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Answer to the Question No-1

Q) Answer: Blind Search Algorithm. These algorithms are brute force operations and they don't have additional information about the search space. Only information they have is one has to traverse or visit nodes in the tree. Thus unformed search algorithms are also called blind search algorithms.

- III The different types search algorithms - use in AI are as follows
- (1) Depth first search → (2) Breadth-first search
 - (3) Depth limited search → (4) Uniform cost search
 - (5) Iterative Deepening Depth first search → (6) Bidirectional search (if applicable)

But before we go into these search types and you go a step further wandering into any artificial intelligence course, let's go to know the few terms which will be frequently used in the upcoming section.

Here are some common blind search algorithms along their properties.

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① Breadth first search (BFS)

②

→ property: BFS Expands the shallowest unexpanded node first, i.e. It explores all the neighboring nodes before moving to the next level of the search tree.

III DFS (Depth-First search): → property: DFS Expands the deepest unexpanded node first i.e. It explores as far as possible along each branch before backtracking.

Completeness: DFS is not complete if the search space contains loops or infinite path.

Answers to the question ① ②

② Answer: Briefly describe the four general steps

① Define the problem: The first step in problem solving is to clearly define and understand the problem at hand, This involves identifying the specific issue or challenge determining its scope and boundaries, and gathering all relevant information by clearly defining the problem. you set the foundation for finding an effective solution.

② Generate possible solutions: Once the problem is defined the next step is to generate a range of possible solutions. This involves brainstorming and considering

Different ideas, approaches, and perspective. The goal is to explore various options and be open to creative approaches and considering different perspective. The goal is to explore various options and be open to creative selection without judgement or evaluation at this stage.

III ③ Evaluate and select a solution: After generating a list of possible solutions the next step is to evaluate each option and select the most appropriate. This involves analyzing the potential pros and cons of each solution. Considering factors such as feasibility, effectiveness, resources required, and potential outcomes. It's important to critically assess the solution and choose the one that best aligns with the defined problem and desired outcome.

④ Implement and Review: Once a solution is chosen, the next step is to implement it. This involves putting the selected solution into action and executing the necessary steps. It's important to monitor the progress, gather feedback, and assess the effectiveness of the implemented solution.

Answer to the Question No-2

(4) (9) (4)

(a) states: According to one definition, a state is a community formed by people and exercising permanent power within a specified territory. According to international law, a state is typically defined as being based

In AI a process known as state space search is used to explore all potential configurations or states of an instance until one with the necessary features is found. A state is a time snapshot - representing some aspect of the problem.

Initial state: Initial state that the agent starts in.

path: A sequence of states connected by the sequence of action.

predecessor: Any node that is higher up on the tree than the one that is being considered.

Successor: Any node that is a child of a node or child or child of a node, etc.

Action: Action selection in AI system is a basic system in which the problem can be analyzed by the machine to understand what it has to do next to get closer to the solution of the problem.

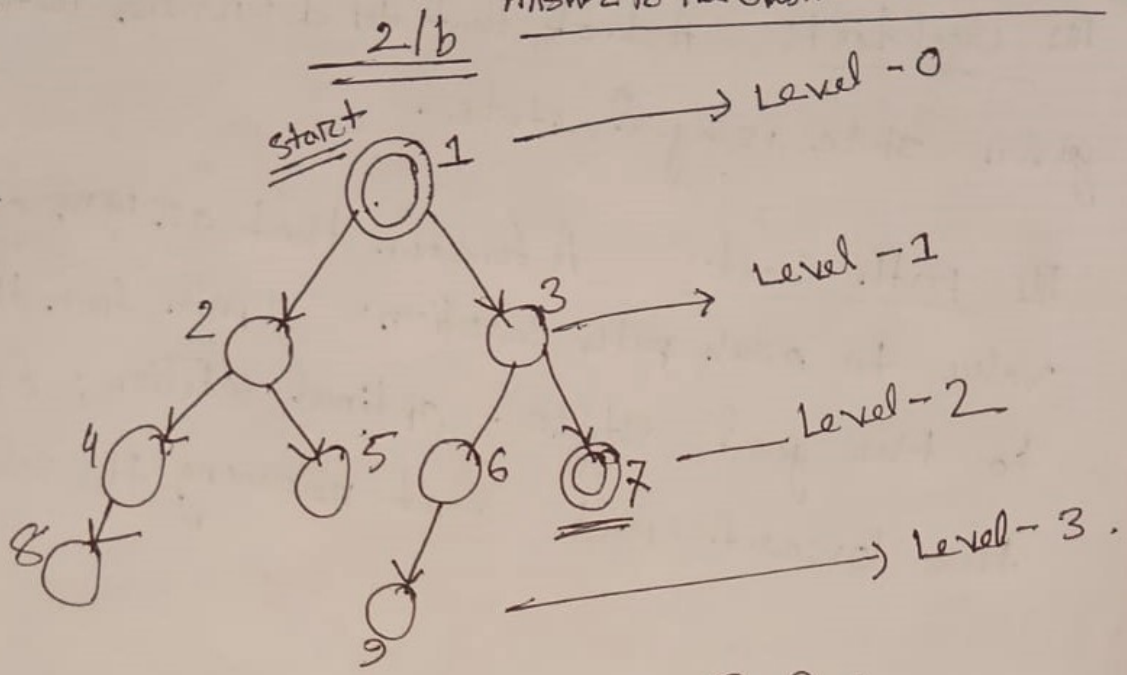
▣ Goal test: A test that ~~def~~ determines whether a 5
given state is a goal state.

