IMAT5121
Introduction to Mobile Robots

iRobot Create Simulator coursework

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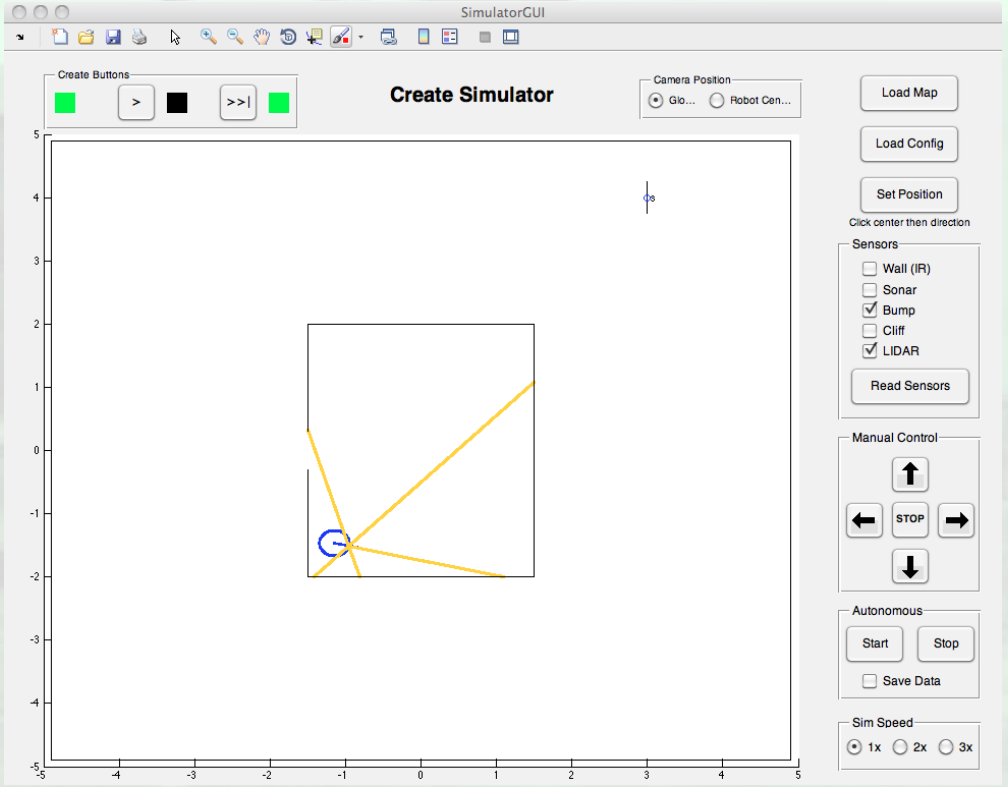
The environment

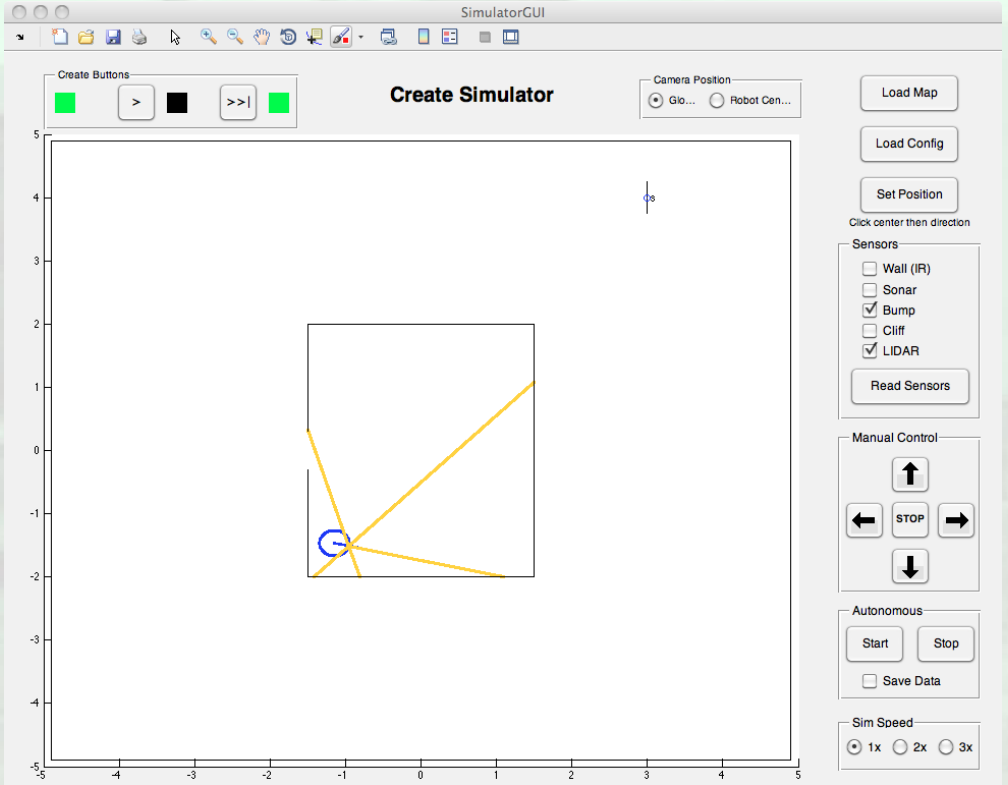
- For the coursework you should use the map cwMap_MG.txt provided here

