Java OOPs

By Umesh Sir

Contact us 7758094241

Object Oriented Programming Concepts

- ★ What is mean by OOPs?
- ★ Core OOPs Concepts?
- ★ What is Object?
- ★ What is Class?
- ★ What is mean by Abstraction?
- ★ What is mean by Encapsulation?
- ★ What is mean by Inheritance?
- ★ What is mean by polymorphism?

★ What is mean by OOPs?

- ★ As the name suggests, Object-Oriented Programming or OOPs refers to languages that use objects in programming, they use objects as a primary source to implement what is to happen in the code.
- ★ Objects are seen by the viewer or user, performing tasks assigned by you. Object-oriented programming aims to implement real-world entities like inheritance, hiding, polymorphism etc. in programming.
- ★ The main aim of OOP is to bind together the data and the functions that operate on them so that no other part of the code can access this data except that function.

★ Core OOPs Concepts?

★ The core OOPs concepts:

1] Object

2] Class

3] Abstraction

4] Encapsulation

5] Inheritance

6] Polymorphism

★ What is Object?

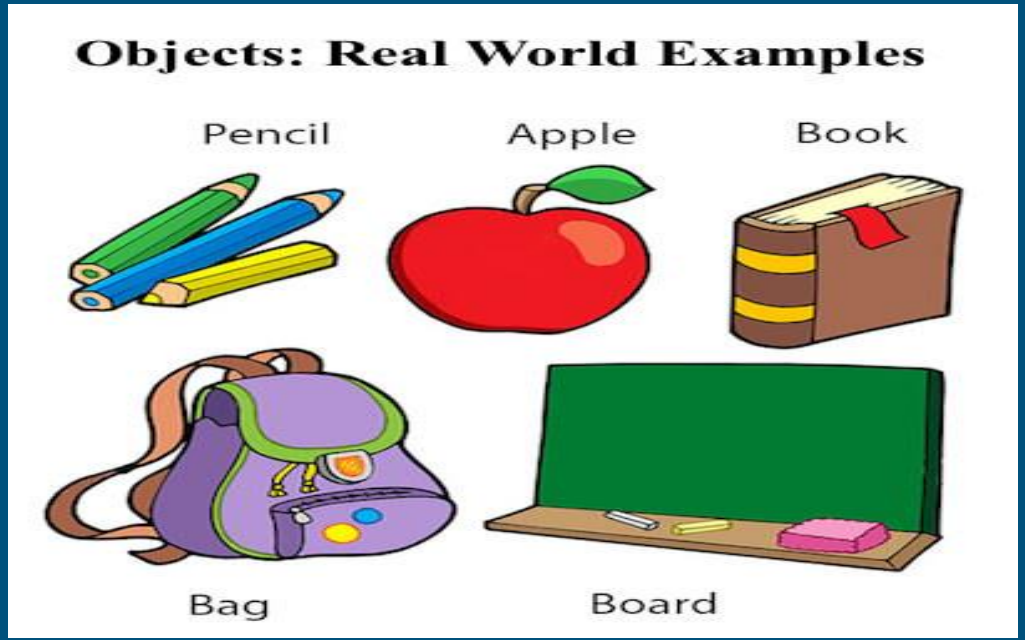
- ★ The Object is the real-time entity having some state and behavior (Variable = State and Behavior = Method). The object of a class can be created by using the new keyword in the Java Programming language.
- ★ A class is a template or blueprint from which objects are created. So, an object is the instance(result) of a class.

I found various Object Definitions:

- ★ 1. An object is a real-world entity.
- ★ 2. An object is a runtime entity.
- ★ 3. The object is an entity that has a state and behavior.
- ★ 4. The object is an instance of a class.

