

91.451, Robotics II
Spring 2007

Lab 2: Wall-Following

Out: 13 February 2007

Due: 22 February 2007

Overview: In this lab, you'll test out the bases that you've built by adding sensors and writing code to perform wall following.

Lab Description: In this lab, you will use the optical rangefinder sensor ("ET") to build a wall-following robot. The sensor's range is 1.5 to 12 inches (other versions exist with a range of 4 to 30 inches, but we believe this version will be better for Trinity). Low values indicate a large distance and high values indicate a distance approximating 1.5 inches. If something is closer than 1.5 inches, the values will go high again.

Mount sensors on each side of your robot and in the front.

Exercise 4a in Section 3.6.5 of Martin on p. 127 discusses two ways to write a wall following program. The first is to have two states: one if the sensor reading indicates that the robot is too close to the wall and the other that the robot is too far. In the too close state, the robot should turn away from the wall. In the too far state, the robot would turn towards the wall. You may select the distance at which you'd like to follow the wall. I'd recommend that you pick a distance a bit away from the 1.5" minimum, since you'll get readings that increase from this point whether you get closer or farther away. Implement this solution. Turn in your code.

The second way to implement wall following code is to have three states: too close, just right, and too far. Modify your code to include the third state, the ideal distance from the wall. In this state, you'll drive forward. Experiment with the width of the "just right" range. What works best? Turn in your code.

How do the two programs compare? Which one does a better job following the wall? How far can your robot travel down the hall? What does it do when there are doorways with open doors? What does it do with recessed doors?

Show us your hall following robot that uses the method that you think is best. You can use the Trinity arena as your testing grounds.