Computer Science
Robot Assignments
Revision A

1. Navigate the perimeter of a rectangular enclosed space.

   a. Navigate

   b. Measure and report the area

   c. Measure and report the circumference

2. Consider that your robot is a Zamboni. Create and execute an efficient ice-dressing traversal of the enclosed space (rink). How will you adjust from a rectangular enclosure to one that represents an elongated oval (like a hockey rink)?

3. Find center of mass of a rectangular enclosure.

4. Make your robot function as a measurement tool.

   a. Measure the distance between a movable object and the robot and display the result on the LED display by adjusting the number of LEDs that are on.

   b. Change the precision of the output / display by using both color and number of LEDs. For example, red range is between 0 – 25 cm, yellow range is between 26 – 50 cm, green range is between 51 – 75+ cm, etc.

   c. Augment your solution with sound using different notes to indicate distance.

   d. Augment your solution to cause the robot to move backwards if the object comes closer than 5 cm.

5. Create an interactive robot control interface.

6. Program your robot to follow another robot that is being controlled by an operator using the interactive robot control interface.

7. Build a ramp that will cause the robot to roll over as it drives up the ramp. Monitor the robot's position and attitude to detect if it rolls over. When it does, send an alert to the console, disable the motors and cause the LEDs to flash 4 times a second.