Lecture – 6 (Part 1)

Basic Concepts and Features of OOP

Today's Contents

- **Basic concepts of OOP**
  - **Object**
  - **Class**
  - **Methods**
  - **Instance Variables**
- **Basic Features of OOP**
  - **Abstraction**
  - **Encapsulation**
  - **Polymorphism**
  - **Inheritance**

Concepts of OOP

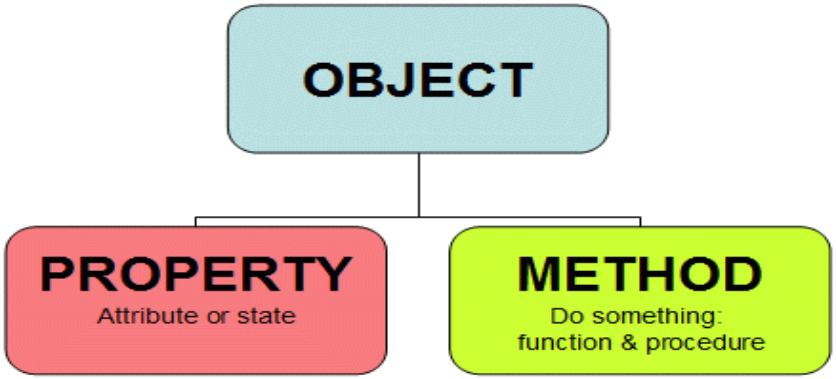
1. Object
2. Class
3. Instance Variables
4. Methods

1. Object

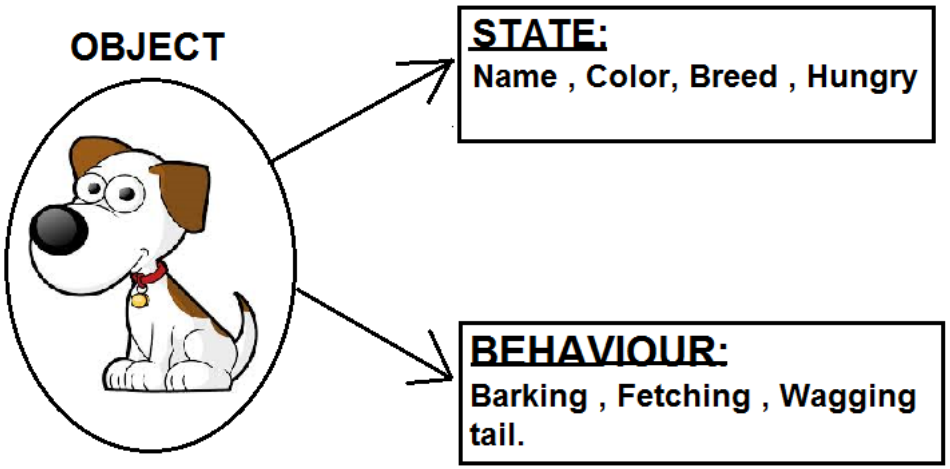
- **Real world entity.**
- Bundle of related **variables** and **functions** (also known **methods**).
- Objects share **two** characteristics:

