Introduction to Object-Oriented Programming

# Worksheet 1 – Objects and Classes

The owner of an airport transfers company has sub-contracted you to develop software to manage the operations of his company.

## Task 1 – The Vehicle Class

1. Create a class Vehicle with the following attributes (example of data in brackets)
   1. VIN (e.g., ABC-123)
   2. Make (e.g., Toyota)
   3. Model (e.g., Yaris)
   4. Weight (e.g., 1500kg)
   5. Fuel Consumption (e.g., 7.7l per 100km)
   6. Fuel Capacity (e.g., 42 litres)
   7. Fuel Level (e.g., 30 litres)
2. Create a parameterless and a parameterized constructor for the class. Assume that the car’s fuel level is always half full at instantiation.

## Task 2 – Business Logic

1. Create a GetData() method capable of returning a string with all the relevant vehicle data.
2. Add a method FillUpFuelTank (no parameters). Assume that vehicles are always filled up to maximum capacity when sent to the service station.
3. Add a method bool MakeTrip (requires destination). Every trip consumes fuel according to the fuel consumption rate. The method should return false if the car has insufficient fuel to complete the trip. Note that the company operates three routes:
   1. Airport to Valletta (8km)
   2. Airport to Sliema (10km)
   3. Airport to Bugibba (19km)

## Task 3 – The Main Program

1. At startup, initialise a variable fleet (List of type Vehicle) as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **VIN** | **Make** | **Model** | **Weight** | **Consumption (l. per 100km)** | **Capacity (l.)** |
| MCT-001 | Toyota | Avensis | 1500 | 7.9 | 50 |
| MCT-002 | Honda | Accord | 2000 | 9.2 | 60 |
| MCT-003 | Volkswagen | Passat | 1800 | 8.5 | 70 |

1. The main program should be made up of two components. The upper part of the screen should show the vehicles data in real-time.
2. The lower part of the screen should consist of a menu with the following options:
3. Make Trip – asks for the VIN and destination. Performs the operation and shows an error message if there is insufficient fuel to complete a trip.
   1. Fill up Tank – asks for the VIN and performs the operation.
   2. Exit