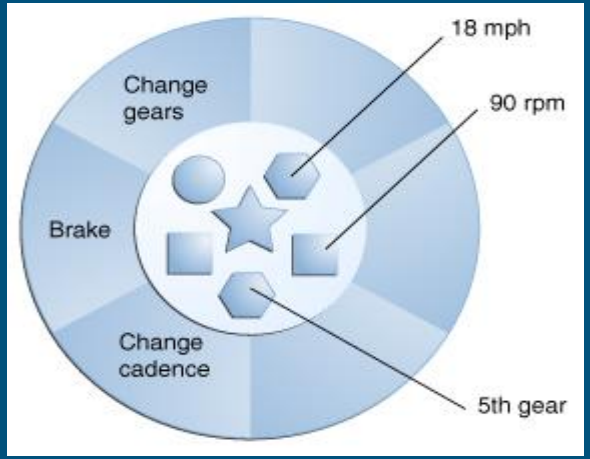
Real-world examples of Object

Dogs have state (name, color, breed, hungry) and behavior (barking, fetching, wagging tail). Chair, Bike, Marker, Pen, Table, Car, Book, Apple, Bag, etc. It can be physical or logical (tangible and intangible).



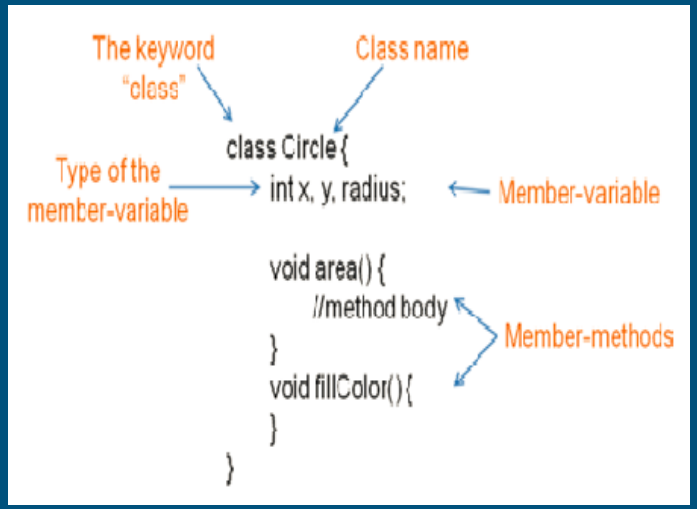
Real-world examples of Object

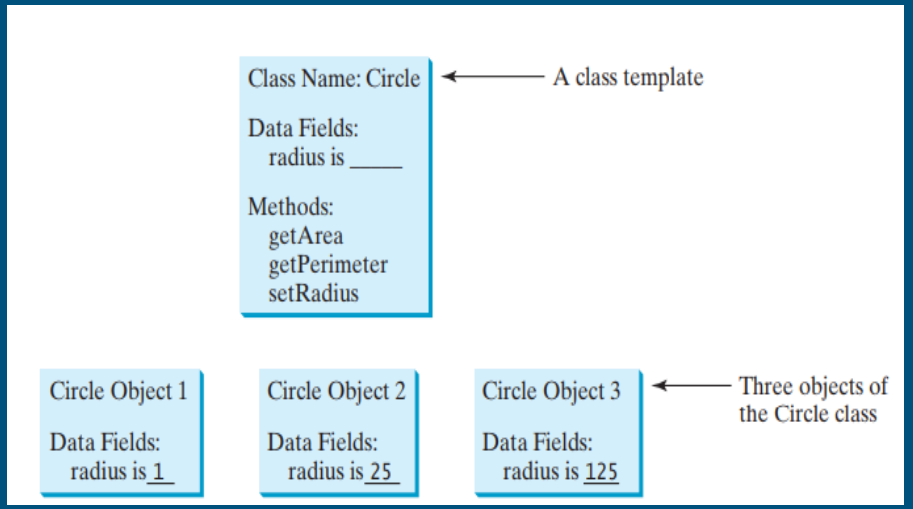
Bicycles also have state (current gear, current pedal cadence, current speed) and behavior (changing gear, changing pedal cadence, applying brakes).



★ What is Class?

It is a template or blueprint from which objects are created. In short, a class is the specification or template of an object.A class is a group of objects which have common properties.

