W6_COMPUTER PROGRAMMINING 2019 SPRING

W6 further in class concepts, introduction to composition & inheritance, class array structures

We will use the class IO

```
 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));}

   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

```
public class book
{ public String name,author;
  int year;

  public book(String namei,String authori,int yeari)
  {name=namei;author=authori;year=yeari;}

  public book(book bi)
  {name=bi.name;author=bi.author;year=bi.year;}

  public String toString()
  {String s="book name = "+name+" book author = "+author+" publication year = "+year;
   return s;
   }
}
```

```
public class library
{ public book b[];
  String library_name;
  public library(String namei,book bi[])
  {library_name=namei;
   int n=bi.length;
   b=new book[n];
   for(int i=0;i<n;i++)
   {b[i]=bi[i];}
  }
  public String toString()
  {String s=" Library name : "+library_name+"\n";
   int n=b.length;
```

```
   for(int i=0;i<n;i++)
   {s+=b[i]+"\n";}
   return s;
  }}
```

```
 public class W6E1
{
  public static void main(String arg[])
  { book b1=new book("heat transfer","Özışık",1976);
    book b2=new book("the plaque","Camus",1987);
    book b3=new book("Computer programing","Çoban",2019);
    book b[]={b1,b2,b3};
    library l=new library("week 6 library",b);
    IO.print(""+l);
  }
}
```

Array of class

```
public class librarya
{ public book b[];
  String library_name;
  public librarya(String namei,book bi[])
  {library_name=namei;
   b=bi;
  }
  public String toString()
  {String s=" Library name : "+library_name+"\n";
   int n=b.length;
   for(int i=0;i<n;i++)
   {s+=b[i]+"\n";}
   return s;
  }
}
```

```
 public class W6E1a
{
  public static void main(String arg[])
  { book b1=new book("heat transfer","Özışık",1976);
    book b2=new book("the plaque","Camus",1987);
    book b3=new book("Computer programing","Çoban",2019);
    book b[]=new book[3];
    for(int i=0;i<b.length;i++)
    {b[i]=new book(b1);}
    librarya l=new librarya("week 6 librarya",b);
    IO.print(""+l);
  }
}
```

EX2

```
 public class box
{ double width,length,height;
  String bcolor;
 public box(double widthi,double lengthi,double heighti,String bc)
 {width=widthi;length=lengthi;height=heighti;bcolor=bc;}
 public double area()
 {return width*length+width*height+length*height;}
 public double volume()
 {return length*width*height;}
  public String toString()
  {String s="width = "+width+" m length = "+length+" m height = "+height+" m area = "+area()+" m"+'\u00B2'+" volume = "+volume()+"
m"+'\u00B3'+" color = "+bcolor;
   return s;
  }
}
```

composition

```
public class red_box
{ public box b;
 public red_box(double widthi,double lengthi,double heighti)
```

```
 {b=new box(widthi,lengthi,heighti,"red");}
 public String toString()
 {String s=""+b;
  return s;}
}
```

```
public class W6E2
{
 public static void main(String arg[])
 { red_box b1=new red_box(1.2,2.3,1.5);
   IO.print(""+b1);
 }
}
```

Inheritance

```
public class yellow_box extends box
{ public yellow_box(double widthi,double lengthi,double heighti)
 {super(widthi,lengthi,heighti,"yellow");}
}
```

```
public class W6E2a
{
 public static void main(String arg[])
 { yellow_box b1=new yellow_box(1.2,2.3,1.5);
   IO.print(""+b1);
 }
}
```

EX3

```
public class complex
{ public double real,imag;
 public complex(double r,double i)
 {real=r;imag=i;}
 public complex(complex c)
 {real=c.real;imag=c.imag;}
 public void add(complex c)
  {real+=c.real;
   imag+=c.imag;
  }
  public  static complex add(complex c1,complex c2)
  {complex c3=new complex((c1.real+c2.real),(c1.imag+c2.imag));
   return c3;
  }
  public String toString()
  {String s="("+real+" + i*"+imag+")";
   return s;
  }
}
```

