

## LEC8 OOP 2018-2019

### Example 1:

Create a class called Employee that includes three pieces of information as instance variables:

an Employee number (type integer),  
an Employee step (type integer) and  
a monthly salary (double).

Your class should have a constructor that initializes the three instance variables. Provide set and get methods for each instance variable. If the monthly salary is not positive, set it to 0.0.

Write a test application named EmployeeTest that demonstrates class Employee's capabilities. Create two Employee objects and display each object's yearly salary. Then give each Employee a 10% raise (زيادة) and display each Employee's yearly salary again.

```
public class Employee {  
    private int number;  
    private int step;  
    private double salary;  
  
    public Employee(int no,int st, double sal) {  
        number=no; step=st;  
        if (sal > 0.0)  
            salary=sal;  
        else salary=0.0; }  
  
    public int getNo(){  
        return (number);}  
    public int getSt(){  
        return (step); }  
    public double getSalary(){  
        return salary; }  
  
    public void setNo(int no){  
        number=no; }  
    public void setSt(int st){  
        step=st; }  
    public void setSalary(double sal){  
        if (sal > 0.0)  
            salary = sal;  
        else  
            salary = 0.0; } }
```

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```
public class EmployeeTest {  
public static void main (String args[]){  
  
Employee e1=new Employee (1,3,20000.00);  
Employee e2=new Employee (2,5,50000.00);  
  
System.out.println("1) "+e1.getNo()+e1.getSt()+e1.getSalary()*12);  
System.out.println("2) "+e2.getNo()+e2.getSt()+e2.getSalary()*12);  
  
e1.setSalary(0.1*e1.getSalary()+e1.getSalary());  
e2.setSalary(0.1*e2.getSalary()+e2.getSalary());  
  
System.out.println("3) "+e1.getNo()+e1.getSt()+e1.getSalary()*12);  
System.out.println("4) "+e2.getNo()+e2.getSt()+e2.getSalary()*12);  
} }
```

The output is the following:

- 1) 1320000.0
- 2) 2550000.0
  
- 3) H.W.
- 4) H.W.

### Example 2:

Create a class called Date that includes three pieces of information as instance variables:

A month (type int), a day (type int) and a year (type int). Your class should have a constructor that initializes the three instance variables and assumes that the values provided are correct. Provide a set and a get method for each instance variable. Provide a method displayDate that displays the month, day and year separated by forward slashes (/). Write a test application named DateTest that creates a date object and print the full date. Change the date to another one and print it again.

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```
public class Date {
private int month;
private int day;
private int year;

public Date(int m, int d, int y) {
month = m; day = d; year =y;}

public void setMonthDate(int m) { month = m;}

public int getMonthDate() { return month;}

public void setDayDate(int d) { day = d;}

public int getDayDate() { return day;}
public void setYearDate(int y) { year = y;}
public int getYearDate() { return year;}
public void displayDate() { System.out.println(month+"/"+day+"/"+year);}
}

public class DateTest {
public static void main(String[] args) {

Date myDate = new Date(19,6,1977);
myDate.displayDate();

int myMonth = 5;
myDate.setMonthDate(myMonth);

int myDay = 7;
myDate.setDayDate(myDay);

int myYear = 1974;
myDate.setYearDate(myYear);
myDate.displayDate();
}}
```

The output will be:

```
19/64/1977
5/7/1974
```

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### Example 3:

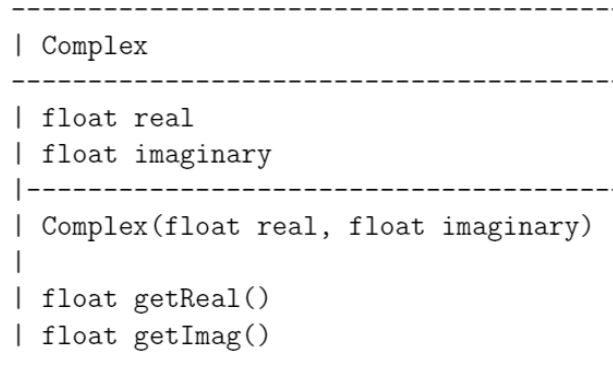
Write a program contains a class called Number; this class has 2 member variables and number of methods: addition, subtraction, division, multiplication ,and prin. Declare two objects and print the results of addition ,subtraction, multiplication and division of their member variables .Use the constructor to initialize the numbers.

```
public class Number {  
    private int x,y;  
  
    public Number(int n1,int n2){  
        x=n1;    y=n2; }  
  
    public int add(){ return(x+y); }  
    public int sub(){return (x-y);}  
    public int mul(){ return x*y;}  
    public int div(){ return x/y;}  
  
    public void print(){ System.out.println("x="+x+" y="+y);}  
}  
  
public class Main {  
  
    public static void main(String[] args) {  
  
        Number n1,n2;  
        n1=new Number(50,100);  
        n2=new Number(80,20);  
        n1.print();  
        System.out.println(n1.add());  
        System.out.println(n1.sub());  
        System.out.println(n1.mul());  
        System.out.println(n1.div());  
  
        n2.print();  
        System.out.println(n2.add());  
        System.out.println(n2.sub());  
        System.out.println(n2.mul());  
        System.out.println(n2.div());  
    } }  
}
```

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### LAB.

- 1- Update the above program to print the summation of 50 random integer numbers which are between -100 and 100.
- 2- Following is an example class diagram for what is expected to be a representation of Complex numbers



Use the above class for :

- 1-adding two complex number  $(a + b i) + (c + d i) = (a + c) + (b + d) i$
- 2-subtracting two complex number  $(a + b i) - (c + d i) = (a - b) + (b - d) i$
- 3-multiplying two complex number  $(a + b i)(c + d i) = (a c - b d) + (a d + b c) i$
- 4-dividing two complex number

```
public class Complex {  
  
    private float real,img;  
    public Complex(float r,float i){  
        real=r;img=i;}  
    public Complex(){ }  
    public float get_real(){ return(real); }  
    public float get_img(){ return(img); }  
  
    public Complex add (Complex c1){  
        Complex c2=new Complex();  
  
        c2.real=c1.real+real;  
        c2.img=c1.img+img;  
        return(c2);}  
  
    public void print(){  
        System.out.println(real+" "+img+"i");  
    }  
}
```

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```
public class Main {
public static void main(String[] args) {

    Complex no1=new Complex( 5.0f,4.0f);
    Complex no2=new Complex(8.0f,9.0f);
    Complex no3=new Complex();

    no3=no1.add(no2);
    no1.print();    no2.print();    no3.print();

    Complex no4=new Complex(1.0f,2.0f);
    Complex no5=new Complex(3.0f,4.0f);
    Complex no6=new Complex( no4.get_real()+no5.get_real(),
                             no4.get_img()+no5.get_img());

    no4.print();    no5.print();    no6.print(); }}
```

### 1- The results add operation

5.0+4.0i  
8.0+9.0i  
13.0+13.0i

### 2- The results without add operation

1.0+2.0i  
3.0+4.0i  
4.0+6.0i