    1. Properties / State

    2. Method / Behavior (Functionalities)

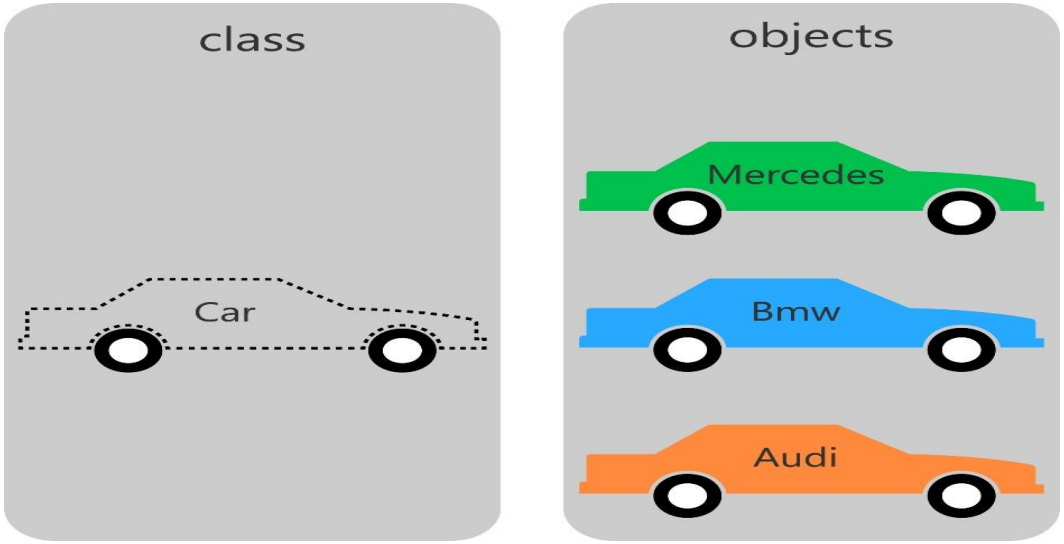


An Object

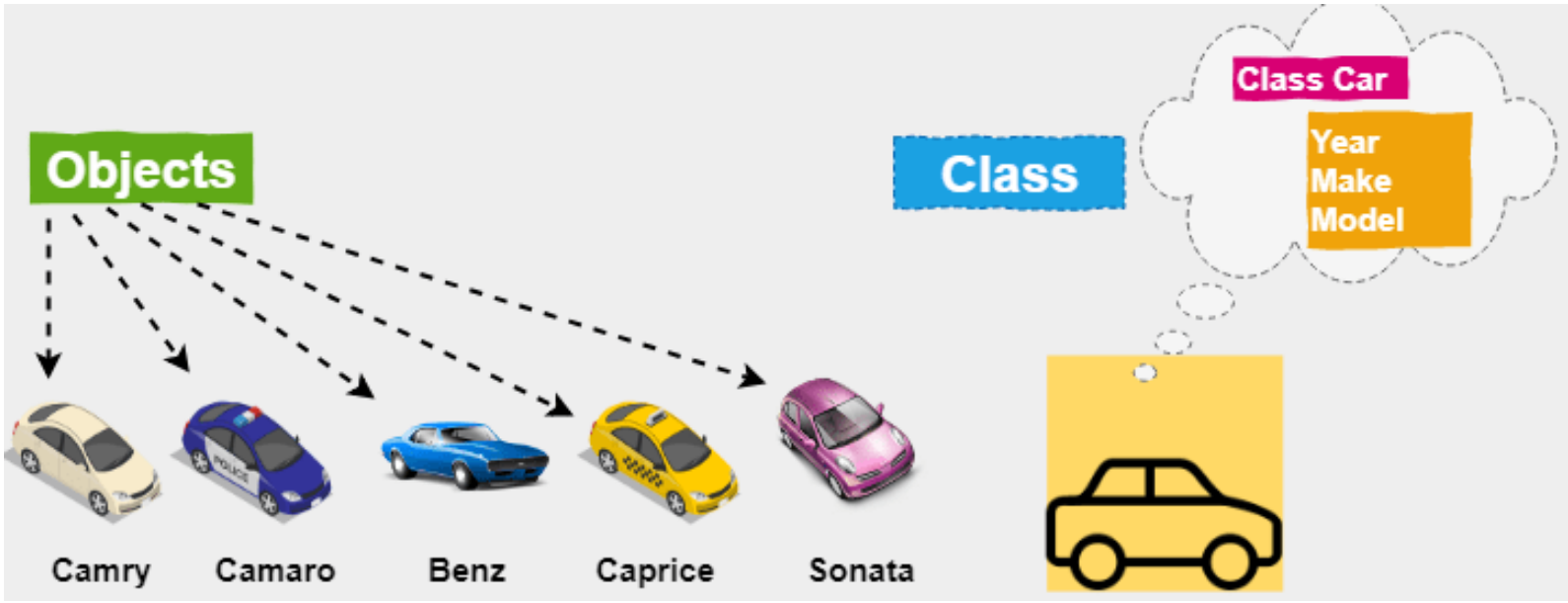

OBJECT
STATE:
Name , Color, Breed , Hungry
BEHAVIOUR:
Barking , Fetching , Wagging tail.

