EN613 Final Project Instructions

For the final project you will create a robot which can successfully traverse a mazelike environment in the Gazebo simulation environment. All the instructions on how to download, install, and run the code can be found in the EN613_Final_Project_Template.pdf included in this assignment.

Mission: Navigate a robot across an unexplored environment to a goal location
Assignment: Write a controller, planner, and estimator in ROS2 to get to the goal
Template: Can be found under Final Project course model (final_project_template.zip)

- Launch files for starting Gazebo and ROS
- Default Map
- Default Robot
    - Differential Drive
    - 2D Lidar Sensor

Students will be required to record a video of their robot in action that they will share with the class. This video should include 2 of the 4 scenarios available for different robot starting positions and goal positions (see Template.pdf on how to launch different scenarios). If the robot is significantly slower than real-time then the video should be sped up to take fewer than 2 minutes.

Students will give a short 5 minute presentation to the class covering their approach and sharing the video of their robot. The format

1. 5 minute presentation
    a. 3-4 Slides
    b. 1-2 minute video of the robot in action.
2. Discuss the following
    a. Any changes you made to the robot model from the default
    b. What algorithm did you use?
    c. What was your ROS node architecture?
    d. What challenges did you encounter?
        i. Technical challenges with ROS
        ii. Challenges implementing the algorithm
    e. What would you do to improve your system if you had more time?

You are free to alter the robot in any way you need or introduce elements into the gazebo world to aid in localization. You may not edit the map itself and you may not use third-party packages without instructor approval.

The assignment is due on 12/04/2020. Class presentations are at 4:30pm and the upload deadline is at 11:59pm.

All Students must Submit:

3. All source code.
4. 1-2 page document explaining the approach, and how to run the code. Please include any information such as run environment (e.g. if you used ROS2 Dashing instead of ROS2 Foxy) or other package dependencies.
5. Videos of the robot in action executing 2 of the 4 scenarios defined by the spawn_scenario file.
6. Slides used for the class presentation.