

# Midterm Exam Sample Questions

COCS 4550/5550 – Intro to Artificial Intelligence

Exam to be held Nov. 20, 2017

Name: \_\_\_\_\_

Notes:

- Many questions involve many sub-questions. It is your responsibility to make sure you answer each part of each question!
- If I can't read your handwriting, I can't give you credit...
- Show your work: it may give you partial credit.
- The test is long: use time strategically and efficiently

**Problem 1** What was the “Dartmouth Conference”? And what is one important idea or consequences that came out of it?

**Problem 2** Give one advantage of depth-first search over breadth-first search, and one advantage of breadth-first search over depth-first search.

**Problem 3** Does the A\* algorithm stop when it first expands a goal state? Why or why not?

**Problem 4** In the context of optimization, define the gradient, and mention (at a very high, conceptual level) how it is used.

**Problem 5** Describe the minimax algorithm (in plain text, or pseudocode), and what types of problems it should be used on.

**Problem 6** Suppose that 4 percent of men and 0.75 percent of women are colorblind. A colorblind person is chosen at random. What is the probability of this person being male? Assume that there are equal numbers of men and women in the general population. Use Bayes rule and show your work.

**Problem 7** In the context of Kalman filters, why are particle filters important? What assumption do they help us to overcome?

**Problem 8** Give a real-world example of an application where you would want to use a Kalman filter.

**Problem 9** Define reinforcement learning.

**Problem 10** Name one benefit of using a discount factor in reinforcement learning.

**Problem 11** How does classification differ from regression?

**Problem 12** Why is the logistic activation function preferred over the step function in logistic classification (and why is this property important in mutli-layer neural networks too)?