

- (c) Macro definitions
- (d) Type definitions

3. We saw that writing `#include <file>` instead of `#include "file"` may not work if *file* is one that we've written. Would there be any problem with writing `#include "file"` instead of `#include <file>` if *file* is a system header?
4. Assume that `debug.h` is a header file with the following contents:

```
#ifndef DEBUG
#define PRINT_DEBUG(n) printf("Value of " #n ": %d\n", n)
#else
#define PRINT_DEBUG(n)
#endif
```

Let `testdebug.c` be the following source file:

```
#include <stdio.h>

#define DEBUG
#include "debug.h"

int main(void)
{
    int i = 1, j = 2, k = 3;

    #ifdef DEBUG
        printf("Output if DEBUG is defined:\n");
    #else
        printf("Output if DEBUG is not defined:\n");
    #endif

    PRINT_DEBUG(i);
    PRINT_DEBUG(j);
    PRINT_DEBUG(k);
    PRINT_DEBUG(i + j);
    PRINT_DEBUG(2 * i + j - k);

    return 0;
}
```

- (a) What is the output when the program is executed?
- (b) What is the output if the `#define` directive is removed from `testdebug.c`?
- (c) Explain why the output is different in parts (a) and (b).
- (d) Is it necessary for the `DEBUG` macro to be defined *before* `debug.h` is included in order for `PRINT_DEBUG` to have the desired effect? Justify your answer.

Section 15.4

5. Suppose that a program consists of three source files—`main.c`, `f1.c`, and `f2.c`—plus two header files, `f1.h` and `f2.h`. All three source files include `f1.h`, but only `f1.c` and `f2.c` include `f2.h`. Write a makefile for this program, assuming that the compiler is `gcc` and that the executable file is to be named `demo`.
- W 6. The following questions refer to the program described in Exercise 5.
 - (a) Which files need to be compiled when the program is built for the first time?
 - (b) If `f1.c` is changed after the program has been built, which files need to be recompiled?
 - (c) If `f1.h` is changed after the program has been built, which files need to be recompiled?
 - (d) If `f2.h` is changed after the program has been built, which files need to be recompiled?