Victoria University of Bangladesh

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Ans to the qu no-1

(a) Blind search Algorithm: Thes algorithm are brute force operations and they dont have additional information about the search space only information they have is an has to traverse on no.it nodes in the tree. the uninformed search algorithm are also called bind search algorithm.

=> The different types search algorithm - use in AI are as flow

-> (1) Depth first search (2) Breadth first search (3) Interactive Deepening depth first search (4) Bidirectional search (if applicable) But be for we go into these search type and you go a step further wandering into any artificial Inteligence course. Lets go to know the few terms which will be frequencys used in the upcoming section.

Here are some common bind search algorithm along their properties.

(P.T.O)

⇒ Breadth first search:

→ property: BFS exponds the shallowest unexpended node first. ie. It ~~example~~ explore all the neighboring nodes before moving the next level of the search tree

⇒ DFS: property: DFS expond s the deepest un-exponded noods first i.e. It explore as far as possible along pack branch. Before backtracking.

Completeness: DFS in not complete if the contains Loops or infinite path.

(b)

Briefly describe the four general step:—

⇒ Define the problem: The first step in problem solving is to clearly do fine and understand the problem at hand. This problem indentifing the specific issue or challenge determining. Its scope and boundaries and gathering all relearnt information by clearly defining the problem. you set the foundation for finding and effective solution.

(p.t.o)

⇒ Generate possible solution: on the problem is defining the next step is to generat arrange of possible solutions. This mules brain stroming and consioering different ideas. approaches and perspeetive. The goal is to explore various option and be open to creative solution without judgement or evoluation at this stage.

⇒ Evalute and select a solution: After generating a lost of posible solution the next step is to Entete each option and select the most appropneat this invalues analyzing the potential pros and cons of each solution- considering fections such as feability, effectiveness, resource nequined, and potential out comes. Its important to cretically asses the solution and choice the one that best aligens with the different problem and desined outcome.

⇒ Implement an Review: once a solution is chosen the next steed is to implement it. this involves puting the selected solution into aetion and excuting the neeessary gather feedback and asses the effectiveness of the implemented solution.

Ans to the qu no-2

(a) States: According to one defintion states is a community formed by people and excersing permonent power within a specific territory. According intention law a state typically defined being biased.

⇒ 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 seaquence of state connected by the seaquence of action.

⇒ predecessor: Any node that is higher upon the tree. Then the one that is beeing considered.

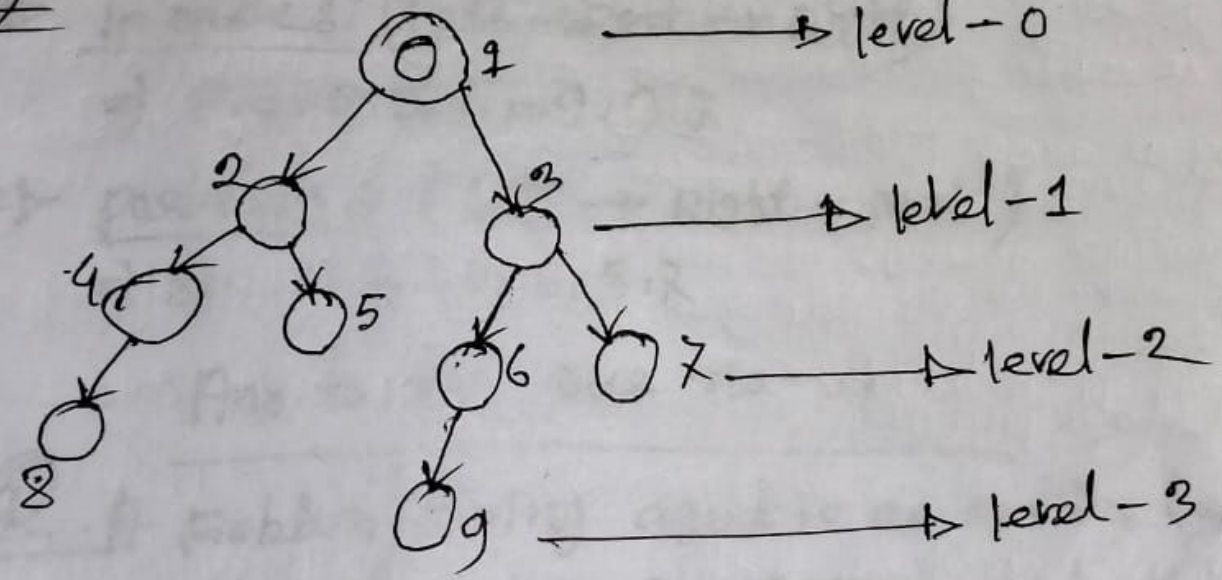
⇒ successor: Any node that is a child of a node or child or child of a node etc.

