

WHy OOPS?

To achieve modular programming oops concept is imp

modular programming?

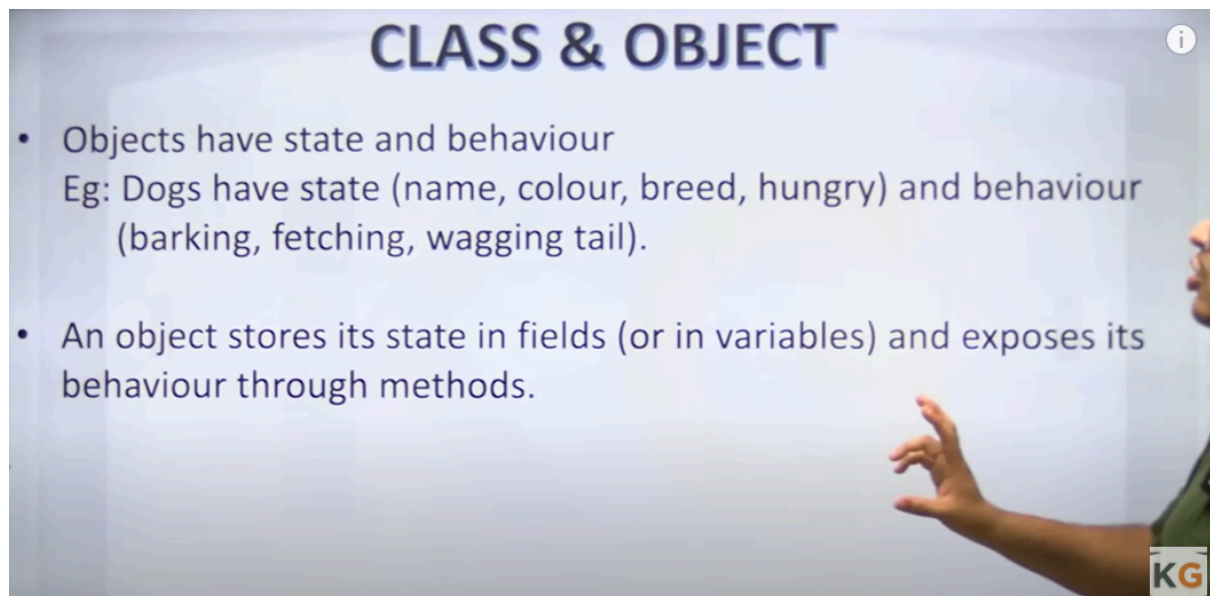
Classes and objects ki help se alag-alag modules bnayenge

