**Introduction:**

### This reflective report highlights how quality assurance methods have been introduced to ensure that the matlab code developed does what it is supposed to do. To ensure it does what it’s supposed to do, appropriate software engineering practises were implemented to test the matlab code, these practises involve:

### Test management

### Test techniques

### By testing the code, it helped to prevent defects and problems. To do that, the tests needed to be designed based off Software Requirement Specification (SRS) document [1] which was developed at the start of the project. This was important as it consists all the requirements for the project’s development.

### To ensure that the tests adhered to the SRS document [1], Agile methodology was used to ensure that testing conformed to the requirements and expectations.

### Agile method helped manage the project by structuring it into stages [3], this allowed cohesiveness between requirements and the test cases [2].

### Agile was implemented by using smartsheet [4], it’s a software project management tool that allows you to collaborate, manage and report on work in real-time.

### How Smartsheet is used to implement the project and the project tasks can viewed in my Github repository <https://github.com/samuraiamz/MatlabTests.git>

### As well as the use of Smartsheet to manage the project, Version control tool Github is used to help manage changes to matlab source code and track all modifications to the code[16]. The use of Github allowed the tests to be kept within my developer workflow, along with the products code; The code and tests are together meaning that I always know what the expected behaviour for the matlab code and that a history of the tests conducted is kept.

The use of Github (version control tool) not only helps with to control the testing plans, but it also helps in defects management.[3]  
How Github was used in my project to manage & control test plans can be viewed in my Github repository <https://github.com/samuraiamz/MatlabTests.git>

### Writing my test cases:

### To write my test cases a test plan document and test strategy document were written out. They were necessary because a test case is designed to test a scenario that verifies the functionality of the software application [5]. In this case that would be my matlab code.

### The test plan document is derived from the SRS document which was produced at the start of the project; it defines the scope, objective and the approach to the way we will be testing the matlab code.[6]

### The test strategy document is a subset of the test plan as it outlines the approach to testing the matlab code; it’s a set of guidelines that explains the test design, determining how testing needs to be done.[6]

### These documents are vital to the outcome of the testing as the results of the testing will be determined by the quality and scope of these testing plans. They can be viewed in Github repository <https://github.com/samuraiamz/MatlabTests.git>.

The basic objective of writing these test cases is to validate the test coverage of the test scenarios established in the test scenario document for the matlab code. The test scenarios were derived from the SRS document, from that we understand what functionalities to test.

The test cases were derived from the test scenarios; The test cases that are highlighted in the test cases document are a set of instructions on how to verify the functionality of the matlab code, which when followed will tell us if the expected behaviour of the system is satisfied or not. The test cases and test scenarios can be viewed in the Github repository <https://github.com/samuraiamz/MatlabTests.git>.

To ensure that the test cases verify the functionality’s highlighted by the test scenarios appropriate testing methodologies and techniques are selected to the test cases to validate the requirements of the matlab code.   
Functional testing is used to test the matlab code. It was chosen as it’s a type of software testing in which it validates the software system against the functional requirements/specification.[7]

**Testing techniques used to design test cases:**

The test cases were created to systematically test the functions of the matlab code, this was done by using black box techniques. The black box techniques used are Equivalence partitioning and boundary value analysis.

In equivalence partitioning input values to the system are divided into different groups based on the similarity of the outcome. This reduces the total number of test cases to a finite number of testable test cases, whilst ensuring requirements are met.[9][10]

Instead of using every input value, any one value from the group can test the outcome for all inputs of the group. This is because the hypothesis behind this technique is that if one value in a partition passes, all others will pass, likewise that if one fails, then all other values in that group will fail.[8]

**![A screenshot of a social media post

Description automatically generated]()**The use of equivalence partitioning helped maintain maximum test coverage whilst reducing time spent on test cases as it reduces a large number of test cases to manageable chunks. As well as that it provides for clear guidelines on determining test cases without loss of the effectiveness of testing. How equivalence partitioning was used to design the test cases for the matlab codes can be viewed in the Github repository https://github.com/samuraiamz/MatlabTests.git

**Figure A**

**![A screenshot of a social media post

Description automatically generated]()**Boundary Value Analysis testing is the next part of Equivalence Partitioning for designing test cases where test cases are selected at the edges of the equivalence classes.

This is done as input values at extreme ends cause a lot of errors in a system, thus the testing technique is used to identify errors at boundaries rather than the ones that are in the centre of the input domain.[8][9][10]

How boundary value analysis was used to help design the test cases for MotorA2 matlab code can be viewed in the Github repository https://github.com/samuraiamz/MatlabTests.git

**Figure B**

### A screenshot of a social media post Description automatically generated

### The execution of the test cases and their results is shown in Figures A – C.

**Figure C**

### Quality assurance in my practise: QA does not assure quality, instead it creates and ensures that the processes are being followed to assure quality [11]. This is done by the activities; they have been designed to ensure that the approaches, techniques, methods and process of my project are conforming to the expectations of the specified requirements. Whilst doing quality assurance, the processes, strategies etc. that needs to be used and followed throughout the life cycle of my project is developed. List of Quality Assurance practises implemented in this project: Agile methodology – Smartsheet Version control - Github Test Plan & Test Strategy Functional testing Test monitoring – Requirement Traceability Matrix How agile ensured good level of quality assurance in my practise: The role of Quality Assurance in agile can involve testing and development. Agile framework used in the project is Smartsheet as it’s a highly visual method – It provides an image of the workflow process, with the aim of finding issues, write and execute test cases, and uncover any gaps in requirements early on in the process.[13] This helped to ensure high quality matlab code is produced by providing a clear and measurable structure that involved iterative development.[13] How Version Control ensured good level of Quality Assurance in my practise: The use of Github has helped to keep my QA process organized and efficient. It’s done this by providing several key benefits such as knowledge of what the expected behaviour is for that code, A historical log of test cases and how they change over time

which are important to successfully implementing a fast, flexible testing strategy.[17]

**How Test Plan and Test Strategy ensured good level of Quality Assurance in my practise:**  
As part of quality assurance practise the test plan and test strategy define the process & methods of how to test, when to test and what techniques to use. This ensures that the activities designed for the matlab code project conforms to the expectations and requirements highlighted in these documents.

**How Functional Testing ensured good level of Quality Assurance in my practise:**  
Functional testing is a quality assurance technique that verifies the test cases (designed based off the specification) complies with the specified functional requirements of the system/component. This was used to design the test cases as it helped me implement quality assurance in my testing by allowing me to be able to verify the functionality of the matlab code [14][15].  
  
**How Requirements Traceability Matrix ensured good level of Quality Assurance:**Requirement traceability matrix is used to trace user requirements with test cases. This was created to implement good test monitoring, as it helps with QA by informing me how much work is required and where the design tasks are at. This helped ensure that for each and every requirement adequate level of testing is done.[18]

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