CISC 3060 Introduction to Robotics

Lab Assignment #2

Step 1: Write a python ROS node that will behave as follows:

a) Will rotate 360 degrees in place when started, with fixed angular velocity *w=0.1 rps*, and then stop
b) At each step during the rotation, it will add **gFrontDistance** to any array (list) **H,** indexed by the angle rotated.
   You will need to add π to the **gPose[2]** orientation so that it is always positive, and then map that floating point number to an integer between 0 and a variable **Pmax** so that you can use it as an index into the array. Initially **pMax** can be 8.
c) After one rotation, and the update of **H,** show a bar graph of the array.
d) Repeat the process at a rate *0.1 Hz* (how often will this be repeated in seconds?)

Write a short explanation of how you implemented each of these three.

Step 2: Using the "enclosed.world" simulation world, move the robot using the Gazebo menu and the mouse to the following points, and generate and record **H** for each one:

a) A short distance from reach of the four corners,
b) And approximately centered, just above the middle wall

Explain the appearance of each graph based on the location at which it was measured.

Step 3: Repeat the process for **pMax=16.** Explain any difference you see and comment on what effect this might have on any future planned motions.

Step 4 Modify your ROS node by adding a function that when given **H** as an argument, will return the index into **H** that reflects the furthest open space around the robot. Add code to rotate the robot to this heading and move forward for 0.5 seconds at *0.5 m/s.* (Remember you added π.)

Place the robot in one of the corners and allow your ROS node to repeat at least 3 times. Explain what happens using the bar charts you generated.