TEKNOTURF

OBJECT ORIENTED PROGRAMMING

Objectives

- Class
- Object
- Encapsulation
- Abstraction
- Polymorphism
- Hierarchy
- Modularity
- Typing
- Persistent

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Object Oriented Concepts

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An Object Oriented program consists of many well encapsulated objects, and interacts with each other by sending messages

The object-oriented languages focus on components that the user perceives, with objects as the basic unit.

Benefits	*Ease in software design* as you could think in the problem space rather than the machine's bits and bytes.
	Ease in software maintenance: object-oriented software are easier to understand, therefore easier to test, debug and maintain.
	Reusable software: you don't need to keep re-inventing the wheels and re-write the same functions for different situations.

Object Oriented Concepts

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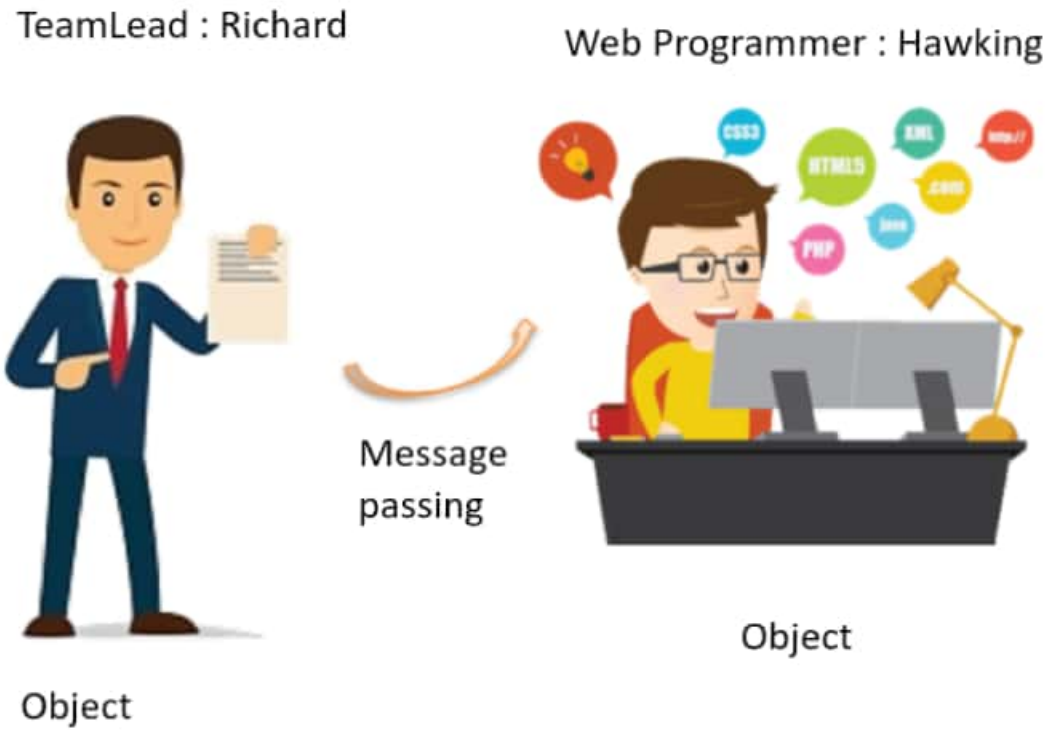
The basic unit of OO Approach is

- Class
- Object
- messages



Class

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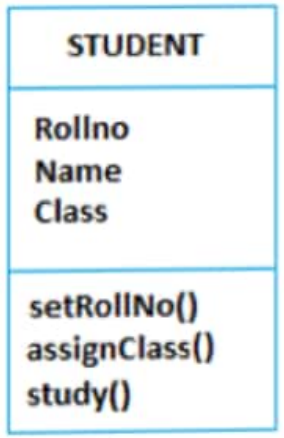
Classes are the fundamental building blocks of a Java program

A class is a definition of objects of the same kind.

Class can be defined as a blueprint, template or a prototype that defines and describes the ***attributes*** and ***behaviors*** common to all objects of the same kind.



Attribute of a class

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Attribute is a named property of a class describing a range of values that instances of the class may hold for that property.

An attribute has a type and only the holding object is able to change the values of its own attributes.

