Spring 2016
Control of Mobile Robotics
CDA4621
Final Competition
Total: 10 points
(1 point = 1% of final grade)
Competition Date: Thursday May 5th, 2016, 10am-12m
http://www.ods.usf.edu/Space/docs/Final-Exam-Matrix.pdf
Competition Location: C4 Lab

A. Competition Requirements

- Hardware Requirements
The "Robo-Bull-2016" (Figure 1) is the main robot hardware used for the course. Note, that the components of the robot are the same as in Lab4.

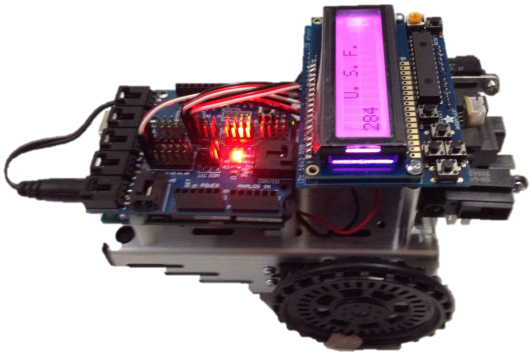

Figure 1: Robo-Bull-2016.

- Software Requirements
The software requirements are the same as in Lab4

B. Maze Configuration
The final maze configuration is shown in Figure 2. The start and goal locations will only be known at the beginning of the competition.

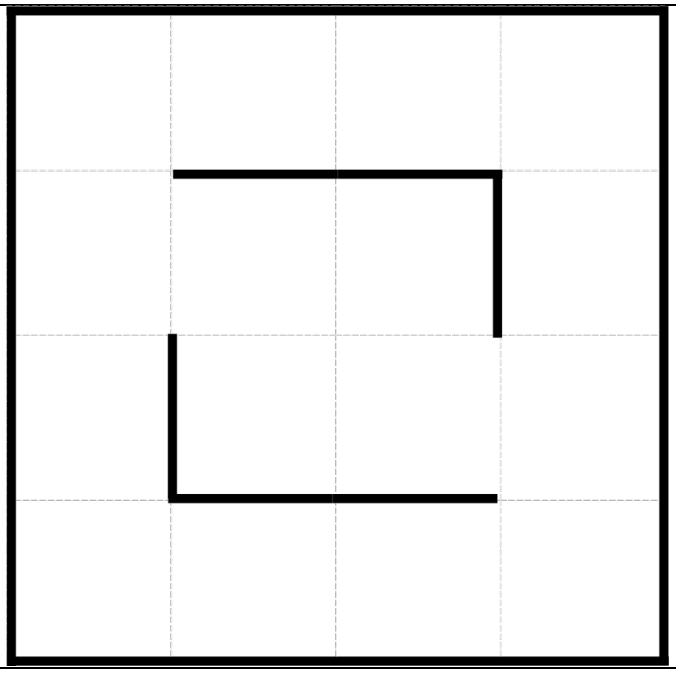

Figure 2. Final Maze Configuration. Robot start and goal locations will only be given at the beginning of the competition.

C. **Start and Goal Input**

The starting and goal location will only be given to the robot at the beginning of the task. Figure 3 shows functionality you have to program for each of the LCD input buttons, similar to Lab4.

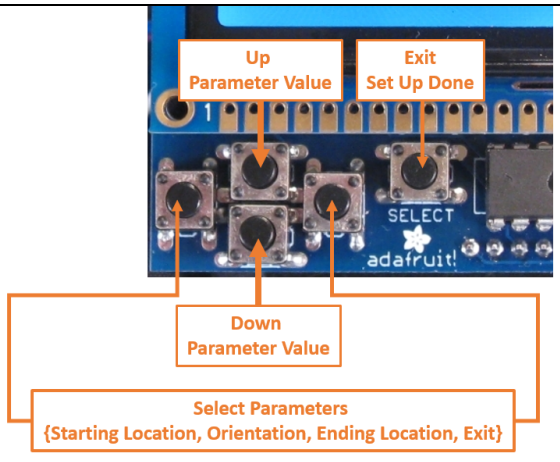

Figure 3. LCD buttons for start and goal input.

