

CS 4752 – Assignment 5 – Take Home Quiz

Note: There are **no partners** for this assignment. All work must be done by yourself, and you are not allowed to discuss your answers with any other members of the class. Any collaboration on this assignment will be considered cheating, and academic discipline will be pursued.

Please answer all questions to the best of your ability, writing at most 2 paragraphs or so for each answer. These are intuition and understanding problems, so please don't try to google the answers.

Your answers must be typed, and submitted as a single PDF document on D2L before the due date of Wednesday, April 5th @ 11:59pm.

Heuristic Search

1. Explain why for Assignment 1, the 4-directional Manhattan distance heuristic is not an admissible heuristic for 8-directional movement.
2. In A1, why were nodes in the closed list of A* never re-expanded?
3. Intuitively, for zero-sum games, why is the minimax solution the same as a Nash Equilibrium?
4. Why is iterative deepening needed to implement a time-limit stopping condition for Alpha Beta?

Reinforcement Learning

5. Devise 2 different examples of tasks (not mentioned in the lectures) that fit into the reinforcement learning framework. Identify their states, actions, and rewards.
6. What is the difference between Rewards and Values in Reinforcement Learning algorithms?

Genetic Algorithms

7. The Mutation Rate is very important in Genetic Algorithms. What is the intuitive effect of setting the mutation rate too low in your GA? What about too high?
8. In Assignment 4 you ensured both parents weren't the same. Why does this help?

Neural Networks

9. What was the reason for 'smoothing' the activation function (replacing thresholding with a sigmoid function) of a Neuron in a neural network?
10. Why are convolutions such a powerful technique for image classification?