The set of attribute values defines the state of the object

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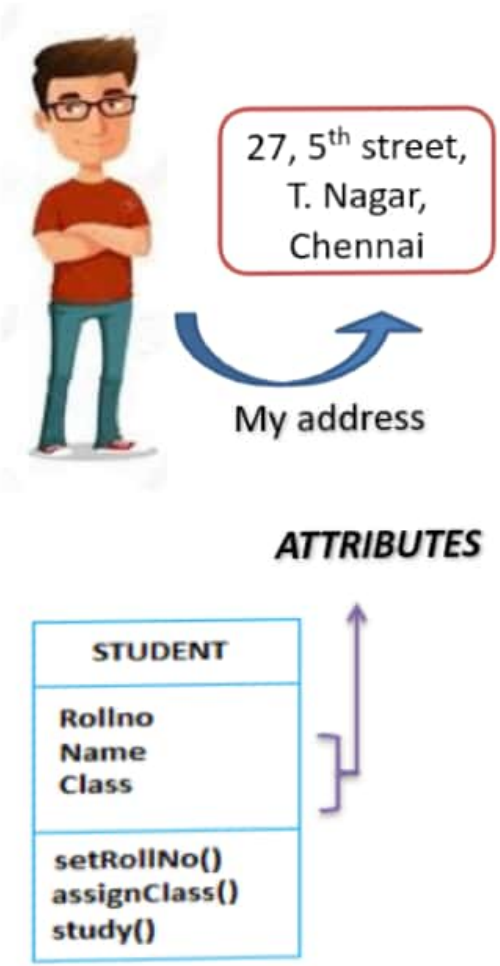

Methods of Class

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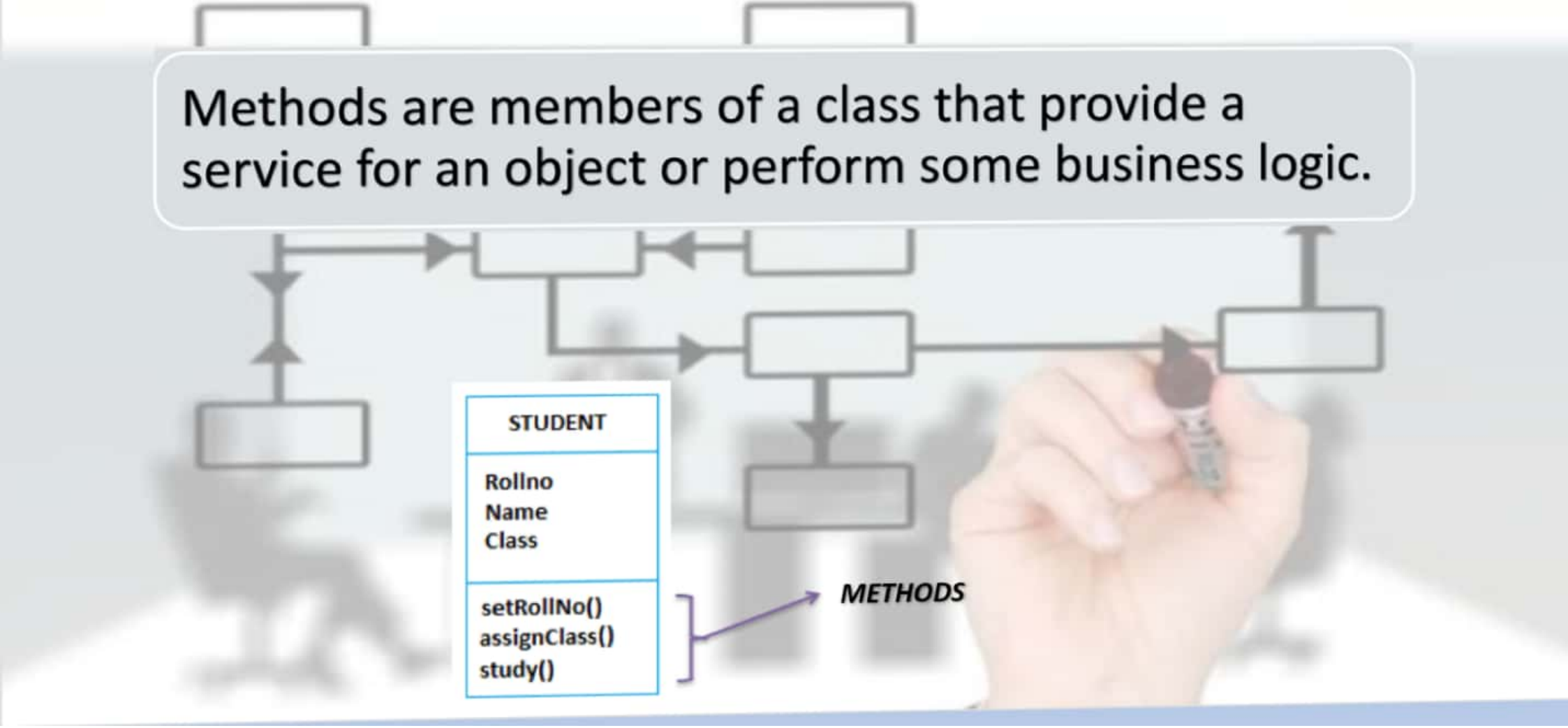
Methods are members of a class that provide a service for an object or perform some business logic.



Object

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An object is an instance of a class.

