

Q1:

- a) A stochastic environment is an environment full of randomness and unpredictability. This means that even if the same action is taken multiple times in the same environment it does not guarantee the same outcome every time. Self-driving cars are an example because we cannot control other driver's moves, there may be sudden turns or brakes we can't predict.
- b) A partially observable environment is one in which the observer (AI agent) does not have full access to all the information about the environment it operates in. This limited visibility can impact its decision-making processes. A self-driving car is an example of operating in a partially observable environment because of several reasons:
- Sensor Limitations: The sensors on a self-driving car do not have long range visibility like human eyes do, it might not spot the accident or incident far away.
  - Environmental Interference: Various weather conditions can obscure sensors' ability to collect accurate data, causing AI to receive inaccurate data

The main differences of between stochastic and partially observable is that: In a stochastic environment the same actions can lead to different outcome; and in a partially observable environment you don't have complete information to make decisions that can lead to the same outcome.

- c) An environment is described as sequential when every decision leads to a new state, each state is dependent on the history of previous decisions. The outcome is directly decided by the sequence of actions. Chess is an example of a sequential environment because each move leads to a new state, for example a blunder. And the outcome is directly decided by your sequential move.
- d) An environment is considered dynamic when the result changes over time, either from the actions taken by an AI agent or changes that occur independently from agent's decision making. Video games are good example because the characters

can make decisions that will impact the game's progress and plot based on the games

- e) Multiagent is when an environment involves multiple agents or decision makers. Each agent has their own plan and decisions that can impact the whole state of the environment. Poker is a good example because one decision maker can directly influence the behaviors of other agents. It makes the environment more uncontrollable and complex because there are now multiple sources contributing to the outcome.