Flow Control Statements
&
Object Oriented Programming

By

Rakesh Bisht

Assistant Professor, CSE Dept.

BTKIT Dwarahat , Contact: 9411300460

Email ID: rakeshbishtrakesh@gmail.com

If Statement

If
It's raining:
Sit inside

else
Go out and Play Football

If
Marks > 70:
Get Ice-cream

else
Give Practice Test

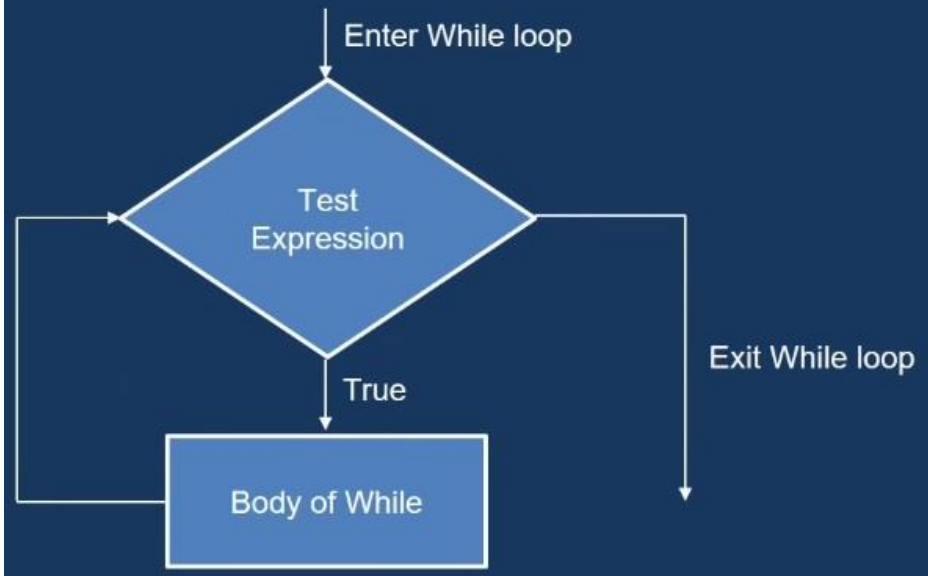
if...else Pseudo Code

```
If(condition){
Statements to be executed....
}

else{
Statements to be executed....
}
```

Looping Statements

Looping statements are used to repeat a task multiple times

While Loop



Syntax:

while condition:
    Execute Statements

For Loop

For Loop is used to iterate over a sequence(tuple, list, dictionary..)


```
for val in sequence:
        Body of for
```

