       :    0.64


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :   24
ChiSquare statistic                   :   20.98
p-value of test                       :    0.64


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :   17
ChiSquare statistic                   :   12.55
p-value of test                       :    0.77


-----------------------------------------------
CPU time used                    :  00:00:57.83

Generator state:



************************************************************
HOST = compute, Linux
```

```
MIXMAX


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 100000000,  r = 25,   s = 5,   L0 =   50,   L1 =   50



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :   36
ChiSquare statistic                   :   29.46
p-value of test                       :    0.77


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :   35
ChiSquare statistic                   :   29.98
p-value of test                       :    0.71


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          :   25
ChiSquare statistic                   :   19.64
p-value of test                       :    0.77


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :   24
ChiSquare statistic                   :   25.89
p-value of test                       :    0.36


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :   17
ChiSquare statistic                   :   13.51
p-value of test                       :    0.70


-----------------------------------------------
CPU time used                    :  00:01:02.51

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX
```

```
swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 10000000,  r =  0,   s = 10,   L0 = 1000,   L1 = 1000



-----------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :  146
ChiSquare statistic                   :  123.10
p-value of test                       :    0.92


-----------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :  146
ChiSquare statistic                   :  153.71
p-value of test                       :    0.31


-----------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          :  500
ChiSquare statistic                   :  530.37
p-value of test                       :    0.17


-----------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :  136
ChiSquare statistic                   :  127.93
p-value of test                       :    0.68


-----------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :   74
ChiSquare statistic                   :   78.67
p-value of test                       :    0.33


-----------------------------------------------
CPU time used                    :  00:01:35.53

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


swalk_RandomWalk1 test:
-----------------------------------------------
   N =  1,  n = 10000000,  r = 20,   s = 10,   L0 = 1000,   L1 = 1000
```

```
------------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :  146
ChiSquare statistic                   :  138.30
p-value of test                       :    0.66


------------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :  146
ChiSquare statistic                   :  144.99
p-value of test                       :    0.51


------------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          :  500
ChiSquare statistic                   :  498.35
p-value of test                       :    0.51


------------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :  136
ChiSquare statistic                   :  159.36
p-value of test                       :    0.08


------------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :   74
ChiSquare statistic                   :   92.34
p-value of test                       :    0.07


------------------------------------------------
CPU time used                    :  00:01:36.17

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


swalk_RandomWalk1 test:
------------------------------------------------
   N =  1,  n = 1000000,  r =  0,   s = 15,   L0 = 10000,   L1 = 10000



------------------------------------------------
Test on the values of the Statistic H
```

```
Number of degrees of freedom          :  384
ChiSquare statistic                   :  398.80
p-value of test                       :    0.29


------------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :  384
ChiSquare statistic                   :  378.47
p-value of test                       :    0.57


------------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          : 5000
ChiSquare statistic                   : 4796.27
p-value of test                       :    0.98


------------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :  378
ChiSquare statistic                   :  388.82
p-value of test                       :    0.34


------------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :  200
ChiSquare statistic                   :  191.81
p-value of test                       :    0.65


------------------------------------------------
CPU time used                    :  00:01:25.96

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


swalk_RandomWalk1 test:
------------------------------------------------
   N =  1,  n = 1000000,  r = 15,   s = 15,   L0 = 10000,   L1 = 10000



------------------------------------------------
Test on the values of the Statistic H

Number of degrees of freedom          :  384
ChiSquare statistic                   :  378.60
p-value of test                       :    0.57
```

```
------------------------------------------------
Test on the values of the Statistic M

Number of degrees of freedom          :  384
ChiSquare statistic                   :  366.83
p-value of test                       :    0.73


------------------------------------------------
Test on the values of the Statistic J

Number of degrees of freedom          : 5000
ChiSquare statistic                   : 5101.60
p-value of test                       :    0.15


------------------------------------------------
Test on the values of the Statistic R

Number of degrees of freedom          :  378
ChiSquare statistic                   :  374.03
p-value of test                       :    0.55


------------------------------------------------
Test on the values of the Statistic C

Number of degrees of freedom          :  200
ChiSquare statistic                   :  216.96
p-value of test                       :    0.20


------------------------------------------------
CPU time used                    :  00:01:28.48

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


scomp_LinearComp test:
------------------------------------------------
   N =  1,  n = 400020,  r =  0,    s = 1



------------------------------------------------
Number of degrees of freedom          :   12
Chi2 statistic for size of jumps      :   14.92
p-value of test                       :    0.25


------------------------------------------------
Normal statistic for number of jumps  :   -1.27
p-value of test                       :    0.90
```

```
-----------------------------------------------
CPU time used                    :  00:02:22.66