```
public class W6E3
{
 public static void main(String arg[])
 { complex c1=new complex(1.2,2.3);
   complex c2=new complex(1.1,2.0);
   complex c3=complex.add(c1,c2);
   IO.print(""+c1+"+"+c2+" = "+c3);
 }
}
```

```
public class W6E3a
{
 public static void main(String arg[])
 { complex c1=new complex(1.2,2.3);
   complex c2=new complex(1.1,2.0);
   complex c3=new complex(c1);
   c3.add(c2);
   IO.print(""+c1+"+"+c2+" = "+c3);
 }
}
```

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

W6HW1 :

```
 public class car
{ public String brand,model;
  int year;
  public car(String brandi,String modeli,int yeari)
  {brand=brandi;model=modeli;year=yeari;}
  public String toString()
  {String s="car brand = "+brand+" model = "+model+" year = "+year;
   return s;
  }
}
```

```
public class car_registry
{ public car c[];
  String registry_name;
  public car_registry(String namei,car ci[])
  {registry_name=namei;
   int n=ci.length;
   c=new car[n];
   for(int i=0;i<n;i++)
   {c[i]=ci[i];}
  }
  public String toString()
  {String s=" Registry : "+registry_name+"\n";
   int n=c.length;
   for(int i=0;i<n;i++)
   {s+=c[i]+"\n";}
   return s;
  }
}
```

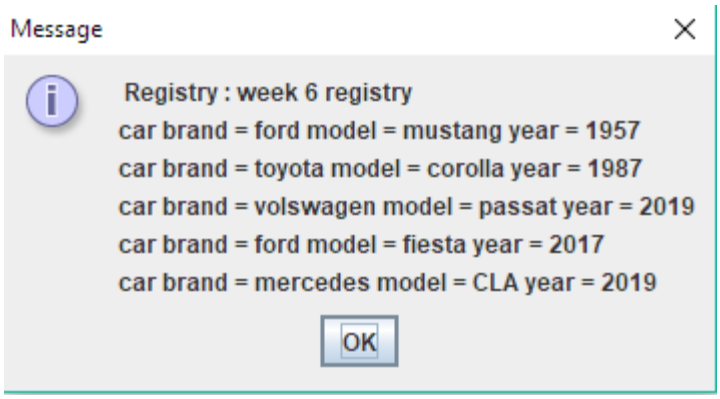
```
public class W6E4
{
  public static void main(String arg[])
  { car c1=new car("ford","mustang",1957);
    car c2=new car("toyota","corolla",1987);
    car c3=new car("volswagen","passat",2019);
    car c[]={c1,c2,c3};
    car_registry cr=new car_registry("week 6 registry",c);
    IO.print(""+cr);
  }
}
```

public class ford extends car
public class Mercedes extends car

car class is given write a carregistry class similar to library class to register cars is given as below. Now create a ford class for ford brand cars and a Mercedes class for Mercedes brand cars (similar to yellow_box) and add them into the registry as:

```
public class W6E4a
{
  public static void main(String arg[])
  { car c1=new car("ford","mustang",1957);
    car c2=new car("toyota","corolla",1987);
    car c3=new car("volswagen","passat",2019);
```

```
    ford c4=new ford("fiesta",2017);
    mercedes c5=new mercedes("CLA",2019);
    car c[]={c1,c2,c3,c4,c5};
    car_registry cr=new car_registry("week 6 registry",c);
    IO.print(""+cr);
  }
}
```



W6HW2 Investigate EX3 complex class. In this class methods
public void add(complex c)
public static complex add(complex c1,complex c2)
is given to add complex numbers. Add methods
public void multiply(complex c)
public static complex multiply(complex c1,complex c2)
to multiply complex numbers create an example program and print out the results
Note: $(a_1 + b_1 i)(a_2 + b_2 i) = (a_1 a_2 - b_1 b_2) + (a_1 b_2 + b_1 a_2)i$