Functions in Real Life

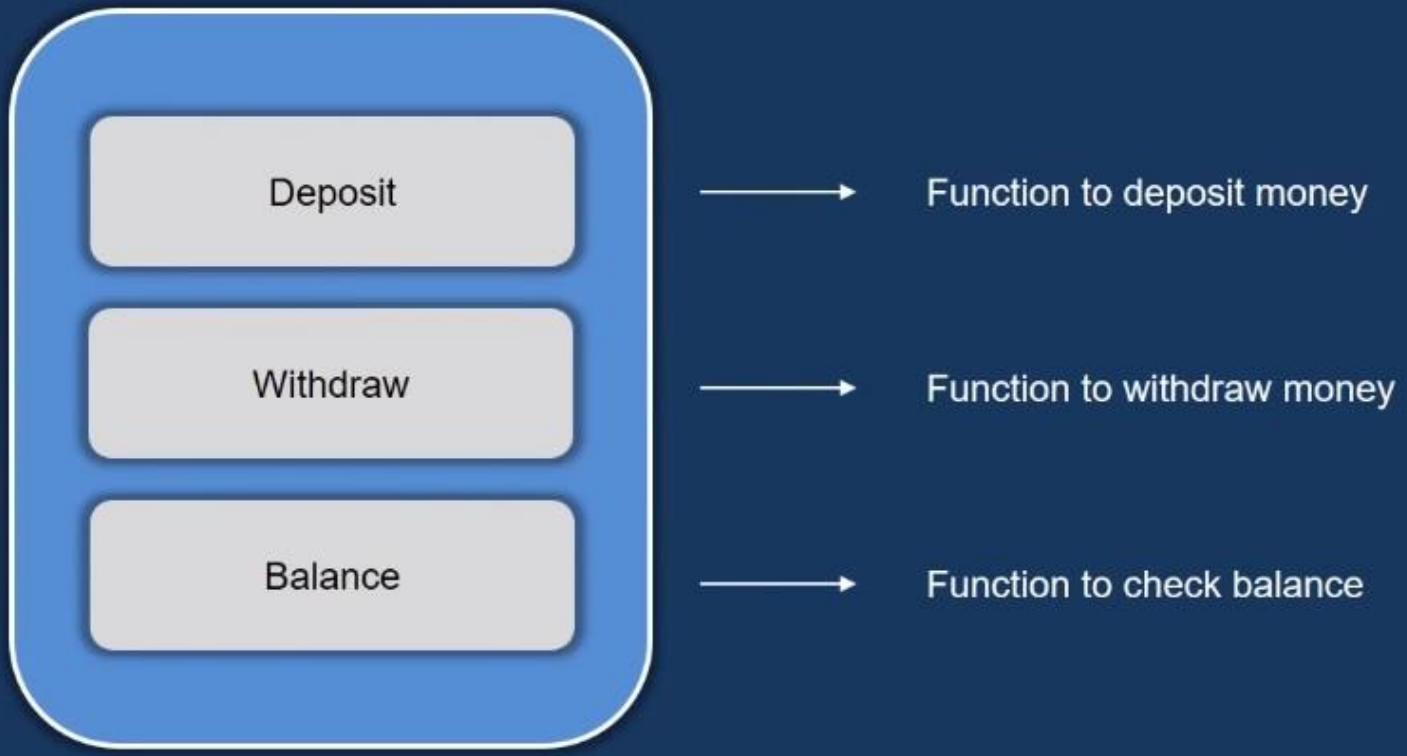
Eating

Running

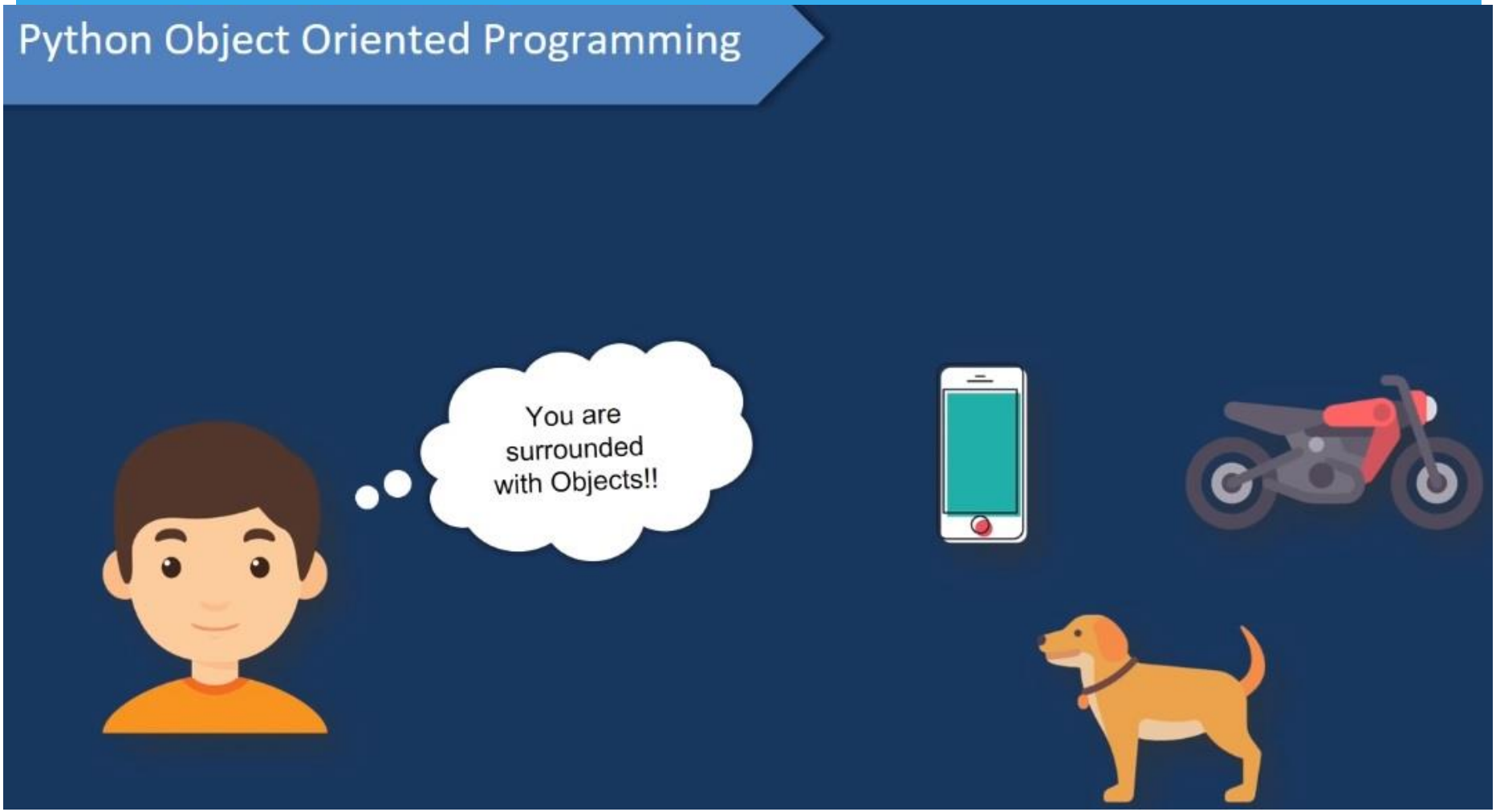
Cycling

Python Functions

Function is a block of code which performs a specific task



Python Object Oriented Programming



Classes

Class is a template/blue-print for real-world entities

Properties

- Color
- Cost
- Battery Life

Behavior

- Make Calls
- Watch Videos
- Play Games

Class in Python

Class is a user-defined data-type

I am a user-defined data type

Mobile

int

float

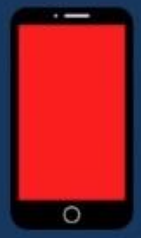
bool

str

Objects

Objects are specific instances of a class

Apple



Motorola

Samsung

Objects in Python

Specific instances of Mobile data type

Apple

Motorola

Samsung

---

a = 10

b = 20

c = 30

Specific instances of integer data type

Creating the first Class

```
In [1]: class Phone:

            def make_call(self):
                print("Making phone call")

            def play_game(self):
                print("Playing Game")
```

Creating the 'Phone' class

```
In [38]: p1=Phone()
```

Instantiating the 'p1' object

```
In [39]: p1.make_call()
         Making phone call

In [40]: p1.play_game()
         Playing Game
```

Invoking methods through object

Adding parameters to the class

```
[42]: class Phone:

          def set_color(self,color):
              self.color=color

          def set_cost(self,cost):
              self.cost=cost

          def show_color(self):
              return self.color

          def show_cost(self):
              return self.cost

          def make_call(self):
