ESE 356 Digital System Specification and Modeling
Project 2: Robot Navigation in Confined Areas
Phase 2 (Final Version) Requirement

Due on 11/3/2020

Total Points (20): No late submission (submit the file by midnight of the due date)

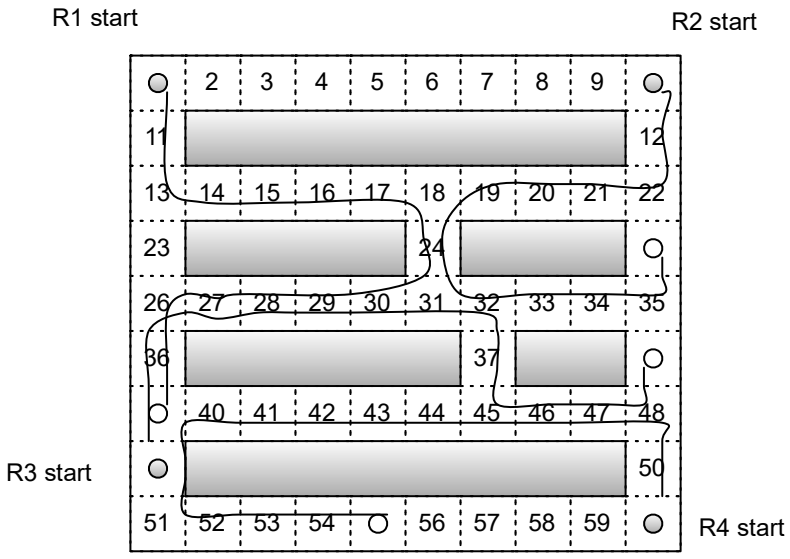
1. Final Phase Specification

In phase 2, there are 4 robots navigating as shown below. The paths are provided by the server to each robot though FIFO (will be discussed in the lecture).

Their path is indicated in the map. However, their start times are:
R1 start at 1sec (Convert to count values)
R2 starts at 5sec
R3 starts at 7sec
R4 starts at 2sec

The server must control each robot so that there is no collision among robots as well as deadlocks. The maximum speed of the robot is 2m/s. You should complete the entire navigation in shortest time (i.e., as fast as possible through speed control).

You should have 6 obstacles (each circling the wall). For example, obstacle 1 circles (1,2, 3, 4, 5, 6,7, 8, 9,10, 12, 22, 21, 20, 19, 18, 17, 16, 15, 14, 13, 11, 1). The obstacles move at 5m/sec



Simulation results, plot speed variation of each robot (format will be discussed in the lecture)

2. Verification and Simulation

- Simulation with 4 robots and 6 obstacles in 2-diensional maps described in the Project Description.
- Grid size is 2m by 2m.
- Robots with the maximum speed of 2m/s
- Obstacles with the constant speed of 4m/s
- The paths for the robots are sent by Server.
- Speed control of each robot to complete the entire service in the shortest time while minimizing stop time duration
- Speed plots generation

3. Submission Requirements

- Source codes for robot, processing, server, top main and necessary test-bench codes
- Data base structures for robot, processing, server
- Description (pseudo codes) for handshaking mechanism
- Verification/Simulation results: Handshake event activities (with time and event)
- Speed variation plots.
- Summary report (1-2 pages)

Submission through electronic files (zip version)
The report grading will be based on 1. Clarity of the report, 2. Completeness of the results.

4. Grading

1. Source Codes (4)
2. Description of Speed Control Mechanism (2)
3. Service Time Control Mechanism (2)
4. Path Transmission Mechanism (2)
5. Server Port Specification (2)
6. Robot Port Specification (2)
7. Processing Port Specification (2)
8. Successful Compilation (1)
9. Speed Variation Plots (3)