Week 6 – Progress Report

Project: Design an Autonomous Robot

Task: To design an autonomous robot that is capable of navigating to a predetermined position while avoiding obstacles and firing objects at two targets. This is to be done in the shortest time possible.

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# Gantt Chart

The Gantt chart has been updated dramatically. In order to fix bugs in the program, the chart had to be rebuilt. The tasks have been reassigned in order to reflect the tasks done.

# Documentation

All the testing have at least one version documented. The initial documents have been updated again. The formatting of all the documentation has been unified. Proper table of contents have been added to all the documents.

# Poster Project

The UML has been completed. The mechanical design of the robot has changed, so the LDD has been updated to the current version of the mechanical design. Therefore, with the UML and the LDD finished, only the general format and the budget analysis needs to be done. Since the end of the project has not reached the end, we are unable to finish the budget analysis. However, it is updated weekly. Thus far, the weekly budget can be seen in the Dropbox.

# Mechanical Design

There are three major changes to the mechanical design. First, extra Lego pieces are used to reinforce the structure of the robot. Secondly, extra Lego pieces have been added to the loading area of the robot, more specifically, where the ping pong balls rest before they are shot. This change makes the loader and the launcher more accurate and has less chances of breaking after multiple launches. Lastly, extra Lego blocks have been added to the left side of the robot in order to fix the weight distribution issues, which caused the robot’s path to be slightly curved. All these changes have also been made on the LDD version of the design, so refer to the LDD for more specifics.

# Software Design

Minor changes in the code have been made in order to calibrate the robot. During the preparation to the beta demo, the obstacle avoidance needed to be recalibrated in order to avoid the big white cardboard boxes rather than the blocks used in the lab. The speed has also been adjusted in order to make the robot turn properly. The odometer correction is in the process of being modified to correct the heading too. The software design used in the beta demo should be capable of passing the competition if the odometer correction is not improved. (Refer to the beta demo folder.)

# Testing

The testing of the current version of the robot is mostly completed. The integration test and the speed test have been done. The results were positive for the integration test. However for the speed test, more testing needs be done, since the speed for the obstacle avoidance directly depends on the speed of the robot, which will need much more testing, instead of solely changing the travel speed of the robot. Battery restrictions needed to be explored more in depth, thus a test has been designed in order to analyze the correlation between the battery level and the robot’s performance.

# Plans for the following week

For the following week, we plan to be ready for the competition, thus finishing all the documents, software design, hardware design, software design, and testing of the final design.