CS 2073, Computer Programming with Engineering Applications  
Spring 1992  
Exam 1

(20) 1. Write a program segment which will read in two integers \( A \) and \( B \) and will write out the \textit{larger} of the two numbers (or the common value if they are equal).  (No declarations or comments needed.)

(20) 2. Each of the four examples below contains a significant error. In each case say what the error is and whether it is a compile-time error (produces a message at compile time), a link-time error (produces a message at link time), a run-time error (produces a message during the run of the program, along with the program output), or a logic error (produces no error message).

(a) \( N := 0; \ X := 13.0/N; \)

(b) \( \text{if } X = 0 \text{ then } Y := 1; \)
\( \text{else } Y := 2; \)

(c) \text{program XYZ (input, output);} \)

(d) \( \text{sum := 0; count := 0;} \)
\( \text{while not eof(infil) do} \)
\( \text{readln(infil,score);} \)
\( \text{sum := sum + score;} \)
\( \text{count := count + 1;} \)
\( \text{average := sum/count;} \)

(20) 3. Consider the following code segment, where \( X, Y, \) and \( \text{TEMP} \) are declared integer.

\( X := 3; \ Y := 5; \)
\( \text{while } X < Y \text{ do} \)
\( \text{begin} \)
\( \text{TEMP := X;} \)
\( X := Y; \)
\( Y := \text{TEMP} \)
\( \text{end;} \)
\( \text{writeln(X, Y);} \)
(a) How many times will the statements inside the while loop be executed?

(b) What is written out?

(20) 4. Consider the following Pascal program, including a function definition:

```pascal
program right_triang;
var A, B, C: real;

function hypot (X, Y: real): real;
begin
  if (X < 0.0) or (Y < 0.0) then
    hypot := 0.0
  else
    hypot := sqrt(sqr(X) + sqr(Y))
end; (* hypot *)

begin
  A := 3.0; B := 4.0;
  C := hypot(A, B);
  writeln(C)
end.
```

(a) What will be printed out?

(b) How have we referred to the variables \( A \) and \( B \) in the function call \( \text{hypot}(A, B) \)? How have we referred to the variables \( X \) and \( Y \) in the function definition?

(c) Describe in some detail how the numbers \( 3.0 \) and \( 4.0 \) are moved around as the program is executed and how \( C \) acquires a value.

(d) Are the parentheses around \( X < 0.0 \) and around \( Y < 0.0 \) required?

(20) 5. Write a program segment that will read integer numbers from the terminal until a negative number is entered. The program should find and print out the average of the numbers read in up to the negative number. The average should be printed out using three digits to the right of the decimal place. (Thus if you type in 80, 100, 90, and -1 on separate lines, your program should print 90.000 as the average. No declarations or comments are needed.)