Agent Architectures

Instructions

Answer the following questions by selecting the correct option (A, B, C, or D).

1. Question: What is an agent in the context of artificial intelligence?

A) A piece of software that can only perform pre-defined tasks.

B) An entity that perceives its environment and takes actions to maximize its goals.

C) A computer program that generates random outputs.

D) A physical robot with no decision-making capabilities.

2. Question: What is the purpose of representations in AI?

A) To confuse the user and increase the difficulty of tasks.

B) To provide a way to visualize algorithms.

C) To transform raw data into a form that can be processed by AI algorithms.

D) To replace human decision-making with automated processes.

3. Question: What does the term "sub-symbolic AI" refer to?

A) AI systems that use abstract symbols for all computations.

B) AI approaches that focus on high-level reasoning.

C) AI systems that operate on numerical data and patterns at a lower level of abstraction.

D) AI architectures that mimic human cognitive processes.

4. Question: In a hierarchy of representations, what does each level typically represent?

A) Different categories of data.

B) The complexity of algorithms used.

C) Different levels of decision-making.

D) Different levels of abstraction and detail.

5. Question: When considering the representation of systems, which statements accurately capture the relationship between flat and hierarchical representations?

A) Flat representations are always suitable for complex biological systems.

B) Hierarchical reasoning exclusively involves discrete components.

C) A flat description can only be continuous.

D) Hierarchical reasoning often incorporates both continuous and discrete aspects.

6. Question: Let's consider the decision-making process of a chess-playing AI. The AI can evaluate all possible moves on the board, foreseeing the outcomes several moves ahead, without any concern for computational limitations. It then selects the move that guarantees the best outcome based on this extensive analysis. Does this example exhibit both concepts of rationality discussed in the context of artificial intelligence?

A) Yes, the AI demonstrates both perfect rationality and bounded rationality.

B) No, the AI only showcases bounded rationality.

C) No, the AI only demonstrates perfect rationality.

D) Yes, the AI perfectly balances its rationality based on the situation.

7. Question: Consider an online shopping platform where users can browse and purchase products. The platform allows users to create wishlists, add items to their carts, and write reviews. The system tracks user interactions, such as viewed products, purchased items, and ratings given. Based on this information, the platform recommends products to users. Which representation is being used to model and analyze user interactions on the online shopping platform?

A) Explicit States

B) Features or Propositions

C) Individuals and Relations

D) None of the Above

8. Question: Consider a robotic vacuum cleaner deployed in a household environment. The robot navigates through rooms to clean the floors. It uses sensors to detect obstacles, such as furniture and walls, and adjusts its path accordingly. The robot follows a predetermined cleaning pattern for each room and completes cleaning tasks based on the user's schedule. Occasionally, the robot's sensors might be affected by lighting changes or the presence of reflective surfaces. What type of environment and behavior does the robotic vacuum cleaner operate in?

A) Fully-Observable and Stochastic
B) Fully-Observable and Deterministic
C) Partially-Observable and Stochastic
D) Partially-Observable and Deterministic

9. Question: In the realm of agent behavior and decision-making, different stages involve distinct types of reasoning and computation. Match the given situations to the corresponding types of reasoning and computation:

A) Design time reasoning and computation
B) Offline computation
C) Online computation

Situation 1: An AI-driven weather forecasting system processes historical weather data, satellite images, and climate models to create accurate weather predictions for the upcoming week. Situation 2: A software engineer is designing the logic and decision-making rules for an autonomous delivery robot that will navigate through a busy city to deliver packages efficiently. Situation 3: A financial trading algorithm evaluates real-time stock market data to make split-second decisions about buying and selling stocks.

10. Question: In the realm of agent control and interaction with the environment, which statements accurately describe the characteristics of controllers and their functioning?

A) Controllers have unlimited memory and computational capabilities.
B) Agents only receive sensory data in time, but their actions are not time-dependent.
C) The command specified by the controller is fixed and unchangeable throughout the agent's operation.
D) Controllers rely on both current and previous percepts to determine the command at a given time.

11. Question: In the context of agent memory and decision-making, consider the concepts of belief states and agent history. Which statement accurately reflects the relationship between an agent's memory, belief state, and decision-making process?

A) An agent's belief state encompasses only its current percepts and doesn't consider past history.
B) An agent's belief state includes all its past history, regardless of what it can access.
C) An agent's belief state encapsulates the agent's accessible history, aiding its current and future decision-making.
D) An agent's belief state is solely based on its percepts, ignoring any historical information.