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


scomp_LinearComp test:
-----------------------------------------------
   N =  1,  n = 400020,  r = 29,    s = 1



-----------------------------------------------
Number of degrees of freedom          :   12
Chi2 statistic for size of jumps      :   10.76
p-value of test                       :    0.55


-----------------------------------------------
Normal statistic for number of jumps  :   -0.16
p-value of test                       :    0.56



-----------------------------------------------
CPU time used                    :  00:02:22.29

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


scomp_LempelZiv test:
-----------------------------------------------
   N = 10,  n = 134217728,  r =  0,   s =   30,   k =   27


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.23
p-value of test                       :    0.31

Kolmogorov-Smirnov- statistic = D-    :   0.079
p-value of test                       :    0.84

Anderson-Darling statistic = A2       :    0.58
p-value of test                       :    0.66
```

```
Tests on the sum of all N observations
Standardized normal statistic         :   -0.68
p-value of test                       :    0.75

Sample variance                       :    0.59
p-value of test                       :    0.80

-----------------------------------------------
CPU time used                    :  00:01:01.70

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


scomp_LempelZiv test:
-----------------------------------------------
   N = 10,  n = 134217728,  r = 15,   s =   15,   k =   27


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.32
p-value of test                       :    0.10

Kolmogorov-Smirnov- statistic = D-    :   0.066
p-value of test                       :    0.88

Anderson-Darling statistic = A2       :    2.62
p-value of test                       :    0.04

Tests on the sum of all N observations
Standardized normal statistic         :   -1.98
p-value of test                       :    0.98

Sample variance                       :    1.47
p-value of test                       :    0.15

-----------------------------------------------
CPU time used                    :  00:01:03.90

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


sspectral_Fourier3 test:
-----------------------------------------------
   N = 100000,  n = 16384,  r =  0,   s =    3,   k =   14


-----------------------------------------------
```

```
Kolmogorov-Smirnov+ statistic = D+    : 9.03e-3
p-value of test                       :    0.51

Kolmogorov-Smirnov- statistic = D-    : 7.17e-3
p-value of test                       :    0.65

Anderson-Darling statistic = A2       :    0.35
p-value of test                       :    0.90

-----------------------------------------------
CPU time used                    :  00:00:49.41

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


sspectral_Fourier3 test:
-----------------------------------------------
   N = 100000,  n = 16384,  r = 27,   s =    3,   k =   14


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    : 6.64e-3
p-value of test                       :    0.69

Kolmogorov-Smirnov- statistic = D-    : 7.48e-3
p-value of test                       :    0.63

Anderson-Darling statistic = A2       :    0.30
p-value of test                       :    0.94

-----------------------------------------------
CPU time used                    :  00:00:49.34

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


sstring_LongestHeadRun test:
-----------------------------------------------
   N =  1,  n = 1000,  r =  0,   s = 3,   L = 10000020


-----------------------------------------------
Number of degrees of freedom          :    8
Chi-square statistic                  :    8.28
p-value of test                       :    0.41
```

```
-----------------------------------------------
Global longest run of 1               :   33.00
p-value of test                       :    0.44



-----------------------------------------------
CPU time used                     :  00:01:38.90

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


sstring_LongestHeadRun test:
-----------------------------------------------
   N =  1,  n = 1000,  r = 27,   s = 3,   L = 10000020


-----------------------------------------------
Number of degrees of freedom          :    8
Chi-square statistic                  :    8.52
p-value of test                       :    0.38

-----------------------------------------------
Global longest run of 1               :   32.00
p-value of test                       :    0.50



-----------------------------------------------
CPU time used                     :  00:01:52.90

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


sstring_PeriodsInStrings test:
-----------------------------------------------
   N = 10,  n = 500000000,  r =  0,   s =   10


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.27
p-value of test                       :    0.20

Kolmogorov-Smirnov- statistic = D-    :    0.16
p-value of test                       :    0.54

Anderson-Darling statistic = A2       :    0.85
```

```
p-value of test                       :    0.45

Test on the sum of all N observations
Number of degrees of freedom          :  200
Chi-square statistic                  :  183.94
p-value of test                       :    0.79

-----------------------------------------------
CPU time used                    :  00:02:42.11

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


sstring_PeriodsInStrings test:
-----------------------------------------------
   N = 10,  n = 500000000,  r = 20,   s =   10


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.20
p-value of test                       :    0.38

Kolmogorov-Smirnov- statistic = D-    :    0.16
p-value of test                       :    0.54

Anderson-Darling statistic = A2       :    0.60
p-value of test                       :    0.64

