Hands-on Experiment # 7 : Worksheet

Section_____2_____ Date_____15/3/2018_____

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

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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;

public class MathPowLoop{

	public static void main(String [] args){

		Scanner sc = new Scanner(System.in);

		System.out.print("a=");

		double a = sc.nextDouble();

		System.out.print("b=");

		int b = sc.nextInt();

		double result1 = Math.pow(a,b);

		double result2=1;


		if (b<0)

			{

			b=-b;

				for (int i=0;i<b;i++)

				{

				result2=result2*a;
```

```
                    }
                result2=1/result2;
                }
            else
                {
                for (int i=0;i<b;i++)
                    {
                    result2=result2*a;
                    }
                }
            System.out.println("Math.pow("+a+","+b+") = "+result1);
            System.out.println("Your loop a^b = "+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	5.081	3.1632966104122	10	0
Q2	5.014	3.2441221198235	10	0
Q3	5.586	2.260910373216	9	2
Q4	7.499	1.737532163160	10	5
Q5	5.478	1.733932675314	8	3
Total	5.7316	2.67548	10	0

- 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	5.081	3.1632966104122144	10	0
Q2	5.014	3.2441221198235346	10	0
Q3	5.586	2.260910373216001	9	2
Q4	7.499	1.737532163160736	10	5
Q5	5.478	1.7339326753142763	8	3
Total	5.7316	2.675479971634197	10	0

List your code here.

```
import java.io.File;

import java.io.FileNotFoundException;

import java.util.Scanner;

public class Iteration{

        public static void main(String[] args)  throws FileNotFoundException{

                Scanner sc1 = new Scanner( new File ("score.csv"));

                sc1.nextLine();

                int q1max=0;

                int q2max=0;

                int q3max=0;

                int q4max=0;
```

```
int q5max=0;
int q1min=10;
int q2min=10;
int q3min=10;
int q4min=10;
int q5min=10;
int maxt = 0;
int mint = 0;
int line = 0;
double sum1 = 0;
double sum2 = 0;
double sum3 = 0;
double sum4 = 0;
double sum5 = 0;



while(sc1.hasNextLine()){
        String str = sc1.nextLine();
        Scanner sc2 = new Scanner(str).useDelimiter(",");
        sc2.next();
        int q1 = Integer.parseInt(sc2.next());
        int q2 = Integer.parseInt(sc2.next());
        int q3 = Integer.parseInt(sc2.next());
        int q4 = Integer.parseInt(sc2.next());
        int q5 = Integer.parseInt(sc2.next());
        sum1+=q1;
        sum2+=q2;
```

```
            sum3+=q3;
            sum4+=q4;
            sum5+=q5;
            if(q1 > q1max) q1max = q1;
            if(q2 > q2max) q2max = q2;
            if(q3 > q3max) q3max = q3;
            if(q4 > q4max) q4max = q4;
            if(q5 > q5max) q5max = q5;
            if(q1 < q1min) q1min = q1;
            if(q2 < q2min) q2min = q2;
            if(q3 < q3min) q3min = q3;
            if(q4 < q4min) q4min = q4;
            if(q5 < q5min) q5min = q5;
            line++;
        }

        double avg1 = sum1/line;
        double avg2 = sum2/line;
        double avg3 = sum3/line;
        double avg4 = sum4/line;
        double avg5 = sum5/line;
        double avgt = (sum1+sum2+sum3+sum4+sum5)/(5*line);
        maxt = q1max>maxt?q1max:maxt;
        maxt = q2max>maxt?q2max:maxt;
        maxt = q3max>maxt?q3max:maxt;
        maxt = q4max>maxt?q4max:maxt;
        maxt = q5max>maxt?q5max:maxt;
```

```
mint = q1min<mint?q1min:mint;
mint = q2min<mint?q2min:mint;
mint = q3min<mint?q3min:mint;
mint = q4min<mint?q4min:mint;
mint = q5min<mint?q5min:mint;
sc1.close();

double sd1 = 0;
double sd2 = 0;
double sd3 = 0;
double sd4 = 0;
double sd5 = 0;
double sdt = 0;
Scanner sc3 = new Scanner( new File ("score.csv"));
sc3.nextLine();

while(sc3.hasNextLine()){
        String str = sc3.next();
        Scanner sc2 = new Scanner(str).useDelimiter(",");
        sc2.next();
        int q1 = Integer.parseInt(sc2.next());
        int q2 = Integer.parseInt(sc2.next());
        int q3 = Integer.parseInt(sc2.next());
        int q4 = Integer.parseInt(sc2.next());
        int q5 = Integer.parseInt(sc2.next());
        sd1 += Math.pow(q1-avg1,2);
        sd2 += Math.pow(q2-avg2,2);
```

```
                    sd3 += Math.pow(q3-avg3,2);

                    sd4 += Math.pow(q4-avg4,2);

                    sd5 += Math.pow(q5-avg5,2);

                    sdt += Math.pow(q1-avgt,2)+Math.pow(q2-avgt,2)+Math.pow(q3-
avgt,2)+Math.pow(q4-avgt,2)+Math.pow(q5-avgt,2);

                }

                sd1 = Math.sqrt(sd1/(line-1));

                sd2 = Math.sqrt(sd2/(line-1));

                sd3 = Math.sqrt(sd3/(line-1));

                sd4 = Math.sqrt(sd4/(line-1));

                sd5 = Math.sqrt(sd5/(line-1));

                sdt = Math.sqrt(sdt/((5*line)-1));

                sc3.close();

                System.out.println("max = " + q1max + ", "  + q2max + ", "  + q3max + ", " + q4max + ", " + q5max
+ ", " + maxt);

                System.out.println("min = " + q1min + ", "  + q2min + ", "  + q3min + ", " + q4min + ", " + q5min +
", " + mint);

                System.out.println("average = " + avg1 + ", " + avg2 + ", " + avg3 + ", " + avg4 + ", " + avg5 + ", " +
avgt);

                System.out.println("sd(population) = " + sd1 + ", "  + sd2 + ", "  + sd3 + ", " + sd4 + ", "  + sd5 + ", "
+ sdt);

        }

}
```

Submit this worksheet (by only one member of the group) via http://www.myCourseVille.com (Assignments > Hands-on Experiment # 7) before noon of the day after your lecture.