              print("Making phone call")

          def play_game(self):
              print("Playing Game")
```

Setting and Returning the attribute values

Creating a class with Constructor

```
In [4]: class Employee:
            def __init__(self,name,age, salary,gender):

                self.name = name
                self.age = age
                self.salary =  salary
                self.gender = gender

            def employee_details(self):
                print("Name of employee is ",self.name)
                print("Age of employee is ",self.age)
                print("Salary of employee is ",self.salary)
                print("Gender of employee is ",self.gender)
```

init method acts as the constructor

Instantiating Object

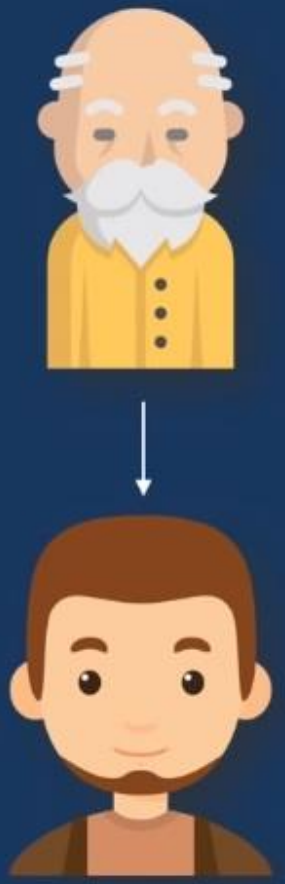
Instantiating the ‘e1’ object

```
In [5]: e1 = Employee('Sam',32,85000,'Male')

In [6]: e1.employee_details()

        Name of employee is  Sam
        Age of employee is  32
        Salary of employee is  85000
        Gender of employee is  Male
```

Invoking the ‘employee_details’ method

Inheritance in Python

With inheritance one class can derive the properties of another class



Man inheriting features from his father

Inheritance Example

```
In [23]: class Vehicle:

             def __init__(self,mileage, cost):
                 self.mileage = mileage
                 self.cost = cost

             def show_details(self):
                 print("I am a Vehicle")
                 print("Mileage of Vehicle is ", self.mileage)
                 print("Cost of Vehicle is ", self.cost)
```