- The robot's initial position should be any random place inside the room in the middle of the map



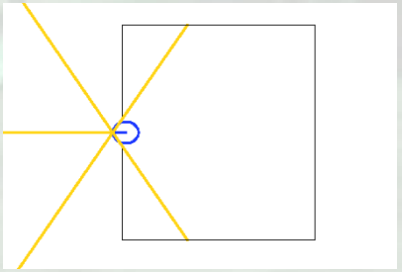
The environment

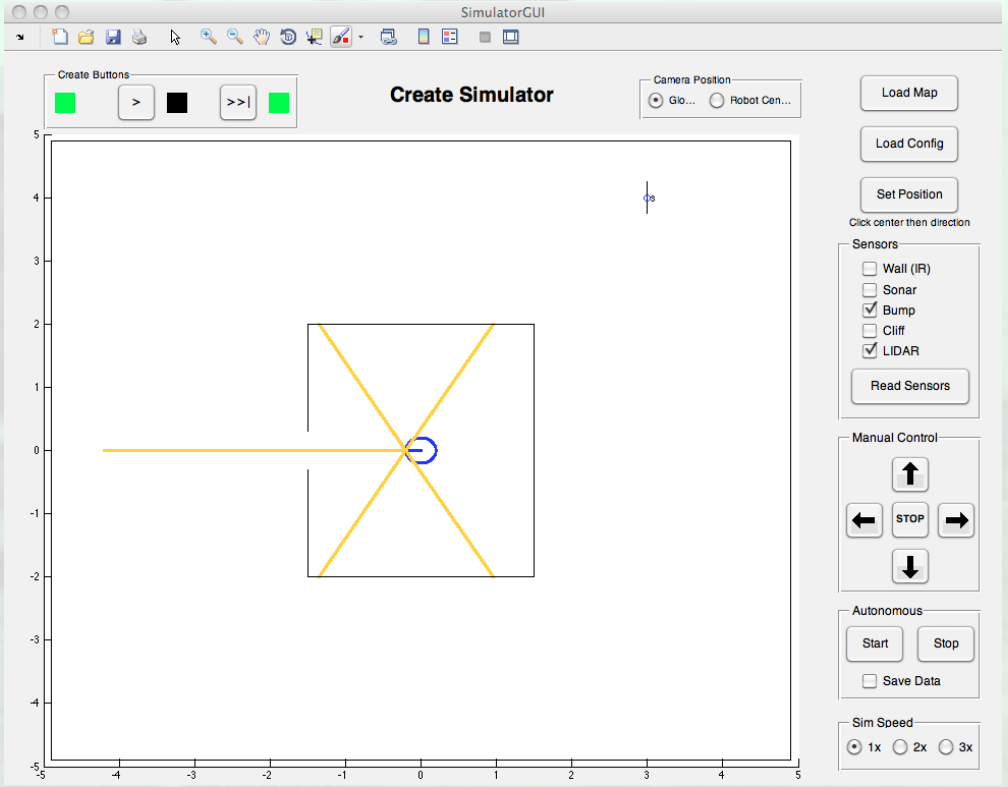
- The room has a narrow doorway
- There is a beacon (which can be positioned anywhere in the map) with a short wall across it, the wall can have any orientation relative to the beacon