Objects are the real time entity which are created through their template, their class

Object is dynamic

CLASS

STUDENT
Rollno Name Class
setRollNo() assignClass() study()

Properties of Object

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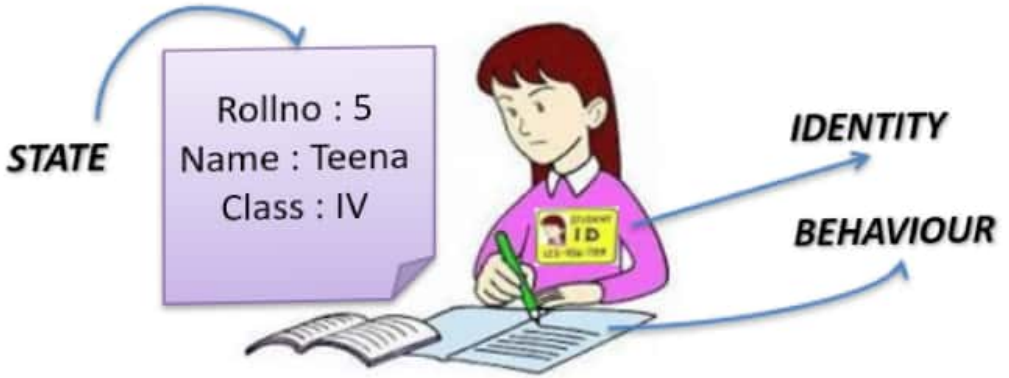
- State : An object's state is defined by the attributes of the object and by the values they have.
- Behavior : Behavior is how an object acts and reacts in terms of its state changes and message passing
- Identity : Identity is that property of an object which distinguishes it from all others



Principles of OOP

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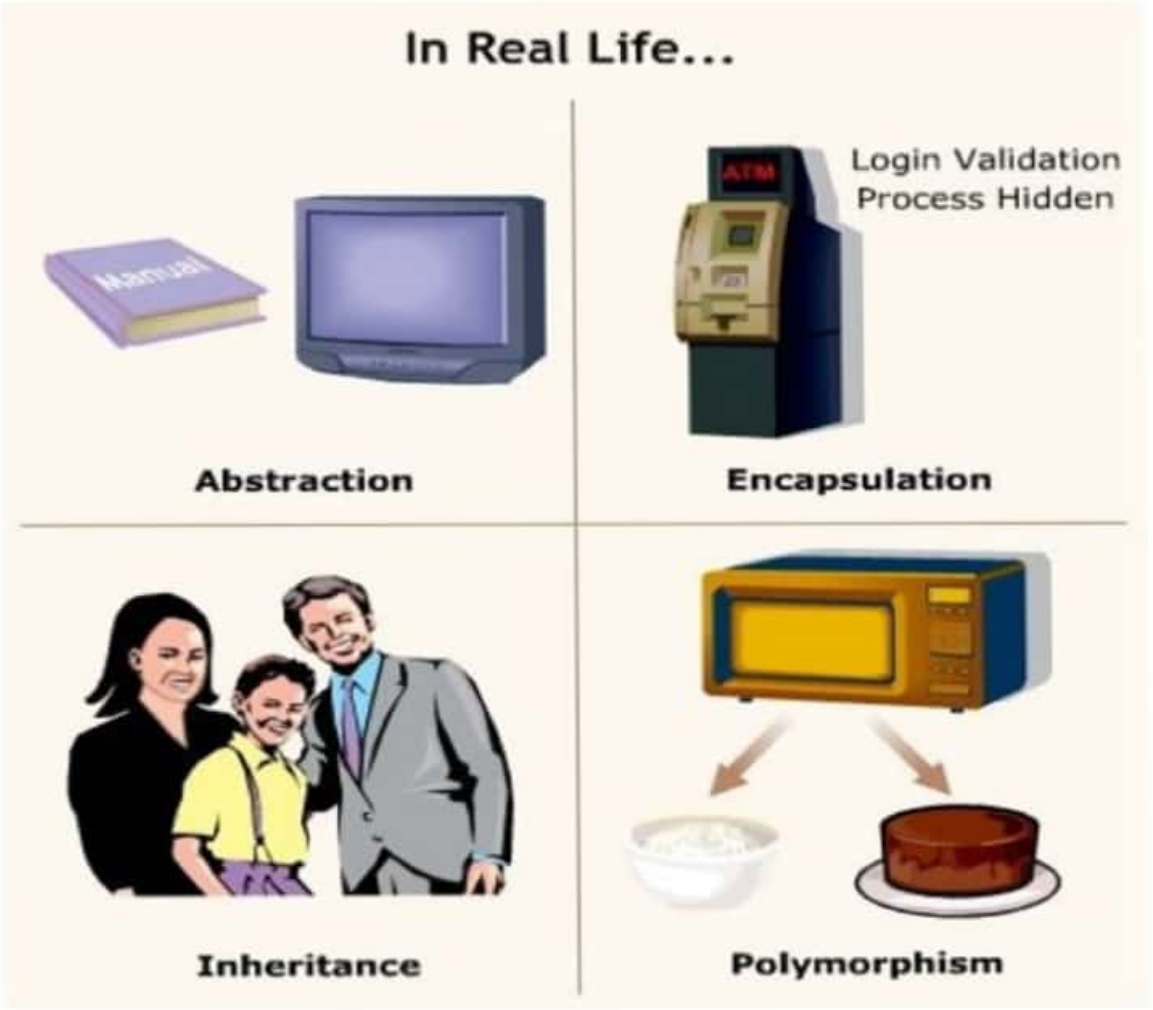
- Abstraction
- Encapsulation
- Polymorphism
- Hierarchy
- Modularity
- Typing
- Persistence