Test on the sum of all N observations
Number of degrees of freedom          :  200
Chi-square statistic                  :  190.69
p-value of test                       :    0.67

-----------------------------------------------
CPU time used                    :  00:02:43.09

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


sstring_HammingWeight2 test:
-----------------------------------------------
   N = 10,  n = 1000000000,  r =  0,   s = 3,   L = 1000000


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :   0.099
```

```
p-value of test                       :    0.77

Kolmogorov-Smirnov- statistic = D-    :    0.17
p-value of test                       :    0.52

Anderson-Darling statistic = A2       :    0.59
p-value of test                       :    0.66

Test on the sum of all N observations
Number of degrees of freedom          : 10000
Chi-square statistic                  :10018.93
p-value of test                       :    0.44

-----------------------------------------------
CPU time used                    :  00:01:05.50

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


sstring_HammingWeight2 test:
-----------------------------------------------
   N = 10,  n = 1000000000,  r = 27,   s = 3,   L = 1000000


-----------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.32
p-value of test                       :    0.10

Kolmogorov-Smirnov- statistic = D-    :    0.14
p-value of test                       :    0.63

Anderson-Darling statistic = A2       :    1.09
p-value of test                       :    0.31

Test on the sum of all N observations
Number of degrees of freedom          : 10000
Chi-square statistic                  : 9859.13
p-value of test                       :    0.84

-----------------------------------------------
CPU time used                    :  00:01:10.41

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


sstring_HammingCorr test:
-----------------------------------------------
```

```
   N =  1,  n = 1000000000,  r = 10,   s = 10,   L = 30


------------------------------------------------
Normal statistic                      :   -1.92
p-value of test                       :    0.97

------------------------------------------------
CPU time used                    :  00:01:24.27

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


sstring_HammingCorr test:
------------------------------------------------
   N =  1,  n = 100000000,  r = 10,   s = 10,   L = 300



------------------------------------------------
Normal statistic                      :    0.56
p-value of test                       :    0.29

------------------------------------------------
CPU time used                    :  00:01:22.96

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


sstring_HammingCorr test:
------------------------------------------------
   N =  1,  n = 100000000,  r = 10,   s = 10,   L = 1200



------------------------------------------------
Normal statistic                      :    0.35
p-value of test                       :    0.36

------------------------------------------------
CPU time used                    :  00:05:28.47

Generator state:
```

```
************************************************************
HOST = compute, Linux

MIXMAX


sstring_HammingIndep test:
-------------------------------------------
   N = 10,  n = 30000000,  r =  0,   s = 3,   L = 30,   d = 0



Counters with expected numbers >= 10
-------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.18
p-value of test                       :    0.47

Kolmogorov-Smirnov- statistic = D-    :    0.19
p-value of test                       :    0.43

Anderson-Darling statistic = A2       :    0.45
p-value of test                       :    0.80

Test on the sum of all N observations
Number of degrees of freedom          : 4890
Chi-square statistic                  : 4873.69
p-value of test                       :    0.56

-------------------------------------------
CPU time used                    :  00:02:10.07

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


sstring_HammingIndep test:
-------------------------------------------
   N = 10,  n = 30000000,  r = 27,   s = 3,   L = 30,   d = 0



Counters with expected numbers >= 10
-------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.17
p-value of test                       :    0.51

Kolmogorov-Smirnov- statistic = D-    :    0.26
p-value of test                       :    0.22

Anderson-Darling statistic = A2       :    0.58
p-value of test                       :    0.66

Test on the sum of all N observations
Number of degrees of freedom          : 4890
Chi-square statistic                  : 4915.50
```

```
p-value of test                       :    0.40

------------------------------------------------
CPU time used                     :  00:02:21.64

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


sstring_HammingIndep test:
------------------------------------------------
   N =  1,  n = 30000000,  r =  0,   s = 4,   L = 300,   d = 0



Counters with expected numbers >= 10
------------------------------------------------
Number of degrees of freedom          : 4117
Chi-square statistic                  : 4123.93
p-value of test                       :    0.47

------------------------------------------------
CPU time used                     :  00:01:37.14

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


sstring_HammingIndep test:
------------------------------------------------
   N =  1,  n = 30000000,  r = 26,   s = 4,   L = 300,   d = 0



Counters with expected numbers >= 10
------------------------------------------------
Number of degrees of freedom          : 4117
Chi-square statistic                  : 4208.99
p-value of test                       :    0.16

------------------------------------------------
CPU time used                     :  00:01:44.22

Generator state:



************************************************************
HOST = compute, Linux
```

```
MIXMAX


sstring_HammingIndep test:
------------------------------------------------
   N =  1,  n = 10000000,  r =  0,   s = 5,   L = 1200,   d = 0



