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Assignment 1

Question 1: Environments.

- If an environment is stochastic, actions have more than one possible outcome. An example of a stochastic environment is driving. An example of a deterministic environment is playing chess. The difference between these two examples is that while driving, you can't guarantee that your actions will always lead to the same result, however, when playing chess, no unexpected situations can arise, and every move you make will have a guaranteed outcome.

- If an environment is partially observable, there are things that we cannot sense and we need to use our intuition. Chess is an example of a fully observable environment and poker is an example of a partially observable environment. The difference between these two is that in chess, you are fully aware of all the pieces of the game but in poker, you can't see the cards your opponent holds.

- A sequential environment is when you need to complete a sequence of tasks in order to achieve a goal and requires recall of previous events. An example of an episodic environment is setting an alarm and an example of a sequential environment is playing guitar. The difference between these two environments is that setting an alarm doesn't require real thinking; you just set the alarm and are finished. Playing guitar is a sequential environment because it requires many steps that need to be completed in the right order to play the song correctly.

- A dynamic environment is an environment that is changing while the action is being performed. An example of a static environment is shooting a free throw in basketball and an example of a dynamic environment is snowboarding. The difference between these two is that when shooting a free throw, everything is stationary and you don't need to worry about anything besides shooting the ball. Snowboarding requires you to be constantly thinking and adapting to the environment as you go down the mountain.

- An online environment is one that needs to complete actions in real-time. An example of an offline environment is a calculator and an example of an online environment is a self-driving car. A self-driving car needs to make decisions in real-time and react to unexpected conditions while a calculator does not require an internet connection and only needs to worry about the input it receives.

Question 5

a) An environment is considered to be stochastic if its future states cannot be fully determined based on the present state and the past history of the environment. In other words, the outcome of an event in a stochastic environment is probabilistic and depends on chance.

An example of a stochastic environment is rolling a die. The outcome of each roll is not deterministic and depends on chance. On the other hand, an example of a deterministic environment is a simple mechanical system, such as a pendulum swinging back and forth. The future states of the pendulum can be fully determined based on the present state and its previous states.

b) An environment is partially observable if the agent cannot fully observe all aspects of the environment that are relevant to making a decision. In such an environment, the agent must infer the state of the environment based on partial information.

An example of a fully observable environment is a chess board, where the agent can see the entire state of the board. On the other hand, an example of a partially observable environment is playing poker, where the agent can only see its own cards and must infer the state of the game based on the actions of other players.

c) An environment is sequential if the agent's decisions and actions at each time step affect the future state of the environment. In other words, the order in which actions are taken is important in a sequential environment.

An example of an episodic environment is playing a single game of chess, where the outcome of the game does not affect the next game. On the other hand, an example of a sequential environment is playing multiple games of chess, where the outcome of each game affects the next game.

d) An environment is dynamic if the state of the environment changes over time, regardless of the actions of the agent. In other words, the environment is not static and can evolve over time.

An example of a static environment is a simple maze where the structure of the maze does not change. On the other hand, an example of a dynamic environment is a simulation of a stock market, where the prices of stocks can change over time based on various factors.

e) An environment is considered to be online if the agent must make decisions in real-time, without access to the entire history of the environment. In other words, the

agent must make decisions based on the current state of the environment and its immediate history.

An example of an offline environment is a batch processing system, where the agent can process all the data at once before making a decision. On the other hand, an example of an online environment is playing a real-time video game, where the agent must make decisions in real-time based on the current state of the game.

- ChatGPT's answers are correct and I would not be able to distinguish its answers from an actual person's. There are a few instances where ChatGPT could have elaborated further on the answer. For example, when ChatGPT said playing multiple games of chess is a sequential environment, it would have been useful for an explanation.

- ChatGPT was able to correctly say which answers were written by a human. It basically said that my answers came from a human because I made grammar mistakes. I agree with its analysis although I don't think my grammar is that bad, although it isn't amazing when compared to a language model.

Question 6

- The Chinese Room argument says that although a computer may be able to pass the Turing test and produce intelligent responses to intelligent questions, computers lack semantics and don't truly understand the language in the way humans do. Similar to how a person in a room may be able to respond to Chinese by looking things up in a book but it doesn't mean they actually understand Chinese.

- The books in the Chinese Room are essentially a simulation of an AI program. The books do not have any translation of the Chinese text, they only provide instructions, kind of like a computer algorithm. This has to do with computers because Searle is essentially arguing that AI receives input and then provides an intelligent response without understanding the meaning of the input it receives. In the same way that the person in the Chinese Room doesn't understand Chinese but is able to provide an intelligent response.

- Searle believes that the Chinese Room shows that a computer can pass the Turing test without understanding because computers are good at recognizing symbols and following instructions. Computers have a set of instructions for every possible input and will produce an intelligent response giving the illusion of intelligence.

- I think that Searle's argument is very convincing. It makes sense to me that a computer would be good at recognizing patterns that are meaningless to it and following

instructions based on those patterns. I think that this brings up a point about consciousness. Computers may be able to at least appear to understand information but they lack consciousness. I find it hard to believe that a computer can have a mind of its own and make its own decisions without the presence of a human. I am yet to be convinced that a computer can think for itself.