Principles of OOP



Abstraction

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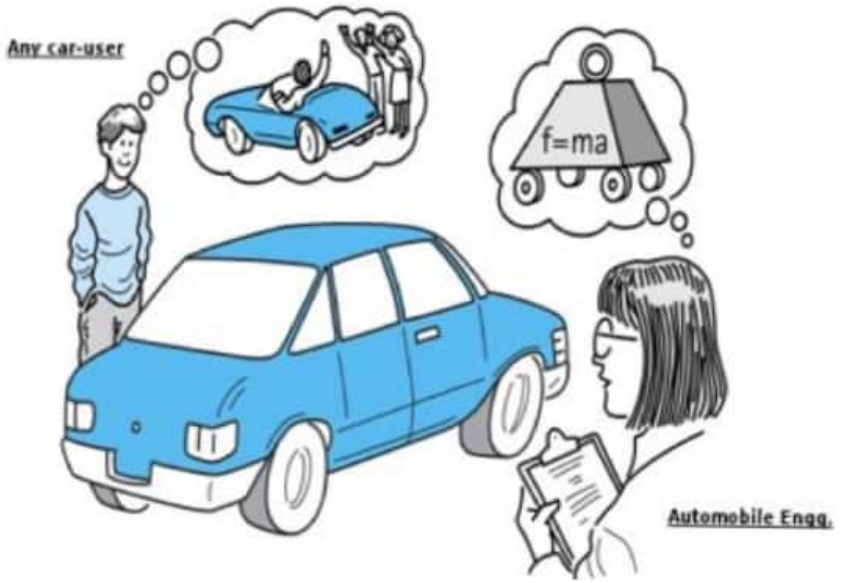
Abstraction includes the essential details relative to the perspective of the viewer

Abstraction allows us to manage complexity by concentrating on the essential aspects making an entity different from others.



Encapsulation

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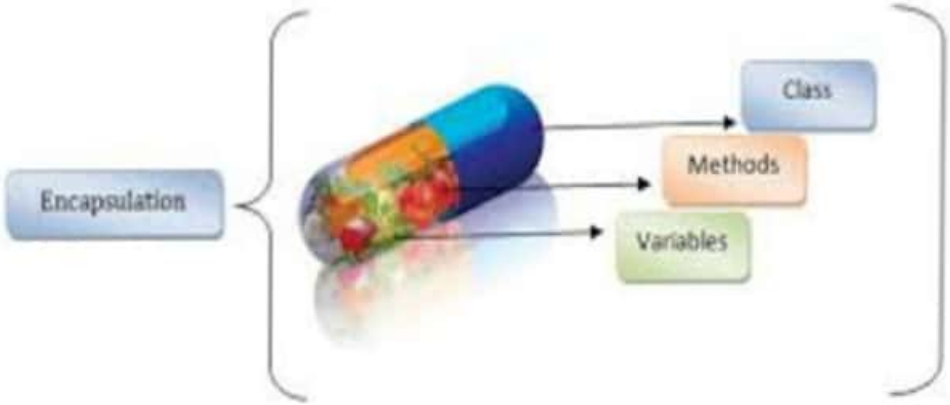
Encapsulation is the process of binding data and functions together into a single functional unit.

Provides data security using information hiding



Hierarchy

Hierarchy is ranking or ordering of abstractions.

Two levels of hierarchy

- Aggregation — Is a part of relation. Object structure hierarchy
- Generalization — Is a type of relation. Class Structure hierarchy

Generalization

Objects of the real world often form conceptual hierarchies.

