

W3_COMPUTER PROGRAMMING 2019 SPRING

for, while do-while, case statements, formulations of series in static methods, Math static method library

We will use the class IO we created last week, be sure that it is include in the directory you use

```
import java.util.Scanner;
import javax.swing.*;

class IO
{ public static void print(String s)
  { JOptionPane.showMessageDialog(null,s);}
  public static void Cprint(String s)
  { System.out.print(s);}
  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

```
public class W3E1
{ public static void main(String arg[])
  { int n=IO.Iinput("n=");
    double total=0;
    for(int i=1;i<=n;i++)
    { total+=i;}
    IO.Cprint("n = "+n+" total="+total);
  }
}
```

```
public class W3E1a
{ public static double one_to_hundred_total(int n)
  { double total=0;
    for(int i=1;i<=n;i++)
    { total+=i;}
    return total;
  }
  public static void main(String arg[])
  { int n=IO.Iinput("n=");
    IO.Cprint("n = "+n+" total="+one_to_hundred_total(n));
  }
}
```

EX2 while, do while

```
public class W3E2
{ public static double one_to_hundred_total(int n)
  { double total=0;
    int i=1;
    while(i<=n)
    { total+=i;int i=1;}
    return total;
  }
  public static void main(String arg[])
  { int n=IO.Iinput("n=");
    IO.Cprint("n = "+n+" total="+one_to_hundred_total(n));
  }
}
```

```
public class W3E2a
{ public static double one_to_hundred_total(int n)
  { double total=0;
    int i=1;
    do
    { total+=i; i++; } while(i<=n);
    return total;
  }
  public static void main(String arg[])
  { int n=IO.Iinput("n=");
    IO.Cprint("n = "+n+" total="+one_to_hundred_total(n));
  }
}
```

```

{int n=IO.linput("n=");
 IO.Cprint("n = "+n+" total="+one_to_hundred_total(n));
}
}

```

EX 3 for – String-char

```

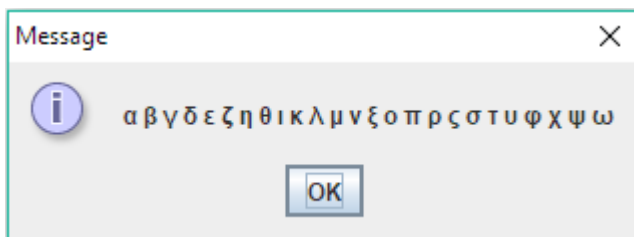
public class W3E3
{ public static String char_list(char first_char,char last_char)
{String s="";
 for(char b=first_char;b<=last_char;b++)
 {s+=b+" ";}
 return s;
}
 public static void main(String arg[])
{char c1='A';
 char c2='Z';
 String s=char_list(c1,c2);
 IO.print(s);
}
}

```

```

public class W3E3a
{ public static void main(String arg[])
{char c1='\u03B1'; // alfa
 char c2='\u03C9'; // omega
 String s=W3E3.char_list(c1,c2);
 IO.print(s);
}}

```

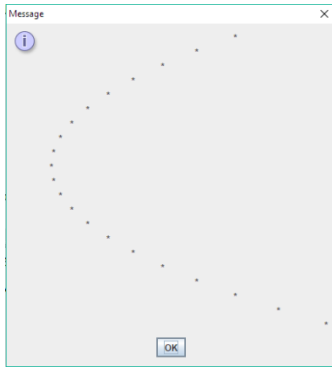


while – String

```

public class W3E3b
{ public static int f(int x)
{return x*x+2*x+1;}
 public static void plot(int xmin,int xmax)
{ int x=xmin;
 String sum="";
 String s="";
 int y=0;
 while(x<=xmax)
 { y=f(x); // 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[])
{ plot(-10,10);}
}

```



W3E4

$$e^x = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots = \sum_{n=0}^{\infty} \frac{x^n}{n!}$$

```
public class W3E4
{ public static double exp(double x)
  { double power=1;
    double exponent=1;
    double factorial=1;
    double number=1;
    while(number<=200)
    {
      factorial*=number;
      power*=x;
      exponent+=power/factorial;
      number++;
    }
    return exponent;
  }

  public static void main(String arg[])
  { double x=1.0;
    String s="exp("+x+") = "+exp(x)+"\n";
    s+="Math.exp("+x+") = "+Math.exp(x)+"\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

W3HW1 : Investigate excersise W3E3b change program to use **for instead of while and change function to $f(x)=x*x+x+3$; rewrite the program.**

```
public class W3HW1
{ public static int f(int x)
  { return x*x+2*x+1;}
  public static void plot(int xmin,int xmax)
  {
    String sum="";
    String s="";
    int y=0;
    for(int x=xmin;x<=xmax;x++)
    { y=f(x); // function to be plotted
      int i=0;
      sum="*";
      while(i<y)
```

```

        { sum = " "+sum;i++;}
        s+=sum+"\n";
    }
    IO.print(s);
}
public static void main(String arg[])
{ plot(-10,10);}
}

```

W3HW2

Investigate exercise W3E4 change program to use **for** instead of **while**

```

public class W3HW2
{ public static double exp(double x)
{ double power=1;
double exponent=1;
double factorial=1;
for(double number=1;number<=200;number++)
{
factorial*=number;
power*=x;
exponent+=power/factorial;
}
return exponent;
}

public static void main(String arg[])
{ double x=1.0;
String s="exp("+x+") = "+exp(x)+"\n";
s+="Math.exp("+x+") = "+Math.exp(x)+"\n";
IO.print(s);
}
}

```

W3HW3 Following series formula is given:

$$\ln(x) = (x-1) - \frac{(x-1)^2}{2} + \frac{(x-1)^3}{3} - \frac{(x-1)^4}{4} + \dots = \sum_{n=1}^{\infty} \frac{(-1)^{n+1}(x-1)^n}{n}$$

$$-0.5 \leq x \leq 0.5$$

Write a method and program to calculate it

```

public class W3HW3
{ public static double ln(double x)
{ // -0.5 < x < 0.5
double y=x-1;
double power=1;
double total=0;
int plusminus=1;
for(int n=1;n<=200;n++)
{ power*=y;
total+=power/n*plusminus;
plusminus*=-1;
}
return total;
}

public static void main(String arg[])
{ double x=0.5;
String s="ln("+x+") = "+ln(x)+"\n";
s+="Math.log("+x+") = "+Math.log(x)+"\n";
IO.print(s);
}
}

```

W3HW4: Write a program to calculate the number $A = \sum_{n=1}^{\infty} \frac{6}{n^2}$ by using a for loop. They claim that number A is equal to $\pi^2 = 9.86969604401$ check if it is true.

```

public class W3HW4
{ public static double A()
{ double total=0;

```

```
for(int n=1;n<=65000;n++)
{ total+=6.0/(n*n);}
return total;
}

public static void main(String arg[])
{ double A=A();
String s="A = "+A+"\n";
s+="Pi^2 = "+Math.PI*Math.PI+"\n";
System.out.println(s);
}
}
```

----- Capture Output -----

> "D:\co\java\bin\java.exe" W3HW4

A = 9.869304019222321

Pi^2 = 9.869604401089358

> Terminated with exit code 0.

It is approximating to the value but converging very slowly, therefore it is not very useful