

Navigating your robot

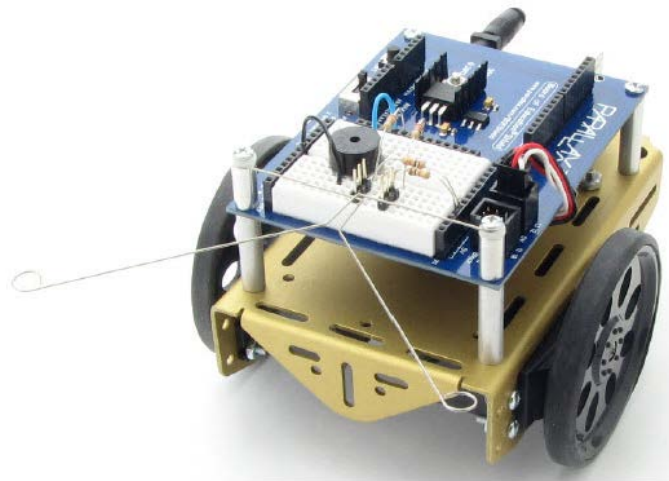
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Introduction

In this lab, we are going to make Parallax Kit navigate with whiskers and Infrared (IR) headlights.

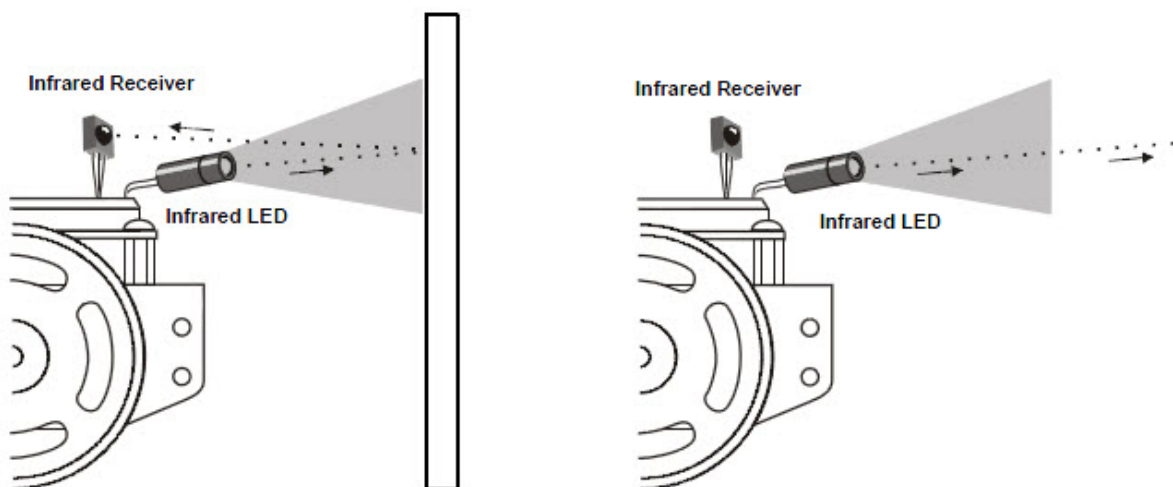
Whisker switches give the robot the ability to sense its surroundings through touch as it roams around. We build whisker switches on the robot and use them to navigate the robot. When the left whisker touches an obstacle, the robot turns right because the obstacle is on the left-side. For right-side works similarly.

Figure 1



The IR LEDs emit infrared light, just like the red LEDs we have been using emit visible light. However, IR is light the human eye cannot detect. When infrared light is reflected, IR receiver can detect it and consider an obstacle ahead. If infrared is not reflected, IR receiver detects nothing (Figure 2).

Figure 2



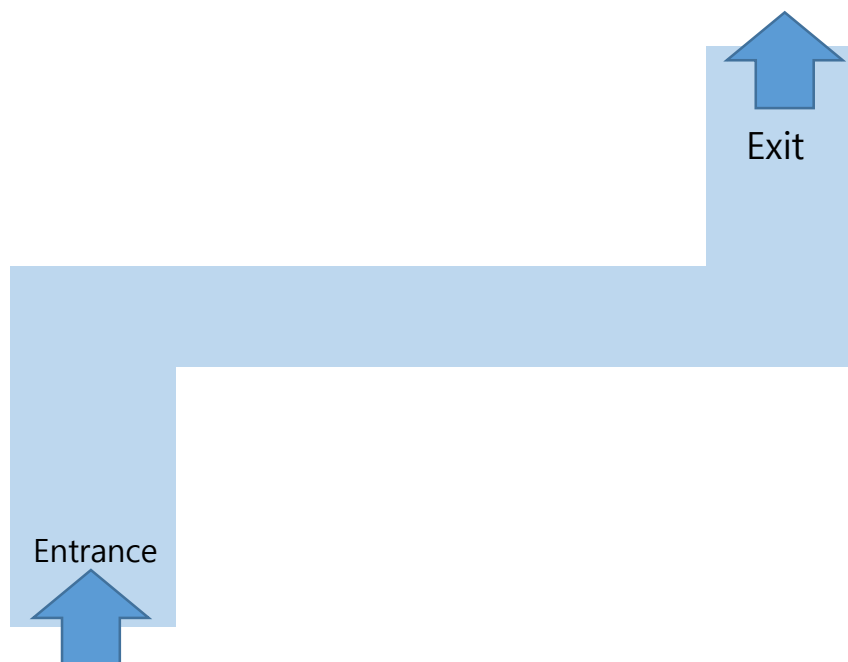
In this lab, you will learn:

- How to sense surroundings with whisker switches and IR sensors.
- How to make your robot navigate with sensed information.

Problem Specification

The assignment is more difficult navigation using only one IR sensor. With one IR sensor, it is difficult to detect obstacles surrounded. You have to stop when an obstacle is detected, decide either left or right to go. For simplicity, we consider only turning right or left by 90 degree.

Given the terrain shown below, program your robot to avoid the obstacles with one IR sensor.



Reports Evaluation Criteria

Each item listed below will be checked when your report is evaluated. Some points will be taken off if there is any omission or improper content.

Preliminary Report

Please read chapter 5 and 7 of '[Robotics with the Board of Education Shield for Arduino](#)' and answer questions below:

- How do Whisker switches work?
- Where are IR Sensors applicable? Give an example and explain.
- If your robot (having only one IR sensor) is approaching the corner, how would you program to avoid it? Explain your algorithm.

Final Report

Please include followings in your final report:

- Draw the schematics of two examples: Whiskers and IR Sensor, and explain them.
- Attach example codes and explain them.
- Describe the difference between having 2 IR sensors and 1 IR sensor. Explain how different and how difficult to navigate with only 1 eye.

Notes

TAs are very strict on copying and plagiarizing. You can refer to books, papers and internet pages. However, you cannot borrow them 'as is' if you do not explicitly indicate the source that you have cited. Also, it is strongly recommended that to write down what you've understood in your words.

Your report does not need to include a cover page and you can format it freely. (Because TA do not evaluate how beautifully you format it.) However, the content of the report should be precise. We receive the report using the <http://klms.kaist.ac.kr>. You can submit your report (or a part of it) in hardcopy if you want to.

When you upload your compressed project file, preliminary report and final report, you must follow the format described below. Also you must use pdf format for preliminary and final reports.

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