2. Class

- A class can be defined as a **template/blueprint** of an object that describes the **behaviors/states** that object.



Class: A template/blueprint of an objects



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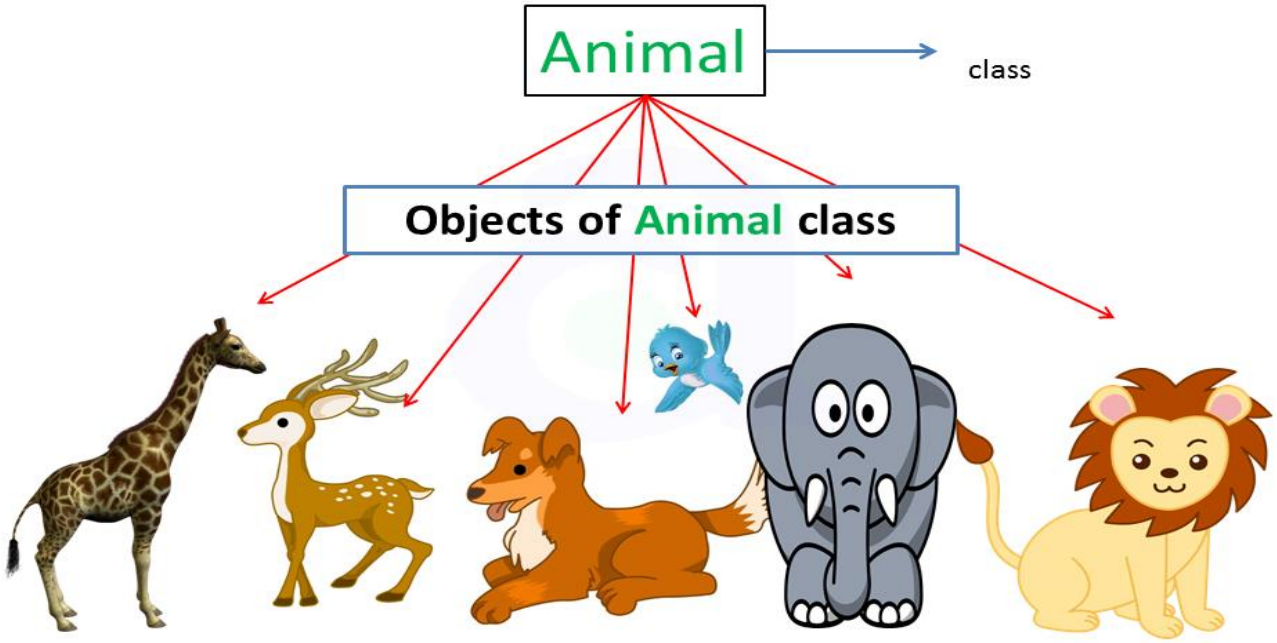
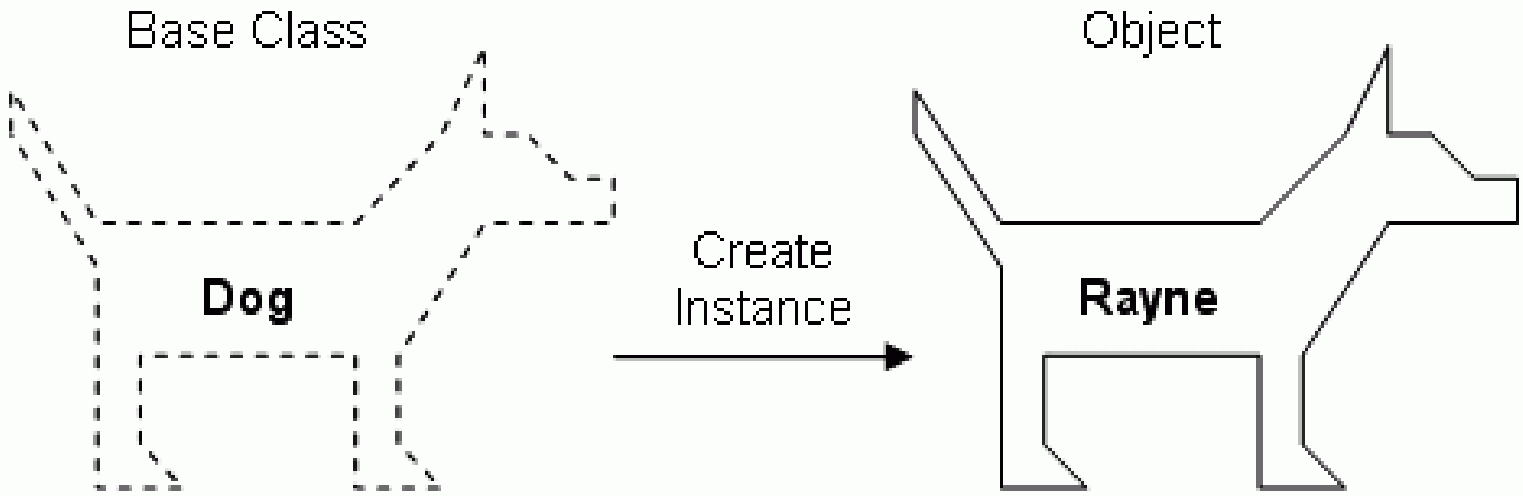
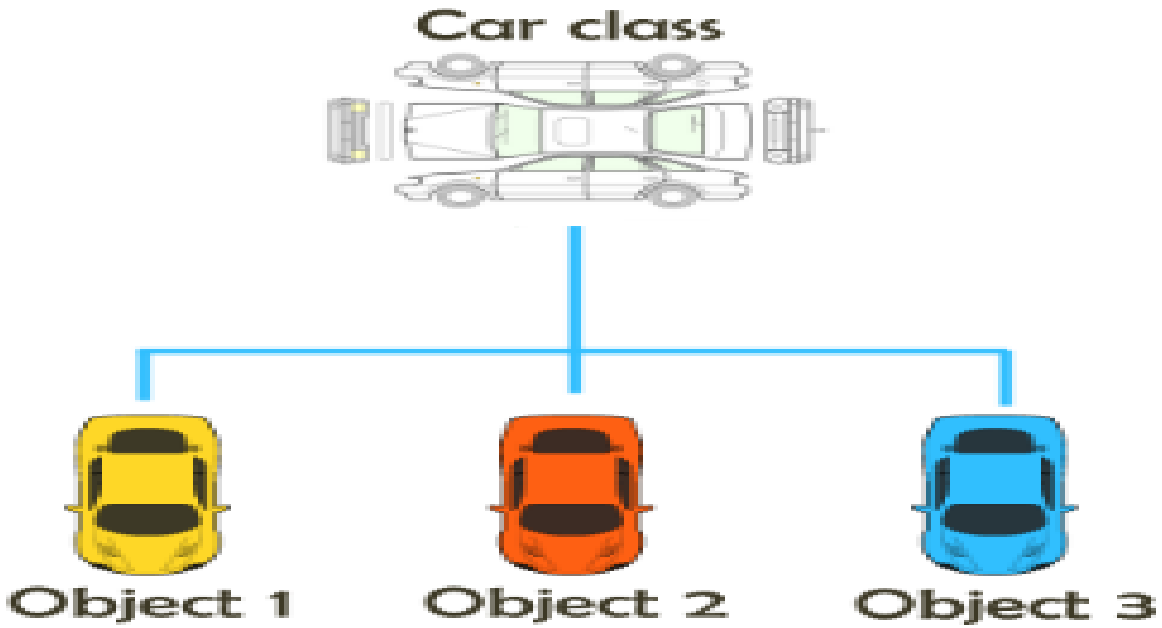


