Object Oriented Programming (OOPs)

What is an Object ?

* An object is a **physical entity** which exist in the real world.
Example : Car, Mouse, Pen, Keyboard

* An Object has 3 characteristics :
- a) Identification Of an Object (Name of the object)
- b) State of an Object (Non static Variable/Filed/Attributes/Properties)
- c) Behavior of an Object (Non static Method OR Functionality of an Object)

How to create an Object in Java :

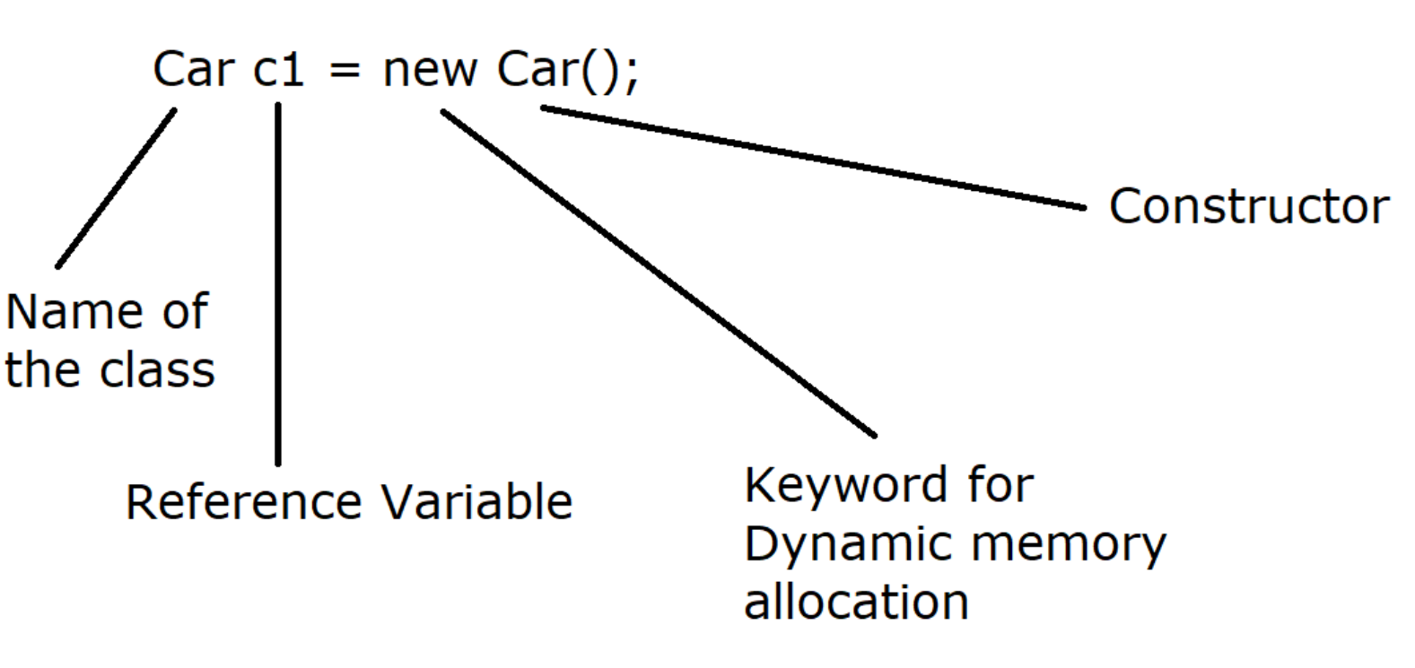
* In order to create an object in java, Basically we need **class name** and **new keyword**

Example :

```
public class Car
{

}

Car c1 = new Car();
```



* Object Oriented Programming is an approach to **design and develop** the programs by using **class and Object.**

* If a programmer is able to write the programs on **real life object** then the Progammer is called Object Oriented Programmer.

* In OOP we concentrate on objects rather than method OR function.

Advantages of OOP :

We have following advantages with Object Oriented Programming :

1) Modularity (Dividing the bigger task into number of smaller tasks)
2) Reusability (We can reuse a BLC class number of times in java)
3) Flexibility (We can easily modify the project for new changes [interface])

Features of OOP :

We have following faeatures in OOP :
1) Class
2) Object
3) Abstraction
4) Encapsulation
5) Inheritance
6) Polymorphism