OOP pillars

1. Object
2. Class
3. Inheritance
4. Polymorphism
5. Abstraction
6. Encapsulation

**Class** is a factory producing objects. Class is a blueprint

**Object** is any real world entry



**State** is stored in variables and **behaviour** is stored in functions(aka methods in oop)

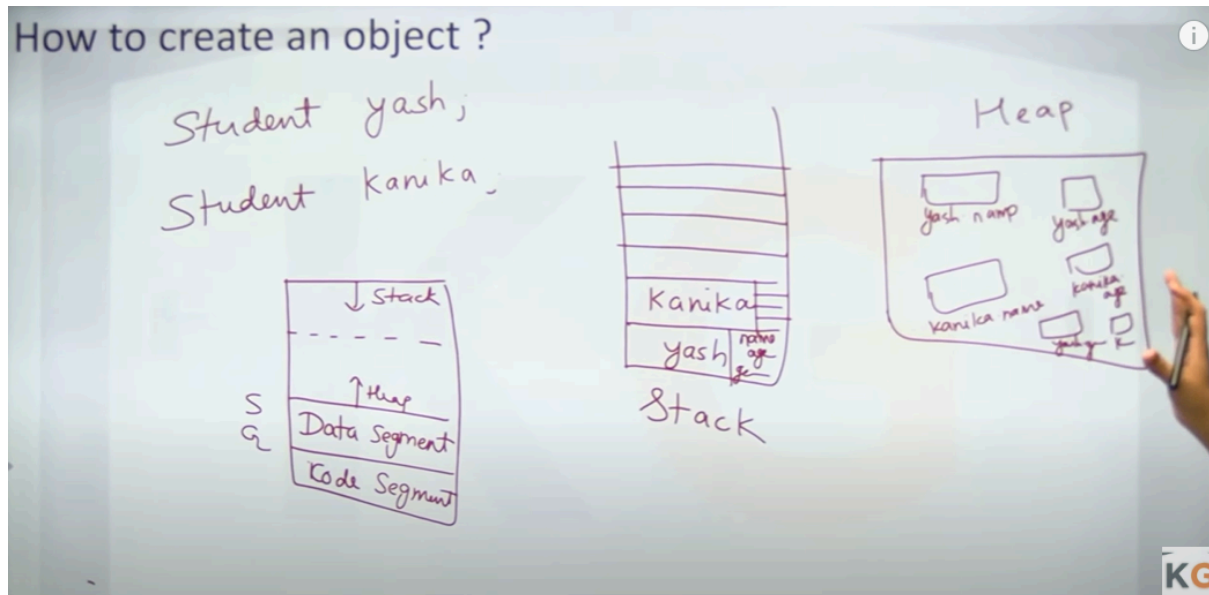
```
// structure || class
// in structure, we dont have security features
// class has security (public private protected access
modifiers)

// in structures, we can not declare methods but variables
// in class, we can declare variables as well as methods
```

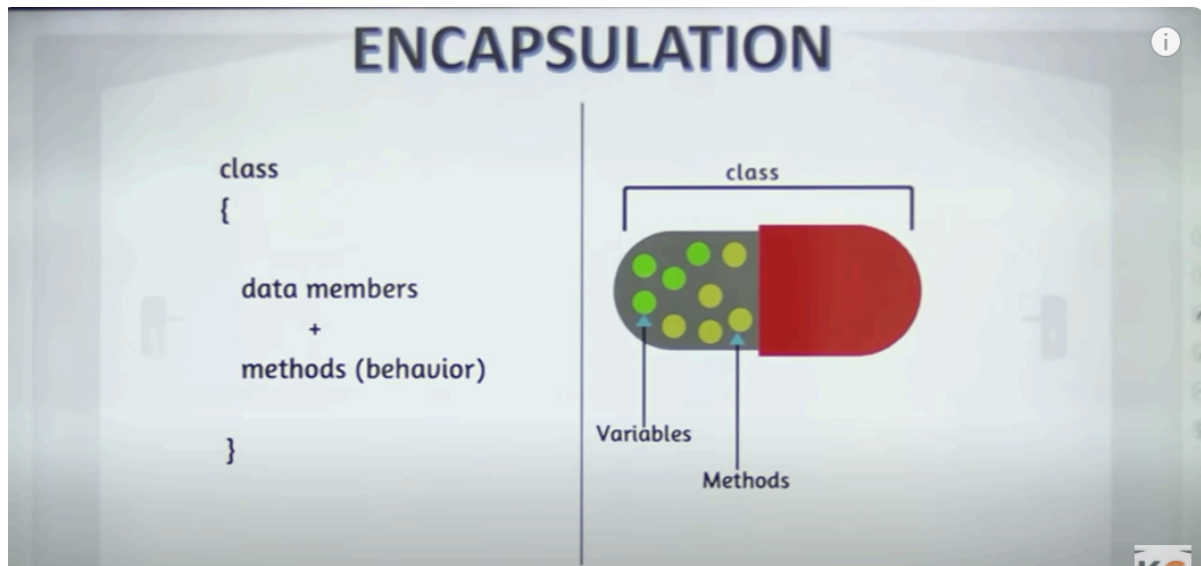
Jb tak class ka object nhi bnate, tab tak class ke variables ko memory allocate nhi hogi.