The task (cont…)

- The iRobot should start anywhere in the room, move around and using the Lidar find the middle of the room
- It should then align itself with the exit and come out in a straight line without crashing

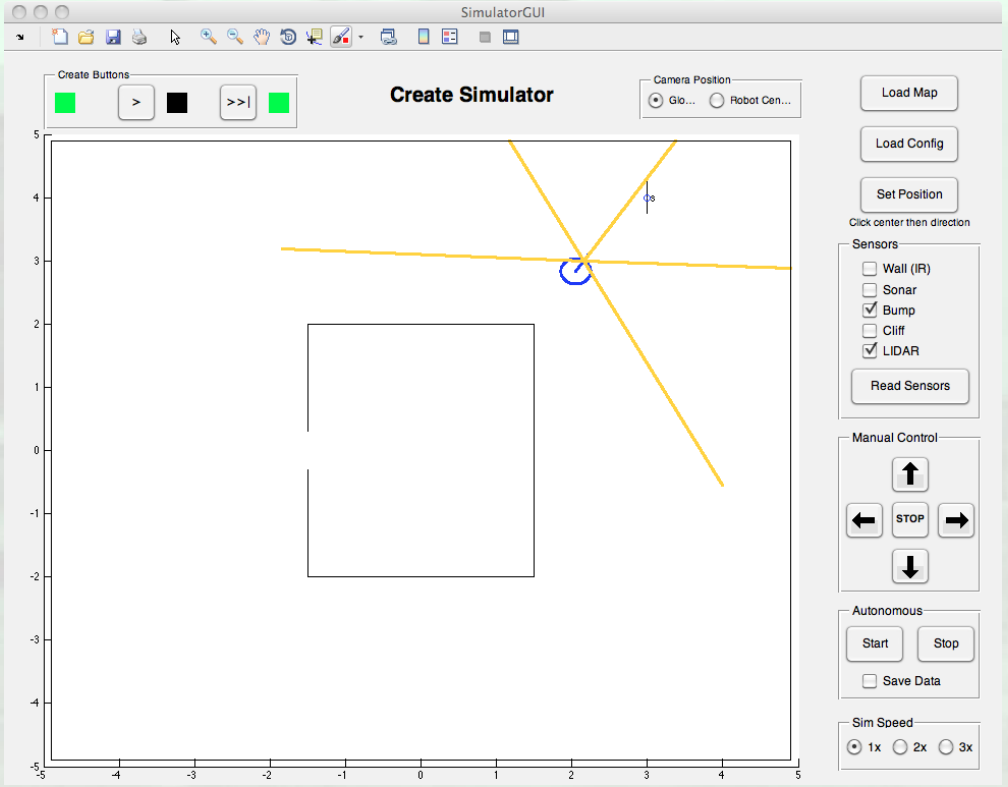




The task (cont…)

- Once out of the room, the robot should start exploring the environment to find the beacon

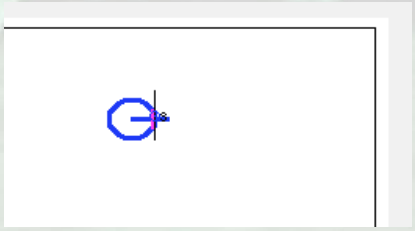
- Once the beacon is found the iRobot should circle around it “looking” at (and avoiding) the wall

