

Checkpoint #4 Full Function Demonstration

● Purpose:

The purpose of this checkpoint has two goals. First, making sure that your robot can detect a beacon signal and move towards it. Second, combine all the function as Obstacle Avoidance, Hockey Seeking (Light-ball detection) and Goal Seeking (IR signal receiving and moving toward goal) together for robot hockey contest.

For this assignment, two infrared diodes will be set up at opposite ends of an arena. Each diode will be emitting light modulated at 38 KHz, but their pulse width are different when received by IR receiver module.

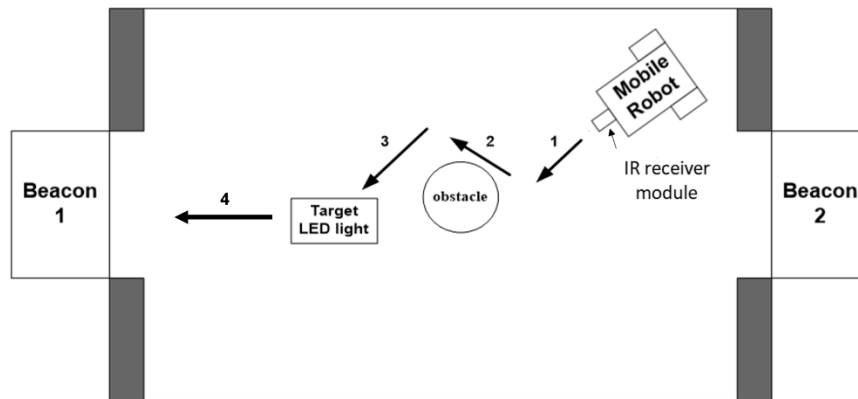
You will need to demonstrate your robot's capabilities under relaxed conditions with no other robots in the arena. The arena will be the actual contest arena.

● Tasks:

Please demonstrate your robot performing the following actions:

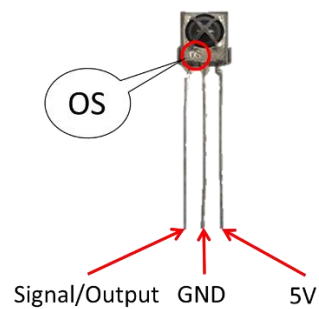
1. Have the ability to avoid all the obstacle in the arena. (20%)
2. Capture the hockey puck. (20%)
3. Your robot should be able to find **two different beacons (Beacon-1 600 and Beacon-2 1500)** and move to the specified beacon in the arena and bring the puck into the goal , respectively, of Beacon1 and Beacon 2. (25%)
4. The time to complete the goal of **Beacon-1 600** and the goal of **Beacon-2 1500 (25%)**.
5. Should complete the mission in 120sec. (The completing time will be counted for grading.)(10%)

Arena:



● Materials list:

	Material	Number
1	PIC-428 LM IR receiver	1

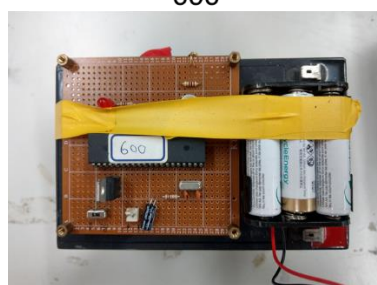


Using IR receiver to find beacons(Beacon-1 600 and Beacon-2 1500) which is the goal.

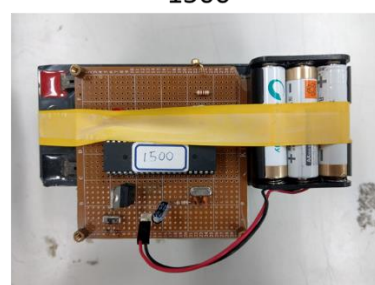
● Beacon (Provided by TA):

Two infrared diodes are set up at opposite ends of the arena. Each Beacon will emit light modulated at 38KHz, but their pulse widths are different when received by the IR receiver module.

Beacon-1
600

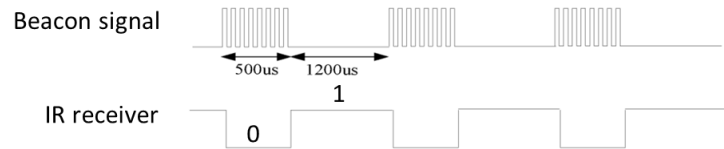


Beacon-2
1500

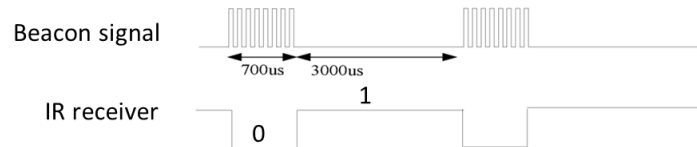


● Search Beacon:

- Beacon-1 600



- Beacon-2 1500



Receive IR data for a period of time(≥ 0.1 seconds) and calculate the pulse proportion.

$$\text{Ratio} = \frac{\text{number of 0}}{\text{total data(include 0 and 1)}}$$

If your goal door is 1500, the ratio is between 0.17 and 0.22.

If your goal door is 600, the ratio is between 0.27 and 0.32.