

NAME

`mcheck`, `mcheck_check_all`, `mcheck_pedantic`, `mprobe` – heap consistency checking

SYNOPSIS

```
#include <mcheck.h>

int mcheck(void (*abortfunc)(enum mcheck_status mstatus));

int mcheck_pedantic(void (*abortfunc)(enum mcheck_status mstatus));

void mcheck_check_all(void);

enum mcheck_status mprobe(void *ptr);
```

DESCRIPTION

The **mcheck()** function installs a set of debugging hooks for the **malloc(3)** family of memory-allocation functions. These hooks cause certain consistency checks to be performed on the state of the heap. The checks can detect application errors such as freeing a block of memory more than once or corrupting the bookkeeping data structures that immediately precede a block of allocated memory.

To be effective, the **mcheck()** function must be called before the first call to **malloc(3)** or a related function. In cases where this is difficult to ensure, linking the program with `-lmcheck` inserts an implicit call to **mcheck()** (with a NULL argument) before the first call to a memory-allocation function.

The **mcheck_pedantic()** function is similar to **mcheck()**, but performs checks on all allocated blocks whenever one of the memory-allocation functions is called. This can be very slow!

The **mcheck_check_all()** function causes an immediate check on all allocated blocks. This call is effective only if **mcheck()** is called beforehand.

If the system detects an inconsistency in the heap, the caller-supplied function pointed to by *abortfunc* is invoked with a single argument, *mstatus*, that indicates what type of inconsistency was detected. If *abortfunc* is NULL, a default function prints an error message on *stderr* and calls **abort(3)**.

The **mprobe()** function performs a consistency check on the block of allocated memory pointed to by *ptr*. The **mcheck()** function should be called beforehand (otherwise **mprobe()** returns **MCHECK_DISABLED**).

The following list describes the values returned by **mprobe()** or passed as the *mstatus* argument when *abortfunc* is invoked:

MCHECK_DISABLED (mprobe() only)

mcheck() was not called before the first memory allocation function was called. Consistency checking is not possible.

MCHECK_OK (mprobe() only)

No inconsistency detected.

MCHECK_HEAD

Memory preceding an allocated block was clobbered.

MCHECK_TAIL

Memory following an allocated block was clobbered.

MCHECK_FREE

A block of memory was freed twice.

RETURN VALUE

mcheck() and **mcheck_pedantic()** return 0 on success, or -1 on error.

VERSIONS

The **mcheck_pedantic()** and **mcheck_check_all()** functions are available since glibc 2.2. The **mcheck()** and **mprobe()** functions are present since at least glibc 2.0

ATTRIBUTES

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

Interface	Attribute	Value
mcheck() , mcheck_pedantic() , mcheck_check_all() , mprobe()	Thread safety	MT-Unsafe race:mcheck const:malloc_hooks

CONFORMING TO

These functions are GNU extensions.

NOTES

Linking a program with *-lmcheck* and using the **MALLOC_CHECK_** environment variable (described in **malloc(3)**) cause the same kinds of errors to be detected. But, using **MALLOC_CHECK_** does not require the application to be relinked.

EXAMPLE

The program below calls **mcheck()** with a NULL argument and then frees the same block of memory twice. The following shell session demonstrates what happens when running the program:

```
$ ./a.out
About to free

About to free a second time
block freed twice
Aborted (core dumped)
```

Program source

```
#include <stdlib.h>
#include <stdio.h>
#include <mcheck.h>

int
main(int argc, char *argv[])
{
    char *p;

    if (mcheck(NULL) != 0) {
        fprintf(stderr, "mcheck() failed\n");

        exit(EXIT_FAILURE);
    }

    p = malloc(1000);

    fprintf(stderr, "About to free\n");
    free(p);
    fprintf(stderr, "\nAbout to free a second time\n");
    free(p);

    exit(EXIT_SUCCESS);
}
```

SEE ALSO

malloc(3), **malloc(3)**, **mtrace(3)**

COLOPHON

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