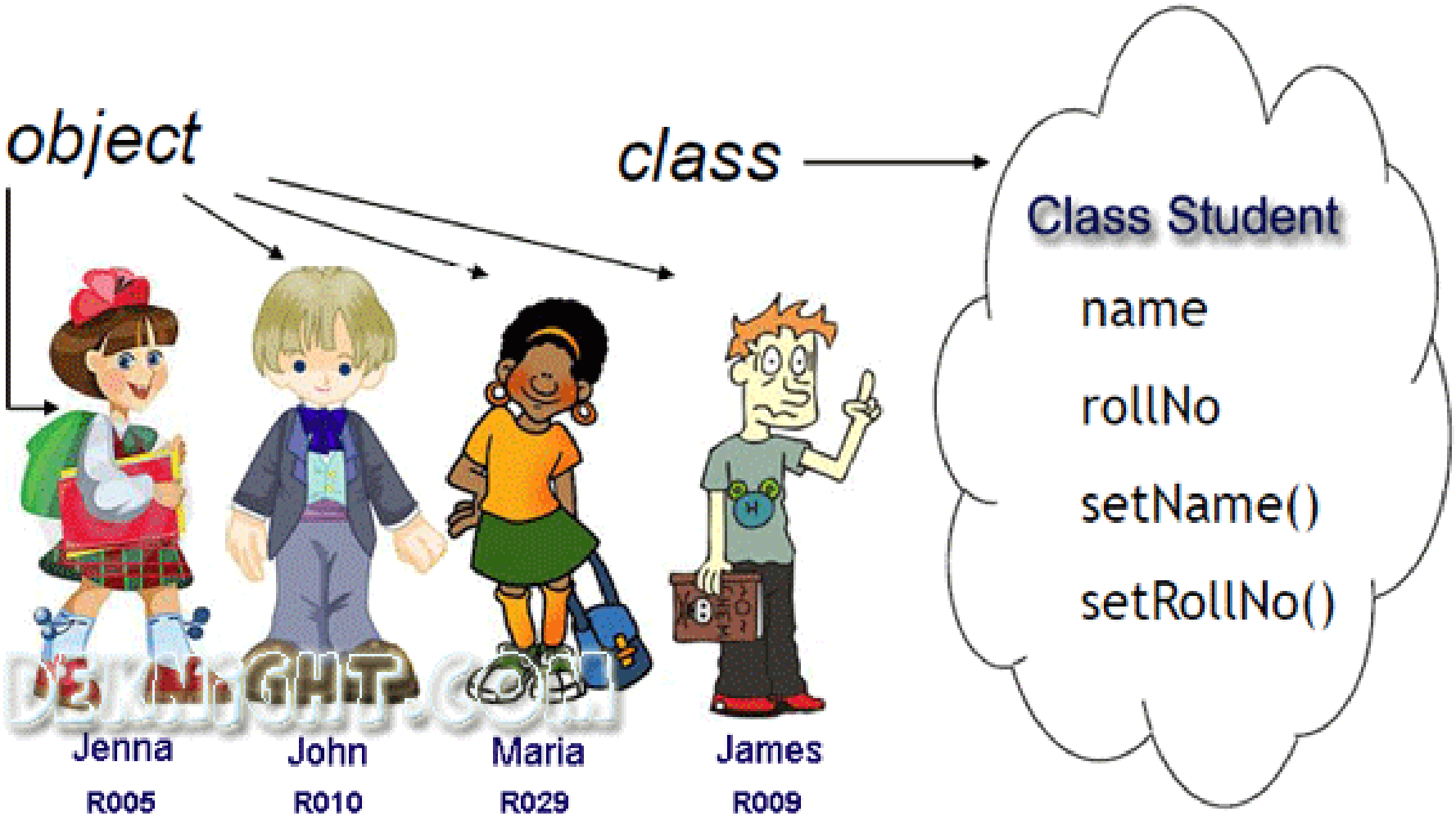


Properties	**Methods**
Color	Sit
Eye Color	Lay Down
Height	Shake
Length	Come
Weight	