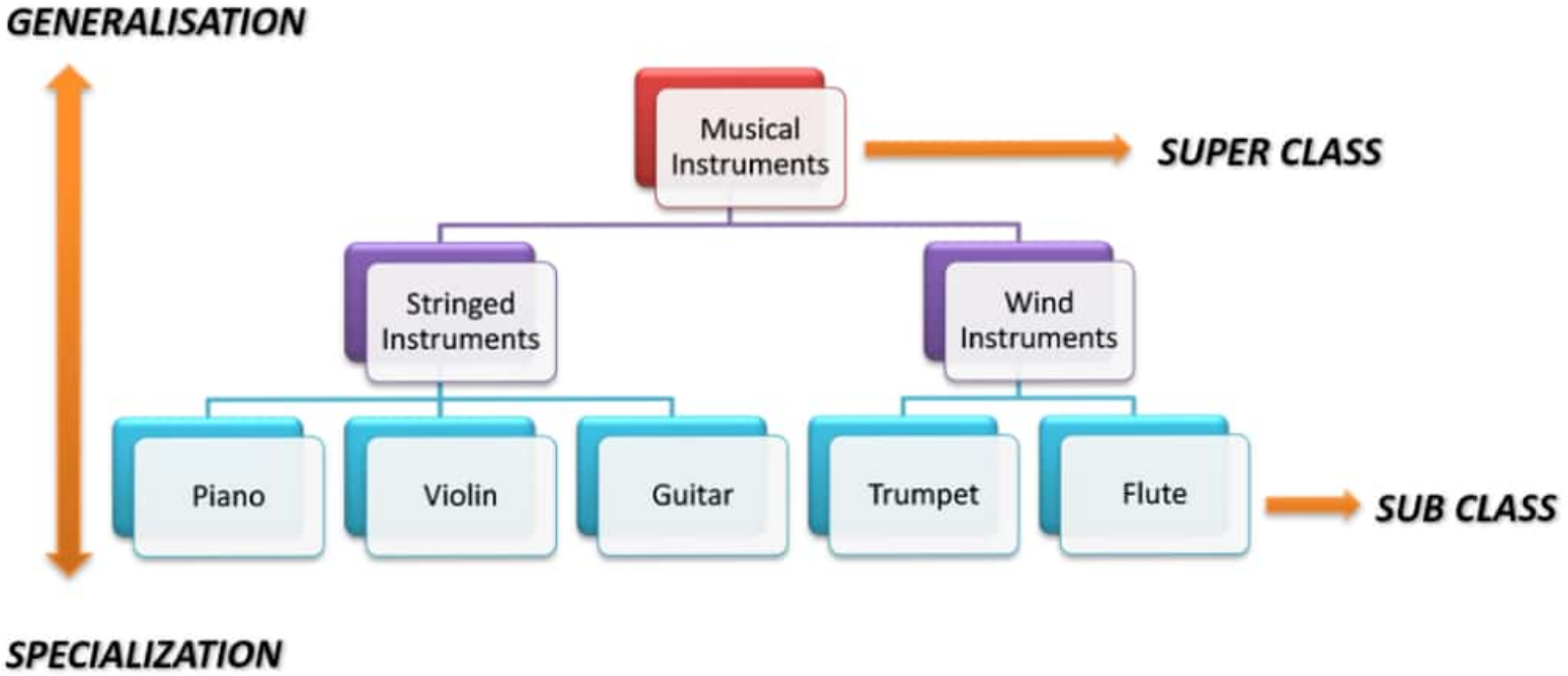
Ordering of abstractions into a tree-like structure.

The parent class defines the common properties of one or more child classes.

The child classes derive the properties of the parent and also have specific properties of their own

A parent class itself can have another parent and hence forming a hierarchy.

Generalization



Polymorphism

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Taking many forms

Surgeon

Hair Stylist

Director

Cut

Cut function takes many forms depending on person

Polymorphism

Having multiple forms	
Refers to a **programming** language's ability to process objects differently depending on the context	
Polymorphism could be	**Overloading -** Static polymorphism in simple words means two methods having the same method name, but taking different input parameters.
	Overriding - derived class is implementing a method of its super class.

Aggregation

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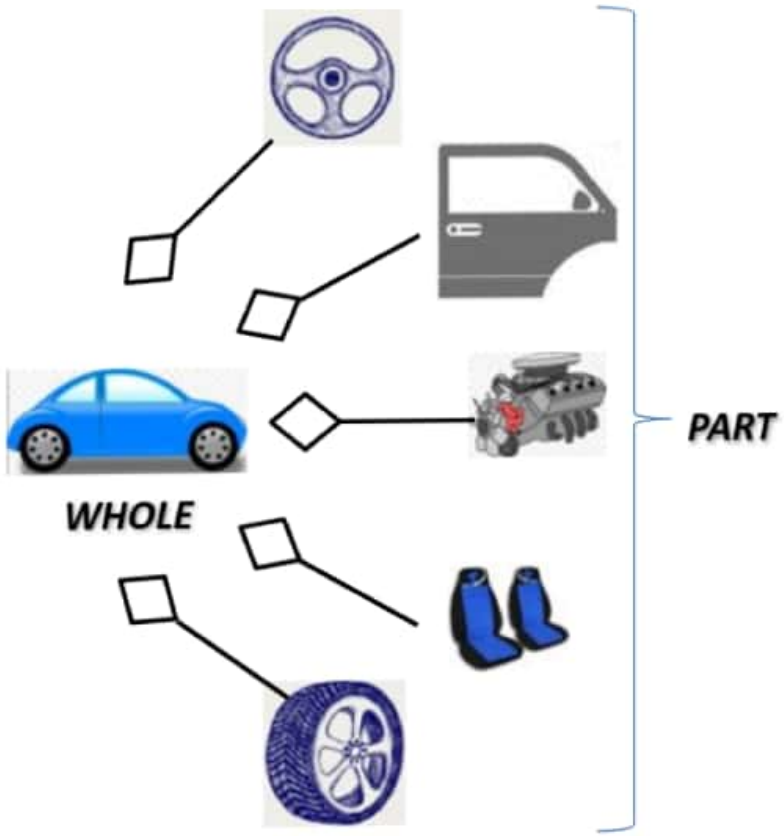
Aggregation represents a “whole-part or a-part-of” the relationship.

