Prelab Exercises

1. What is the difference between a variable and a constant?

2. Explain what each of the lines below does. Be sure to indicate how each is different from the others.
   a. int x;

   b. int x = 3;

   c. x = 3;

3. The following program reads three integers and prints the average. Fill in the blanks so that it will work correctly.

```
// ********************************************************************
//   Average.java
//
//   Read three integers from the user and print their average
// ********************************************************************

import java.util.Scanner;
public class Average
{
  public static void main(String[] args)
  {
    int val1, val2, val3;
    double average;
    Scanner scan = new Scanner(System.in) ;

    // get three values from user
    System.out.println("Please enter three integers and " +
                       "I will compute their average");

    ____________________________________

    ____________________________________

    ____________________________________

    //compute the average

    ____________________________________

    //print the average

    ____________________________________

  }
}
```

4. Given the declarations below, find the result of each expression.

```
int a = 3, b = 10, c = 7;
double w = 12.9, y = 3.2;

a. a + b * c

b. a - b - c

c. a / b

d. b / a

e. a - b / c

f. w / y

g. y / w

h. a + w / b

i. a % b / y

j. b % a

k. w %  y
```

5. Carefully study the following program and find and correct all of the syntax errors.

```
// File:     Errors.java
// Purpose:  A program with lots of syntax errors
//           Correct all of the errors (STUDY the program carefully!!)

#import java.util.Scanner;

public class errors
{
   public static void main (String[] args)
   {
       String Name;  / Name of the user
       int number;
       int numSq;
       Scanner scan = new Scanner(System.in);

       System.out.print ("Enter your name, please: ")
       Name = scan.nextInt();

       System.out.print ("What is your favorite number?);
       number = scan.nextInt();

       numSq = number * number;

       System.out.println (Name  ", the square of your number is "
                           numSquared);

}
```

6. Trace the execution of the following program assuming the input stream contains the numbers 10, 3, and 14.3. Use a table that shows the value of each variable at each step. Also show the output (exactly as it would be printed).

```
// FILE:  Trace.java
// PURPOSE:  An exercise in tracing a program and understanding
//           assignment statements and expressions.

import java.util.Scanner;

public class Trace
{
   public static void main (String[] args)
   {
      int one, two, three;
      double what;
      Scanner scan = new Scanner(System.in);

      System.out.print ("Enter two integers: ");
      one = scan.nextInt();
      two = scan.nextInt();

      System.out.print("Enter a floating point number: ");
      what = scan.nextDouble();

      three = 4 * one + 5 * two;
      two = 2 * one;
      System.out.println ("one " + two + ":" + three);

      one = 46 / 5 * 2 + 19 % 4;
      three = one + two;
      what = (what + 2.5) / 2;
      System.out.println (what + " is what!");
   }
}
```