Department of Computer Engineering

T.E. (Computer Sem VI)Assignment -1 Artificial Intelligence (CSC604)

Student Name: _Meetali Bhole_____ Roll No: __9591_____

CO Addressed:–CSC604.1 -To conceptualize the basic ideas and techniques underlying the design of intelligent systems.

Assignment 1:

1. Explain the concept of rationality in the context of intelligent agents. How does rationality relate to the behavior of agents in their environments? Provide examples to illustrate your explanation.
2. Discuss the nature of environments in which intelligent agents operate. What are the key characteristics that define an environment, and how do they influence the design and behavior of agents? Provide examples of different types of environments and the challenges they present to agents.
3. Describe the structure of intelligent agents and the types of agents commonly used in artificial intelligence. What are the components of an agent, and how do they interact to achieve intelligent behavior? Provide examples of different types of agents and their applications in real-world scenarios.
4. Outline the process of problem-solving by searching, including the role of problem-solving agents and the formulation of problems. How do problem-solving agents analyze and approach problems, and what methods do they use to search for solutions? Illustrate your explanation with examples of problem-solving tasks and the strategies employed by agents to solve them.

Rubrics for the First Assignments:

Indicator	Average	Good	Excellent	Marks
Organization (2)	Readable with some missing points and structured (1)	Readable with improved points coverage and structured (1)	Very well written and fully structured	
Level of content(4)	All major topics are covered, the information is accurate (2)	Most major and some minor criteria are included. Information is accurate (3)	All major and minor criteria are covered and are accurate (4)	
Depth and breadth of discussion and representation(4)	Minor points/information maybe missing and representation isminimal (1)	Discussion focused on some points and covers themadequately (2)	Information is presented indepth and is accurate (4)	
Total				

Signature of the Teacher

Meetali Bhole
9591
Comps A

Artificial Intelligence Assignment - 1

1) Explain the concept of rationality in the context of intelligent agents. How does rationality relate to the behavior of agents in their environments? Provide examples to illustrate your explanation.

ns → Rationality in the context of intelligent agents refers to the ability of an agent to make decisions that maximize the expected outcome or utility based on available information and goals.

→ A rational agent is one that takes actions to achieve its objectives, considering the current state of the environment and its knowledge.

Examples :-

- Chess - playing AI - A chess playing AI agents ~~set~~ that selects moves to maximize the probability of wining based on its evaluation of the current board position.
- Autonomous Vehicles - An autonomous car makes decision to navigate through traffic to reach its destination efficiently and safely.

2) Discuss the nature of environments in which intelligent agents operate. What are the key characteristics that define an environment, and how do they influence the design and behavior of agents? Provide examples of different types of environments and the challenges they present to agents.

Ans :- → Environments for intelligent agents encompass everythi that the agent interacts with, including physical and virtual elements.

→ An environment is fully observable if the agent's ~~errors~~ ~~or~~ sensors can detect all relevant aspects. Otherwise, it is partially observable.

→ In a deterministic environment, the next state is completely determined by the current state and the agents ~~or~~ actions. In stochastic environments, there is uncertainity.

→ In ~~epos~~ episodic environments, each decision is independent. Sequential environments involve a series of actions with dependencies.

Examples :-

- Chess game - Fully observable, deterministic and sequential.
- Autonomous drone delivery - Partially observable, stochastic (due to weather), and sequential.

3. Describe the structure ~~of~~ intelligent agents and the types of agents commonly used in artificial intelligence what are the components of an agent, and how do they interact to achieve intelligent behavior? Provide examples of different types of agents and their applications in real-world scenarios.

Ans → Components :-

- Perception - The agent's ability to percieve its environment through sensors.

- Actuators - The mechanisms through which the agent affects its environment
- Reasoning - The ability to make decisions based on available information.
- Learning - Adaption and improvement based on experience

→ Types of Agents :-

- Simple Reflex Agents - Act solely based on the current percept.
- Model- Based Reflex Agents - Maintain an internal state based on past percept.
- Goal- Based Agents- work towards achieving specific goals.
- Utility- Based Agents - Consider utility or values when making decisions.

→ Examples :-

- Roomba vacuum cleaner : Simple reflex agent
- Personal assistance (eg Siri or Alexa) : ~~Mob~~ Model-based reflex agent.

4 Outline the process of problem~~ing~~-solving by searching, including the role of problem-solving agents and the formulation of problems. How do problem-solving agents analyze and approach problems, and what methods do they use to search for solutions? Illustrate your explanation with examples of problem-solving tasks and the strategies employed by agents to solve them.

→ Problem solving Agents : Agents that explore sequences of actions to find solutions to problems.

→ Formulation of Problems : Define the initial state, act transition model, goal test, and path cost.

→ Search strategies : Methods employed by agents to explore possible solutions.

→ Examples :—

- Route planning - finding the shortest path between two locations on a map using algorithms like A*.
- Puzzle solving - Solving a Rubik's cube by explorin different sequences of moves.
- Game playing - Chess AI exploring possible moves and outcomes to determine the best moves.