Q&A

The value stored in errno when an error occurs is often either EDOM or ERANGE. (Both are macros defined in <errno.h>.) These macros represent the two kinds of errors that can occur when a math function is called:

- *Domain errors* (EDOM): An argument passed to a function is outside the function's domain. For example, passing a negative number to sqrt causes a domain error.
- *Range errors* (ERANGE): A function's return value is too large to be represented in the function's return type. For example, passing 1000 to the exp function usually causes a range error, because e^{1000} is too large to represent as a double on most computers.

exp function ➤23.3

Some functions can experience both kinds of errors; by comparing errno to EDOM or ERANGE, we can determine which error occurred.

C99

<wchar.h> header ➤25.5

encoding error ➤22.3

C99 adds the EILSEQ macro to <errno.h>. Library functions in certain headers—especially the <wchar.h> header—store the value of EILSEQ in errno when an encoding error occurs.

The perror and strerror Functions

```
void perror(const char *s);                 from <stdio.h>
char *strerror(int errnum);                 from <string.h>
```

We'll now look at two functions that are related to the errno variable, although neither function belongs to <errno.h>.

perror

When a library function stores a nonzero value in errno, we may want to display a message that indicates the nature of the error. One way to do this is to call the perror function (declared in <stdio.h>), which prints the following items, in the order shown: (1) its argument, (2) a colon, (3) a space, (4) an error message determined by the value of errno, and (5) a new-line character. perror writes to the stderr stream, not to standard output.

stderr stream ➤22.1

Here's how we might use perror:

```
errno = 0;
y = sqrt(x);
if (errno != 0) {
  perror("sqrt error");
  exit(EXIT_FAILURE);
}
```

If the call of sqrt fails because of a domain error, perror will generate the following output:

```
sqrt error: Numerical argument out of domain
```

The error message that perror displays after sqrt error is implementation-defined. In this example, Numerical argument out of domain is the mes-