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# Inheritance & More on OOPs

Inheritance is a way of creating a new class from an extance class.

Syntex:

```
Class Employee:
    #code...          ---> Base class

Class programmer (Employee):
    #code             ---> Derived or child class
```

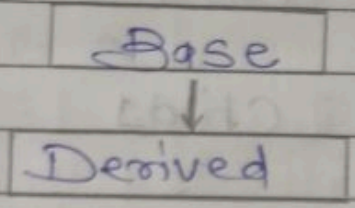
We can use the methods & attributes of employee in programmer object.
Also, we can overwrite or add new attributes & methods in programmer class.

## Types of Inheritance

1] Single Inheritance
2] Multiple Inheritance
3] Multilevel Inheritance

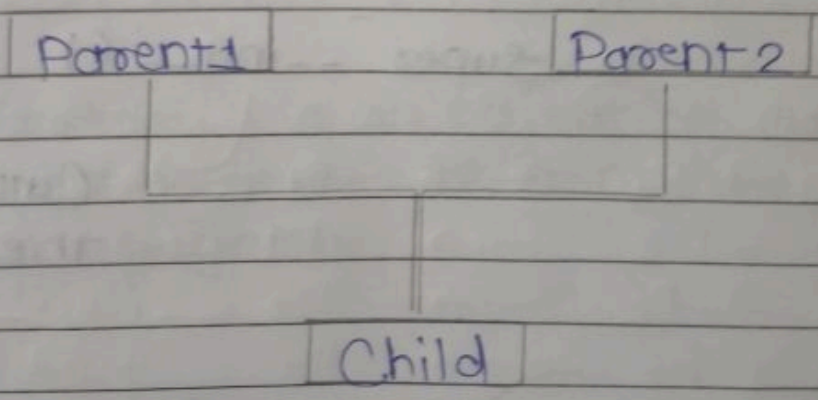
## Single Inheritance

Single Inheritance occurs when child class inherits only a single parent class.



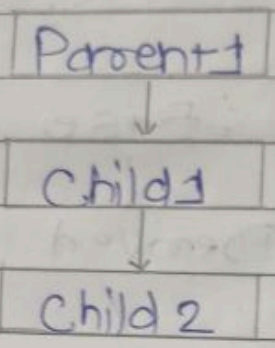

## Multiple Inheritance

Multiple Inheritance occurs when the child class inherits from more than one parent class.



## Multilevel Inheritance

When a child become a parent for another child class.




## Super() Method

Super method is used to access the method of a super class in the derived class

Super --init-- ()

→ Call Constructor of the base class.

## Class Methods

A class method is a method which is bound to the class & not the object of the class.

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@classmethod decorator is used to create a class method.

Syntax to create a class method:

```
@classmethod
def (cls, p1, p2):
    ...
```

@property decorator

Consider the following class.

```
Class Employee
    @property
    def name (self):
        return self.ename.
```

if e = Employee() is an object of class employee, we can print (e.name) to print the ename / call name() function.

@getter & @.Setter

The method name with @property decorator is called getter method.

We can define a function + @name.setter decorater like below:

```
@name.setter
def name(self, value):
    self.ename = value.
```

## Operator overloading in python

operater in python can be overloaded using dunder method.

These method are called when a given operator is used on the objects.

operater in python can be overloaded using the following methods.

| | | |
|---|---|---|
| P1 + P2 | ⟶ | P1 --add-- (P2) |
| P1 - P2 | ⟶ | P1 --sub-- (P2) |
| P1 * P2 | ⟶ | P1 --mul-- (P2) |
| P1 / P2 | ⟶ | P1 --truediv-- (P2) |
| P1 // P2 | ⟶ | P1 --floordiv-- (P2) |

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# Other Dunder / Magic Methods in python.

__str__() → Used to set what gets displayed upon calling str(obj).

__len__() → Used to set what gets displayed upon calling .__len__ or len(obj).

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# Practice Set

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1] Create a Class: Ed2 Vector & use it to Create another class representing a 3-d Vector.

2] Create a class pers from a class animals and further Create class Dog from pers. Add a method bark to. Class Dog.

3] Create a Class Employee & add salary & increment properties to it
With a method salary After increment method with a @property decorator with a setter which changes the value of increment based on the salary.

4] Write a Class Complex to represent Complex numbers along with overloaded operators + & * which adds multiple them.

5] Write a class Vector representing a Vector of n dimension. Overloaded the + & * operator which Calcutes the sum & the dot product of them.

6] Write __str__() method to print the vector as follows:

$7\hat{i} + 8\hat{j} + 10\hat{k}$

Assume Vector of dimension 3 for this problem.

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7] overriding the --len-- () method on Vector of problem 5 to display the dimension of the vector.