

# CPE 470-670 – Autonomous Mobile Robots

**Instructor: Monica Nicolescu**

## Lab 3 – Handout

### Corner Escape Contest:

This lab will rely on the sonar obstacle avoidance capabilities you developed in the previous lab and learn to use the RF ID sensor. In the **corner escape** contest, you are supposed to write a program for your robot to go through a tunnel with a dead end and come out of it from where it started and not get stuck in it. The contest will be held at the beginning of Lab 4.

### Contest Rules:

- In this contest we will record the time that each robot takes to go to the end of the tunnel and come back. The winner is the robot that reaches the end and returns in the fastest time.
- The end of the tunnel will be marked by an RF transponder card (which can be detected using the RF ID sensor). To indicate that it reached the end, the robot should make a significantly loud sound when the RF card is detected. Download the `RFIDlib.nxc` and `RFID_demo.nxc` from <http://www.cse.unr.edu/~monica/Courses/CPE470-670/Resources/Examples/>.
- If the robot returns from the tunnel without reaching the end, it will be disqualified from the contest.
- Your robot should monitor its own performance in order to avoid getting stuck. This can happen in particular at the end of the tunnel, where the robot may end up turning from side to side in an infinite loop.
- The angle in which the robots will start going through the tunnel is not known to you prior to the contest (however, they will be facing toward the inside of the tunnel). All robots will start at the same angle.
- The tunnel shape will contain one or more left and right turns.

### Programming tips:

- a) To avoid getting stuck (e.g., the robot turned left/right more than 4 times in 2 seconds) you may decide to do a random turn to get out of the trouble. Try to show when your robot is doing a random turn (either use the LCD screen to print a message on it or use the beeper.)
- b) Try using functions as much as possible. Write basic functions of your robot like turning left or right, left-sensing or right-sensing, etc as different functions in your code so that you will be able to use them in future.
- c) Program your robot so that it goes as straight as possible when it is supposed to do that.

### Reporting:

The report for this lab is due on September 24, one week after the contest.