Design Defense Project 2:

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* Analyze the differences between human and machine approaches to solving problems.
  + Describe the steps a human being would take to solve this maze.
    - A human would take a look at the maze and establish the start and look for the finish. If the hope is to collect the most points while moving in the least moves in order to avoid deduction in points, then a human would maybe trace out potential paths or mentally evaluate the maze in order to figure out the best outcome.
  + Describe the steps your intelligent agent is taking to solve this pathfinding problem.
    - My intelligent agent uses reinforcement learning to try to reach the end of the maze by collecting points and avoiding roadblocks. In doing so it uses reinforcement learning which is a machine learning technique for solving problems by a feedback system (rewards and penalties) applied on an agent which operates in an environment and needs to move through a series of states in order to reach a pre-defined final state. The intelligent agent experiments and utilizes past episodes to learn through trial and error in search of the maximal sum of rewards.
  + What are the similarities and differences between these two approaches?
    - Reinforcement learning was designed to mimic how a human would process through a problem. The difference is that an intelligent agent has the computing power to explore the maze at such a higher rate. In doing so it’ll remember it’s past episodes, use those to evaluate what worked (think points and number of moves) puts together a route that maximally meets the goal of the program.
* Assess the purpose of the intelligent agent in pathfinding.
  + What is the difference between exploitation and exploration? What is the ideal proportion of exploitation and exploration for this pathfinding problem? Explain your reasoning.
    - Exploitation is finding what works and continuing to use that to accomplish a goal. With that though, it may not always be the most efficient way to do something that maximizes the reward. Exploration explores other opportunities to find out what could me better. Although this may lead to some failed attempts it could likely also lead to a higher reward or quicker results. The ideal proportion is striking a balance between the two. Initially there needs to be sufficient exploration such that the best options may be identified. Then exploit the optimal option in order to maximize the total reward. Typically the exploration rate is between 0 and 1.
  + How can reinforcement learning help to determine the path to the goal (the treasure) by the agent (the pirate)?
    - The agent used experiences to explore and then exploit the potential options for maximal points and minimal point reductions. It utilized the past episodes to establish what was the maximal reinforcement it could receive.
* Evaluate the use of algorithms to solve complex problems.
  + How did you implement deep Q-learning using neural networks for this game?
    - For these games the pirate explored a previously unknown route 1 in 10 times. In doing so it built a neural network of potential routes and the success of those paths when in regard to potential points, moves, and if the episode was considered a win.

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