When an object has another object within it, it is a ‘has-a’ relationship, called aggregation

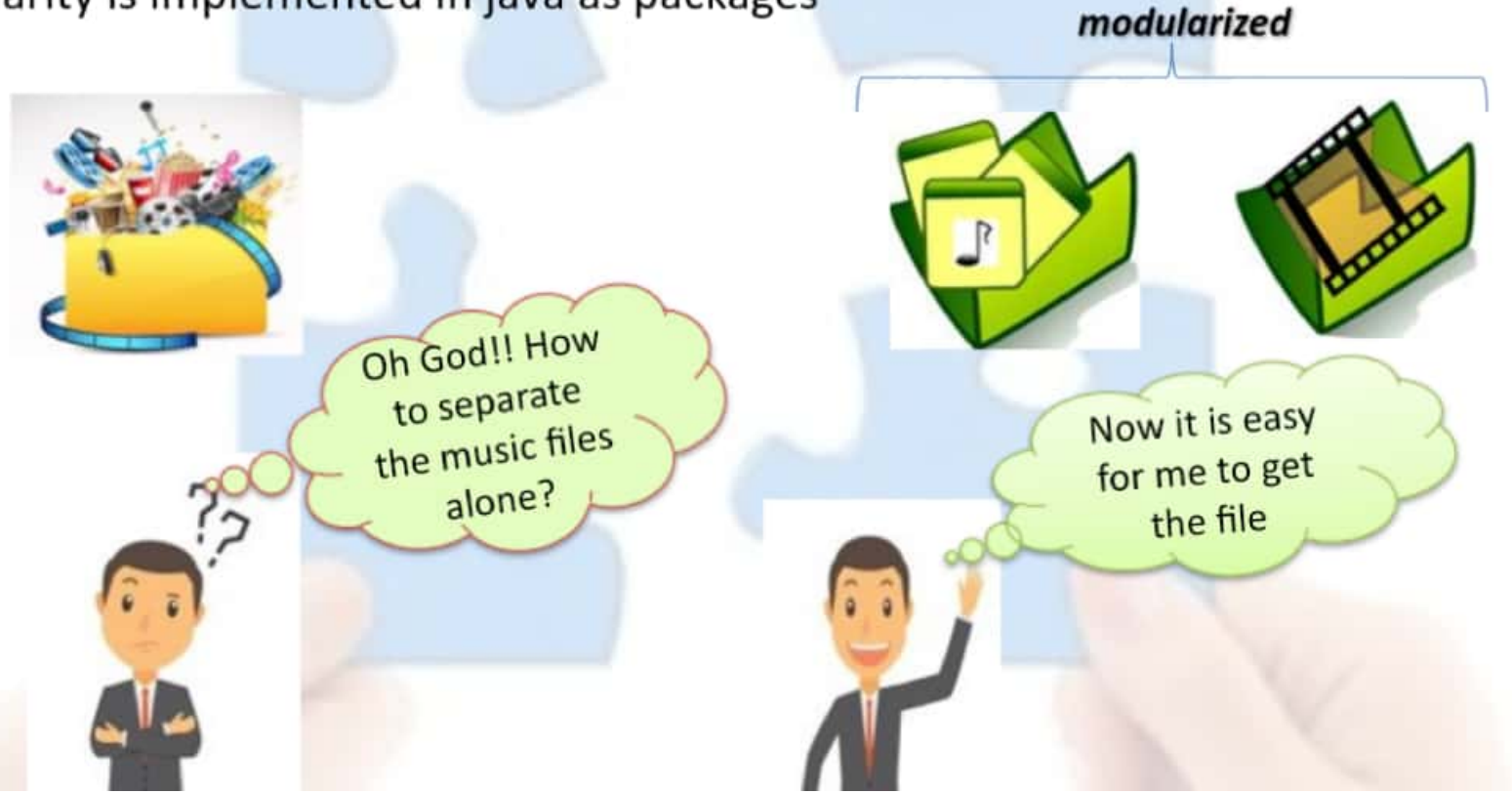
When the whole Object is destroyed the part object can still be used

Stronger form of aggregation is composition
Eg: House and room



Modularity

- Modularity is a method to divide a program into smaller units
- Modularity is implemented in java as packages



Typing

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Identifies a programming language type conversion and characteristics.