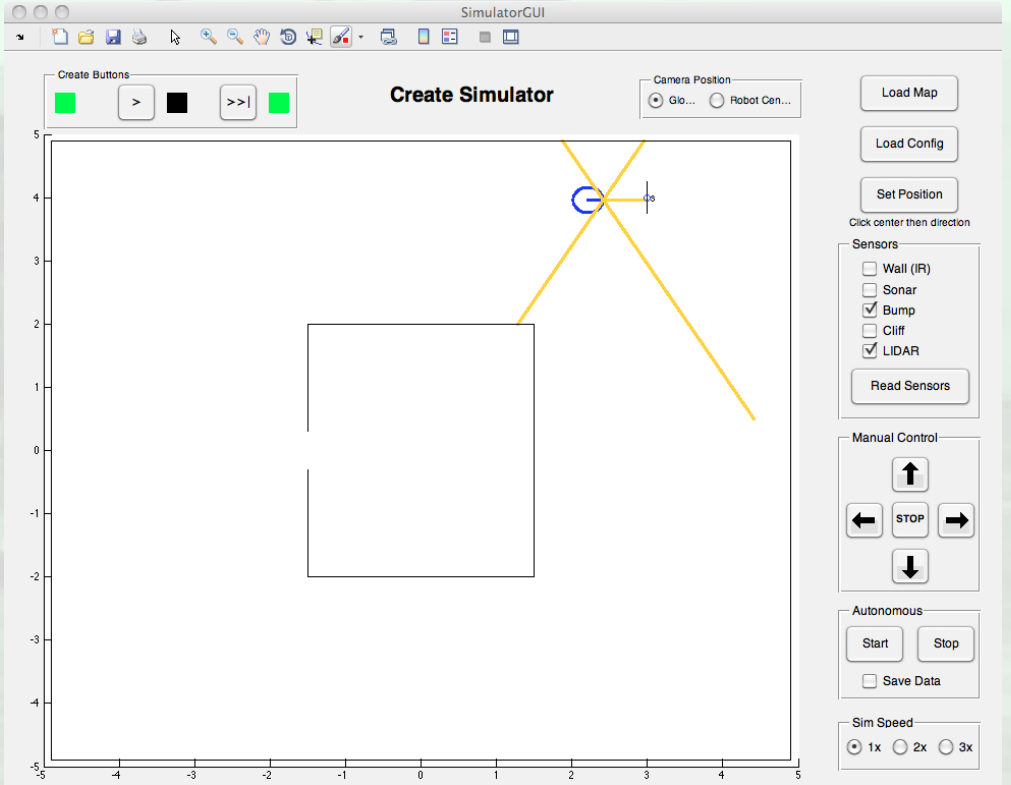


The task (cont…)

- While circling the beacon, it should be checking its alignment with the wall

- The objective is to get perpendicular to it, and when aligned, it should bump it head on

