

## Java Programming.

### Hackathon: TVS Motor Vehicle Inventory Management System

#### 1. Overview

TVS Motor, a leading two-wheeler manufacturer, wants to develop a **Vehicle Inventory Management System (VIMS)** to manage their vehicle production, inventory, and sales data efficiently. The system needs to handle different types of vehicles, track inventory levels, process sales, and generate reports using core Java concepts such as Object-Oriented Programming (OOP), Collections, and Stream API.

#### 2. Objectives

- **Design a robust object-oriented system** to represent various types of vehicles.
- **Manage inventory** using Java Collections to store and retrieve vehicle data.
- **Implement custom exception handling** for various error scenarios.
- **Utilize Java Stream API** for processing data.

#### 3.Requirement:

##### a. Vehicle Class Hierarchy [ 5 marks]

- Create a base Vehicle class with common attributes like id, name,engineCapacity, fuelType, price, and productionYear.
- Implement subclasses for specific vehicle types, such as Bike, Scooter, and Moped, with additional properties like isElectric, maxSpeed, vehicleType etc.

Note: vehicleType is Scooter, Bike ,Moped

##### b. Inventory Management with Collections [15 marks]

- Use Java Collections to manage the inventory of vehicles.
- Implement methods to add, remove, update, and search for vehicles in the inventory.
- Implement a sales processing feature that updates inventory when a vehicle is sold.

##### c. Exception Handling And Validation [10 marks ]

- Vehicle name should be TVS Apache, TVS Raider, TVS Star City , TVS Jupiter, TVS Ntorq, TVS Iqube , TVS XL100
- Create custom exceptions such as VehicleNotFoundException, InvalidPriceException, and InvalidNameException. OutOfStockException.

##### d. Stream API for Data Processing [ 20 marks]

- Implement a method to filter and sort vehicles based on attributes like price, fuel type, and production year.
- Find the total inventory value.
- find the most popular vehicle model.
- Find the total sales of all Scooter.
- Find the total sales of Electric Scooter.
- Find Total count of Vehicle in the inventory.
- Find the Total Count of Vehicle which are manufactured in year 2023.
- Display all the vehicle details which are manufactured between 2022 to 2023.

Note: follow coding standard ,naming convention , proper use of packages like model, service, app, util.