DAY 13 **[09 - JULY - 2025]**

OBJECT AND CLASSES

A class in Python is a user-defined template for creating objects. It bundles data and functions together, making it easier to manage and use them. When we create a new class, we define a new type of object. We can then create multiple instances of this object type.
Classes are created using class keyword. Attributes are variables defined inside the class and represent the properties of the class. Attributes can be accessed using the dot . operator (e.g., MyClass.my_attribute).
An Object is an instance of a Class. It represents a specific implementation of the class and holds its own data.

Class and Instance Variables in Python

In Python, variables defined in a class can be either class variables or instance variables, and understanding the distinction between them is crucial for object-oriented programming.

- *Class Variables*
  These are the variables that are shared across all instances of a class. It is defined at the class level, outside any methods. All objects of the class share the same value for a class variable unless explicitly overridden in an object.
- *Instance Variables*
  Variables that are unique to each instance (object) of a class. These are defined within __init__ method or other instance methods. Each object maintains its own copy of instance variables, independent of other objects.

SELF KEYWORD:

self is a conventional name for the first parameter of a method within a class definition. It is not a reserved keyword, but its use is a widely accepted and crucial convention in object-oriented programming.

PRACTICE QUESTIONS:

Q1. Create a calculator name class and this class has to perform multiple types of calculations like(calculate body mass, simple calculator, simple interest calculator, tax calculator and so on as you wish. But calculator should be more than 4

Code:

```
class Calculator:

    def add(self, a, b):      # SELF : Accessing instance variables and
functions
        return a + b

    def subtract(self, a, b):
        return a - b

    def multiply(self, a, b):
        return a * b

    def divide(self, a, b):
        if b == 0:
            return "Error: Division by zero"
        return a / b


    def calculate_bmi(self, weight_kg, height_m):
        if height_m == 0:
            return "Error: Height cannot be zero"
        return weight_kg / (height_m ** 2)


    def simple_interest(self, principal, rate, time):
        return (principal * rate * time) / 100


    def calculate_tax(self, income, tax_rate):
        return (income * tax_rate) / 100


    def area_of_circle(self, radius):
        pi = 3.14159
        return pi * radius * radius



calc = Calculator()

print("Addition: ", calc.add(10, 5))
```

```
print("BMI: ", calc.calculate_bmi(70, 1.75))
print("Simple Interest: ", calc.simple_interest(1000, 5, 2))
print("Tax: ", calc.calculate_tax(50000, 10))
print("Area of Circle: ", calc.area_of_circle(7))
```

Output:

```
Addition:  15
BMI:  22.857142857142858
Simple Interest:  100.0
Tax:  5000.0
Area of Circle:  153.93791
```

Q2. class name parking

three functions:

1. car parking
2. two wheeler parking
3. cycle parking

get the user name and vehicle no.

print username and vehicle no. and type of vehicle

Code:

```
class Parking:
    def car_parking(self, username, vehicle_no):
        print("\n\n Car Parking ")
        print("Username:", username)
        print("Vehicle No.:", vehicle_no)
        print("Vehicle Type: Car")

    def two_wheeler_parking(self, username, vehicle_no):
        print("\n\n Two-Wheeler Parking ")
        print("Username:", username)
        print("Vehicle No.:", vehicle_no)
        print("Vehicle Type: Two-Wheeler")

    def cycle_parking(self, username, vehicle_no):
        print("\n\n Cycle Parking ")
        print("Username:", username)
        print("Vehicle No.:", vehicle_no)
        print("Vehicle Type: Cycle")
```

```
name = input("Enter your name: ")
v_no = input("Enter your vehicle number: ")

print("\nSelect Vehicle Type:")
print("1. Car")
print("2. Two-Wheeler")
print("3. Cycle")
choice = input("Enter choice : ")

park = Parking()
if choice == "1":
    park.car_parking(name, v_no)
elif choice == "2":
    park.two_wheeler_parking(name, v_no)
elif choice == "3":
    park.cycle_parking(name, v_no)
else:
    print("Invalid choice!")
```

Output:

```
Enter your name: AMANDEEP
Enter your vehicle number: 120

Select Vehicle Type:
1. Car
2. Two-Wheeler
3. Cycle
Enter choice : 3


 Cycle Parking
Username: AMANDEEP
Vehicle No.: 120
Vehicle Type: Cycle
```