

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

Due on 11/7/2019

Total Points (25): No late submission (submit the file by midnight of the due date)

1. Initial 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

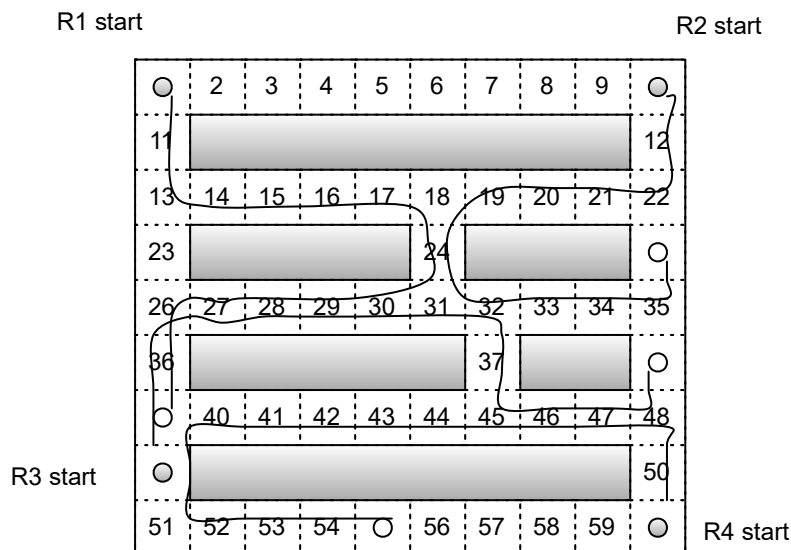
R2 starts at 5sec

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 4 obstacles in 2-dimensional maps described in the Project Description.
- Grid size is 2m by 2m.
- Robots starts at the opposite corners of the map.
- Obstacles move (back-and-forth) with 4 m/s speed.
- Robots move with 2m/s speed.
- The path for the robots are parameterized.
- Speed control
- Speed plots

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 mechanisms
- 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.