1. Briefly define, in the context of this course, each of the following terms.

   a. problem specification
   b. process
   c. recursion
   d. program
   e. parsing
   f. scanning
   g. object-oriented programming
   h. selection

2. List two factors that complicate the writing of specifications.

3. Arrange these terms hierarchically (i.e., as a "contains" relationship):

   * statements
   * methods
   * programs
   * tokens

4. Given that \( x \) and \( y \) are integer parameters, describe what this function returns:

   function mystery(x, y) returns integer
   {
   x = x - y;
   y = x + y;
   x = y - x;
   return x;
   }

5. What is the value of \texttt{result} in the following function \texttt{test()}?

   function F(n) returns integer
   {
   integer temp = 0;
   integer index = 0;
   while (index < n)
   {
   temp = temp + (n * n);
   index = index + 1;
   }
   return temp;
   }
   function test()
   {
   integer result = F(2);
   }
6. The discriminant of a quadratic equation \( ax^2 + bx + c = 0 \) is given by the equation 
\[ \text{discriminant} = b^2 - 4ac \]
Show the parse tree for the discriminant equation.

7. Refer to #6 above, now generate the PIPPIN assembly code for the parse tree to determine the discriminant of a quadratic equation.

8. Find the logic error(s) in the following program fragment.

```plaintext
function pounds(x, y) returns real-value {
    y = 2.2 * x
    return y
}

define function weight() {
    real-value start = 10
    return pounds(start)
}
```

9. Identify the nesting of control structures in the following function

```plaintext
function power(x, y) returns real-value // x is a real-value, but y is an integer // returns the value of x to the y power (x^y) // e.g., power(2,3) = 8 since 2*2*2 = 2^3 = 8 {
    if (y < 0)
        return power(x, -y)
    else
    {
        integer i = 0
        real-value result = 1.0
        while (i < y)
        {
            result = result * x
            i = i + 1 // increment i
        }
        return result
    }
}
```