

NAME

nextafter, nextafterf, nextafterl, nexttoward, nexttowardf, nexttowardl - floating-point number manipulation

SYNOPSIS

```
#include <math.h>
```

```
double nextafter(double x, double y);
float nextafterf(float x, float y);
long double nextafterl(long double x, long double y);

double nexttoward(double x, long double y);
float nexttowardf(float x, long double y);
long double nexttowardl(long double x, long double y);
```

Link with *-lm*.

Feature Test Macro Requirements for glibc (see [feature_test_macros\(7\)](#)):

nextafter():

```
_BSD_SOURCE || _SVID_SOURCE || _XOPEN_SOURCE >= 500 ||
_XOPEN_SOURCE && _XOPEN_SOURCE_EXTENDED || _ISOC99_SOURCE ||
_POSIX_C_SOURCE >= 200112L;
or cc -std=c99
```

nextafterf(), **nextafterl()**:

```
_BSD_SOURCE || _SVID_SOURCE || _XOPEN_SOURCE >= 600 || _ISOC99_SOURCE ||
_POSIX_C_SOURCE >= 200112L;
or cc -std=c99
```

nexttoward(), **nexttowardf()**, **nexttowardl()**:

```
_XOPEN_SOURCE >= 600 || _ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L;
or cc -std=c99
```

DESCRIPTION

The **nextafter()**, **nextafterf()**, and **nextafterl()** functions return the next representable floating-point value following *x* in the direction of *y*. If *y* is less than *x*, these functions will return the largest representable number less than *x*.

If *x* equals *y*, the functions return *y*.

The **nexttoward()**, **nexttowardf()**, and **nexttowardl()** functions do the same as the corresponding **nextafter()** functions, except that they have a *long double* second argument.

RETURN VALUE

On success, these functions return the next representable floating-point value after *x* in the direction of *y*.

If *x* equals *y*, then *y* (cast to the same type as *x*) is returned.

If *x* or *y* is a NaN, a NaN is returned.

If *x* is finite, and the result would overflow, a range error occurs, and the functions return **HUGE_VAL**, **HUGE_VALF**, or **HUGE_VALL**, respectively, with the correct mathematical sign.

If *x* is not equal to *y*, and the correct function result would be subnormal, zero, or underflow, a range error occurs, and either the correct value (if it can be represented), or 0.0, is returned.

ERRORS

See [math_error\(7\)](#) for information on how to determine whether an error has occurred when calling these functions.

The following errors can occur:

Range error: result overflow

An overflow floating-point exception (**FE_OVERFLOW**) is raised.

Range error: result is subnormal or underflows

An underflow floating-point exception (**FE_UNDERFLOW**) is raised.

These functions do not set *errno*.

ATTRIBUTES

Multithreading (see [pthread\(7\)](#))

The `nextafter()`, `nextafterf()`, `nextafterl()`, `nexttoward()`, `nexttowardf()`, and `nexttowardl()` functions are thread-safe.

CONFORMING TO

C99, POSIX.1-2001. This function is defined in IEC 559 (and the appendix with recommended functions in IEEE 754/IEEE 854).

BUGS

In glibc version 2.5 and earlier, these functions do not raise an underflow floating-point (**FE_UNDERFLOW**) exception when an underflow occurs.

SEE ALSO

[nearbyint\(3\)](#)

COLOPHON

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