

**NAME**

random\_r, srandom\_r, initstate\_r, setstate\_r - reentrant random number generator

**SYNOPSIS**

```
#include <stdlib.h>

int random_r(struct random_data *buf, int32_t *result);

int srandom_r(unsigned int seed, struct random_data *buf);

int initstate_r(unsigned int seed, char *statebuf,
               size_t statelen, struct random_data *buf);
int setstate_r(char *statebuf, struct random_data *buf);
```

Feature Test Macro Requirements for glibc (see [feature\\_test\\_macros\(7\)](#)):

```
random_r(), srandom_r(), initstate_r(), setstate_r():
/* Glibc since 2.19: */ _DEFAULT_SOURCE || /* Glibc versions <= 2.19: */ _SVID_SOURCE ||
_BSD_SOURCE
```

**DESCRIPTION**

These functions are the reentrant equivalents of the functions described in [random\(3\)](#). They are suitable for use in multithreaded programs where each thread needs to obtain an independent, reproducible sequence of random numbers.

The **random\_r()** function is like [random\(3\)](#), except that instead of using state information maintained in a global variable, it uses the state information in the argument pointed to by *buf*, which must have been previously initialized by **initstate\_r()**. The generated random number is returned in the argument *result*.

The **srandom\_r()** function is like [srandom\(3\)](#), except that it initializes the seed for the random number generator whose state is maintained in the object pointed to by *buf*, which must have been previously initialized by **initstate\_r()**, instead of the seed associated with the global state variable.

The **initstate\_r()** function is like [initstate\(3\)](#) except that it initializes the state in the object pointed to by *buf*, rather than initializing the global state variable. Before calling this function, the *buf* field must be initialized to NULL. The **initstate\_r()** function records a pointer to the *statebuf* argument inside the structure pointed to by *buf*. Thus, *statebuf* should not be deallocated so long as *buf* is still in use. (So, *statebuf* should typically be allocated as a static variable, or allocated on the heap using [malloc\(3\)](#) or similar.)

The **setstate\_r()** function is like [setstate\(3\)](#) except that it modifies the state in the object pointed to by *buf*, rather than modifying the global state variable. *state* must first have been initialized using **initstate\_r()** or be the result of a previous call of **setstate\_r()**.

**RETURN VALUE**

All of these functions return 0 on success. On error, -1 is returned, with *errno* set to indicate the cause of the error.

**ERRORS****EINVAL**

A state array of less than 8 bytes was specified to **initstate\_r()**.

**EINVAL**

The *statebuf* or *buf* argument to **setstate\_r()** was NULL.

**EINVAL**

The *buf* or *result* argument to **random\_r()** was NULL.

**ATTRIBUTES**

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

| Interface  | Attribute     | Value            |
|--|---------------|------------------|
| <code>random_r()</code> , <code>srandom_r()</code> ,<br><code>initstate_r()</code> , <code>setstate_r()</code> | Thread safety | MT-Safe race:buf |

### CONFORMING TO

These functions are nonstandard glibc extensions.

### BUGS

The `initstate_r()` interface is confusing. It appears that the `random_data` type is intended to be opaque, but the implementation requires the user to either initialize the `buf.state` file to NULL or zero out the entire structure before the call.

### SEE ALSO

[drand48\(3\)](#), [rand\(3\)](#), [random\(3\)](#)

### COLOPHON

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