It can be either strongly or weakly typed

Strong typing requires explicit conversions for conversions between different data types in expressions.

Typing is inherently Language Implementation Dependent

Persistence

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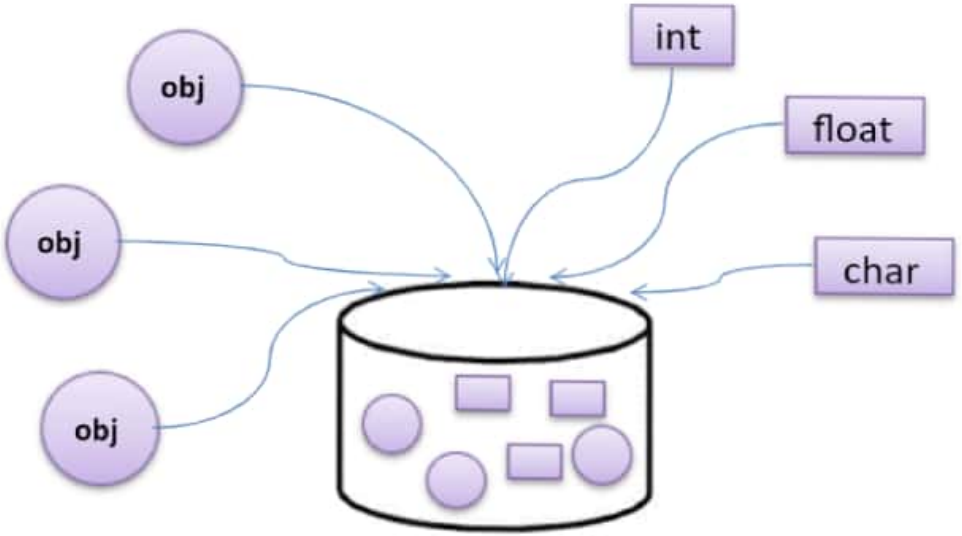
Persistence is the ability of an object or data to outlive the lifetime of the program that creates, accesses or modifies it.

A persistent object is one that continues to exist after a program that creates or uses it, terminates.



Few more concepts of OOP

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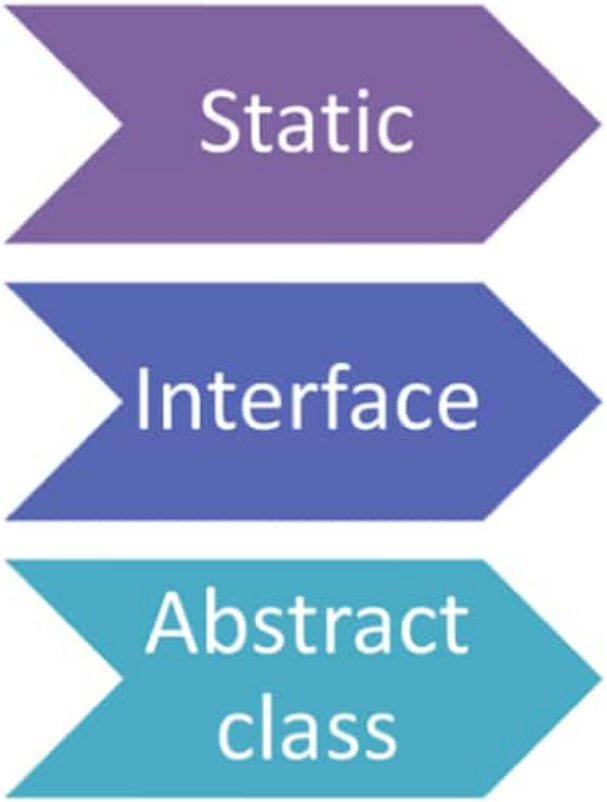

Static

Exactly! What do you infer from this scenario? Certain things are available for each individual apartment, whereas certain things are common for all apartments.

Lift, Generator, Gym, Swimming Pool .....

Static - Overview

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Likewise, in an object oriented way , certain attributes will be applicable for each instance of that class and some attributes will be common to all instances in a class. These common attributes are termed static.

CompanyName="Teknoturf"

Abstract class

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Methods that do not have any implementations are called as abstract methods.