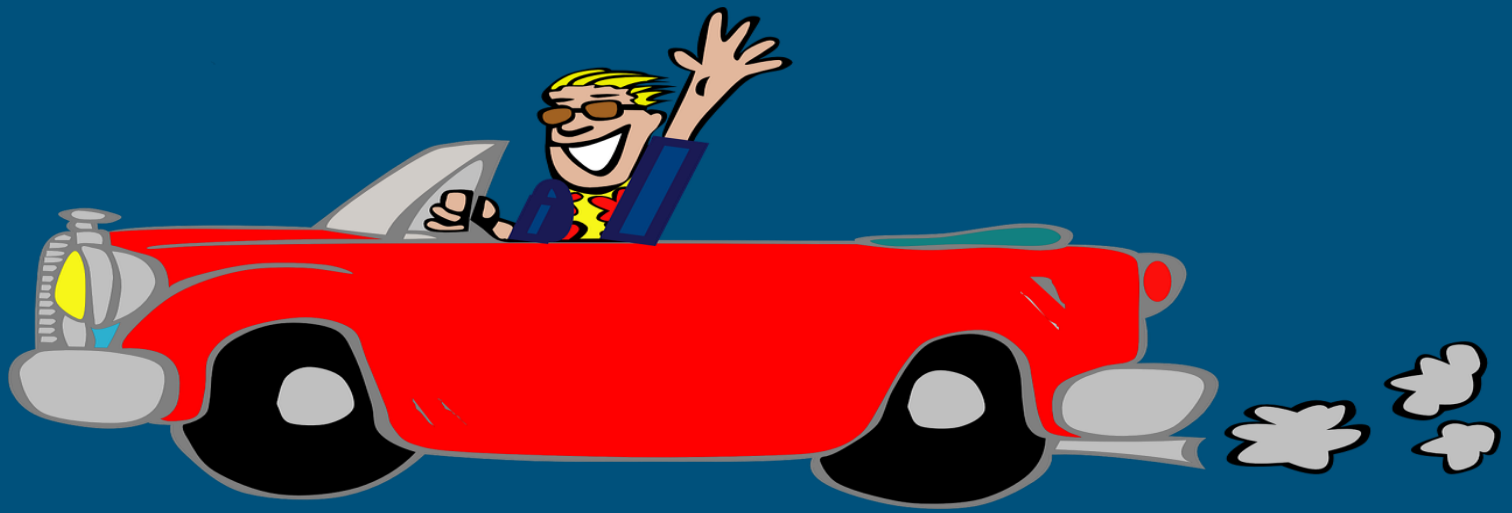




★ What is mean by Abstraction?

Abstraction means hiding lower-level details and exposing only the essential and relevant details to the users.

Real-world examples :- Let's consider a Car, which abstracts the internal details and exposes to the driver only those details that are relevant to the interaction of the driver with the Car.



Abstraction Real World Example

- Example 2: Consider an ATM Machine; All are performing operations on the ATM machine like cash withdrawal, money transfer, retrieve mini-statement...etc. but we can't know the internal details about ATM.

★ What is mean by Encapsulation?

Encapsulation is a process of wrapping data and methods in a single unit is called encapsulation.

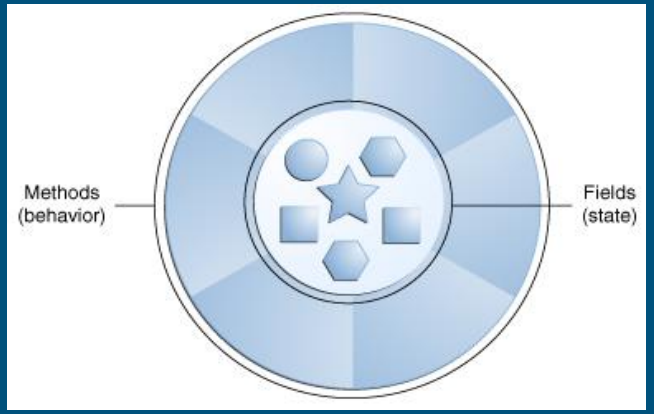
In OOPs, data and methods operating on that data are combined together to form a single unit, which is referred to as a Class.

