W5_COMPUTER PROGRAMMINING 2019 SPRING
W5 Array structures of basic variable types

We will use the class IO /Array input-output is included

```
 import java.util.*;
import javax.swing.*;
import java.awt.Font;
class IO
{  static Scanner input = new Scanner( System.in );
   //change font and size for JOptionPane class,//example font "Arial"
   //example size 14
   public static void setOptionPane(String font,int size)
   {UIManager.put("OptionPane.messageFont", new Font(font, Font.PLAIN, size));}
   //array input
   public static double[] Dinput(int n)
   {double c[]=new double[n];
    for(int i=0;i<n;i++)
    {c[i]=Dinput("a["+i+"] = ");}
    return c;
   }

   public static double[][] Dinput(int n,int m)
   {double c[][]=new double[n][m];
    for(int i=0;i<n;i++)
    {for(int j=0;j<m;j++)
     {c[i][j]=Dinput("a["+i+","+j+"] = ");}
    }
    return c;
   }

   public static int[] Iinput(int n)
   {int c[]=new int[n];
    for(int i=0;i<n;i++)
    {c[i]=Iinput("a["+i+"] = ");}
    return c;
   }
   public static int[][] Iinput(int n,int m)
   {int c[][]=new int[n][m];
    for(int i=0;i<n;i++)
    {for(int j=0;j<m;j++)
    {c[i][j]=Iinput("a["+i+","+j+"] = ");}
    }
    return c;
   }
   public static String[] input(int n)
   {String c[]=new String[n];
    for(int i=0;i<n;i++)
    {c[i]=input("a["+i+"] = ");}
    return c;
   }
   public static String[][] input(int n,int m)
   {String c[][]=new String[n][m];
    for(int i=0;i<n;i++)
    {for(int j=0;j<m;j++)
    {c[i][j]=input("a["+i+","+j+"] = ");}
    }
    return c;
   }
   public static String toString(double a[],int n)
   { Locale us=new Locale("us");
     String s1="[";
     for(int i=0;i<a.length;i++)
     { s1+=String.format(us,"%"+n+"f",a[i]);}
     s1+="]\n";
     return s1;
   }

   public static String toString(int a[],int n)
   {String s1="[";
   for(int i=0;i<a.length;i++)
    { s1+=String.format("%"+n+"d",a[i]);}
   s1+="]\n";
   return s1;
```

```
  }

  public static String toString(String a[],int n)
  {String s1="[";
  for(int i=0;i<a.length;i++)
   { s1+=String.format("%"+n+"s",a[i]);}
  s1+="]\n";
  return s1;
  }

  public static String toString(double a[][],int n)
  { String s1="";
    for(int i=0;i<a.length;i++)
    { s1+=toString(a[i],n);}
    return s1;
  }

  public static String toString(int a[][],int n)
  { String s1="";
    for(int i=0;i<a.length;i++)
    { s1+=toString(a[i],n);}
    return s1;
  }

  public static String toString(String a[][],int n)
  { String s1="";
    for(int i=0;i<a.length;i++)
    { s1+=toString(a[i],n);}
    return s1;
  }

  public static void print(String s)
  {JOptionPane.showMessageDialog(null,s);}

  public static void Cprint(String s)
  {System.out.print(s);}

  public static void Cprintln(String s)
  {System.out.println(s);}

 public static double DCinput(String s)
 {     System.out.print(s);
       return Double.parseDouble(input.next());}

 public static int ICinput(String s)
 {   Cprint(s);return input.nextInt();}

 public static String Cinput(String s)
 {     Cprint(s);return input.next();}

 public static double Dinput(String s)
 {     return Double.parseDouble(JOptionPane.showInputDialog(s));}

 public static int Iinput(String s)
 {     return Integer.parseInt(JOptionPane.showInputDialog(s));}

  public static String input(String s)
  {     return JOptionPane.showInputDialog(s);}
}
```

EX 1 for

```
class W5E1
{
public static void main(String args[] )
{
int days_of_the_month[];
days_of_the_month=new int[12];
days_of_the_month[0]=31;
days_of_the_month[1]=28;
days_of_the_month[2]=31;
days_of_the_month[3]=30;
days_of_the_month[4]=31;
days_of_the_month[5]=30;
days_of_the_month[6]=31;
```

```
days_of_the_month[7]=31;
days_of_the_month[8]=30;
days_of_the_month[9]=31;
days_of_the_month[10]=30;
days_of_the_month[11]=31;
IO.Cprint("Month April is "+days_of_the_month[3]+" days long");
}}
```

```
class W5E1a
{public static void main(String args[] )
{
int days_of_the_month[]={31,28,31,30,31,30,31,31,30,31,30,31};
IO.print("Month April is "+days_of_the_month[3]+" days long");
}}
```

