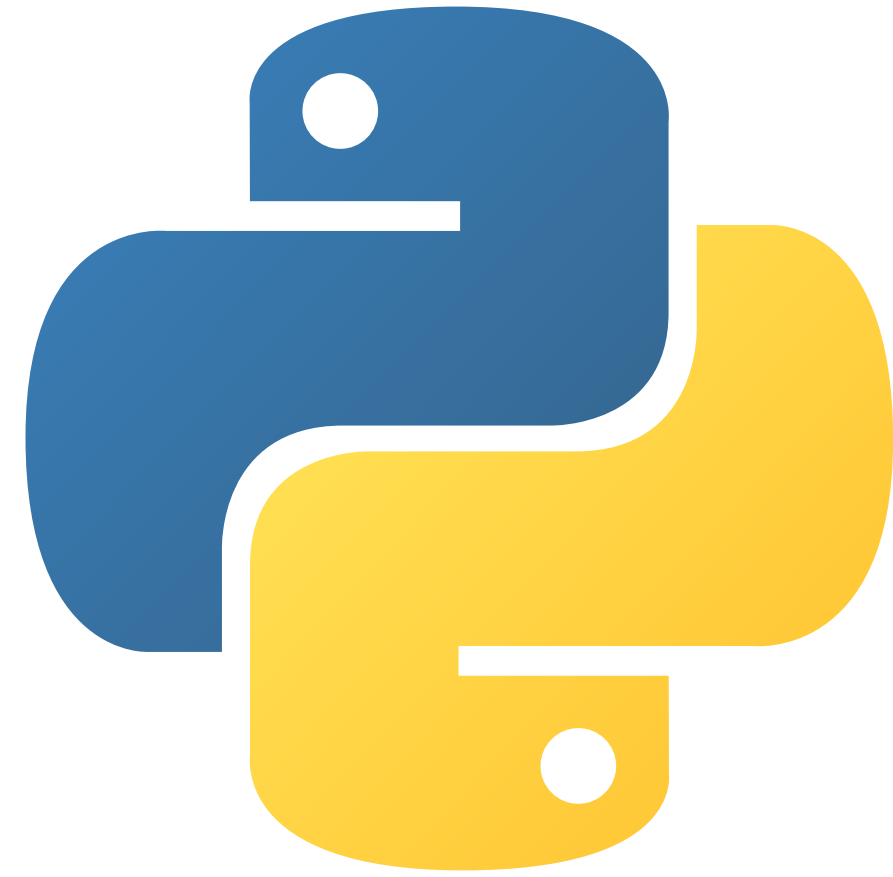


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Polymorphism

In Python

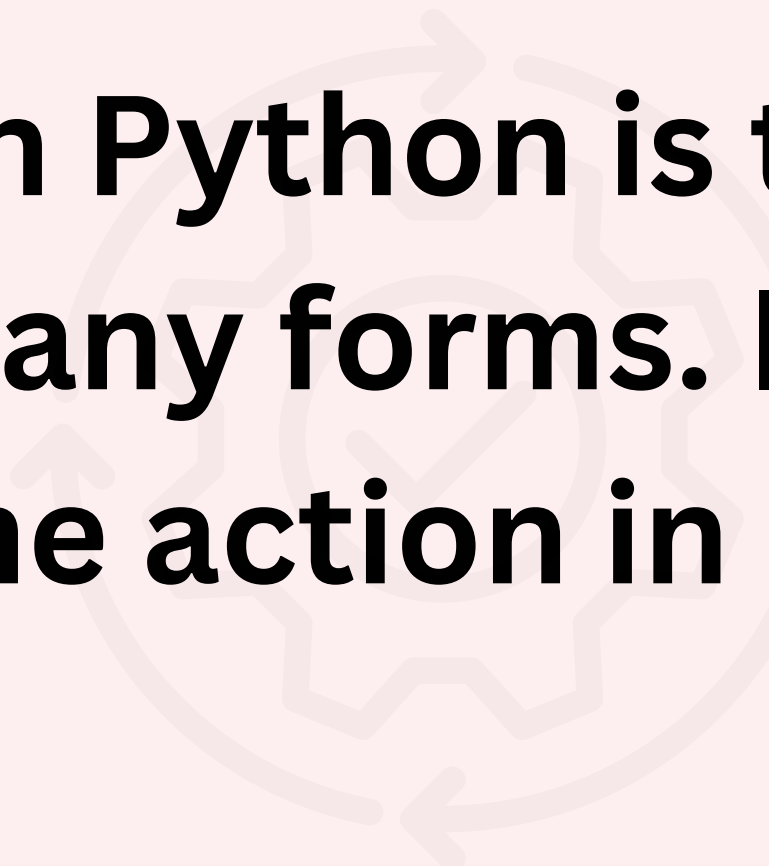


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Polymorphism

Polymorphism in Python is the ability of an object to take many forms. It allows us to perform the same action in many different ways.



Built-in polymorphic functions

There are some built-in functions in Python which are compatible to run with multiple data types. Functions such as `len()`, `max()` etc. are the polymorphic functions.

The function `len()` returns the length of an object depending upon its type. If an object is a string, it returns the count of characters. If an object is a list, it returns the count of items in a list. If an object is a dictionary, it returns the count of items (key:value pair) in the dictionary.

Using Polymorphism in len() function

The len() method treats an object as per its class type.

```
students = ['adi', 'tanu',  
'jony'] school = 'vnmps'  
# calculate count  
print(len(students))  
print(len(school))
```

It prints 3 for list and 5 for string, thats polymorphism.


Let's take an example

We have a vehicle class as a parent and a 'Car' and 'Truck' as its sub-class.

But each vehicle can have a different seating capacity, speed, etc., so we can have the same instance method name in each class but with a different implementation.

Example

```
class Vehicle:
def __init__(self, name, color, price):
self.name name
self.color color
self.price price
def show(self):
print('Details:', self.name, self.color, self.price)
def max speed(self):
print('Vehicle max speed is 158')
def change_gear(self):
print('Vehicle change 6 gear')
# inherit from vehicle class
class Car(Vehicle):
def max speed(self):
```



```
print('Car max speed is 240')
def change gear(self):
print('Car change 7 gear')
#Car Object
car Car('Car x1', 'Red', 20000)
car.show()
#calls methods from Cor class
car.max_speed()
car.change gear()
#Ventele object
vehicle Vehicle('Truck x1', 'white', 75000)
vehicle.show()
#colls method from a Vehtele class
vehicle.max_speed()
vehicle.change_gear()
```

Output:

Details: Car x1 Red 20000
Car max speed is 240
Car change 7 gear
Details: Truck x1 white 75000
Vehicle max speed is 150
Vehicle change 6 gear



Explanation

Due to polymorphism, the Python interpreter recognizes that the `max_speed()` and `change_gear()` methods are overridden for the car object. So, it uses the one defined in the child class (Car)

Polymorphism in class method

```
class Ferrari:
def fuel_type(self): print("Petrol")
def max_speed(self):
print("Max speed 350")
class BMW:
def fuel_type (self): print("Diesel")
def max_speed(self):
print("Max speed is 240")
ferrari Ferrari()
bmw BMW()
#iterate objects of same type
for car in (ferrari, bmw):
car.fuel_type()
car.max_speed()
```

We packed two different objects into a tuple and iterate through it using a car variable.

It is possible due to polymorphism because we have added the same method in both classes

Petrol
Max speed 350
Diesel
Max speed is 240