Figure 4 shows examples of values assigned to each of input function buttons.

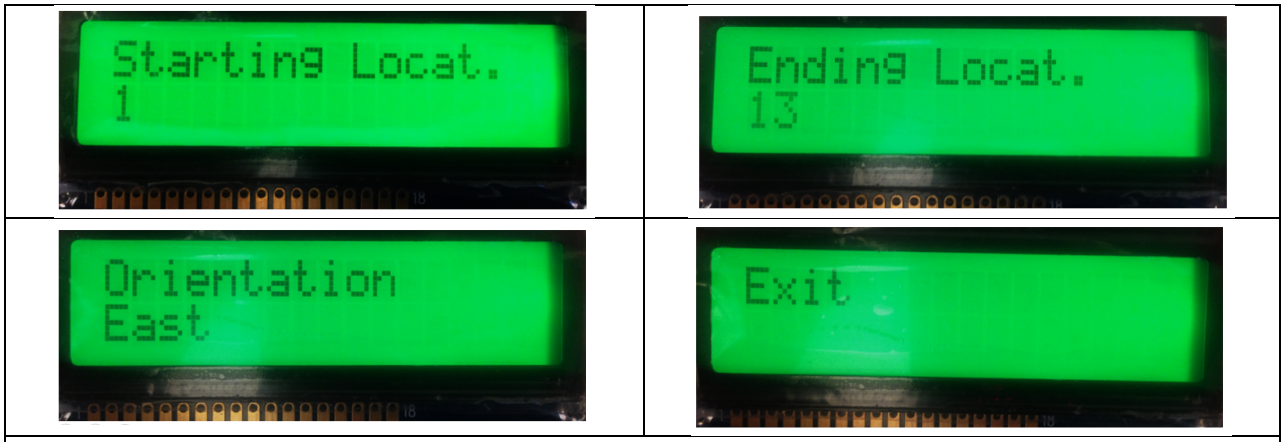

Figure 4. LCD Input buttons sample initial data.

D. **Competition Rules**

The competition rules are as follows:

1. All robots must be set next to the arena and turned off prior to the competition. There will be no further programming or interactions with users. You may bring multiple sets of batteries.
2. Each team will go in numerical team order. The start and goal locations will be set interactively in the LCD prior to robot navigation.
3. There will be two rounds of competition based on robot competition evaluations. From 20 teams, top 10 teams will be able to compete in the second round.
4. Each robot has a single opportunity during any round to navigate the maze for a maximum of 3 minutes. Once the robot starts moving students are not allowed to touch the robot until instructed to do so. Two evaluations will be given: (a) "0" or "1" depending on whether the robot successfully completes the task, and (b) time to complete the task.
5. The robot must provide a "green flash" when starting navigation and a "read flash" when reaching the goal location. The robot needs to stop for at least 5 seconds at the goal with clear indication from the "red flash" that it has reached the goal. The run will be stopped any time a "red flash appears" during navigation.
6. Additional considerations are deferred to the instructor at the time of the competition.

E. **Competition Evaluation**

There is a minimum of "5" point given to all teams that compete, and a maximum of "10" points to all teams:

1. All teams that compete in the first round of maze navigation will receive "5" points for their participation, independent of results.
2. Teams that complete the first round of maze navigation from start to goal under 3 minutes will receive "3" additional points. Top 10 teams from this group will move to next round.
3. Top 10 teams from first round that are able to complete the second round of maze navigation from start to goal under 3 minutes will receive "1" additional point.
4. Top 3 teams (goal, silver, and bronze) in the second round will receive "1" additional point.

NOTE: You MUST return the robot at the end of the competition to get a grade for the course.