## 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 clases

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 chils 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 itis called Hybrid Inheritance.

### Cyclic Inheritance (Optional)

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 in first print function we used "e"(argument in print function) reference variable first  
 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 in first print function we used "t"(argument in print function) reference variable first  
 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