

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():
    _ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L || _XOPEN_SOURCE >= 500 || /* Since
    glibc 2.19: */ _DEFAULT_SOURCE || /* Glibc versions <= 2.19: */ _BSD_SOURCE ||
    _SVID_SOURCE
nextafterf(), nextafterl():
    _ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L || /* Since glibc 2.19: */ _DE-
    FAULT_SOURCE || /* Glibc versions <= 2.19: */ _BSD_SOURCE || _SVID_SOURCE
nexttoward(), nexttowardf(), nexttowardl():
    _XOPEN_SOURCE >= 600 || _ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L
```

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

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

Interface	Attribute	Value
<code>nextafter()</code> , <code>nextafterf()</code> , <code>nextafterl()</code> , <code>nexttoward()</code> , <code>nexttowardf()</code> , <code>nexttowardl()</code>	Thread safety	MT-Safe

CONFORMING TO

C99, POSIX.1-2001, POSIX.1-2008. 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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