COGS 300 – Lab 3 – Three pages max (excl. code)

NOTE: Because this is a between-lab competition, the demo will be in GEOG 100, during normal class time.

Due:

Monday Lab
Starts: March 2\textsuperscript{nd}
Proposal Diagrams: March 9\textsuperscript{th}
Demo: April 2\textsuperscript{nd}
Report: April 9\textsuperscript{th}

Wednesday Lab
Starts: March 4\textsuperscript{th}
Proposal March: March 11\textsuperscript{th}
Demo: April 2nd
Report: April 9\textsuperscript{th}

Goal:

Design, build, and program a team of robots to play a game of Capture the Flag. Each lab's team will be composed of four NXTs - each group will be responsible for one of these players. The goal is to capture the opponents flag while not letting the opponent capture yours.

Setup:

Each team will be allowed 4 NXT robots and half the available sensors and motors. The robots will compete in a “field” marked by tape, the field will be split into two zones, at the back of each zone will be a team's “flag”, in a spot determined by the TAs. To score points, teams must bring the other team's flag to their flag's zone.

Grading:

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Proposal Diagrams

At the beginning of the lab on March 9\textsuperscript{th}/11\textsuperscript{th} each lab will submit a written overall plan for the challenge
– to be decided cooperatively by the lab section as a whole, and not exceeding 200 words.

In addition, each group will submit two proposals for how their robot will fit into the plan. The individual proposal should include a flow-chart that outlines the logic of the steps that your robot will take to complete the problem.

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).

Two marks mark will be awarded for the lab's overall plan, and two more each individual group's proposal.

**Demonstration**

Marks for the demonstration will be broken down into two parts. 5 points will be given based on the lab section's performance.

5/5: Goes to the winning team

4/5: Goes to losing team if they lost by 1 point.

3/5: Goes to losing team if they manage to score.

A mark between 0 and 2 is given based on merit if the losing team is unable to score any points.

A further 3 points will be awarded based on the performance of each group's individual robot. These marks will be awarded based a robot's intended role and its performance in the demonstration.

**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](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 your robot's role in the team, why you built it 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 behavior 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.