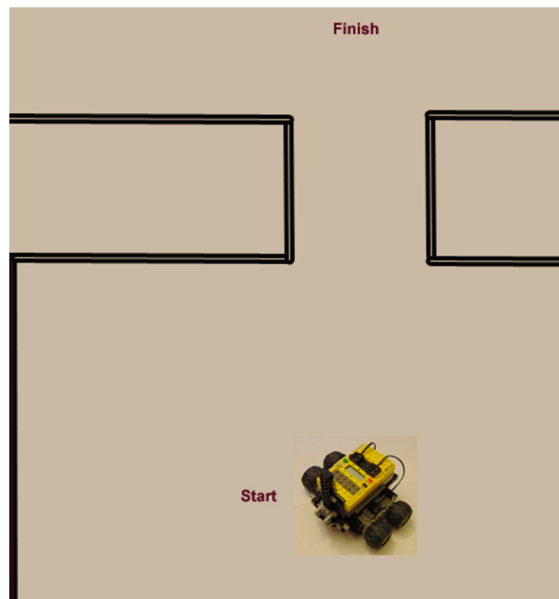


## CS245 – Robotics and Machine Learning

### Lab 3

#### Find the Tunnel

In this exercise, we will make use of robot motion and touch/ultrasonic sensors to make your robot find and go through a narrow opening (i.e. a “tunnel”) on a simple course. Your robot will be randomly placed anywhere within the course. The course will have “walls” and will be about 4 feet by 4 feet. Your robot will first have to find the opening (tunnel) and then navigate through it all the way out. Your robot must know when it has cleared the tunnel and is outside of the enclosed area. A “tunnel” will simply be an opening with side walls in an otherwise solid obstacle. Using the touch sensor and/or ultrasonic sensor, your robot needs to determine the location of the opening and subsequently, pass through the opening to the other side of the tunnel. The tunnel will be wide enough so that your robot will be able to pass through it without any problems (about ½ inch to an 1 inch clearance on both sides). There will be a time limit of 2 minutes for a successful completion of this task. Your robot must be able to perform this task multiple times for it to be successful.



#### Lab Report

Each student should describe, in detail, the process of designing the programs to manipulate your robot for the above tasks. In particular, please describe the following in your report:

- Any physical changes to your robot design for the tasks above
- Designs of your programs in plain language
- Challenges you encountered and how you coped with them
- Observations of the performance of your robot's sensors and effectors

Your report should be between 1 and 3 pages long, single-spaced, in Times New Roman 12 point font. Please turn in your program, either on paper and electronically via email.

The grade for this lab will be determined according to the following:

- Successful completion of Tasks above (60%)
- Lab Report :
  - o Overall quality (10%)
  - o Design process and challenges (10%)
  - o The program (10%)
  - o Sensor/effector performance (10%)

Demonstrations and evaluations of your work for this lab will take place on October 5<sup>th</sup>, during the lab period. Lab reports are due on Monday October 8<sup>th</sup>, before the beginning of the class period. Late submissions will be accepted for 24 hours after the due date and time and will carry a penalty of 50% reduction in the lab grade. No assignments will be accepted after the expiry of the 24 hour extension period.