The #if and #endif Directives

Suppose we're in the process of debugging a program. We'd like the program to print the values of certain variables, so we put calls of printf in critical parts of the program. Once we've located the bugs, it's often a good idea to let the printf calls remain, just in case we need them later. Conditional compilation allows us to leave the calls in place, but have the compiler ignore them.

Here's how we'll proceed. We'll first define a macro and give it a nonzero value:

```
#define DEBUG 1
```

The name of the macro doesn't matter. Next, we'll surround each group of printf calls by an #if-#endif pair:

```
#if DEBUG
printf("Value of i: %d\n", i);
printf("Value of j: %d\n", j);
#endif
```

During preprocessing, the #if directive will test the value of DEBUG. Since its value isn't zero, the preprocessor will leave the two calls of printf in the program (the #if and #endif lines will disappear, though). If we change the value of DEBUG to zero and recompile the program, the preprocessor will remove all four lines from the program. The compiler won't see the calls of printf, so they won't occupy any space in the object code and won't cost any time when the program is run. We can leave the #if-#endif blocks in the final program, allowing diagnostic information to be produced later (by recompiling with DEBUG set to 1) if any problems turn up.

In general, the #if directive has the form

#if directive   #if *constant-expression*

The #endif directive is even simpler:

#endif directive   #endif

When the preprocessor encounters the #if directive, it evaluates the constant expression. If the value of the expression is zero, the lines between #if and #endif will be removed from the program during preprocessing. Otherwise, the lines between #if and #endif will remain in the program to be processed by the compiler—the #if and #endif will have had no effect on the program.

It's worth noting that the #if directive treats undefined identifiers as macros that have the value 0. Thus, if we neglect to define DEBUG, the test

```
#if DEBUG
```