0360-212 Winter 2017 Lab Assignment 2

Due@Blackboard: Jan. 30, 11:59pm

Remember to comment your code.

1. Debug the following Java program. Comment on the changes you make.

```
public class Arithmetic {

   import javax.swing.JOptionPane;

   public static void main( String args[ ] )
   {
      String firstNumber, secondNumber, thirdNumber;
      int num2, num3, sum, product, average;

      firstNumber = = JoptionPane.showInputDialog( "Enter first integer:" )

      secondNumber = = JOptionPane.showInputDialog( "Enter second integer:" )

      thirdNumber = = JOptionPane.showInputDialog( "Enter third integer: )

      num1 == Integer.parseInt( firstNumber );
      num2 == Integer.parseInt( secondNumber );
      num3 == Integer.parseInt( thirdNumber );

      sum = num1 + num2 + num3;
      product = num1 * num2 * num3;
      average = ( num1 + num2 + num3 ) / 3;

      JOptionPaneshowMessageDialog( null, "The sum is " + sum +
            "\nThe product is " + product + "\nThe average is " + average,
            "Results", JOptionPane.PLAIN_MESSAGE );
   }

} // end class Arithmetic
```

2. Suppose a student was taking 5 different courses last semester. Write a program that

(a) asks the student to input his/her name, student ID, marks for these 5 courses,

(b) calculate the average,

(c) determine the letter grade of each course.

(d) record the number of courses whose final letter grade is A+, A, A-, ... , F+, F, F-.

(e) Output the following information in a nice format: student name, student ID, listing of marks, the average, letter grade for each course, and the number of courses in each letter grade category.

3. A right triangle can have sides whose lengths are all integers. The set of three integer values for the lengths of the sides of a right triangle is called a Pythagorean triple. The lengths of the three sides must satisfy the relationship that the sum of the squares of two of the sides is equal to the square of the hypotenuse. Write an application to find all Pythagorean triples for side1, side2 and the hypotenuse, all no larger than 500. Use a triple-nested for loop that tries all possibilities.

4. Write an application that displays the following patterns separately, one below the other. Use for loops to generate the patterns. All asterisks (*) should be printed by a single statement of the form System.out.print('*') (which causes the asterisks to print side by side), or.a statement of the form System.out.println() (which can be used to position to the next line), or a statement of the form System.out.print(' ') (which can be used to display a space for the last two patterns). There should be no other output statements in the program.

```
*                          **********
**                         *********
***                        ********
****                       *******
*****                      ******
******                     *****
*******                     ****
********                   ***
*********                  **
**********                 *
```

5. Write a program that outputs the number of hours, minutes, and seconds that corresponds to 50,391 total seconds. The output should be 13 hours, 59 minutes, and 51 seconds. Test your program with a different number of total seconds to ensure that it works for other cases.

6. The following program will compile and run, but it uses poor programming style. Modify the program so that it uses the spelling conventions, constant naming conventions, and proper formatting style.

```
public class messy {
public static void main(String[] args)
{
double TIME; double PACE;
System.out.println("This program calculates your pace given a time
and distance traveled.");
TIME = 35.5; /* 35 minutes and 30 seconds */
PACE = TIME / distance;
System.out.println("Your pace is " + PACE + " miles per hour.");
}
public static final double distance = 6.21;
}
```

7. A simple rule to estimate your ideal body weight is to allow 110 pounds for the first 5 feet of height and 5 pounds for each additional inch. Write a program with a variable for the height of a person in feet and another variable for the additional inches. Assume the person is at least 5 feet tall. For example, a person that is 6 feet and 3 inches tall would be represented with a variable that stores the number 6 and another variable that stores the number 3. Based on these values, calculate and output the ideal body weight.

8. Write a program that starts with a line of text and then outputs that line of text with the first occurrence of "hate" changed to "love". For example, a possible sample output might be:

```
The line of text to be changed is:
I hate you.
I have rephrased that line to read:
I love you.
```

You can assume that the word "hate" occurs in the input. If the word "hate" occurs more than once in the line, your program will replace only the first occurrence of "hate".

You may want to research the various methods in the String class to make solving this question easier.
See http://docs.oracle.com/javase/8/docs/api/

9. Develop a Java application that determines whether any of several department-store customers has exceeded the credit limit on a charge account. For each customer, the following facts are available:

a) account number
b) balance at the beginning of the month
c) total of all items charged by the customer this month
d) total of all credits applied to the customer's account this month
e) allowed credit limit.

The program should input all these facts as integers, calculate the new balance (= beginning balance + charges – credits), display the new balance and determine whether the new balance

exceeds the customer’s credit limit. For those customers whose credit limit is exceeded, the program should display the message "Credit limit exceeded".

10. Debugging question. Comment on the changes you make.

```
//Debugging Problem
// The program is about converting temperature from Fahrenheit to Celsius and
//vice versa.
// 1. You are not allowed to rewrite the whole program.
// 2. After finishing debugging, comment the code.
// 3. You may need to reference the Java API page for info. on some
//    of the methods and classes used in the program.

import javax.swing.JOptionPane;

public class Temperature {
       public static void main( String args[] )
       {
          int option;
          int degree1;
          int celsius1;
          int fahrenheit1;

          String result;
          String degree;
          String fahrenheit;
          String input;
          String celsius;

          option = 0;

          While ( option != 3 )

             input = JOptionPane.showInputDialog(
                        " 1 for Fahrenheit to Celsius\n" +
                        " 2 for Celsius to Fahrenheit\n 3 to quit:" );

             option = Double.parseDouble( input );

             degree =
        JOptionPane.showInputDialog( "Enter thr degree in Fahrenheit: " );

             degree1 = Double.parseDouble( degree );

             celsius1 = ( degree1 - 32 ) * 5 / 9;

             result = "The temp in Celsius is " + celsius1;

             JOptionPane.showMessageDialog( null, result, "Result",
                        JOptionPane.INFORMATION_MESSAGE );

             if ( option == 2 );

                degree = JOptionPane.showInputDialog( "Enter degree in
Celsius: " );
```

```
                        degree1 = Double.parseDouble( degree );

                        fahrenheit1= ( degree1 * 9 / 5 ) + 32;

                        result = "The temp in Fahrenheit is " + fahrenheit1;

                       JOptionPane.showMessageDialog( null, result, "Result",
                           JOptionPane.INFORMATION_MESSAGE );

                     System.exit( 0 );

                  } // end while loop

               } // end method Main
} // end class Temperature
```