CSM2120: Programming Assignment 3

This is an **individual** assignment for this module. It is worth 20% of your final mark for the module and you are expected to spend approximately 17 hours on the project. You must submit this on Blackboard by **TBC.**

The main focus of this assessment is on the appropriate use of design patterns and the use of JUnit testing. Therefore you should put a lot of thought into the design before touching any code. There will be a discussion on the design patterns applicable for this assignment in the lectures. You **must** bring along your initial ideas for this discussion.

Task description

The application for this assignment is a new car dealership, selling a range of different vehicles, each of which can come with a range of added extras. There is scope within this application to make use of various design patterns that we have covered in lectures.

As a basic requirement, this application should have 3 or 4 concrete types of car. The description of a car should include Model, estimate of Miles per Gallon (mpg) and cost. The customer should be able to select between the following options:

- Fuel type (Petrol / Diesel / Hybrid / Electric)
- Manual or Automatic gear box
- A selection of accessories, such as Air conditioning, Parking sensors, Digital radio, Alloy wheels.

Each of the options will add or subtract a further cost to the car. Note: as green users, we want to promote the use of green cars, therefore a discount is applied when selecting hybrid cars.

While multiple accessories can be selected, the fuel types and gearbox types are mutually exclusive - It is only valid to select one fuel type and one gear box type, and every new car needs to have one of each selected.

A basic interface should be provided, allowing a customer to “build” their car. The interface can be text based or graphical based. There is scope here for WOW features.

You should define a set of JUnit tests to verify the correct behaviour of your application.

In the design documentation, you should describe how you have applied any design patterns and why they are appropriate for this situation. You should include the section of the class diagram that relates to each design pattern used, along with an overview of the whole class diagram. You should also give a description of the JUnit tests that you have defined and the results of the testing.

Evaluation

Your assignment will assess you on the following topics that we have covered so far in the lectures. The breakdown of marks can be found below.

- The appropriate use of design patterns with the use of UML for requirements analysis and design
- Use of JUnit testing
- Quality of the code, including variable names, indentation and Javadoc comments.
- Error Handling.

Marks will be awarded as follows:

Item	**Marks**
The appropriate use of design patterns with the use of UML for requirements analysis and design documentation.	40
Application of JUnit testing, quality of the code and Javadoc comments	30
Correct operation, including consideration of the detailed design and error checking.	20
WOW – additional features that WOW us, e.g. user interface design	10
TOTAL	100