Software Engineering Observations

* Any C program we will ever build can be constructed from only seven different types of control structures (**if, if/else, switch, while, do/while** and **for**) combined in only two ways (control-structure stacking and control structure nesting).
* A compound statement can be placed anywhere in a program that a single statement can be placed.
* Just as a compound statement can be placed anywhere a single statement can be placed, it is also possible to have no statement at all, i.e., the empty statement. The empty statement is represented by placing a semicolon (**;**) where a statement would normally be.
* Many programs can be divided logically into three phases: an initialization phase that initializes the program variables; a processing phase that inputs data values and adjusts program variables accordingly; and a termination phase that calculates and prints the final results.
* The programmer terminates the top-down, stepwise refinement process when the pseudo code algorithm is specified in sufficient detail for the programmer to be able to convert the pseudo code to C. Implementing the C program is then normally straightforward.
* Experience has shown that the most difficult part of solving a problem on a computer is developing the algorithm for the solution. Once a correct algorithm has been specified, the process of producing a working C program from the algorithm is normally straightforward.
* Many experienced programmers write programs without ever using program development tools like pseudo code. These programmers feel that their ultimate goal is to solve the problem on a computer, and that writing pseudo code merely delays the production of final outputs. Although this may work for simple and familiar problems, it can lead to serious errors and delays on large, complex projects.