EX2

```
 public class W5E2
{
public static int[] multiply(int a[],int b[])
{   int c[]=new int[a.length];
          if(a.length!=b.length) {IO.Cprint("error wrong vector size!");}
          else
          {  for(int i=0;i<c.length;i++)
              {c[i]=a[i]*b[i];}
          }
          return c;
}
public static void main(String[] args)
{
    int a1[]={1,2,3,4,5,6};
    int a2[]={1,4,9,16,25,36};
    int a3[]=multiply(a1,a2);
    String s="array1 output : ";
    String s1="a1 =\n"+output(a1,5);
    s1+="a2 = \n"+output(a2,5);
    s1+="a3 = a1*a2 \n"+output(a3,5);
    IO.print(s1);
}
public static String output(int a[],int n)
{
String s1="[";
  for(int i=0;i<a.length;i++)
   { s1+=String.format("%"+n+"d",a[i]);}
  s1+="]\n";
  return s1;
}}
```

```
public class W5E2a
{
public static void main(String[] args)
{   int a1[]=IO.Iinput(6);
    int a2[]=IO.Iinput(6);
    int a3[]=W5E2.multiply(a1,a2);
    String s="array1 output : ";
    String s1="a1 =\n"+IO.toString(a1,5);
    s1+="a2 = \n"+IO.toString(a2,5);
    s1+="a3 = a1*a2 \n"+IO.toString(a3,5);
    IO.print(s1);
}
}
```

Format Specifiers

Here is a quick reference to all the conversion specifiers supported.

SPECIFIER	APPLIES TO	OUTPUT
%a	floating point (except *BigDecimal*)	Hex output of floating point number
%b	Any type	“true” if non-null, “false” if null

SPECIFIER	APPLIES TO	OUTPUT
%c	character	Unicode character
%d	integer (incl. byte, short, int, long, bigint)	Decimal Integer
%e	floating point	decimal number in scientific notation
%f	floating point	decimal number
%g	floating point	decimal number, possibly in scientific notation depending on the precision and v
%h	any type	Hex String of value from hashCode() method.
%n	none	Platform-specific line separator.
%o	integer (incl. byte, short, int, long, bigint)	Octal number
%s	any type	String value
%t	Date/Time (incl. long, Calendar, Date and	%t is the prefix for Date/Time conversions. More formatting flags are needed af
%x	integer (incl. byte, short, int, long, bigint)	Hex string.

EX3 W5E3.java

```
 public class W5E3
{
//array diecount[0] to diecount[5]
public static int[] die(int n)
{int diecount[]=new int[6];
int die=0;
for(int i=0;i<n;i++)
{die=1+(int)(6*Math.random());
 diecount[die-1]++;
}
return diecount;
}
public static void main(String args[] )
{ String s=W5E2.output(die(6000000),10);
  IO.print(s);
}}
```

```
public class W5E3a
{
//array diecount[0] to diecount[5]
public static double[] die(int n)
{double diecount[]=new double[6];
int die=0;
for(int i=0;i<n;i++)
{die=1+(int)(6*Math.random());
 diecount[die-1]++;
}
for(int i=0;i<6;i++)
{diecount[i]/=n;}
return diecount;
}
 public static String output(double a[],int n)
 {
 String s1="[";
   for(int i=0;i<a.length;i++)
    { s1+=String.format("%"+n+"f",a[i]);}
   s1+="]\n";
```

```
   return s1;
 }
public static void main(String args[] )
{ String s=output(die(6000000),10);
  IO.print(s);
}}
```

```
public class W5E3b
{
public static void main(String args[] )
{ String s=IO.toString(W5E3.die(6000000),10);
  IO.print(s);
}}
```

EX4 W5E4

```
 public class W5E4
{
public static double average(double x[])
{double total=0;
int n=x.length;
int i;
for(i=0;i<n;i++)
{total+=x[i];}
return total/n;
}
public static void main(String args[] )
{ double x[]={1.2,2.3,3.3,2.1,1.2,3.4,5.6,7.8,1.2,3.2};
  IO.print("average = "+average(x));
}}
```

EX5 W5E5

```
class W5E5 {
public static int month(String s)
{
String month[]={"january","february","march","april","may","june","july",
          "august","september","october","november","december"};
int i;
int j=-1;
for(i=0;i<12;i++)
{if(s.equals(month[i])) {j=i;break;}}
return j;
}
public static void main(String args[] )
{ int the_day_of_the_month[]={31,28,31,30,31,30,31,31,30,31,30,31};
String s2="february";
int i=month(s2);
String s="The day of the month : \n";
s+="Month "+s2+" is "+the_day_of_the_month[i]+" days long \n";
IO.print(s);
}
}
```

HOMEWORK EXERCISES

Homework exercises will be done at home and will bring to next Thursday class printed no late exercises will be excepted. Each code should include student name id#, code plus results should be given. Homeworks will be accepted in written format plus a computer copy in pdf format will be sent to computer_programming@turhancoban.com adress your file name should be "group"+"week#"+studentname+studentid#.pdf
A_W1_turhan_coban_0101333.pdf
B_W3_ali_veli_02335646.pdf

W5HW1 :

```
class W5HW1
{ public static void plot(int z[])
  {     int x=0;
        String sum="";
```

```
        String s="";
        int y=0;
        for(int j=0;j<z.length;j++)
        {   y=z[j];  // function to be plotted
            int i=0;
            sum="*";
            while(i<y)
            { sum = " "+sum;i++;}
            s+=sum+"\n";
            x++;
        }
        IO.print(s);
 }
 public static void main(String arg[])
 {

 }
}
```

int i[]={9,4,1,0,1,4,9,16,25} is given plot the array by using * so that plot shape

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

Will come as an output

W5HW2: Formula for standard deviation is given as

$$s = \sqrt{\frac{\sum_{i=1}^{n}(X_i - \bar{X})^2}{n-1}}$$

where $\bar{X}$ is the average value (method is given at W5E4) write a static method
public static double stdev(double x[])
{}
Note to take square root use Math.sqrt(x) method