MCAST
Technical College
INSTITUTE OF INFORMATION
AND COMMUNICATION TECHNOLOGY

Introduction to Object-Oriented Programming

WORKSHEET 1 – ABSTRACTION AND ENCAPSULATION

The owner of the airport transfers company has asked you for a set of new requirements.

TASK 1 – ADVANCED BUSINESS LOGIC

Start by adding a property (get and set) for every attribute in the Vehicle class. Further to the business logic in Task 3, consider the details below:

1. Every liter of fuel adds a kg to the vehicle weight (*tip: update weight in the FuelLevel setter)*
2. The fuel consumption rate assumes a full gas tank. Use the fuel consumption formula provided below that takes into consideration the actual weight of the vehicle at the start of the trip *(tip: update the fuelConsumptionRate in the Weight setter)*.

   Assuming the car weighs 900 kilograms, has a fuel capacity of 100 liters, and a fuel consumption rate of 1.6 liters per 100km:

Fuel	**Weight**	**Fuel Consumption Rate**
	Weight + Fuel	*Rate * curr. weight / max weight*
100	900 + 100 = 1000	1.6 * 1000 / 1000 = 1.6
50	900 + 50 = 950	1.6 * 950 / 1000 = 1.52
25	900 + 25 = 925	1.6 * 925 / 1000 = 1.48

3. An error message should be shown if there is insufficient fuel to complete a trip
4. Modify the dashboard so that the fuel indicator would be expressed as a three-state indicator
   a. 1/3 full
   b. 1/3 - 2/3 full
   c. 2/3 – full

TASK 2 – AUDITING

Add another menu option for auditing. The auditing option would show a report of the vehicle lifetime, including registration, trips, and re-fueling. For each entry, include a date time stamp, and a running balance of the fuel (in liters).

TASK 3 – OBJECT-ORIENTED AUDIT

Modify the auditing functionality (Task 2) to make it object-oriented