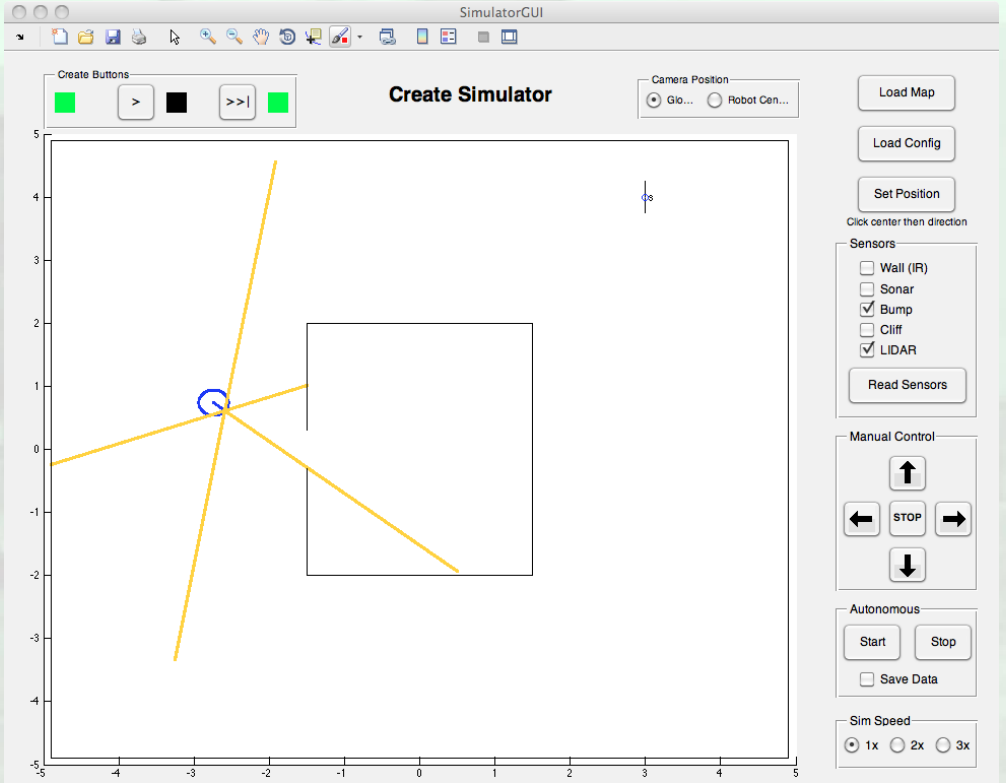




The task (cont…)

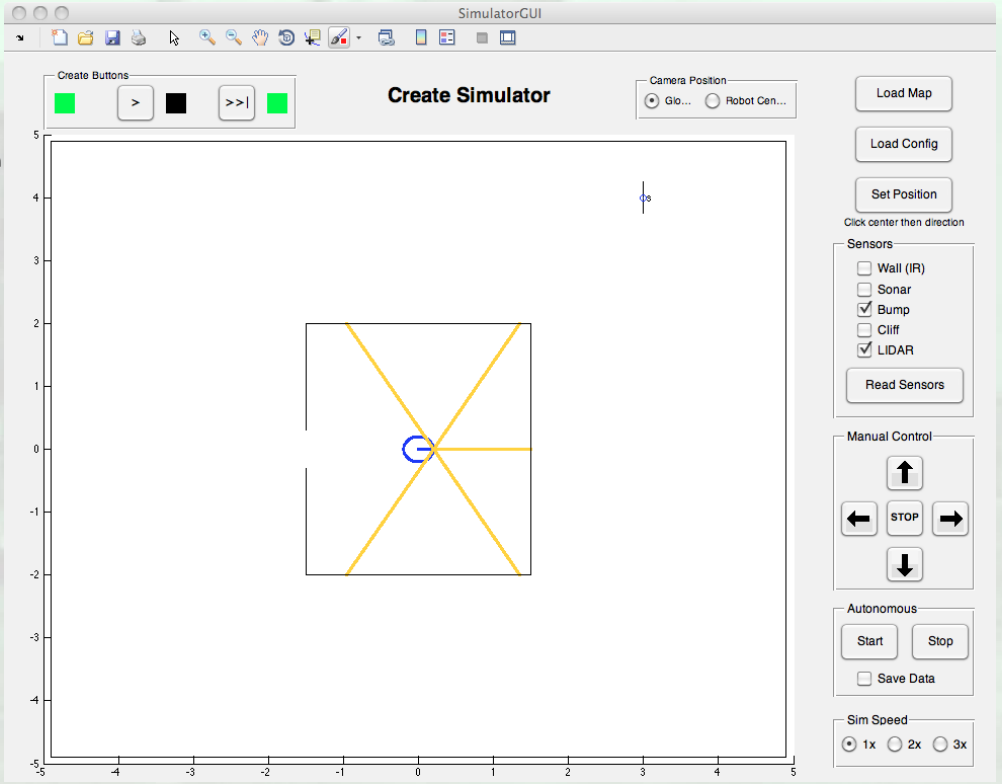
- Once the bump with the wall is detected, the robot will set off to find the room

- And of course find the entrance to the room



The task (cont…)

- The final objective is to enter the room without bumping to the sides
- And stop exactly in the middle of the room



Some experimenting…

- Once your program executes the full task using the map provided, experiment with different setups.
- Start the robot in different places
- Change the position of the beacon with the short wall across it, and the orientation if the wall…

  the robot should bump the short wall perpendicular to it

Assessment

- You should submit a report explaining how did you tackle the problem and presenting the solution developed by you
- Make sure you report the testing and measuring of the performance of the various requirements:
  - The robot finds the middle of the room
  - The robot exits/enters the room without bumping
  - The robot bumps the beacon's wall perpendicular to it
  - The robot returns and stops in the middle of the room

Assessment

- Make sure you include well documented source code, a good structure with all relevant sections, analysis and conclusions
- Submit the work using the turnitin link
- This assessment will be 50% of your overall mark