CS 212 – Object-Oriented Programming in Java -- Exam 1 – Practice B

Last Name_____ First Name _____ Seat_____

Directions:

Read the whole question before answering. Proper use of Java concepts is expected; minor syntax errors will be overlooked.

1. **(25 points)** Write a Java application that accepts one String parameter from a *JOptionPane inputDialog* and prints to a *JOptionPane messageDialog* the number times *two* digits in a row occur. For example:

Input string: messageDialog says

```
Testing 12                          Two digits happen 1 time.
Testing 123                         Two digits happen 2 times.
123 Testing 12 23 234               Two digits happen 6 times.
```

Hint: Recall that there is a method in the Character wrapper class:
```
boolean Character.isDigit (char c)
```

2. (25 points) Write a boolean method that will return true if the sum of the diagonal (upper-left to lower-right) of a two-dimension array is equal to the sum of a given row:

```
diagonalEqualsRow ( int [][] myArray, int row)
```

If the array is not a square matrix of the row number is out of bounds, throw an IllegalArgumentException with an appropriate message.

For example:

myArray1

1	**3**	**5**	**7**	**9**
2	3	4	6	8
0	1	5	1	3
4	5	2	7	8
7	6	3	2	9

myArray2

1	3	3	2
4	2	5	6
1	**2**	**3**	**4**
7	8	9	4

myArray3

1	3	5	6	7
0	8	7	4	3

myArray4

1	3	3	2
4	2	5	6
1	**2**	**3**	**4**
7	8	9	4

```
diagonalEqualsRow (myArray1, 0) returns true
diagonalEqualsRow (myArray2, 2) returns true
diagonalEqualsRow (myArray3, 0) throw an exception – not a square matrix
diagonalEqualsRow (myArray1, 6) throw an exception – illegal row
```

Continue the back of the page as needed

3. (25 points) Create the following class. Read the entire question first!

Write a class `Distance` with the following specifications:

Class variables:
    a private static integer called INCHES_IN_A_FOOT with a value 12;
    a private static float called FEET_IN_A_METER with a value of 0.3048f;
Instance variables:
    Two integer instance variables: feet and inches;
Constructors:
    a no argument constructor to initialize a Distance with zero feet, zero inches.
    a two argument constructor that will accept two positive integers and for feet and inches. An
        "IllegalArgumentException" is thrown if the number of inches is more than 11.
Get/Set methods:
    get methods for the instance variables;
    set methods for instance variables.

Public methods:
    1. a method add() that adds another Distance object to itself.
    That is,

```
        w1 = new Distance(4,9);
        w2 = new Distance (3,6);
        w1.add(w2);                    // w1 becomes 8 feet, 3 inches
```

    2. a method metricDistance() that will return (as a float) the number of meters in the distance
        represented by the object.
    That is, for w1 above, w1.metricDistance() returns 1.4478f

4. (25 points) What will be printed by this program?

```java
public class Question4 {
   static String s1,s2,s3,s4;
   public static void main (String[] args){

      s1 = new String("CAT");
      s2 = new String("DOG");
      s3 = new String("RAT");
      animal(s1,s2);
      System.out.println(mixThem(s2,s3));

   } //main
   private static void animal (String a1, String a2) {
      if(a1.equals(a2))
         System.out.println(a1);
      else
         System.out.println(a2);
   }
   private static String mixThem (String b1, String b2){
      String c1 = b1;
      b1 = b2;
      b2 = new String ("HAT");
      System.out.println(b1);
      System.out.println(b2);
      System.out.println(c1);
      System.out.println(s2);
      return b2;
   }

} //Question4
```

Answer here: