Hands-on Experiment # 6 : Worksheet

Section_____ Date_____

No more than 3 students per one submission of this worksheet.

Student ID _____ Name_____

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Part A: Loop Writing Practice

In *MathPowLoop.java*, write Java statements using "loops" to calculate `result2` so that its value is similar to `result1` (which is calculated from *Math.pow()*) for every `double a` and `int b`.

No methods in the *Math* class is allowed.

List your code here.

```
import java.util.Scanner;
import java.io.*;
import java.lang.Math;

public class PartA {
   public static void main(String[] args) {
      double a = 2.0;
      int b = 8;
      double result1 = Math.pow(a, b);
      double result2 = 1;
      for (int i = 0; i < Math.abs(b); i++)
         result2 *= a;
      if (b < 0)
         result2 = 1 / result2;
      System.out.println(result1);
      System.out.println(result2);
   }
}
```

Test your code with the following test data set.

a	b	Math.pow(a,b)	Your code
2.0	8	256.0	256.0
2.5	3	15.625	15.625
-2.0	8	256.0	256.0
1.0	1	1.0	1.0
1.0	0	1.0	1.0
2.0	30	1.073741824E9	1.073741824E9
-2.0	30	1.073741824E9	1.073741824E9
2.0	-1	0.5	0.5
2.0	-4	0.0625	0.0625

Part B: Text File Processing

The file *score.csv* contains scores from the midterm examination of a programming course, which has 5 questions (Q1-Q5). The file is in the "Comma-separated Value" format (http://en.wikipedia.org/wiki/Comma-separated_values) with the first line being the header labels describing the order of data on the other lines.

- Read http://docs.oracle.com/javase/7/docs/api/java/util/Scanner.html to learn how to read a text file using an instance of the Scanner class.
- Open the file in a spreadsheet application (such as MS Excel). If you do not have any spreadsheet application on your machine, try using Google Spreadsheet.
    - Use the application to find the average score, the maximum score, and the minimum score of each question (Q1-Q5).
    - Find the average of the total score and its corresponding standard deviation.
- Fill the results in the following table.

From Spreadsheet	Average	Standard Deviation	Max	Min
Q1				
Q2				
Q3				
Q4				
Q5				
Total				

- Write a Java program to:
    - Compute the average score, the maximum score, and the minimum score of each question (Q1-Q5).
    - Compute the average of the total score and its corresponding standard deviation.
- Fill the results in the following table.

From Your Java App	Average	Standard Deviation	Max	Min
Q1				
Q2				
Q3				
Q4				
Q5				

Total				

List your code here.

```
import java.util.Scanner;
import java.io.*;
import java.util.Arrays;

public class PartB {
   public static void main(String[] args) throws IOException {
      Scanner in = new Scanner(new File("score.csv"));
      in.nextLine();
      in.useDelimiter("\\r\\n|,");
      int q[][] = new int[1000][5];
      double sumpowdiff[] = new double[5];
      int sum[] = new int[5];
      int max[] = new int[5];
      int min[] = new int[5];
      int num = 0;
      double count = 0;
      double avg[] = new double[5];
      double sd[] = new double[5];
      double sumavgpowdiff = 0;
      double sumavg = 0;
      double avgq, sdq;
      double totalsumpowdiff = 0;
      Arrays.fill(max, -99999);
      Arrays.fill(min, 99999);
      while (in.hasNext()) {
         String id = in.next();
         for (int i = 0; i < 5; i++) {
            q[num][i] = in.nextInt();
            sum[i] += q[num][i];
            if (q[num][i] > max[i])
               max[i] = q[num][i];
            if (q[num][i] < min[i])
```

```
                min[i] = q[num][i];
            }
            count++;
            num++;
        }
        for (int i = 0; i < 5; i++) {
            avg[i] = sum[i] / count;
            System.out.println("Avg for Q" + (i + 1) + ": " + avg[i]);
            System.out.println("Min = " + min[i] + " Max = " + max[i]);
            for (int j = 0; j < 1000; j++) {
                sumpowdiff[i] += Math.pow(q[j][i] - avg[i], 2);
                totalsumpowdiff += Math.pow(q[j][i] - avg[i], 2);
            }
            sumavg += avg[i];
            sd[i] = Math.sqrt(sumpowdiff[i] / 1000);
            System.out.println("SD For Q" + (i + 1) + ": " + sd[i]);
        }
        avgq = sumavg / 5;
        System.out.println("Avg for all Q : " + avgq);
        for (int i = 0; i < 5; i++)
            for (int j = 0; j < 1000; j++)
                sumavgpowdiff += Math.pow(q[j][i] - avgq, 2);
        sdq = Math.sqrt(sumavgpowdiff / 5000);
        System.out.println("SD for all Q : " + sdq);
    }
}
```

Submit this worksheet (by only one member of the group) via http://www.myCourseVille.com (Assignments > Hands-on Experiment # 6) **within the day after your lecture**.