Counters with expected numbers >= 10
------------------------------------------------
Number of degrees of freedom          : 11825
Chi-square statistic                  :12051.79
p-value of test                       :    0.07

------------------------------------------------
CPU time used                    :  00:01:47.04

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


sstring_HammingIndep test:
------------------------------------------------
   N =  1,  n = 10000000,  r = 25,   s = 5,   L = 1200,   d = 0



Counters with expected numbers >= 10
------------------------------------------------
Number of degrees of freedom          : 11825
Chi-square statistic                  :11857.23
p-value of test                       :    0.42

------------------------------------------------
CPU time used                    :  00:01:58.10

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


sstring_Run test:
------------------------------------------------
   N =  1,  n = 2000000000,  r =  0,   s =    3


------------------------------------------------
Total number of 1 runs:  2000000001
```

```
Number of degrees of freedom          :   54
Chi2 statistic for number of runs     :   28.29
p-value of test                       :    0.9985


------------------------------------------------
Total number of bits:  7999973838

Normal statistic for number of bits   :   -0.21
p-value of test                       :    0.58



------------------------------------------------
CPU time used                    :  00:01:20.98

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


sstring_Run test:
------------------------------------------------
   N =  1,  n = 2000000000,  r = 27,   s =    3


------------------------------------------------
Total number of 1 runs:  2000000000

Number of degrees of freedom          :   54
Chi2 statistic for number of runs     :   42.21
p-value of test                       :    0.88


------------------------------------------------
Total number of bits:  8000006061

Normal statistic for number of bits   :   0.048
p-value of test                       :    0.48



------------------------------------------------
CPU time used                    :  00:01:25.03

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


sstring_AutoCor test:
------------------------------------------------
```

```
   N = 10,  n = 1000000030,  r =  0,   s = 3,   d = 1


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.11
p-value of test                       :    0.72

Kolmogorov-Smirnov- statistic = D-    :    0.19
p-value of test                       :    0.41

Anderson-Darling statistic = A2       :    0.30
p-value of test                       :    0.94

Tests on the sum of all N observations
Standardized normal statistic         :  -0.050
p-value of test                       :    0.52

Sample variance                       :    0.98
p-value of test                       :    0.46

------------------------------------------------
CPU time used                    :  00:02:42.52

Generator state:



************************************************************
HOST = compute, Linux

MIXMAX


sstring_AutoCor test:
------------------------------------------------
   N = 10,  n = 1000000029,  r =  0,   s = 3,   d = 3


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.23
p-value of test                       :    0.30

Kolmogorov-Smirnov- statistic = D-    :    0.10
p-value of test                       :    0.75

Anderson-Darling statistic = A2       :    0.52
p-value of test                       :    0.72

Tests on the sum of all N observations
Standardized normal statistic         :   -0.59
p-value of test                       :    0.72

Sample variance                       :    0.76
p-value of test                       :    0.66

------------------------------------------------
CPU time used                    :  00:02:25.34

Generator state:
```

```
************************************************************
HOST = compute, Linux

MIXMAX


sstring_AutoCor test:
------------------------------------------------
   N = 10,  n = 1000000030,  r = 27,   s = 3,   d = 1


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.29
p-value of test                       :    0.15

Kolmogorov-Smirnov- statistic = D-    :    0.10
p-value of test                       :    0.76

Anderson-Darling statistic = A2       :    0.58
p-value of test                       :    0.66

Tests on the sum of all N observations
Standardized normal statistic         :   -0.55
p-value of test                       :    0.71

Sample variance                       :    0.83
p-value of test                       :    0.59

------------------------------------------------
CPU time used                    :  00:02:47.08

Generator state:




************************************************************
HOST = compute, Linux

MIXMAX


sstring_AutoCor test:
------------------------------------------------
   N = 10,  n = 1000000029,  r = 27,   s = 3,   d = 3


------------------------------------------------

Kolmogorov-Smirnov+ statistic = D+    :    0.18
p-value of test                       :    0.46

Kolmogorov-Smirnov- statistic = D-    :    0.24
p-value of test                       :    0.26

Anderson-Darling statistic = A2       :    1.01
p-value of test                       :    0.35

Tests on the sum of all N observations
Standardized normal statistic         :    0.53
p-value of test                       :    0.30
```

```
Sample variance                         :    0.30
p-value of test                         :    0.97

-----------------------------------------------
CPU time used                      :  00:02:27.67

Generator state:




========= Summary results of BigCrush =========

 Version:          TestU01 1.2.3
 Generator:        MIXMAX
 Number of statistics:  160
 Total CPU time:   03:35:34.15

 All tests were passed
```