COURSEWORK
ELECTRIC SCOOTER ARCHITECTURE DESIGN

1 OBJECTIVES

The objective of this coursework is to design an architecture for an electric scooter.

The company MU Scooters Inc. is developing and manufacturing its new scooter model. It has completed the requirements phase and has gathered all the information needed for the architecture design in a document (Scooter_Requirements.docx).

The learning outcomes of this coursework are:

- Understand and interpret system use cases, functions, boundaries and requirements.
- Propose formal and functional architectures.
- Manage architectures in System Composer.

2 TASKS

All the tasks described in the following sections shall be performed using a MATLAB project.

2.1 Create requirement set

Following the requirements given in the specification document, a requirement set shall be created using Requirements Editor.

Configure an additional set containing the motor requirements proposed in the previous module.

2.2 Create functional architecture

In this task, the objective is to compose a functional architecture for the system. The functions of the specification document will be taken into account.

2.3 Create formal architecture

In this task, a formal architecture for the scooter will be proposed. This architecture shall contain all subsystems to perform the specified functions.

In addition, on this architecture, the Profile Editor shall be used to specify stereotypes.

Once the stereotypes are defined, specify each attribute of the component and display various views of the architecture. Justify the purpose of each view.

Architectures:

- Mass view
- Hierarchy of the whole system. Composition diagram.
- Functional to formal mapping.

2.4 Link requirements to architecture

Once the architectures are proposed, requirements shall be linked to architectures. It should be ensured that each requirement has been taken into account in the architecture and that a part of the architecture will be responsible for implementing it.

Show the link between the requirements and functions/components using a traceability matrix.

2.5   Link behavioural model to architecture

You will find a behavioural model of the scooter in Mudle. The aim of this task is to embed the behaviour of each component in the architecture. The result of the task should be an executable architecture file.

3   DELIVERABLES

In order to evaluate this coursework, a MATLAB project shall be delivered in Mudle.

This project will contain:

- The requirement set files (slreqx) and a Word requirement report automatically generated with the Requirements Editor.
- Architecture files (slx) with requirement links, embedded behavioural models and views configured.
- A brief Livescript report describing the contents of the project and any guidelines needed to navigate and analyse the files.
- HIL results. In the last module about validation and verification you will build a HIL platform for the scooter. Add the results of the HIL in this deliverable.

4   EVALUATION CRITERIA

The evaluation will follow these criteria:

- Requirements (2 points):
    - Since requirements were given, its writing will not be checked. Any improvement in the requirements writing, should be pointed out in the description or comments dialog box of Requirements Editor.
    - Requirement sets are well structured and have proper attributes. All the attributes are specified.
    - Each requirement has at least one component in the architecture that implements it.
- Architecture (4 points):
    - All functions described in the specification document are present in the functional architecture.
    - The formal architecture enables the scooter to have the specified functionalities.
    - Stereotypes are used to customize each architecture and include additional information.
    - Views are configured to check the architecture from different points of view.
- Behaviour simulation (2 points):
    - Behavioural simulations are embedded for each component.
    - The formal architecture can be simulated and simulation results viewed in the Data Inspector.
- HIL simulation (2 points):
    - Description of the process to convert the MIL simulation in a HIL simulation.
    - Comparison of the test results in MIL and HIL.