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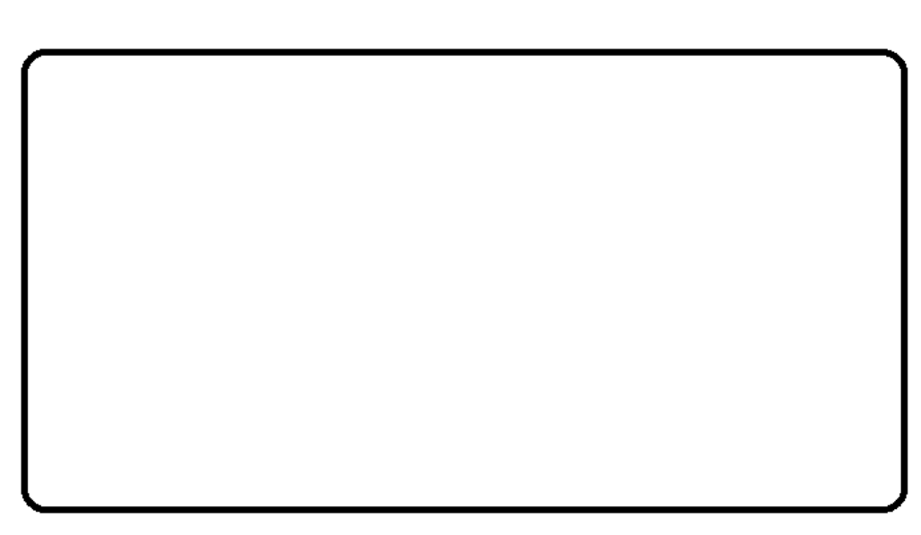
1) What is a class in java ?

* A class is a Model/blueprint/template/prototype for creating the Object.



Restaurant Object

I want to build one Restaurant on this particular land.

Civil Engineer : Will provide one blueprint (Rough Diagram) for creating the Restaurant object.

Once Restaurant is created physically that means Object is created.

