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Course Code: CSI-341

Course Title: Artificial Intelligence.

Answer to the question no: 1 (a)

1 (a) Ans: Blind Searches Algorithms:

Introduction:

Breadth-First Search.

Uniform cost Search.

Depth-First Search.

Depth-Limited Search.

Iterative Deepening Search.

Checking for Repeated States.

Summary.

#Blind Search Algorithms: These algorithms are brute force operations and they don't have additional information about the search space; the only information they have is on how to traverse or visit the nodes in the tree. Thus uninformed search algorithms are also called blind search algorithms.

Answer to the question no: 1(b)

1.(b) Ans: polya created this famous four-step process for problem solving, which is used all over to aid people in problem ~~sh~~ solving:

Step 1: Understand the problem.
Step 2: Device a plan (translate).
Step 3: Carry out the plan. (Solve).
Step 4: Look back (check and interpret).

#Step 1: Differentiate fact from opinion. Specify underlying causes. State the problem specifically. Determine in which process the problem lies. Avoid trying to solve the problem without data.

#Step 2: Postpone evaluating alternatives initially. Specify short- and long-term alternatives. Brainstorm on others ideas. Seek alternatives that may solve the problem.

#Step 3: Evaluate all alternatives without bias. Evaluate both proven and possible outcomes. State the selected alternative explicitly.

#Step 4: plan and implement a pilot test of the chosen alternative. Gather feedback from all affected parties. Establish ongoing measures and monitoring. Evaluate long-term results based on final solution.

P.t.O.

Answer to the question no: 2 (a)

2 (a) Ans: States: According to one of definition, a state is a community formed by people & exercising permanent power within a specified territory. According 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 configuration or states of an instance until one with the necessary feature 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 an node or child on child of a node, etc.

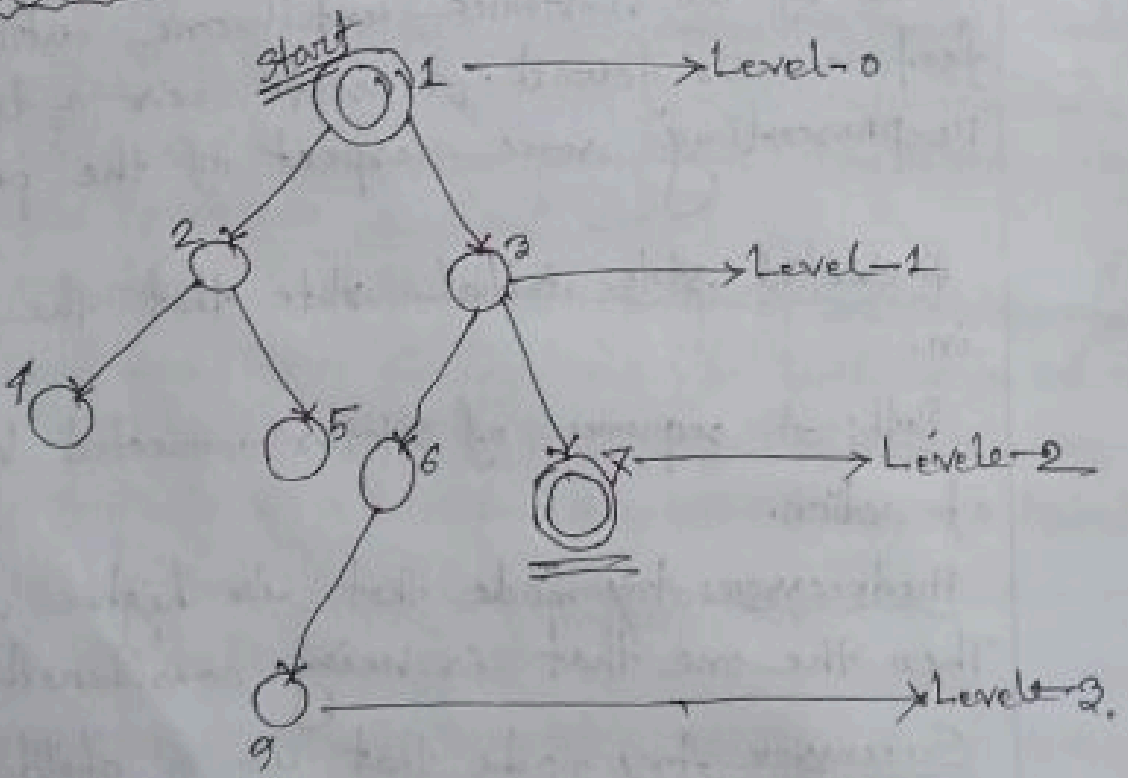
Action: Action selection in AI system is a basic system in which the problem can be analyzed by the machine to understand what is has do next to get closer to the solution of the problem.

Goal test: A test that def determines wether a given state is a goal state.

