

10/5/2022

Lab 4

Group frogs

1. What are the names of everyone in your lab group?

- Nathan Ovadia, Timothy Wilson, Brennan Adams

2. Roughly how much time did your group spend programming this lab?

- About 10 hours

3. The display is setup with 300 rows and 300 columns to cover a 1m x 1m area. What is the spatial resolution of each pixel in the map? Show how you arrived at your answer to get credit.

- $1/300$ meters. Our grid is 300×300 pixels and the area is 1×1 m so each pixel is $1/300$ m

4. How would mapping be affected if the odometry is not perfect and has errors?

- If the odometry is not perfect and has errors the mapping would reflect where the incorrect odometry says the robot is and objects are, and not where they actually are.

5. How could you choose a good resolution for your map? Elaborate on what happens if your resolution is too low or too high.

- If the resolution is too high pixels drawn on the map would be too small to see and if the resolution is too low then the pixels drawn would be overlapping each other, therefore you wouldn't be able to make out the obstacles and the robot's path.

6. You have been using the starting line to perform “loop closure”, recognizing where the robot is to reset its odometry and prevent localization drift. How can you use the LIDAR sensor to accomplish a similar goal?

- You could use the LIDAR sensors to accomplish this by storing the starting readings in a variable. Then checking if the current readings equal the starting readings. If they equal the starting readings then you know the robot has completed a lap.
- When the robot senses an object at a known location we can set everything else from that known spot.