**Final Competition Report**

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**Introduction**

In this lab, we will integrate on TurtleBot3 the functions that have been developed in all the previous labs throughout the semester. Our robot will work in the similar environment to that in Lab 6 as shown below. There are three separate tasks that our robot can attempt: autonomous navigation, lane following, and target search. For autonomous navigation, our robot will make use of the map that is built of the environment and visit the various locations of interest: P1, P2, P3, and P4. For lane following, our robot needs to move in the racetrack along the directions of the six arrows. For target search, our robot needs to look for an Aruco marker placed near one of the corners near P3, making a sound to describe the ID of the marker. The starting point of the competition is P1, and our robot will have a total of five minutes to collect points. Each robot will have two rounds to attempt this competition, and the larger total of the two rounds counts toward to the final standing.



Figure 1: Robot environment with the racetrack to traverse and positions to visit

Our turtle robot will first perform the task of navigation, starting from P1, passing through P2, and finally returning to P1 from P3. Then it will start the line patrol task from P1 and return to P1 after completing the task.