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Rocky Enterprise Linux 9.2 Manual Pages on command 'jrand48.3'

\$ man jrand48.3

DRAND48(3)

Linux Programmer's Manual

DRAND48(3)

NAME

drand48, erand48, lrand48, nrand48, mrand48, jrand48, srand48, seed48, lcong48 - generate uniformly distributed pseudo-random numbers

SYNOPSIS

```
#include <stdlib.h>

double drand48(void);

double erand48(unsigned short xsubi[3]);

long lrand48(void);

long nrand48(unsigned short xsubi[3]);

long mrand48(void);

long jrand48(unsigned short xsubi[3]);

void srand48(long seedval);

unsigned short *seed48(unsigned short seed16v[3]);

void lcong48(unsigned short param[7]);
```

Feature Test Macro Requirements for glibc (see `feature_test_macros(7)`):

```
All functions shown above: _XOPEN_SOURCE

|| /* Glibc since 2.19: */ _DEFAULT_SOURCE

|| /* Glibc versions <= 2.19: */ _SVID_SOURCE
```

DESCRIPTION

These functions generate pseudo-random numbers using the linear congruential algorithm and 48-bit integer arithmetic.

The `drand48()` and `erand48()` functions return nonnegative double-precision floating-point

values uniformly distributed over the interval [0.0, 1.0].

The lrand48() and nrand48() functions return nonnegative long integers uniformly distributed over the interval [0, 2^31].

The mrand48() and jrand48() functions return signed long integers uniformly distributed over the interval [-2^31, 2^31].

The srand48(), seed48(), and lcong48() functions are initialization functions, one of which should be called before using drand48(), lrand48() or mrand48(). The functions erand48(), nrand48(), and jrand48() do not require an initialization function to be called first.

All the functions work by generating a sequence of 48-bit integers, X_i , according to the linear congruential formula:

$$X_{n+1} = (aX_n + c) \bmod m, \text{ where } n \geq 0$$

The parameter $m = 2^{48}$, hence 48-bit integer arithmetic is performed. Unless lcong48() is called, a and c are given by:

$$a = 0x5DEECE66D$$

$$c = 0xB$$

The value returned by any of the functions drand48(), erand48(), lrand48(), nrand48(), mrand48() or jrand48() is computed by first generating the next 48-bit X_i in the sequence. Then the appropriate number of bits, according to the type of data item to be returned, is copied from the high-order bits of X_i and transformed into the returned value.

The functions drand48(), lrand48(), and mrand48() store the last 48-bit X_i generated in an internal buffer. The functions erand48(), nrand48(), and jrand48() require the calling program to provide storage for the successive X_i values in the array argument xsubi. The functions are initialized by placing the initial value of X_i into the array before calling the function for the first time.

The initializer function srand48() sets the high order 32-bits of X_i to the argument seed? val. The low order 16-bits are set to the arbitrary value 0x330E.

The initializer function seed48() sets the value of X_i to the 48-bit value specified in the array argument seed16v. The previous value of X_i is copied into an internal buffer and a pointer to this buffer is returned by seed48().

The initialization function lcong48() allows the user to specify initial values for X_i , a , and c . Array argument elements param[0-2] specify X_i , param[3-5] specify a , and param[6] specifies c . After lcong48() has been called, a subsequent call to either srand48() or

seed48() will restore the standard values of *a* and *c*.

ATTRIBUTES

For an explanation of the terms used in this section, see attributes(7).

?Interface ? Attribute ? Value ?

?drand48(), erand48(), ? Thread safety ? MT-Unsafe race:drand48 ?

?lrand48(), nrand48(), ? ?

?mrand48(), jrand48(), ? ? ?

?srand48(), seed48(), ? ? ?

?lcong48() ? ? ? ?

The above functions record global state information for the random number generator, so they are not thread-safe.

CONFORMING TO

POSIX.1-2001, POSIX.1-2008, SVr4.

SEE ALSO

rand(3), random(3)

COLOPHON

This page is part of release 5.10 of the Linux man-pages project. A description of the project, information about reporting bugs, and the latest version of this page, can be found at <https://www.kernel.org/doc/man-pages/>.

2020-11-01

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