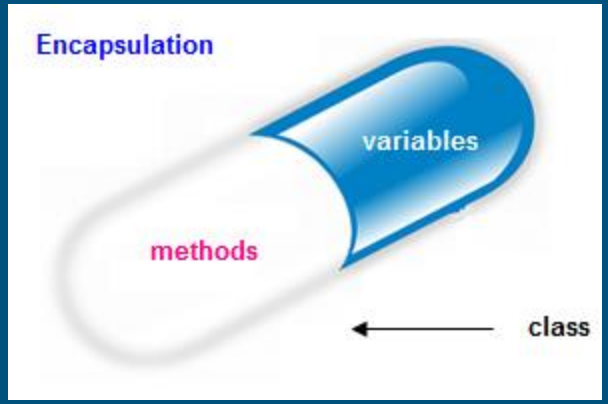
Encapsulation is the mechanism that binds together code and the data it manipulates and keeps both safes from outside interference and misuse. One way to think about encapsulation is as a protective wrapper that prevents the code and data from being arbitrarily accessed by other code defined outside the wrapper.

Real-world examples of Encapsulation

The capsule, it is wrapped with different medicines. In a capsule, all medicine is encapsulated inside capsule.

A Java class is an example of encapsulation. Java bean is the fully encapsulated class because all the data members are private here.





★ What is mean by Inheritance?

Inheritance is a process of obtaining the data members and methods from one class to another class, plus can have its own is known as inheritance. It is one of the fundamental features of object-oriented programming.

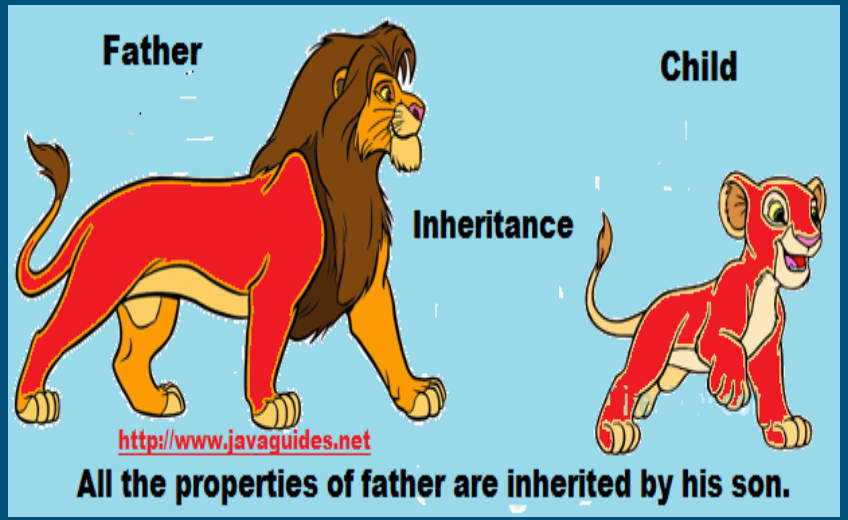
Inheritance - IS-A relationship between a superclass and its subclasses.

Super Class: The class whose features are inherited is known as a superclass (or a base class or a parent class).

Sub Class: The class that inherits the other class is known as a subclass(or a derived class, extended class, or child class). The subclass can add its own fields and methods in addition to the superclass fields and methods.

