

## Overerving en inheritance

Fives types of inheritance in python 1) Single Inheritance 2) Multi level Inheritance 3) Hierarchical Inheritance 4) Multiple Inheritance 5) Hybrid Inheritance 6) Cyclic Inheritance

**Single Inheritance :- contains single parent and single child class**

```
class Parent:
    def m1(self):
        print("Parent class Method")

class Child(Parent):
    def m2(self):
        print("Child class method")

c = Child()
c.m1()
c.m2()

Parent class Method
Child class method
```

**Multi level Inheritance :- The concept of inheriting members from multiple classes to a single child class one after other is called MULTIPLE LEVEL INHERITANCE**

```
class Parent:
    def m1(self):
        print("Parent class object")

class Child(Parent):
    def m2(self):
        print("Child class object")

class Child2(Child):
    def m3(self):
        print("Child2 class object")

c = Child2()
```

```

c.m1()
c.m2()
c.m3()
# Any(multiple) number of levels possible

Parent class object
Child class object
Child2 class object

```

**Hierarchical Inheritance :- single parent class multiple child classes**

```

class Parent:
    def m1(self):
        print("Parent class object")

class Child1(Parent):
    def m2(self):
        print("Child1 class object")

class Child2(Parent):
    def m3(self):
        print("Child2 class object")

```

```

c = Child1()
c.m1()
c.m2()
# Here c.m3() will get error
c = Child2()
c.m1()
c.m3()
# Here c.m2() will get error

```

```

Parent class object
Child1 class object
Parent class object
Child2 class object

```

**Multiple Inheritance :- Multiple parent classes and single child class**

```

class Parent1:
    def m1(self):
        print("Parent1 class object")

```

```
class Parent2():
    def m2(self):
        print("Parent2 class object")
```

```
class Child(Parent1, Parent2):
    def m3(self):
        print("Child class object")
```

```
c = Child()
c.m1()
c.m2()
c.m3()
```

```
Parent1 class object
Parent2 class object
Child class object
```

**Hybrid Inheritance :-** combination of all the above Inheritances order will be decided by MRO Method Resolution Order Algorithm. Even two types of inheritance is used it is called Hybrid Inheritance.

### Cyclic Inheritance

```
class Person:
    def __init__(self, name, age, height, weight):
        self.name = name
        self.age = age
        self.height = height
        self.weight = weight

    def display(self):
        print("Name", self.name)
        print("Age", self.age)
        print("Height", self.height)
        print("Weight", self.weight)

class Student(Person):
    def __init__(self, name, age, height, weight, rollno, marks):
        self.name = name
        self.age = age
        self.height = height
        self.weight = weight
```

```

        self.rollno = rollno
        self.marks = marks

    def display(self):
        print("Name", self.name)
        print("Age", self.age)
        print("Height", self.height)
        print("Weight", self.weight)
        print("Rollno", self.rollno)
        print("Marks", self.marks)

s = Student("Raj", 25, 5.6, 75, 587, 90)
s.display()

Name Raj
Age 25
Height 5.6
Weight 75
Rollno 587
Marks 90

# Now by using super() method
class Person:
    def __init__(self, name, age, height, weight):
        self.name = name
        self.age = age
        self.height = height
        self.weight = weight

    def display(self):
        print("Name", self.name)
        print("Age", self.age)
        print("Height", self.height)
        print("Weight", self.weight)

class Student(Person):
    def __init__(self, name, age, height, weight, rollno, marks):
        super().__init__(name, age, height, weight)
        self.rollno = rollno
        self.marks = marks

    def display(self):
        super().display()
        print("Rollno", self.rollno)
        print("Marks", self.marks)

```

```
s = Student("Raj", 25, 5.6, 75, 587, 90)
s.display()
```

```
Name Raj
Age 25
Height 5.6
Weight 75
Rollno 587
Marks 90
```

```
class P:
    def __init__(self):
        print("Parent constructor")

    def m1(self):
        print("Parent Instance method")

    @classmethod
    def m2(cls):
        print("parent class method")

    @staticmethod
    def m3():
        print("Parent static method")
```

```
class C(P):
    def __init__(self):
        super().__init__()
        super().m1()
        super().m2()
        super().m3()
```

```
c = C()
```

```
Parent constructor
Parent Instance method
parent class method
Parent static method
```

## POLYMORPHISM

```
class Book:
    def __init__(self, pages):
```

```

        self.pages = pages

    def __add__(self, other):
        total_pages = self.pages + other.pages
        return total_pages

```

```

b1 = Book(200)
b2 = Book(300)
print(b1 + b2)

```

500

```

class Book:
    def __init__(self, pages):
        self.pages = pages

    def __add__(self, other):
        total_pages = self.pages + other.pages
        return total_pages

```

```

b1 = Book(200)
b2 = Book(300)
b3 = Book(500)
print(b1 + b2)
print(b1 + b3)
print(b2 + b3)
print(10 + 20)
print("POLY" + "MORPHISM")

```

500

700

800

30

POLYMORPHISM

- —> add()
- —> sub()
- —> mul() / —> div() // —> floordiv() \*\* —> pow() % —> mod() += —> iadd() -= —> isub() \*= —> imul() /= —> idiv() // = —> ifloordiv() \*\* = —> ipow() %= —> imod() < —> lt() > —> gt() <= —> le() >= —> ge() == —> eq() != —> ne()

```

class Student:
    def __init__(self, name, marks):
        self.name = name

```

```

        self.marks = marks

    def __lt__(self, other):
        result = self.marks < other.marks
        return result

    def __le__(self, other):
        result = self.marks <= other.marks
        return result

s1 = Student("one", 100)
s2 = Student("two", 200)
s3 = Student("three", 50)

print(s1 < s2)
print(s2 < s3)
print(s3 <= s1)

True
False
True

class Employee:
    def __init__(self, name, salary):
        self.name = name
        self.salary = salary

    def __mul__(self,
                other): ## Here in Employee function we used magic function(mul) because it
        result = self.salary * other.days
        return result

class TimeSheet:
    def __init__(self, name, days):
        self.name = name
        self.days = days

    def __mul__(self,
                other): ## Here in TimeStamp function we used magic function(mul) because it
        result = self.days * other.salary
        return result

e = Employee("one", 1000)
t = TimeSheet("two", 25)

```

```

print("This month salary", e * t)
print("This month salary", t * e)

```

```

This month salary 25000
This month salary 25000

```

```

class Student:
    def __init__(self, name, marks):
        self.name = name
        self.marks = marks

    def __str__(self):
        return self.name
        #return self.marks # Error int type

```

```

s1 = Student("one", 90)
s2 = Student("two", 95)

```

```

print(s1)
print(s2)

```

```

one
two

```

```

class Student:
    def __init__(self, name, marks):
        self.name = name
        self.marks = marks

    def __str__(self):
        return "Student with Name:{},Marks:{}".format(self.name, self.marks)

```

```

s1 = Student("one", 90)
s2 = Student("two", 95)

```

```

print(s1)
print(s2)

```

```

Student with Name:one,Marks:90
Student with Name:two,Marks:95

```

```

class Student:
    def __init__(self, name, marks):
        self.name = name
        self.marks = marks

```



```
def __str__(self):  
    return str(self.marks)  
  
s1 = Student("one", 90)  
s2 = Student("two", 95)  
print(s1)  
print(s2)  
90  
95
```