When we create an object,  
For eg: student yash;  
Student kanika;

**In the stack, the base address of yash is stored, the base address of yash is stored.**



## Encapsulation



**No one from outside can access the data members of class in encapsulation**

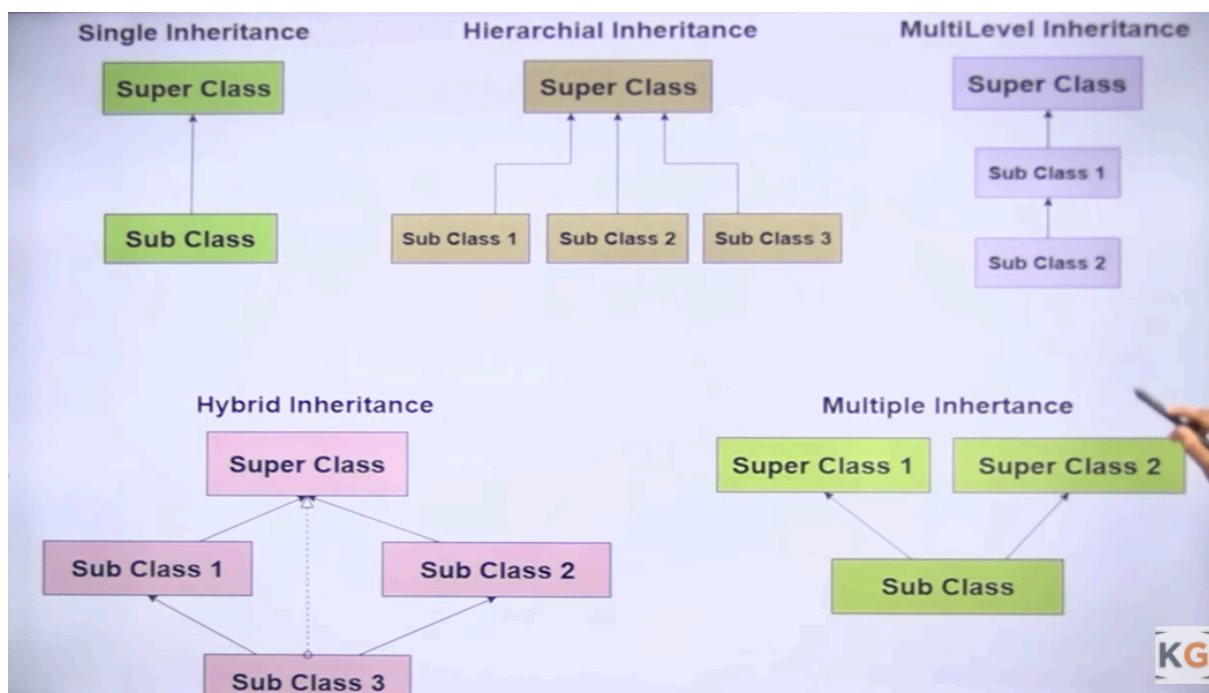
**In encapsulation:==== variables(private),  
members(public)**

## ENCAPSULATION

Instance variables are declared private to prevent misuse.

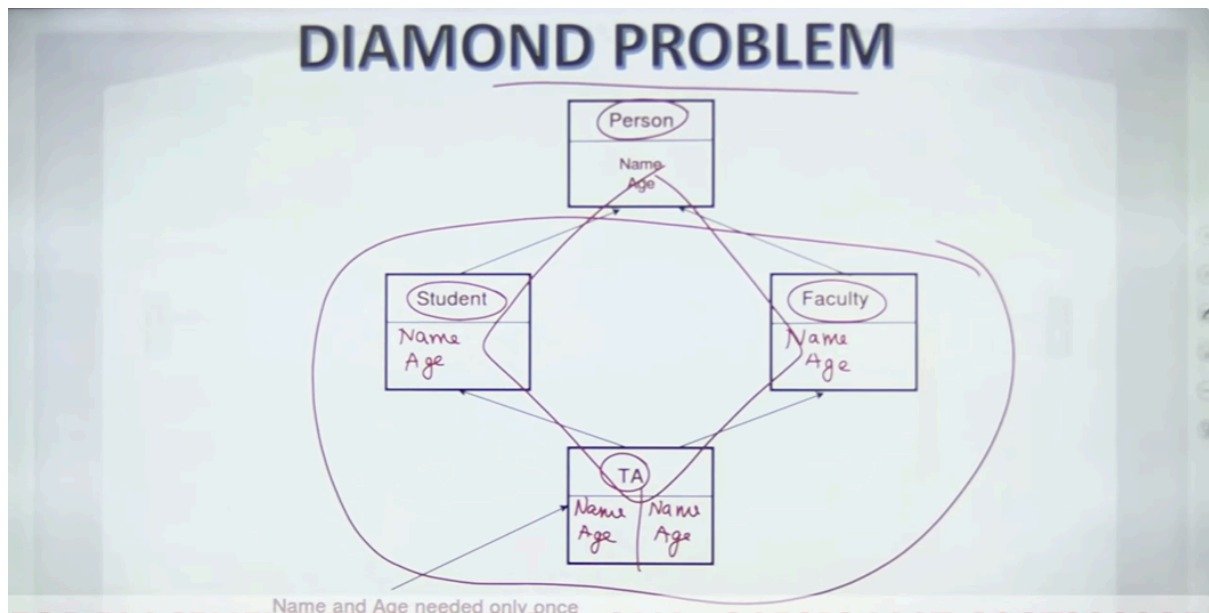
Providing methods that can be used to read/write the state rather than accessing the state directly.