Creating the base class

```
In [24]: v1 = Vehicle(500,500)
         v1.show_details()

         I am a Vehicle
         Mileage of Vehicle is  500
         Cost of Vehicle is  500
```

Instantiating the object for base class

Inheritance Example

```
In [25]: class Car(Vehicle):
             def show_car(self):
                 print("I am a car")
```

→ Creating the child class

```
In [26]: c1 = Car(200,1200)

In [27]: c1.show_details()

         I am a Vehicle
         Mileage of Vehicle is  200
         Cost of Vehicle is  1200
```

→ Instantiating the object for child class

```
In [28]: c1.show_car()

         I am a car
```

→ Invoking the child class method

Over-riding init method

```
In [9]: class Car(Vehicle):

            def __init__(self,mileage,cost,tyres,hp):
                super().__init__(mileage,cost)
                self.tyres = tyres
                self.hp =hp

            def show_car_details(self):
                print("I am a car")
                print("Number of tyres are ",self.tyres)
                print("Value of horse power is ",self.hp)
```

→ Over-riding init method

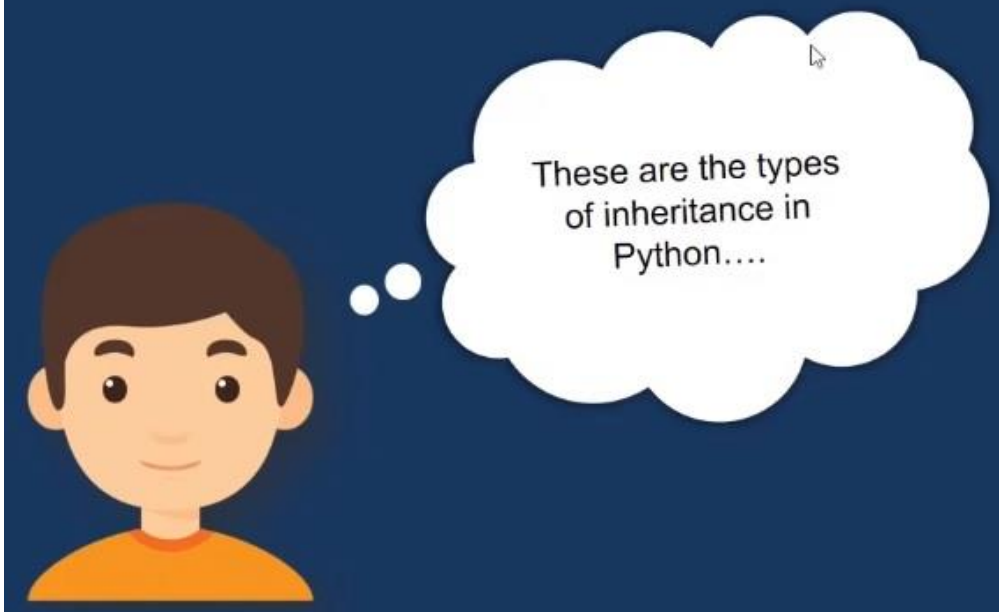
Invoking show_details() method from parent class

```
In [10]: c1 = Car(20,12000,4,300)

In [11]: c1.show_details()

         I am a Vehicle
         Mileage of Vehicle is  20
         Cost of Vehicle is  12000
```

Invoking show_car_details() method from child class

```
In [12]: c1.show_car_details()

         I am a car
         Number of tyres are  4
         Value of horse power is  300
```

