**Brief Summary of Documents**

This is the summary of hardware, testing, and software documents. Please click the title of each section to go to each document.

[**Hardware Document Summary:**](https://docs.google.com/document/d/11oCEPDzxPTfdNnk-QE4vmgCNYmv8P51U/edit)

This hardware design document provides the mechanical configurations and approach to the project based on the Lego Mindstorms Robot and the existing hardware components from the EV3 kit. The document presents the teams entire mechanical planning and design process, as well as the changes and configurations made throughout the project.

The start of this document details the considerations of the limitations and constraints to our hardware designs, which is then used along with our project needs as a criteria for our potential designs. The 3 main proposed designs were then outlined, which was analysed and compared with one another in detail before it was narrowed down to a best-fit design as decided by the team. This selected design is then put through a series of tests and trials throughout the project, to which changes and configurations are made and built upon one another until a final design proves to be successful in the functionality of all required tasks from a hardware perspective.

[**Testing Document Summary:**](https://docs.google.com/document/u/0/d/1qG0Xh_GN59dSIRVYbiQTXl2d8qcl0unNNEytcMWYj1g/edit)

The testing document provides in detail the comprehensive testing plans and strategies as well as all test records conducted throughout the entire project. It keeps track of all test records at specific dates, software and hardware versions as well as all encountered problems and failures throughout the project.

Our testing document first outlines the entire test plan, in which our tests are divided into four main stages. The first stage consists of the testing of the functionality of the sensors in doing basic tasks, where the second stage commences unit tests for each phase of the competition. This is followed by integration tests to ensure that everything would run smoothly when integrated, before full system tests are conducted to check the functionality of the robot and its ability to complete required tasks. All these tests are detailed clearly and concisely in the testing document, where it's formatted in a way such that tables and links provided at each section correspond to its respective specific test records.

[**Software Document Summary:**](https://docs.google.com/document/u/0/d/19JaY5629aUu4Y4rjoQJ-jWyeQLqNSAcr/edit)

The software document provides different models to show the basic behaviors and tasks of the robot. It also describes all functionalities in detail with some specific flowcharts. During the development, the software design has been updated and tested so that the software versions are shown in a table. Lastly, the software versions with test results are described in detail.

First, our software document provides a general flowchart showing the basic behaviors of the robot. With major tasks given by the clients, the class diagram is also constructed in the software documentation. Then, the document has the design of different functions section with all descriptions of the localization, navigation, obstacle avoidance, bridge passer, path manager, wifi class, and the overpass. We use templates for each functionality: title, actor, intention, precondition, main scenario, postcondition, exceptions, and notes. After these descriptions, our software document introduces a sequence diagram to show the thread layout and to mark which classes can be implemented at the same time. As we updated the software design and implementation several times, in section 7, we have a table illustrating all software versions with major change description and link to its GitHub. Lastly, the software document describes the testing regarding each software version and shows the results.