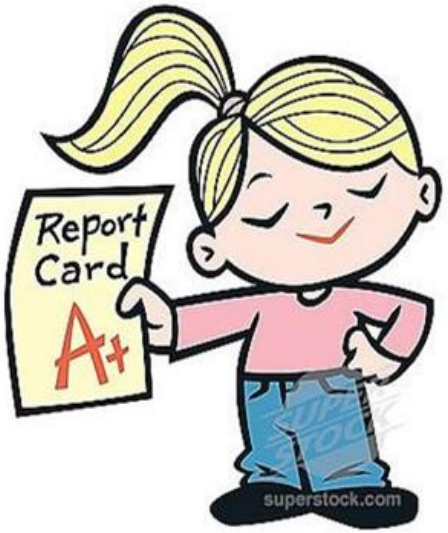
Property values	**Methods**
Color: Gray, White, and Black	Sit
Eye Color: Blue and Brown	Lay Down
Height: 18 Inches	Shake
Length: 36 Inches	Come
Weight: 30 Pounds	

The Class represents a template to for creating objects of that class




object
class
Class Student
name
rollNo
setName()
setRollNo()
Jenna
R005
John
R010
Maria
R029
James
R009

- The set of all students forms the *class* Student
- Each individual student is an *object* of the class Student
- John Smith and Janice Lee are *instances* of Student



3. Methods

- A **method** is basically a **behavior**.
- A class can contain many methods.
- It is in methods where the logics are written, data is manipulated and all the actions are executed.

4. Instance Variables (Field/Local Variable)

- Each object has its **unique set of instance variables**.

Such as,

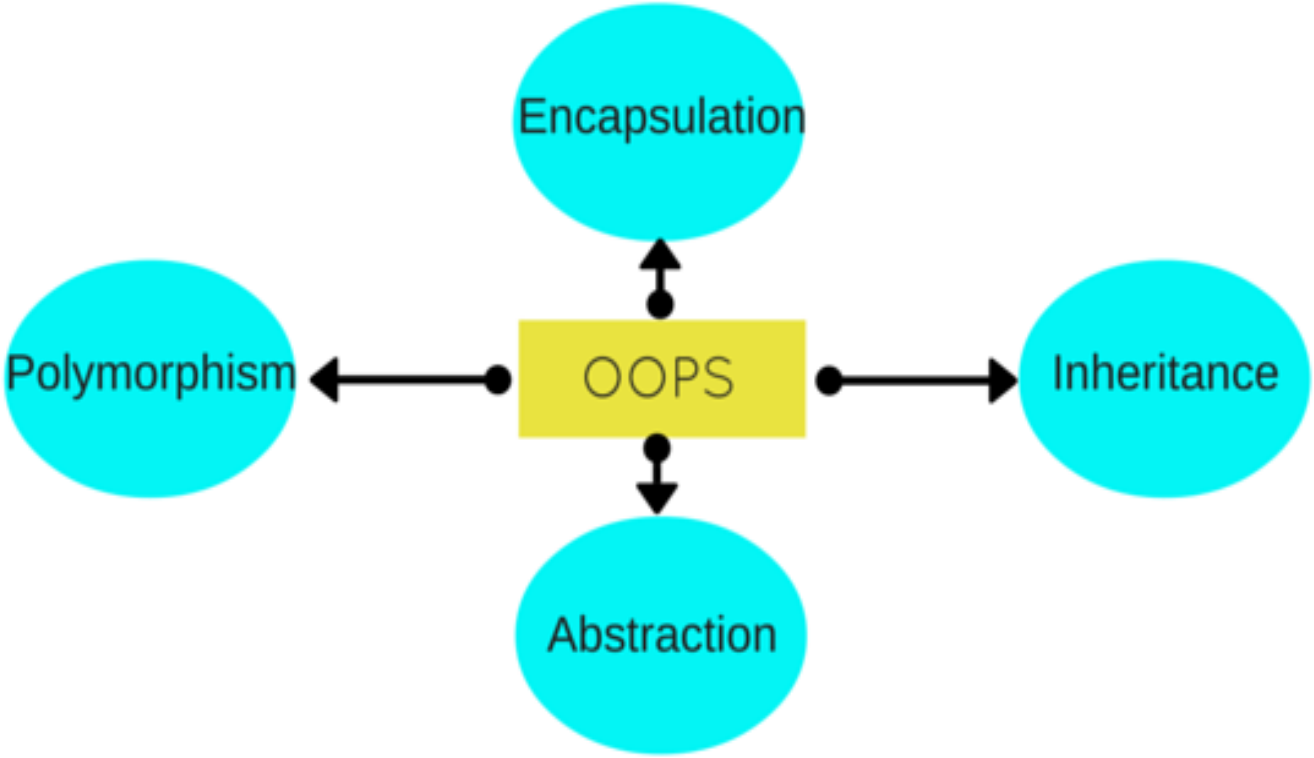
A Box can have **Height**, **Width, Depth**.