▣ path Cost: A function that assigns a Numeric
value to each path solution. A path from the initial
to the goal state. optimal solution: one that has
the lowest path cost among the solution.

Answer to the Question No - 2 b

(6)

2(b) Ans:



BFS : 1, 2, 3, 4, 5, 6, 7, 8, 9.

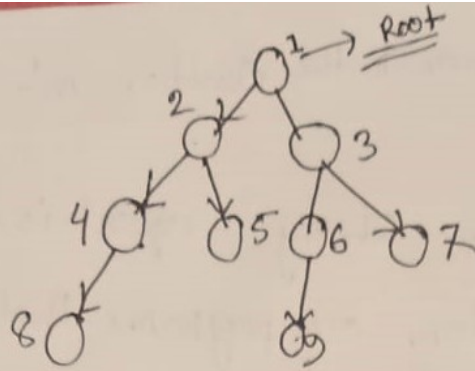
Answer to the Question - 3 - (a)

(a) Answer: DFS: DFS normally 3 types flow process.

- (i) pre order (Root → Left → Right)
- (ii) in order (Left → Root → Right)
- (iii) post order (Left → Right → Root)

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pre order: 1, 2, 4, 8, 5, 3, 6, 9, 7.

In order: (left → Root → Right)

⇒ 8, 4, 2, 5, 1, 6, 9, 3, 7.

post order (left → Right → Root)

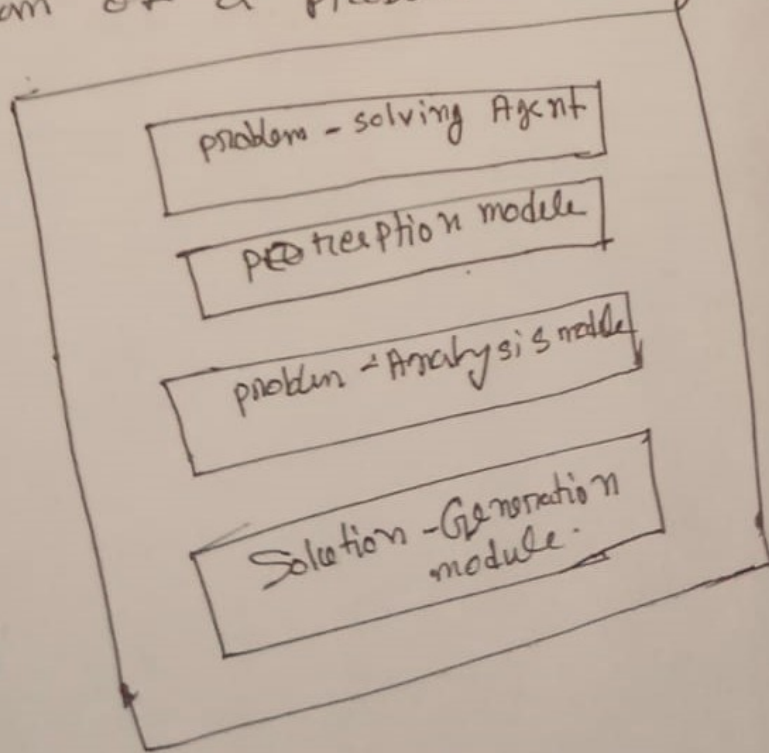
⇒ 8, 4, 5, 2, 9, 6, 3, 7.

3 6

Answer;

Answer to the Question no-4 (a)

(a) Answer: A problem Solving agent is an Entity typically an intelligent system or program, that is designed to analyze problems, generate Solutions and take Action to achieve desired goal or out comes. It is an autonomous agent that uses its knowledge and reasoning capabilities to navigate through problem spaces and find optimal or satisfactory Solution. Here is a brief description and a simplified diagram of a problem-solving agent:



① Sensors: Sensors are responsible for perceiving the environment and gathering relevant information about the current state of the agent, allowing it to observe and understand the problem at hand. Sensors can include various types of input.

② Knowledge: The knowledge base represents the agent's internal repository of information, facts, rules, and heuristics about the problem domain. It contains pre-existing knowledge and learned information that the agent can use to reason, make decisions and generate solutions.

③ problem formulation: problem formulation involves converting the perceived problem into a well-defined representation that the agent can work with. It includes defining the initial state, the goal state, the available or limitations within the problem space.

④ Search and planning: The search and planning component is responsible for exploring the problem space, searching for possible solutions and planning a sequence of actions to reach the desired goal state.

4 b Answer: The depth first search (DFS)

Strategy has several limitation including:

① Completeness: DFS does not guarantee finding a solution if one exists. It may get stuck in an infinite loop if the search space has cycles. To overcome this techniques like cycle detection or iterative deepening can be used.

② Optimal solution: DFS does not guarantee finding the optimal solution it may find a suboptimal solution before exploring the entire search space. To find the optimal solution additional techniques like iterative deepening depth-first search or using cost functions are required.

③ memory usage: DFS can consume a large amount of memory when traversing deep paths. It stores all visited nodes on the stack, which can lead to stack overflow if the especially problem.

④ time complexity: The time complexity of

DFS can be high in the worst case scenario, particularly when the search space is large and unbounded.

⑤ Lack of Breath: