**⚔️ DAY 16 – HOME ASSIGNMENTS: Classes, Objects, \_\_init\_\_, self, Attributes, Methods, and Static Methods**

**🐍 Part A: Classes with Logic**

1. **Bank Account Simulation**
   * Create a class BankAccount:
     + Attributes: account\_number, account\_holder, balance.
     + Methods:
       - deposit(amount)
       - withdraw(amount) (check for insufficient balance)
       - display() (prints account details)
2. **Inventory Item**
   * Create a class Item:
     + Attributes: name, price, quantity.
     + Methods:
       - add\_stock(amount) – Increase quantity.
       - sell\_stock(amount) – Decrease quantity if available.
       - get\_total\_value() – Returns total value of stock (price \* quantity).

**⚡ Part B: Advanced Attribute Handling**

1. **Instance vs. Class Attribute Demo**
   * Create a class Student:
     + Class Attribute: school\_name = "ABC High School"
     + Instance Attributes: name, age, marks
     + Method:
       - display() – Shows student details and the school name.
   * Change school\_name for one object, and observe the result on other instances.
2. **Employee Salary Manager**
   * Create an Employee class:
     + Attributes:
       - Instance: name, salary.
       - Class Attribute: min\_wage = 10000.
     + Method:
       - adjust\_salary() – If salary < min\_wage, set it to min\_wage.
       - display() – Shows employee name and salary.
   * Test with different employee instances.

**🌟 Part C: Static Methods for General Operations**

1. **Math Helper Class**
   * Create a class MathHelper with static methods:
     + is\_prime(num) – Returns True if the number is a prime.
     + gcd(a, b) – Returns the greatest common divisor.
     + lcm(a, b) – Returns the least common multiple.
   * Test with different inputs.

**🚗 Part D: Real-World Simulation Challenges**

1. **Car Service Center**
   * Create a class Car:
     + Attributes:
       - brand, model, speed, fuel\_level.
     + Methods:
       - accelerate() – Increases speed.
       - brake() – Decreases speed.
       - add\_fuel(amount) – Increases fuel\_level.
       - status() – Prints the status of the car.
2. **Employee Class**

Attributes:

* + - Class Attribute: company\_name = "TechCorp"
    - Instance Attributes: name, salary

Method:

* + - give\_raise(percent) – Increases the employee’s salary by the given percentage.
    - display() – Prints employee details.

1. **Library Book Tracker**
   * Create a class Book:
     + Attributes:
       - title, author, copies\_available.
     + Methods:
       - issue() – Decrease copies if available.
       - return\_book() – Increase copies.
       - status() – Shows book status.
2. **Online Shopping Cart Simulation**
   * Create a class Cart:
     + Attribute: items (dictionary with item\_name: price).
     + Methods:
       - add\_item(name, price)
       - remove\_item(name)
       - get\_total()
       - display()