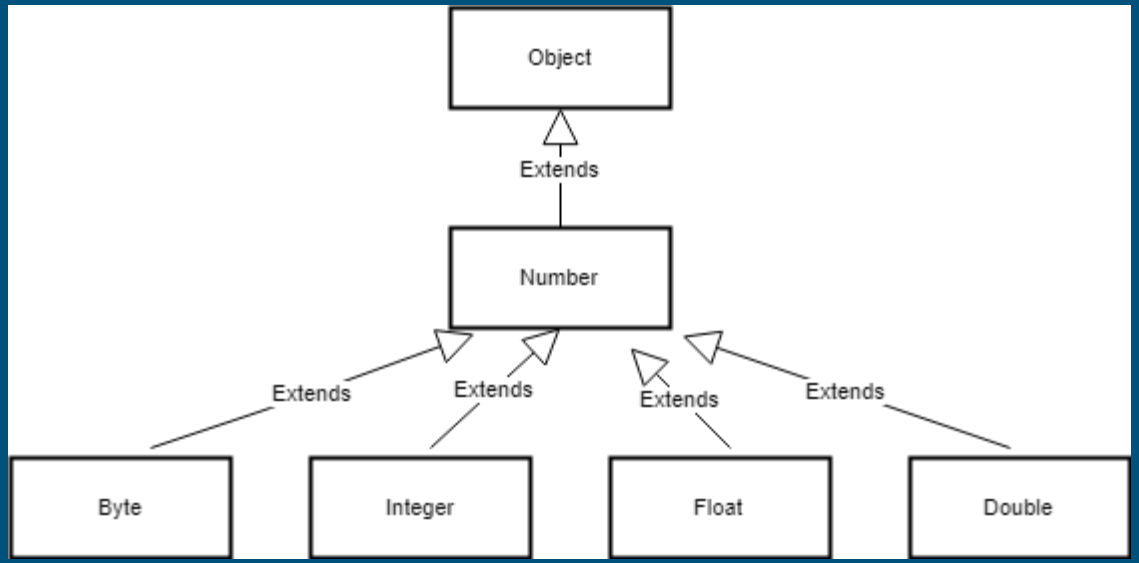
Real-world examples of Inheritance

The real-life example of inheritance is child and parents, all the properties of a father are inherited by his son.



Java src Code Example of Inheritance

In the Java library, you can see extensive use of inheritance. The below figure shows a partial inheritance hierarchy from java.lang library. The Number class abstracts various numerical (reference) types such as Byte, Integer, Float, Double, Short, and BigDecimal.



★ What is mean by polymorphism?

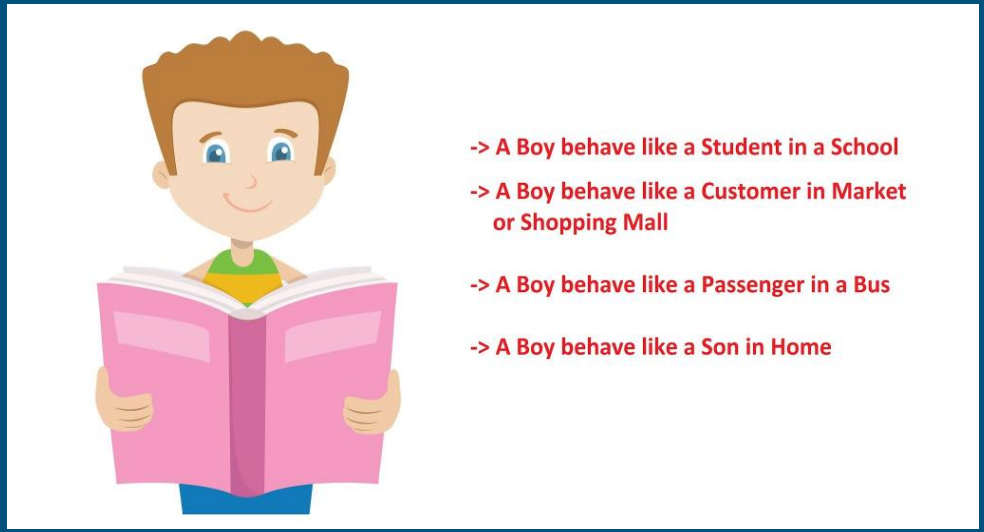
★ The process of representing one name in multiple forms is known as Polymorphism.

★ Different definitions of Polymorphism are:

1. Polymorphism allows us to perform a single action in different ways.
2. Polymorphism allows you to define one interface and have multiple implementations
3. We can create functions or reference variables that behave differently in a different programmatic context.
4. Polymorphism means many forms.

Real-world examples of Polymorphism

- Suppose if you are in a classroom at that time you behave like a student, when you are in the market at that time you behave like a customer when you at your home at that time you behave like a son or daughter, Here one person present in different-different behaviors.



Thank you

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