* **Analyze the differences between human and machine approaches to solving problems.**
  + Describe the steps a human being would take to solve this maze.

To solve this maze, human beings would use their different senses to decide on which direction they should go. Since we have eyes and can obtain visual information, we can use this information to determine which direction would put us the closest to the treasure.

* + Describe the steps your intelligent agent is taking to solve this pathfinding problem.

The intelligent agent solves this maze by using a deep Q-learning algorithm. This algorithm estimates values based on the next possible action for the agent to take. The agent will take the action with the value that is most beneficial. After each action, new estimates will be presented to the agent and the next most beneficial action will be taken.

* + What are the similarities and differences between these two approaches?

The similarities between the AI and human in this situation are the facts that both have ways of deciding which action will put us closer to the goal. With humans, we can visually confirm that we’re getting closer to the intended goal, but with the AI it has to play the game over and over to decide which path is the quickest to use based on various calculations.

* **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 the act of the agent using knowledge it has already gained to decide which is the best action to take next. Exploration is the agent taking a completely random path not based on prior information to gain more knowledge. Each problem would have its own ideal proportion of exploitation and exploration, and I believe that this problem should be 50/50. The agent can train through exploration and use exploitation afterwards to refine the path taken.

* + How can reinforcement learning help to determine the path to the goal (the treasure) by the agent (the pirate)?

By running the maze over and over, the agent can determine the values of all its next possible moves. After lots of reinforcement learning, the agent will know exactly which path will be the shortest to the treasure due to the stored Q-values.

* **Evaluate the use of algorithms to solve complex problems.**
  + How did you implement deep Q-learning using neural networks for this game?

First, the agent needs to know the basics of the environment it will be training in, such as what are walls, valid paths, and the treasure. Then, the intelligent agent has its available actions defined such as moving up, down, left, and right. The neural network takes a state input and generates estimated Q-values to help the agent decide which path to take next. Next, the agent uses a mixture of exploration and exploitation to refine the Q-values for future iterations. The training loop is repeated until we’re satisfied with the agent’s results.