Homework #4
Advanced Make
Due in Lab, September 24, 2003

Name: _____

Lab Time: _____

Grade: _____/10

Reading

In the Make Online Manuals linked from the reference materials section of the class web page read the section titled *Using Implicit Rules* and answer the following questions.

1. Rewrite the following make rule to use an automatic variable in the command. (1 pt.)

```
file.o:  file.cpp
        g++ -c file.cpp
```

2. Rewrite the same rule as a pattern matching rule that compiles any `.cpp` file into a `.o` file. (1 pt.)

3. Rewrite the same rule as a suffix rule that compiles any `.cpp` file into a `.o` file. (1 pt.)

4. Why do pattern matching rules need automatic variables? Why can't they just use a plain filename in their command? (1 pt.)

The files in the current directory are listed below with their timestamps. A higher number means the file is newer.

2	file.o
1	file1.cpp
3	file2.cpp

If the following make rule is run what are the values of the following variables?

```
file.o:  file1.cpp file2.cpp
            echo $<
            echo $^
            echo $?
```

5. $< (1 pt.)

6. $^ (1 pt.)

7. $? (1 pt.)

8. What does the VPATH variable do? This information is actually in the section *Writing Rules: Searching Directories for Dependencies*. It is also discussed in lecture. (1 pt.)

9. If the VPATH variable has multiple directories in it you may not know in what directory a particular file will be found. What is the advantage of automatic variables in this case? (1 pt.)

10. What is an implicit rule? (1 pt.)