NAME

frexp, frexpf, frexpl − convert floating-point number to fractional and integral components

SYNOPSIS

#include <math.h>

double frexp(double *x*, **int ****exp*);
float frexpf(float *x*, **int ****exp*);
long double frexpl(long double *x*, **int ****exp*);

Link with *−lm*.

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

frexpf(), **frexpl**():
_ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L
|| /* Since glibc 2.19: */ _DEFAULT_SOURCE
|| /* Glibc versions <= 2.19: */ _BSD_SOURCE || _SVID_SOURCE

DESCRIPTION

These functions are used to split the number *x* into a normalized fraction and an exponent which is stored in *exp*.

RETURN VALUE

These functions return the normalized fraction. If the argument *x* is not zero, the normalized fraction is *x* times a power of two, and its absolute value is always in the range 1/2 (inclusive) to 1 (exclusive), that is, [0.5,1).

If *x* is zero, then the normalized fraction is zero and zero is stored in *exp*.

If *x* is a NaN, a NaN is returned, and the value of **exp* is unspecified.

If *x* is positive infinity (negative infinity), positive infinity (negative infinity) is returned, and the value of **exp* is unspecified.

ERRORS

No errors occur.

ATTRIBUTES

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

Interface	Attribute	Value
frexp(), **frexpf**(), **frexpl**()	Thread safety	MT-Safe

CONFORMING TO

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

The variant returning *double* also conforms to SVr4, 4.3BSD, C89.

EXAMPLE

The program below produces results such as the following:

```
$ ./a.out 2560
frexp(2560, &e) = 0.625: 0.625 * 2^12 = 2560
$ ./a.out -4
frexp(-4, &e) = -0.5: -0.5 * 2^3 = -4
```

Program source

```
#include <math.h>
#include <float.h>
#include <stdio.h>
#include <stdlib.h>

int
```

```
main(int argc, char *argv[])
{
    double x, r;
    int exp;

    x = strtod(argv[1], NULL);
    r = frexp(x, &exp);

    printf("frexp(%g, &e) = %g: %g * %d^%d = %g\n",
           x, r, r, FLT_RADIX, exp, x);
    exit(EXIT_SUCCESS);
}
```

SEE ALSO

ldexp(3), **modf**(3)

COLOPHON

This page is part of release 5.02 of the Linux *man-pages* project. A description of the project, information about reporting bugs, and the latest version of this page, can be found at https://www.kernel.org/doc/man−pages/.