

COGS 300 – Lab 1

Due:

Monday Lab

Starts: September 15

Proposal Diagrams: September 22

Demo: September 29

Report: October 6

Wednesday Lab

Starts: September 17

Proposal Diagrams: September 24

Demo: October 1

Report: October 8

Goal:

Design, build, and program a robot that can navigate a four way intersection. Your robot must navigate a 4-way intersection where all robots will make a left-hand turn. The goal of this task is to cooperate with other groups to ensure success.

Setup:

Robots will be placed on the right side of the road at each end of a four way intersection. The intersection will be enclosed by white tape on all sides, and the sidewalks will be marked with black tape.

You will be allowed to use 1 NXT, up to 2 sensors and 2 motors.

Grading:

Proposal Diagrams	/2
Demonstration	/5
Pseudo code	/2
Commented code	/5
Design process	/6
Connections	/5

Proposal Diagrams

At the beginning of the lab on Sept 22/Sept24 each group will submit two proposed solutions for the problem at hand. This proposal should include a diagram that outlines the logic of the steps that your robot will take to complete the problem (at high level, so try not to include steps for each sensor).

Two brief paragraphs should describe each solution, including any assumptions made or problems that you could run into. A third should describe why you have chosen one solution over another (~100 words each paragraph). (Note, your final solution does not have to match the proposals, but if they differ it should be explained in your report). One mark will be awarded for completion, one mark will be awarded for your solution and descriptions (full marks given to solutions that are distinct and clearly thought through).

Demonstration

This lab will be cooperative within your lab section, but competitive between labs. Each lab will run 3 trials (up to the decision of the groups within the lab, eg) one at the start of lab on demo day, two near the end of lab giving time for any necessary changes etc. **This must be agreed upon before trial 1 begins**). All robots in the lab section must successfully complete the left-hand turn. If all robots are successful on trial 1, every group will receive 4/5, trial 2: 3/5, trial 3: 2/5. The remaining 1 mark will be rewarded to each lab group within the winning section. The winning section will be the one that has the fastest completion time (out of any of the 3 trials).

Pseudo Code – Flow Chart

Refers to an informal process in which you lay out what your algorithm does in a step by step manner. Your pseudo code should look like a more detailed version of your proposal diagrams, including individual steps. It should allow the reader to walk stepwise through your code. It should be more detailed than your proposal because it will include specific actions and decisions of your robot. See: <http://cdn.robotc.net/pdfs/vex/curriculum/Pseudocode%20and%20Flowcharts.pdf> for an example.

Commented Code

This should be a copy of your actual code. Ensure that you comment your code thoroughly, explicitly defining all methods, tasks, variables and classes. Do not assume that your algorithms are clear to anyone reading the code for the first time.

Design Process

The first component of your write up is a discussion of your general approach to the assignment. Explain why you built like you did, why your program exhibited the behaviours it did, and which approaches you found successful. Be sure to justify any design decisions made, list any difficulties you encountered, and explain why your particular strategy is the best to handle the task.

Connections

The literature/lecture component of your write up should attempt to link what you have learned in the lab with material covered in lecture or assigned readings. Make sure you cite your sources in APA.

This section will be graded on both creativity and quality of the connections made. Think about some of the challenges you encountered while programming your robot. Are any of these similar to existing

conundrums in cognitive science today? Did you find any particular technique helpful when trying to get your NXT to complete the task? What does the relevant literature say about this technique? What constitutes intelligent behaviour and did your robot exhibit this? Did completing the lab project help you better understand any topics covered in lecture? What was the topic and how did it contribute?

Students are advised to pick one or two major connections and explore them in depth rather than identifying a large number of connections and discussing them superficially. Make connections and be ready to defend them!

Style

We reserve the right to reduce up to 2 marks from overall grade due to error-prone writing that would impede understanding. Make sure to proofread your papers before submitting.