

NAME

`toupper`, `tolower`, `toupper_l`, `tolower_l` – convert uppercase or lowercase

SYNOPSIS

```
#include <ctype.h>

int toupper(int c);
int tolower(int c);

int toupper_l(int c, locale_t locale);
int tolower_l(int c, locale_t locale);
```

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

```
toupper_l(), tolower_l():
    Since glibc 2.10:
        _XOPEN_SOURCE >= 700
    Before glibc 2.10:
        _GNU_SOURCE
```

DESCRIPTION

These functions convert lowercase letters to uppercase, and vice versa.

If *c* is a lowercase letter, **toupper()** returns its uppercase equivalent, if an uppercase representation exists in the current locale. Otherwise, it returns *c*. The **toupper_l()** function performs the same task, but uses the locale referred to by the locale handle *locale*.

If *c* is an uppercase letter, **tolower()** returns its lowercase equivalent, if a lowercase representation exists in the current locale. Otherwise, it returns *c*. The **tolower_l()** function performs the same task, but uses the locale referred to by the locale handle *locale*.

If *c* is neither an *unsigned char* value nor **EOF**, the behavior of these functions is undefined.

The behavior of **toupper_l()** and **tolower_l()** is undefined if *locale* is the special locale object **LC_GLOBAL_LOCALE** (see **duplocale(3)**) or is not a valid locale object handle.

RETURN VALUE

The value returned is that of the converted letter, or *c* if the conversion was not possible.

ATTRIBUTES

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

Interface	Attribute	Value
toupper() , tolower() , toupper_l() , tolower_l()	Thread safety	MT-Safe

CONFORMING TO

toupper(), **tolower()**: C89, C99, 4.3BSD, POSIX.1-2001, POSIX.1-2008.

toupper_l(), **tolower_l()**: POSIX.1-2008.

NOTES

The standards require that the argument *c* for these functions is either **EOF** or a value that is representable in the type *unsigned char*. If the argument *c* is of type *char*, it must be cast to *unsigned char*, as in the following example:

```
char c;
...
res = toupper((unsigned char) c);
```

This is necessary because *char* may be the equivalent *signed char*, in which case a byte where the top bit is set would be sign extended when converting to *int*, yielding a value that is outside the range of *unsigned char*.

The details of what constitutes an uppercase or lowercase letter depend on the locale. For example, the default "C" locale does not know about umlauts, so no conversion is done for them.

In some non-English locales, there are lowercase letters with no corresponding uppercase equivalent; the German sharp s is one example.

SEE ALSO

isalpha(3), newlocale(3), setlocale(3), towlower(3), towupper(3), uselocale(3), locale(7)

COLOPHON

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