Object-Oriented Programming

➢ Principles Of Object-Oriented Programming

- Principles of Object-Oriented programming are
- 1.Abstraction.
- 2.Encapsulation.
- 3.Inheritance.
- 4.Polymorphism.

▪ 1.Abstraction

- Abstraction means hiding internal details and showing the required things.

> *For Example*
>
> *Consider a man driving a car, while driving he focus on using of steering, gear, accelerator etc.*
> *He does not require to know the inner mechanism of the car.*

▪ 2.Encapsulation

- Encapsulation is the process of grouping data in a single section.

> *For Example*
>
> *Complete television is single box where all the mechanism are hidden inside the box all are capsuled.*

▪ 3.Inheritance

- Inheritance means designing an object or a class by re-using the properties of the existing class and object.
- Inheritance is same as specialization.

For Example

A old style television (idiot box) is transformed with extra features into slim and smart television where it re-used the properties of old television.

- **4.Polymorphism**
- Polymorphism is a concept in which we can execute a single operation in different ways.
- polymorphism is same as generalization.

➢ **Class VS Object**

- Object is defined in terms of its **properties** and **behaviour.**
- Operation of behaviours will affect the properties.
- Anything in the world can be defined in the terms of properties and behaviour.
- For a single class wee can have many objects.
- Multiple number of objects can be created by one single class

For example

A house or a car or a television is an object but the design or blueprint of the objeect is a class.

Example Program

```
class Television

{
 private int channel;
 private int volume;

 public void changechannel()
 public void changevolume()
}
class test
{
 public static void main()
 {
  Television t=new Television();
  t.changechannel(10);
 }
}
```

- In java there is an area inside main memory which is known as method area which contains all the methods.
- The definitions of the will be present inside the heap, as the objects will be based on the definitions so the objects are also present in heap.

105 class vs object

**********every class contains properties and behaviour

****Properties–

Properties means describing about that person by seeing at him.

Ex–

1) man is in black color

2) man is 5 feet height

3) he has red eyes

****Behavior–

Behavior means what that person can do

Ex–

1) man can ran very fast

2) he plays guitar very sweet

3) he can do coding python very well

Difference between class and object–

Class—it is the plan

Object—construction according to the class is called object

For example–

House – planning sketch for construction is (class)

House is (object)

***CALCULATION OF SOMETHING IS NEEDED WE HAVE DO IN METHODS WE CAN NEATLIY UNDERSTAND BY DOWN EXAMPLES

Create a Class

To create a class, use the keyword `class`:

Main.java

Create a class named "`Main`" with a variable x:

```
public class Main {
  int x = 5;
}
```

Create an Object

In Java, an object is created from a class. We have already created the class named `Main`, so now we can use this to create objects.

To create an object of `Main`, specify the class name, followed by the object name, and use the keyword `new`:

Example

Get your own Java Server

Create an object called "`myObj`" and print the value of x:

```
public class Main {
  int x = 5;

  public static void main(String[] args) {
    Main myObj = new Main();
    System.out.println(myObj.x);
  }
}
```

107--WRITING CLASS FOR CIRCLE

```java
package objectorientiedprograming;

class circle // (class contains properties and behaviour)
{
    public double radius;    // this is properity

    public double area()     // this is behaviour 1
    {
        double areaofcircle;
        areaofcircle=3.14*radius*radius;
        return areaofcircle;
    }

    public double perimeter()    // this is behaviour 2
    {
        double perimeterofcircle;
        perimeterofcircle=2*3.14*radius;
        return perimeterofcircle;
    }
}

public class Creating_circle_class {
    public static void main(String arg[])
    {
        double a,b,c,d;

        // class may contains many (objects)

        circle c1=new circle();  // creating object for class

        c1.radius=7;
        a=c1.area();
        b=c1.perimeter();
        System.out.println("c1");
        System.out.println("Area of circle is : "+a);
        System.out.println("Perimeter of circle is : "+b);

        circle c2=new circle();
        c2.radius=10;
        c=c2.area();
        d=c2.perimeter();
        System.out.println("c2");
        System.out.println("Area of circle is : "+c);
        System.out.println("Perimeter of circle is : "+d);

    }

}
```

OUTPUT---

```
<terminated> Creating_circle_class [Java Application] C:\Program Files\Java\jd
c1
Area of circle is : 153.86
Perimeter of circle is : 43.96
c2
Area of circle is : 314.0
Perimeter of circle is : 62.800000000000004
```

108–WRITING CLASS FOR RECTANGLE

```java
package objectorientiedprograming;

class rectangle
{
    public double length;
    public double breadth;

    public double area()
    {
        double areaofrectangle=length*breadth;
        return areaofrectangle;
    }

    public double perimeter()
    {
        double perimeterofrectangle;
        perimeterofrectangle=2*(length+breadth);
        return perimeterofrectangle;
    }
}
```

```java
public class Creating_rectangle_class {
    public static void main(String arg[])
    {
        double a,b,c,d;

        rectangle r1=new rectangle();
        r1.length=10;
        r1.breadth=10;
        a=r1.area();
        b=r1.perimeter();
        System.out.println("r1");
        System.out.println("Area of rectangle is : "+a);
        System.out.println("Perimeter of rectangle is : "+b);

        rectangle r2=new rectangle();
        r2.length=12;
        r2.breadth=10;
        c=r2.area();
        d=r2.perimeter();
        System.out.println("r2");
        System.out.println("Area of rectangle is : "+c);
        System.out.println("Perimeter of rectangle is : "+d);



    }

}
```

```
r1
Area of rectangle is : 100.0
Perimeter of rectangle is : 40.0
r2
Area of rectangle is : 120.0
Perimeter of rectangle is : 44.0
```

110 WRITING CLASS FOR STUDENT

```java
package objectorientiedprograming;

class student
{
    public String name;
    public int rollno;
    public String course;
    public int m1,m2,m3;

    public int total()
    {
        int totalmarks;
        totalmarks=m1+m2+m3;
        return totalmarks;

    }
    public double average()
    {
        float averagemarks;
        averagemarks=total()/3;
        return averagemarks;

    }

}
```

```java
public class Creating_student_class {
    public static void main(String arg[])
    {
        int a,c;
        double b,d;


        student s1=new student();
        String x=s1.name="varshith";
        int y=s1.rollno=1;
        String z=s1.course="CSE";
        s1.m1=100;
        s1.m2=100;
        s1.m3=100;

        a=s1.total();
        b=s1.average();


        System.out.println("Details of student 1 :");
        System.out.println("Name of student "+x);
        System.out.println("rollno of student "+y);
        System.out.println("course of student "+z);
        System.out.println("totalmarks of student "+a);
        System.out.println("average of student "+b);
```

```
53
54          student s2=new student();
55          String p=s2.name="raju";
56          int q=s2.rollno=2;
57          String r=s2.course="ECE";
58          s2.m1=10;
59          s2.m2=20;
60          s2.m3=10;
61
62          c=s2.total();
63          d=s2.average();
64
65
66          System.out.println("Details of student 2 :");
67          System.out.println("Name of student "+p);
68          System.out.println("rollno of student "+q);
69          System.out.println("course of student "+r);
70          System.out.println("totalmarks of student "+c);
71          System.out.println("average of student "+d);
72
73
74      }
75
76  }
```

OUTPUT–

```
<terminated> Creating_student_class [Java
Details of student 1 :
Name of student varshith
rollno of student 1
course of student CSE
totalmarks of student 300
average of student 100.0
```

```
Details of student 2 :
Name of student raju
rollno of student 2
course of student ECE
totalmarks of student 40
average of student 13.0
```