Abstract class may contain zero or more abstract methods

Abstract class cannot be instantiated

Abstraction- Real world scenario

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Let us consider the Aadhaar card issuing process. The head office for the final approval is present in Bangalore and we have two local offices one at Chennai and the other at Hyderabad. Aadhaar card issuing involves 2 steps. Biometric identification and the other is final approval and issuing the acknowledgement. Chennai does the biometric identification through the finger print and Hyderabad does it through retinal scan. So the Bangalore head office has decided to delegate the biometric identification to both the local offices and take care of the final approval and issuing the acknowledgement

Chennai office adheres to the head office and does finger print identification; and sends the documents to the head office for the final approval.

Head office defines a protocol, that local office should do biometric identification and the final approval will be done by Head office

Hyderabad office adheres to the head office and does retinal scan identification; and sends the documents to the head office for the final approval.

Interface

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Interface is a contract for the classes to implement the behavior in their own way.

All methods inside the interface are public and abstract

Interfaces

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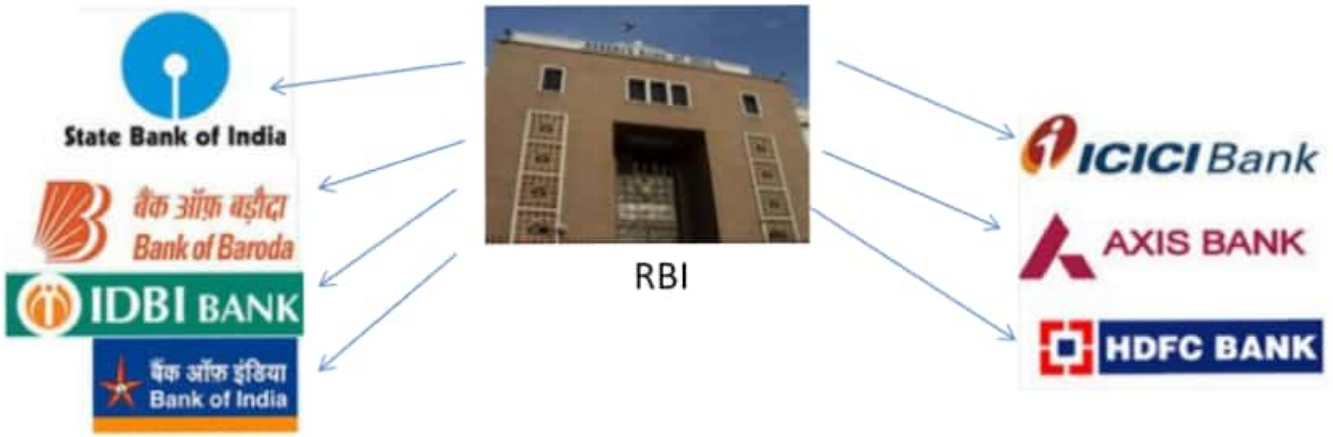
RBI fixes the base interest for Home Loan.

All banks calculate the interest for home loan based on some specific factors of theirs.

Here RBI acts as an interface with the method calculateHomeLoanInterest as abstract

All banks implement this interface and give implementation for this abstract method



Tek university came up with the requirement.They wanted to enhance their website by adding a feature of knowing the count of the new candidates who register in their website. Which OO concept can be used to implement this task

- ○ interface
- ◉ Object
- ✔ ○ static
- ○ class

Incorrect

You did not choose the correct response.

John,Sam are the employees of Allen software company.SPTS,LMS are the projects that are to be moved to the production environment.Every employee has empid,designation,allcoation status and project has projectid,startDate,endDate,projcost.

From the above scenario identify all the possible objects

- ✔ (●) John,Sam,Allen software company,SPTS,LMS,Employee,Project
- ( ) John,Sam,Allen software company,SPTS,LMS
- ( ) Employee,Project
- ( ) John,Sam,empid,designation,allocation status,SPTS,LMS,projid,startdate,enddate,projcost

Correct

That's right! You chose the correct response.

ABC bank wants to automate its banking operations.Customer can register with the bank to perform the banking operations like online fund transfer,pay creditbill,view profile.From the above scenario identify the possible behaviours

- ✔ (●) online fund transfer,pay creditbill,view profile
- ( ) None of the options
- ( ) ABC bank,customer
- ( ) automate,operations

Correct

That's right! You chose the correct response.

with respect to the problem domain taking the relevant information and ignoring the remainder of the information is called

- ○ Encapsulation
- ○ Modularity
- ○ Hierarchy
- ✔ ◉ Abstraction

Correct

That's right! You chose the correct response.

PermanentEmployee is an Employee. What is the relationship between the above 2 classes

- encapsulation
- aggregation
- Modularity
- ✔ Generalization

Correct

That's right! You chose the correct response.

Summary

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- Class
- Object
- Encapsulation
- Abstraction
- Polymorphism
- Hierarchy
- Modularity
- Typing
- Persistent

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THANK YOU