Steel Organization

Hammer

Blacksmith

1 HR : To gather Iron Material

2 HRS : To boil this Iron raw

4 HRS : To beat and provide the Shape.

7 HRS to create a Hammer

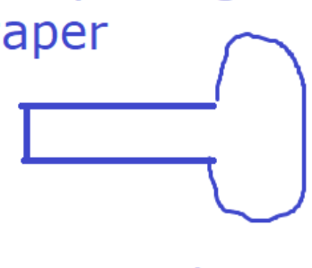
100 X 7 = 700 HRS

Engineer

1 HR : To gather Iron Material

2 HRS : To boil this Iron raw

1 HR : To create a Dye diagram with pen and Paper



3 HRS : To create Original Dye.

1 HR : To cast the liquid into the Dye

8 HRS to create a Hammer

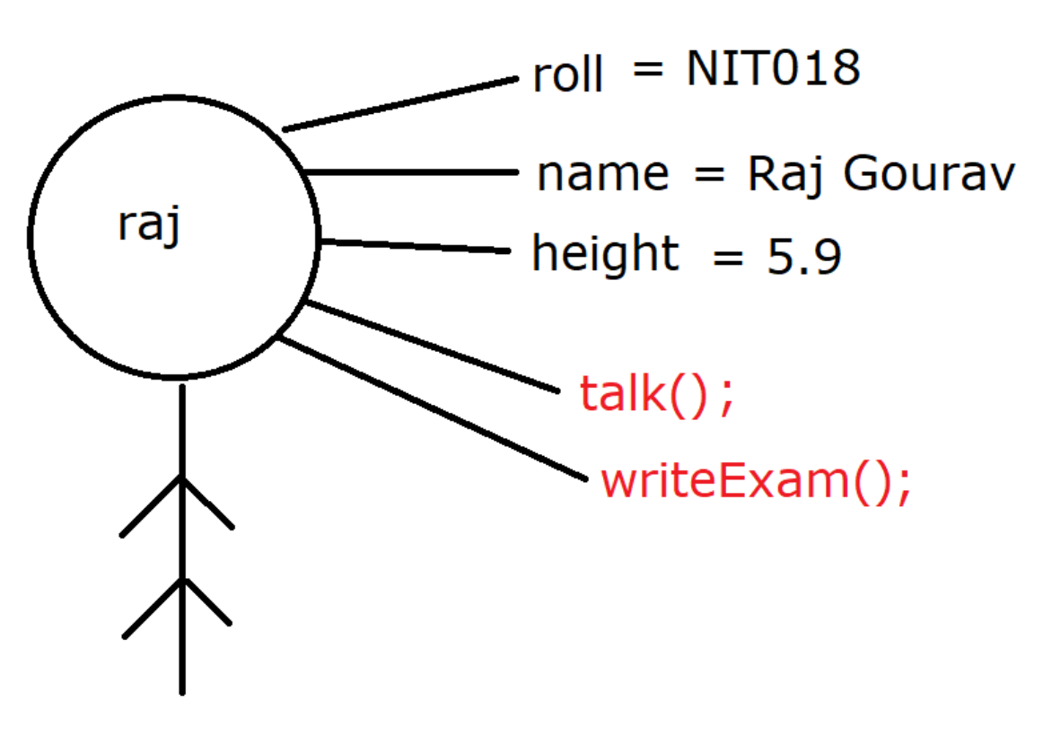
100 X 4 = 400 HRS

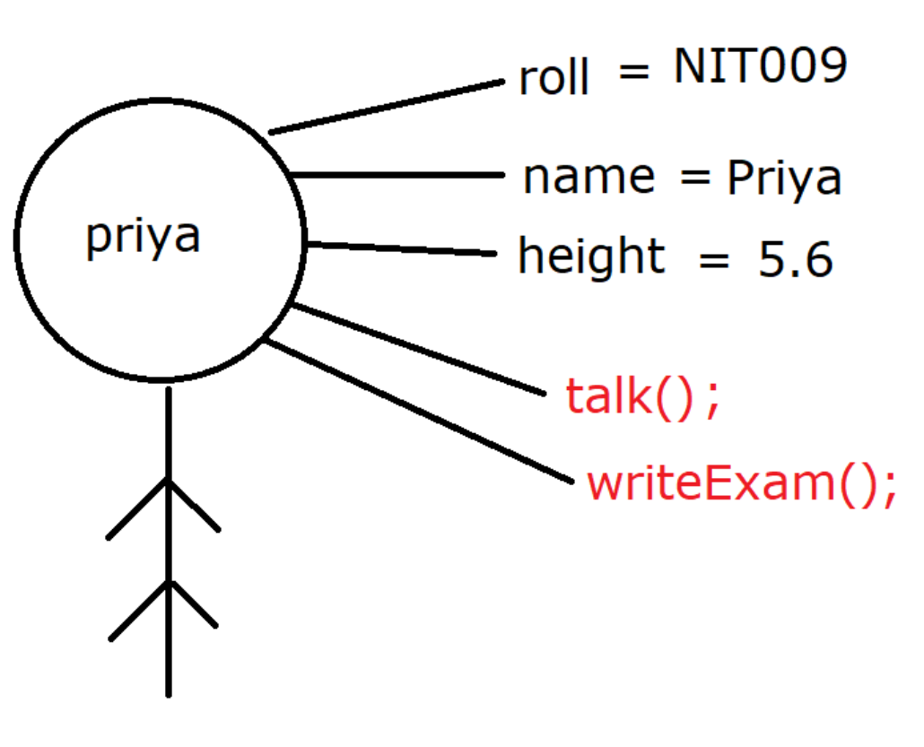
* A class is a user-defined data type which is the combination of Data member (Properties) and member function.
Example :
```
public class Employee
{
   Employee Data (Field OR Attribute)
          +
   Employee Function (methods)
}
```

* A CLASS IS A COMPONENT WHICH IS USED TO DEFINE OBJECT PROPERTIES (non static variable) AND OBJECT METHODS (non static methods).

Write an OOP to show the behavior of a Student :

[Diagram for this Program]





```
package com.ravi.oop;

//BLC
public class Student
{
   String roll;  //non static variable
   String name; //non static variable
   double height; //non static variable

   public void talk()
   {
      System.out.println("Hello Everyone, My Name is :"+name);
      System.out.println("My roll number is :"+roll);
      System.out.println("And my height is :"+height);
   }

   public void writeExam()
   {
      System.out.println(name+" is writing weekly Test on Satuday!!!");
   }

}
```

```
package com.ravi.oop;

//ELC
public class StudentDemo
{
    public static void main(String[] args)
    {
        Student raj = new Student();
        //Initialize the non static variable with Object reference
        raj.name = "Raj Gourav";
        raj.roll = "NIT018";
        raj.height = 5.9;
        raj.talk();
        raj.writeExam();

        System.out.println("....................");

         Student priya = new Student();
         priya.name = "Priya";
         priya.roll = "NIT009";
         priya.height = 5.6;
         priya.talk();
         priya.writeExam();
    }
}
```

* In the above program we have initialized the object properties through object reference variable.

* By using this BLC class Student we can develop so many Student Objects.

Steps to develop Object Oriented Programming (Initializing through Object Reference)

1) Write BLC and ELC class. [Student + StudentDemo]
2) Create the Object of BLC class inside ELC class.
3) Think about the Object, Write Object properties (non static variable) inside BLC class.
4) Write the Object behavior inside the BLC class.
5) Inside the ELC class, With the help of object reference, Initialize all the non static variables with proper values.
6) Using object reference call the object behavior (non static method) and run the program