

# CS 1301

## Homework 6– Sensing Line Color and Orientation

**Due: Thursday October 22nd, before 11:55pm PM EST.**

**Out of 130 points**

**Files to submit:    hw6.py**

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For Help:

- TA Helpdesk – Schedule posted on class website.
- Email TAs

Notes:

### **PAIR PROGRAMMING Assignment: Work with your partner!**

This assignment can be completed with a 2<sup>nd</sup> pair programming partner. (e.g. Pair 2 partner assigned in recitation). You may work alone if you choose to do so, but please notify your assigned partner and TA's so that they can get a new partner. If you pick a partner, it must be from your assigned recitation, and it **MUST NOT BE SOMEBODY WHO YOU HAVE WORKED WITH PREVIOUSLY!**

For pair programming assignments, you and your partner should turn in identical assignments. Your submission must not be substantially similar to another teams' submission. Collaboration at a reasonable level will not result in substantially similar code. Students may only collaborate with fellow students currently taking CS 1301, the TA's and the lecturer. Collaboration means talking through problems, assisting with debugging, explaining a concept, etc. You should not exchange code or write code for others.

- **Don't forget to include the required comments and collaboration statement (as outlined on the course syllabus).**
  - **Do not wait until the last minute to do this assignment in case you run into problems.**
  - **If you find a significant error in the homework assignment, please let a TA know immediately.**
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### **Part I --- Introduction**

Well, now you've spent some time getting to know your robot. Perhaps you even gave it a name and a back story, let's get a bit more involved.

#### **Mission:**

With your team, you will need to satisfy the following problem: Your robot will randomly be shown a page with a printout of a vertical line or a horizontal line, and the line will either be red or blue. **The page will be completely white except for the line.** (You can print your own pages by using the last four pages of this document.) The lines will be thick and they will span the entire width/height of the page. The page will be held close enough to your robot so that the page fills the entire image frame (**about 6 inches away**). You need to write a program to get your robot to determine if the page it is looking at contains a vertical line or a horizontal line. The robot should also determine whether the line

is blue or red. Once the robot has determined what it looking at, it should move and make noise as follows:

- If it sees a vertical line, it should move forward and backward.
- If it sees a horizontal line, it should spin left and right.
- If the line is red, it should beep once for two seconds.
- If the line is blue, it should beep twice for two seconds each with a two second pause between beeps.

**Hint:**

Each pixel contains RGB values ranging from 0 to 255. The RGB values for a pure white pixel are (255, 255, 255). You are trying to detect red pixels with RGB values (255, 0, 0) and blue pixels with the RGB values (0, 0, 255). You will need to be conscious of this when detecting whether the line is red or blue. It may be helpful to use compound conditional statements. **Note that your camera will probably not give “pure” values, so the numbers may be smaller than 255.**

*If you need help with the move functions, go to:*

[http://calicoproject.org/Calico\\_Myro#Movement\\_Functions](http://calicoproject.org/Calico_Myro#Movement_Functions)

*If you need help with the image processing functions, go here:*

[http://calicoproject.org/Calico\\_Myro#Image\\_processing](http://calicoproject.org/Calico_Myro#Image_processing)

**Part Two --- Turning it in, and Demo.**

Be sure to put the lines “from myro import \*” and “initialize()” or “init()” at the beginning of the file (after the required comments). Be sure not to specify the port parameter in your initialize command, such as initialize(“com4”). This makes it very time consuming to grade if we have to go into your code and change the com port to the one that works on our specific system.

**Reminder on collaboration statement and submission:**

This is a group assignment, but each person is responsible for their own submission. **Each group member** needs to turn in hw6.py to T-square before the deadline. Please include your name, and all your group members' names in the collaboration statement.

**Demo:**

Each group (**All members**) needs to come to the TA's help desk or recitation to demo the program to one of the TAs, **preferably your grading TA**. You will be asked questions regarding your code as well. If one of the group members is not present for the demo, his/her grade will be based **ONLY** on the code portion (a possible 60 points) UNTIL they come see a TA to answer questions relating to the code. *Print out and bring a TA demonstration grading sheet (in two pages) to your demo! The TAs will likely not have copies.*

## **Grading Rubric:**

<b>Demo (TA's Discretion, bring next page to your demo)</b>	<b>70 pt</b>
<b>File named correctly</b>	<b>5 pt</b>
<b>Demonstrates correct use of iteration</b>	<b>5 pt</b>
<b>Correctly detects horizontal line</b>	<b>10 pt</b>
<b>Correctly detects vertical line</b>	<b>10 pt</b>
<b>Correctly detects red line</b>	<b>10 pt</b>
<b>Correctly detects blue line</b>	<b>10 pt</b>
<b>Robot moves/beeps correctly based on lines detected</b>	<b>10 pt</b>

# Scribbler Line Sensing Assignment TA Demonstration Grading Sheet

Group Members: \_\_\_\_\_

\_\_\_\_\_

Demo TA: \_\_\_\_\_

Grading TA (if different): \_\_\_\_\_

10 pts \_\_\_\_\_ Robot detects vertical line and moves accordingly.

10 pts \_\_\_\_\_ Robot detects horizontal line and moves accordingly.

10 pts \_\_\_\_\_ Robot detects red line and beeps accordingly.

10 pts \_\_\_\_\_ Robot detects blue line and beeps accordingly.

30 pts \_\_\_\_\_ All group members can explain how the code works.

Total: \_\_\_\_\_ / 70