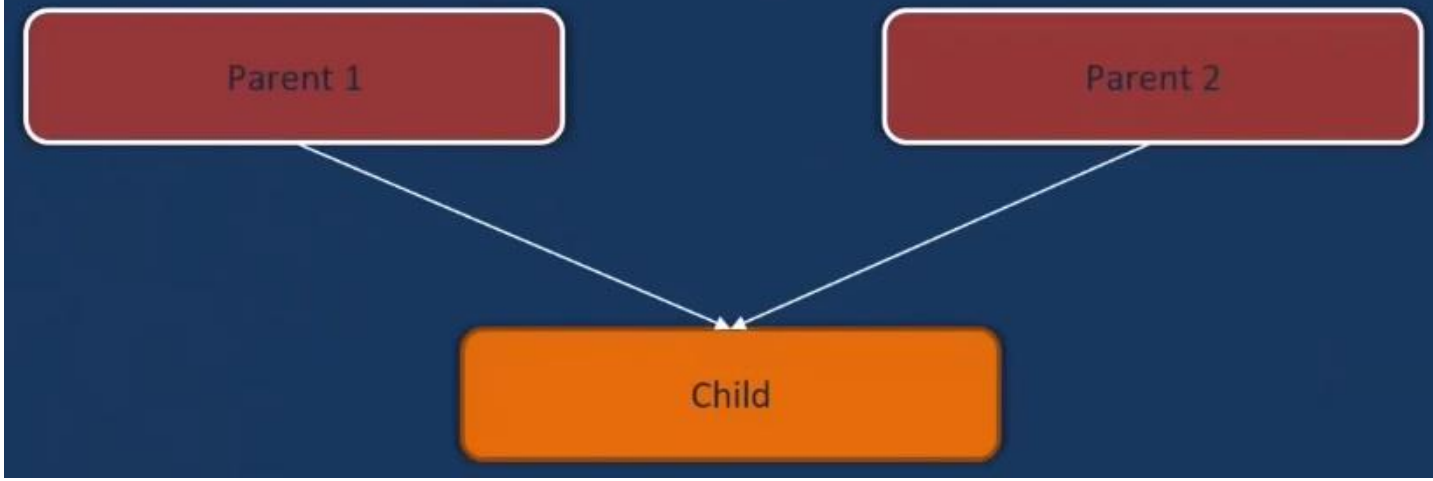
Types of Inheritance



- Single Inheritance
- Multiple Inheritance
- Multi-level Inheritance
- Hybrid Inheritance

Multiple Inheritance

In multiple inheritance, the child inherits from more than 1 parent class



Multiple Inheritance in Python

Parent Class One

```
In [35]: class Parent1():
             def assign_string_one(self,str1):
                 self.str1 = str1

             def show_string_one(self):
                 return self.str1
```

Parent Class Two

```
In [36]: class Parent2():
             def assign_string_two(self,str2):
                 self.str2 = str2

             def show_string_two(self):
                 return self.str2
```

Child Class

```
In [40]: class Derived(Parent1, Parent2):
             def assign_string_three(self,str3):
                 self.str3=str3

             def show_string_three(self):
                 return self.str3
```

Multiple Inheritance in Python

Instantiating object of child class

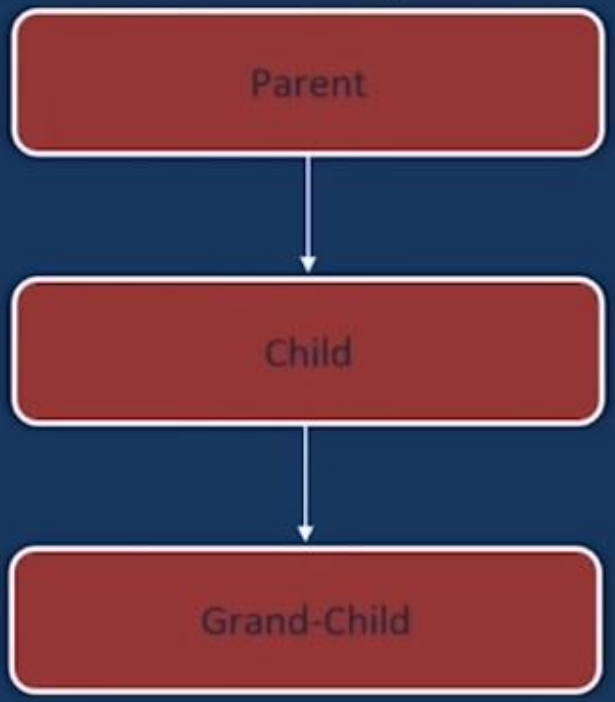
```
In [41]: d1 = Derived()

In [42]: d1.assign_string_one("one")
         d1.assign_string_two("two")
         d1.assign_string_three("three")
```

Invoking methods

```
In [46]: d1.show_string_one()
Out[46]: 'one'

In [47]: d1.show_string_two()
Out[47]: 'two'

In [48]: d1.show_string_three()
Out[48]: 'three'
```

Multi-Level Inheritance

In multi-level Inheritance, we have Parent, child, grand-child relationship



Multi-Level Inheritance in Python

Parent Class

```
In [52]: class Parent():
             def assign_name(self,name):
                 self.name = name

             def show_name(self):
                 return self.name
```

Child Class

```
In [53]: class Child(Parent):
             def assign_age(self,age):
                 self.age = age

             def show_age(self):
                 return self.age
```

Grand-Child Class

```
In [54]: class GrandChild(Child):
             def assign_gender(self,gender):
                 self.gender = gender

             def show_gender(self):
                 return self.name
```