These are the Instance variables of that box.

- An object's state is created by the values assigned to these instance variables.

Features Of OOP

Features of OOP



1. Abstraction

OOPS Concept – Abstraction

- Abstraction refers to the act of representing essential features without including the background details.
- hiding unnecessary data from the users and making the application as user friendly then it is called as abstrcation

An abstraction includes the essential details relative to the perspective of the viewer

Data abstraction is a technique of creating new data types that are well suited to an application

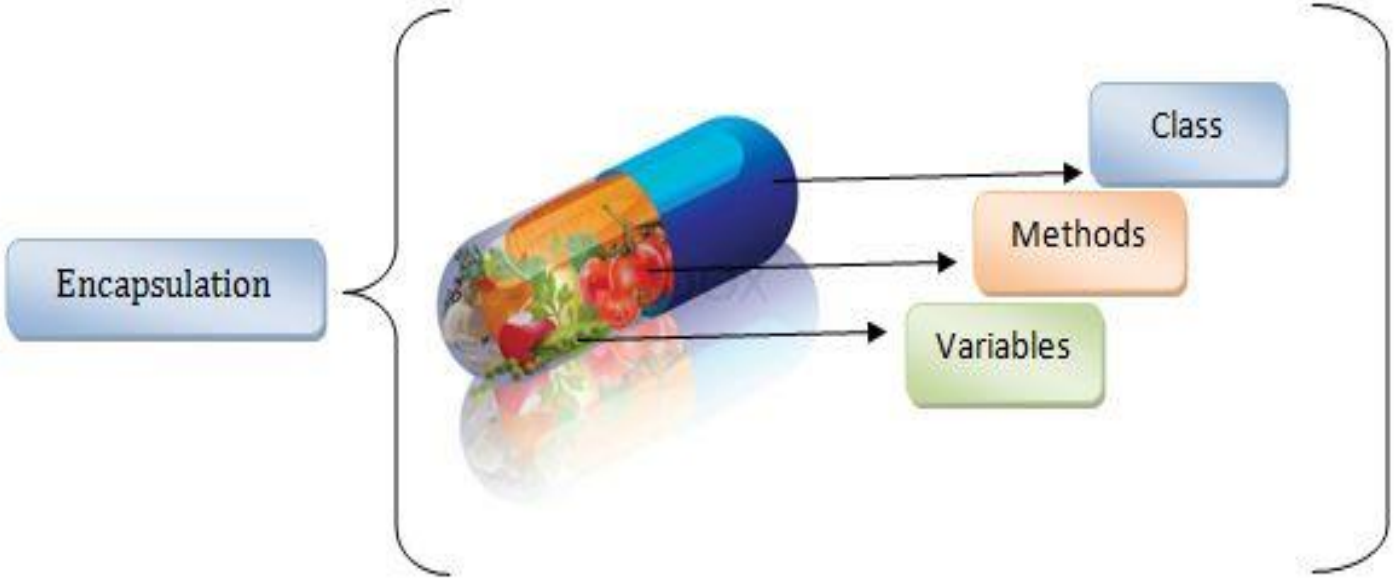
It allows creation of user **defined data types**, having the properties of built in data types and set of permitted operations

2. Encapsulation

What is Encapsulation?