## INheritance



## IMP

### Diamond Problem



**Multiple inheritance occurred here**

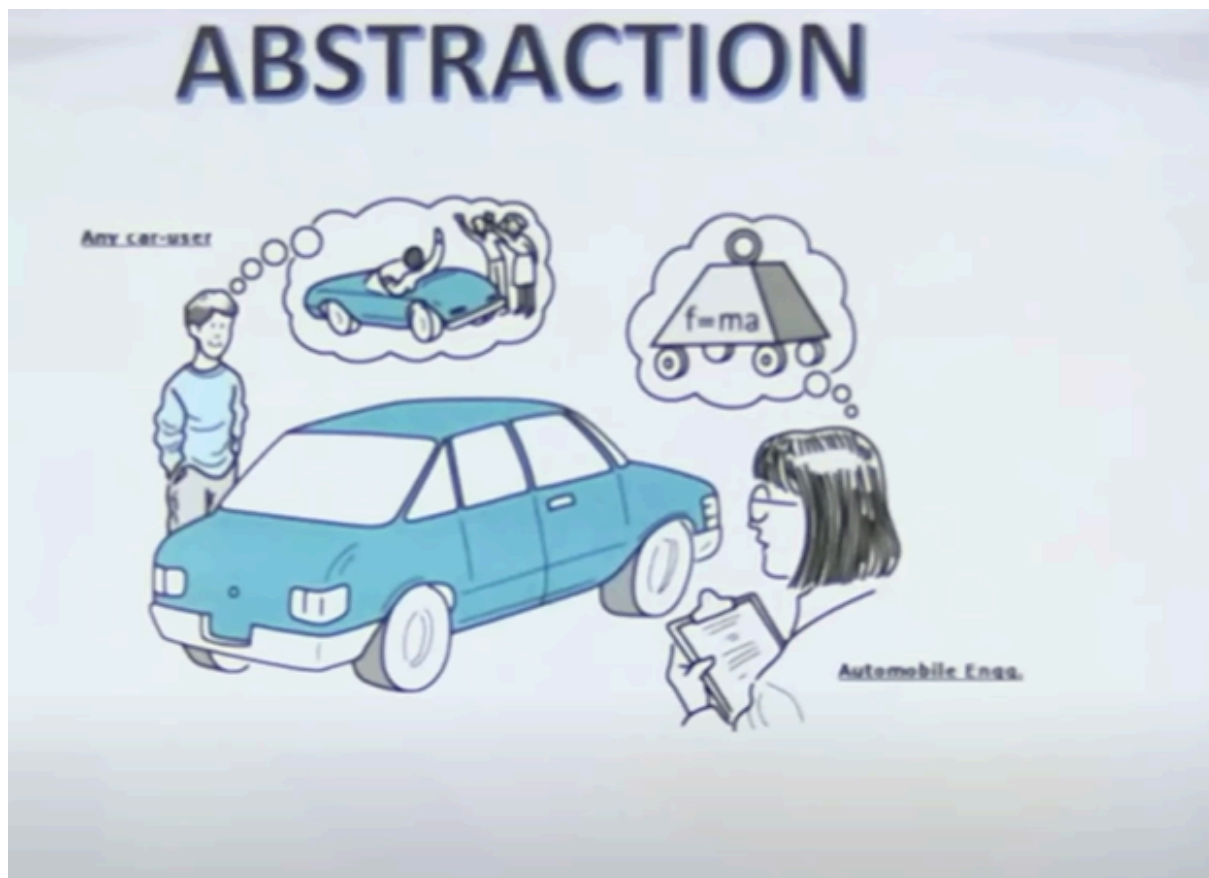
### Data Hiding/Abstraction:

**ABSTRACTION**

Abstraction means displaying only essential information and hiding the details. Data abstraction refers to providing only essential information about the data to the outside world, hiding the background details or implementation.

Consider a real life example of a man driving a car. The man only knows that pressing the accelerators will increase the speed of car or applying brakes will stop the car but he does not know about how on pressing accelerator the speed is actually increasing, he does not know about the inner mechanism of the car or the implementation of accelerator, brakes etc in the car. This is what abstraction is.

## Ex of abstraction

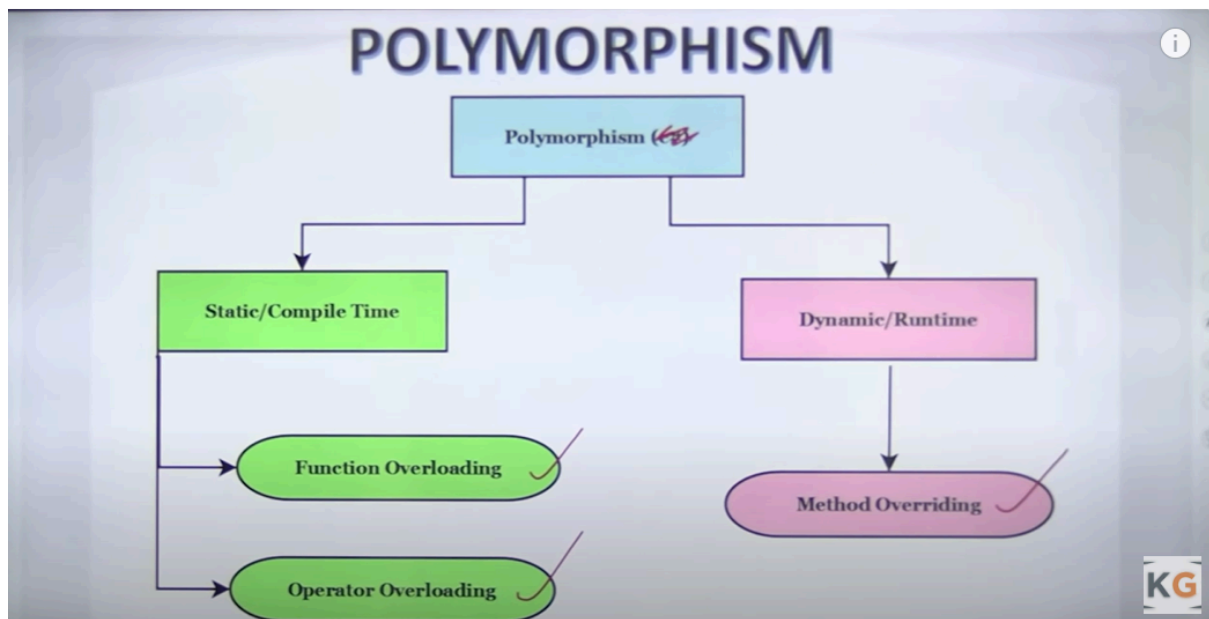


## Polymorphism

**POLYMORPHISM**

The word polymorphism means having many forms. In simple words, we can define polymorphism as the ability of a message to be displayed in more than one form.

- ✓  $\text{Sum}(\text{int } a, \text{int } b)$
- ✓  $\text{Sum}(\text{int } a, \text{int } b, \text{int } c)$



## Method overloading and overriding