Path Cost: A function that assings 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)

2. (b) Ans:



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

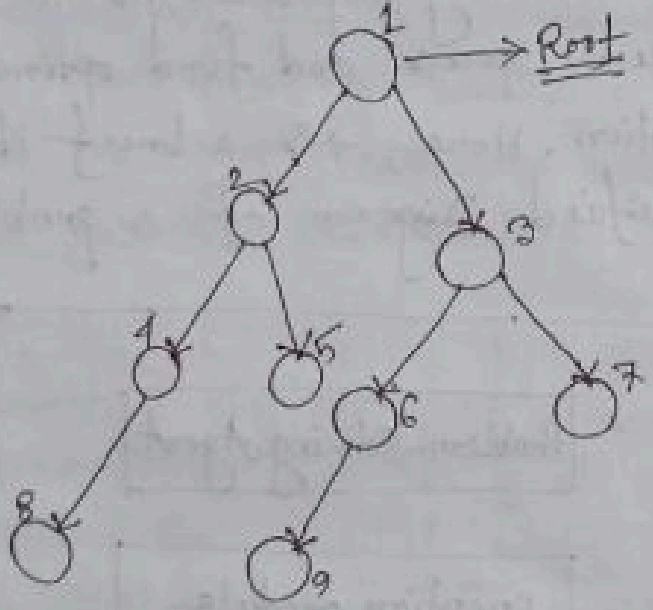
Answer to the question no: 3 (a)

3. (a) Ans: DFS: DFS Normally (3) step flow procedure:

(1) pre-order (Root → Left → Right)

(2) In-order (Left → Root → Left)

(3) Post-order (Left → Right → Root)



#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.

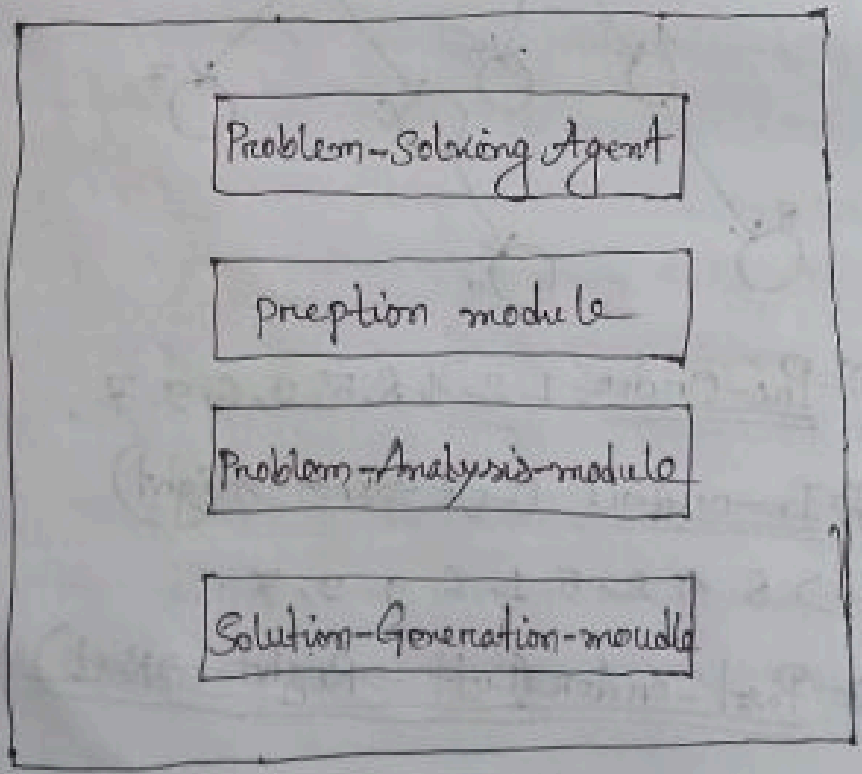
#Post-order (Left → Right → Root)

⇒ 8, 4, 5, 2, 1, 9, 6, 3, 7.

P.t.o.

Answer to the question no: 1 (a)

1. (a) Ans: A problem solving agent is an Entity typically an intelligent system or program, that is designed to analyze problems, generate solution and true action to achive 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 breef duecration and a simplified Digram of a problem-solving agent:



P.t.o.

(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 inter 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 Formation: Problem formulation involves connecting 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 when the problem space.

(4) Search and problemings: The seach an planning component is responsible for exporting the problem space, searching for possible solution and planning a sequence of action to result the goal step.

P.t.o.

Answer to the question no: 1(b)

4.(b) Ans: The Depth Fiirst Search (DFS). Strategy has several limitations including.

(1) Completeness: DFS does not generate finding a solution. if one exists. It may get stuck in an infinite loop if the search space has analys. to overcome this techniques like. cycle detection or itrative desponding can be used.

(2) Optimal Solution: DFS doesn't guaratee finding the optimal solution. it may find a suboptimals solution Before exploreting, the Entire search space. to find the optimal solution additional techniques like iturative despering. Depth-firurt search an wring cost functions are required.

(3) Memory usage: DFS can consume a laroox amount of memory when traversing deep path. 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 the DFS can be high en the worst can senrio. Partically when the search space is long and unbonded.