to handle. (Note the use of `#undef` to undefine `sqrt` before defining the `sqrt` macro. As we'll see in Section 21.1, the standard library is allowed to have both a macro and a function with the same name. Undefining `sqrt` before defining our own `sqrt` macro is a defensive measure, in case the library has already defined `sqrt` as a macro.)

Q: I get an error when I try to use predefined macros such as `__LINE__` and `__FILE__`. Is there a special header that I need to include?

A: No. These macros are recognized automatically by the preprocessor. Make sure that you have *two* underscores at the beginning and end of each macro name, not one.

Q: What's the purpose of distinguishing between a "hosted implementation" and a "freestanding implementation"? If a freestanding implementation doesn't even support the `<stdio.h>` header, what use is it? [p. 330]

A: A hosted implementation is needed for most programs (including the ones in this book), which rely on the underlying operating system for input/output and other essential services. A freestanding implementation of C would be used for programs that require no operating system (or only a minimal operating system). For example, a freestanding implementation would be needed for writing the kernel of an operating system (which requires no traditional input/output and therefore doesn't need `<stdio.h>` anyway). Freestanding implementations are also useful for writing software for embedded systems.

Q: I thought the preprocessor was just an editor. How can it evaluate constant expressions? [p. 334]

A: The preprocessor is more sophisticated than you might expect; it knows enough about C to be able to evaluate constant expressions, although it doesn't do so in quite the same way as the compiler. (For one thing, the preprocessor treats any undefined name as having the value 0. The other differences are too esoteric to go into here.) In practice, the operands in a preprocessor constant expression are usually constants, macros that represent constants, and applications of the `defined` operator.

Q: Why does C provide the `#ifdef` and `#ifndef` directives, since we can get the same effect using the `#if` directive and the `defined` operator? [p. 335]

A: The `#ifdef` and `#ifndef` directives have been a part of C since the 1970s. The `defined` operator, on the other hand, was added to C in the 1980s during standardization. So the real question is: Why was `defined` added to the language? The answer is that `defined` adds flexibility. Instead of just being able to test the existence of a single macro using `#ifdef` or `#ifndef`, we can now test any number of macros using `#if` together with `defined`. For example, the following directive checks whether `FOO` and `BAR` are defined but `BAZ` is not defined:

```
#if defined(FOO) && defined(BAR) && !defined(BAZ)
```