EGR 120 Due date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Introduction to Engineering

File: N120Bot4

### Team Assignment #4

## Navigating the Arduino-BOT using Whiskers

**References**:

1) Arduino-BOT Lecture #4 - <http://faculty.tcc.edu/PGordy/Egr120/>

2) Robotics with the Board of Education Shield for Arduino web tutorials - <http://learn.parallax.com/tutorials/robot/shield-bot/robotics-board-education-shield-arduino>

3) Board of Education Shield for Arduino documentation - <https://www.parallax.com/downloads/robotics-board-education-shield-arduino>

4) Arduino web site (software, microcontrollers, examples, and more) - <https://www.arduino.cc/>

**Team Assignment:**

1) Adding whiskers to the Arduino-BOT

If whiskers have already been added to your Arduino-BOT, skip to step 2. If your Arduino-BOT does not have whiskers, add them by following the instructions in Arduino-BOT Lecture #4.

2) Adding a whisker test circuit to the Arduino-BOT

* Add a whisker test circuit to your Arduino-BOT as shown in Arduino-BOT Lecture #4.
* Enter the whisker test circuit program shown in Arduino-BOT Lecture #4.
* Test the circuit. When the left whisker is pressed, the left LED should light. When the right whisker is pressed, the right LED should light.
* Save and print the program (include required comments as usual).
* Demonstrate the circuit to the instructor when it is working correctly.

3) Navigating the track with whiskers

* Enter the whisker navigation program shown in Arduino -BOT Lecture #4 or download it from the course Blackboard site.
* Try navigating the track shown on the following page with the program just loaded. Save this program before making modifications in the next step. Save the modified program (see next step) under a different file name.
* The Arduino -BOT probably had some difficulty in navigating the track, so try modifying the program until the Arduino -BOT can efficiently navigate the track. For this assignment the Arduino -BOT must make its navigation decisions based on inputs from the whiskers (no dead reckoning).
* Demonstrate proper operation to your instructor.
* Print out the original program and the modified program. Highlight any changes made in the modified program.
* The fastest team will earn bonus points (as timed by the instructor).

## Arduino-BOT Test Track

4) **Report**

Organize your results into a report and submit a single typed report for the group to the instructor by the assigned due date. The report should consist of:

1. Title Page – Include a title page as shown below.
2. Printouts – Include printouts for both programs (be sure to include required comments).

* Whisker Test Program
* Whisker Navigation Program (modified with changes highlighted)

1. Discussion **-** Write 1-2 paragraphs discussing the following:

* Discuss the modifications that you made to the navigation program.
* How difficult was it to program your Arduino-BOT to complete the course?
* How many times did you have to adjust your program to complete the course (an estimate)?
* What was your final time? What was the fastest time in the class?
* How reliable is navigation using whiskers?

EGR 120

Introduction to Engineering

# Team Assignment #4 – Navigating the Arduino-BOT using Whiskers

Date

Group #N (your group number)

Arduino Kit Number

Attendance & Participation Record:

(list all team members and all dates when teams worked

together in class on this assignment and check boxes to mark attendance)

|  |  |  |
| --- | --- | --- |
| Team Member | Date 1 | Date 2 |
| John Doe | ✓ | ✓ |
| etc |  |  |
|  |  |  |
|  |  |  |

Demonstration of Programs

|  |  |  |
| --- | --- | --- |
| Program | Successfully  Demonstrated | Time |
| Whisker test circuit | ✓ | - - |
| Track Navigation | ✓ | Record time |

Instructor’s Checksheet

EGR 120 - \_\_\_\_\_ (section)

Semester: \_\_\_\_\_\_\_\_

**Team Assignment #4 – Navigation with Whiskers**

|  |  |  |
| --- | --- | --- |
| Team | Program 1: Demonstrate whisker test program | Program 2: Navigate entire course  ***(record time) \**** |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |
| 6 |  |  |
| 7 |  |  |
| 8 |  |  |

✓ - Program has been demonstrated (Program 1)

***\* 10 points extra credit for the fastest team!*** (Program 2)