- Encapsulation is the condition of being enclosed. (as in a capsule)
- With programming perspective, Enclosing "**attributes**" and "**methods**" within a class would be called **Encapsulation.**

Encapsulation



3. Polymorphism

Poly = many
morph = form

In Shopping malls behave like Customer

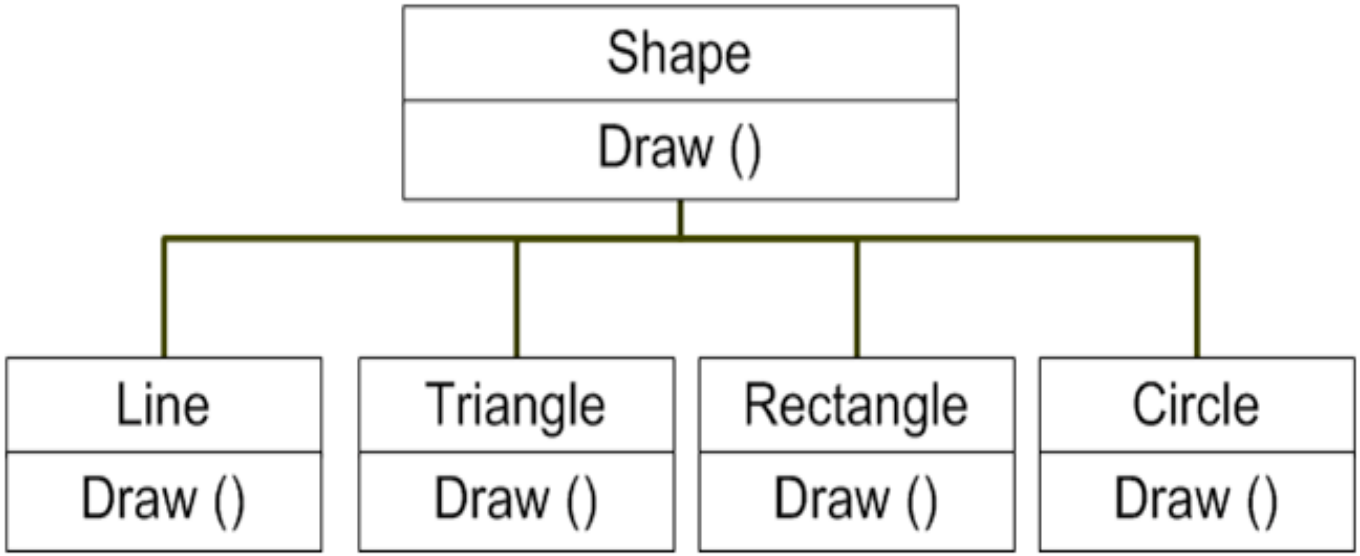
In Bus behave like Passenger

In School behave like Student

At Home behave like Son

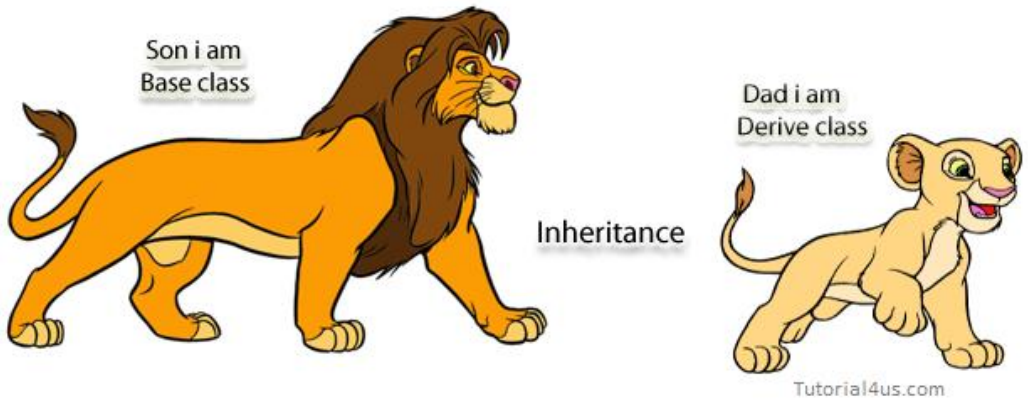
It is an ability of an object to take many forms.

Polymorphism



4. Inheritance

- **Inheritance** is when an object **acquires the property of another object**.
- Inherited class is called as **parent class** or **super class** or **base class**
- Class that inherits a parent class is called as **child class** or **sub class** or **derived class**



Example of Inheritance