⇒ Action: Action seleation in AI System is a basic system in which the problem can by analyzed by the machin to understand what ISL has do to get closer to the solution of the problem.

=> Goal test: A test that determines wether a given state is a good state.

=> path cost: A function that assign a numeric value to each path solutions. A path from the initial to the goal state. Optimal solution: one that has the lowest path cost among the solution.

b)



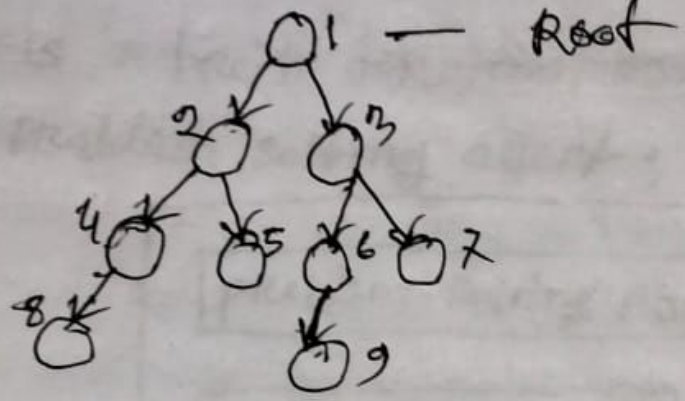
=> DFS: 1, 2, 3, 4, 5, 6, 7, 8, 9

a) Ans to the que no-3

DFS: DFS Normally 3 step flow prossidour:

① pre order (Root → left → Right)
② In order (Left → Root → left)
③ post order (Left → Right → Root)

(P.t.O)



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

⇒ In order : (Left → Root → Right)

⇒ 8, 4, 2, 5, 1, 6, 9, 3, 7

⇒ postorder : (Left → Right → Root)

⇒ 8, 4, 5, 2, 1, 9, 6, 3, 7

Ans to the que no - 4

(a) A problem solving agent is an entity typically an intellegend system. On program that is designd to analyze problems, generate, solutions and true action to achive desired goal or out comes. It is an autonomous agent that uses its knowledge and reasoning capability to navigate through problem spaces and find optional or it is factory solution

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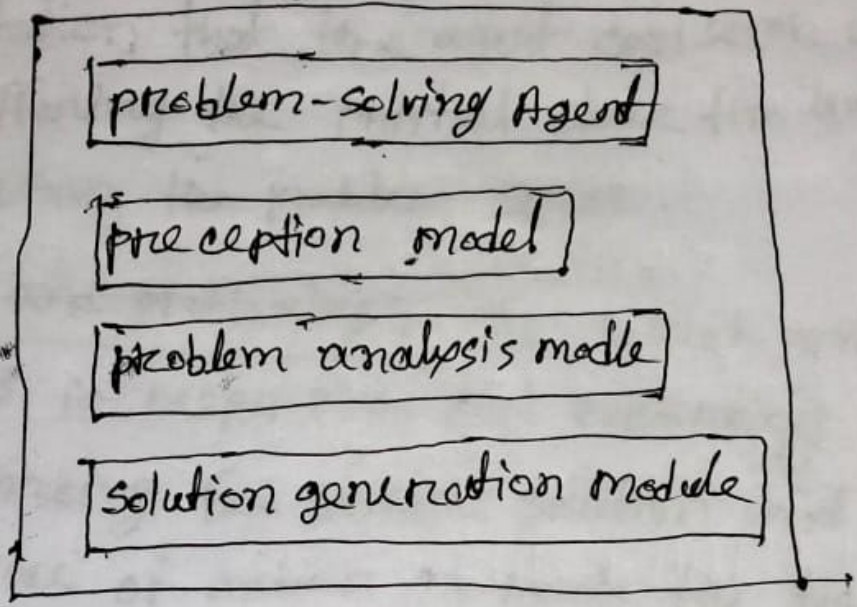
Here is a brief description and a simplified diagram of a problem solving agent:



① Sensors: Sensors are responsible for perceiving the environment and gathering relavent information about the current state of the agent, allowing it to observe and understand the problems at hand sensor can include various type 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 us to reason make and generate solution.

(P.T.O)

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 available operations when the problem space.

④ Search and planning: The search and planning component is responsible for exploring the problem space searching for possible solution and planning a sequence of action to reach the desired goal step.

b) 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.

(p.t.o)

(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 optional solution additional techniques like iterative deepning depth first search or using cost function are required.

(3) memory usage: DFS can consume a large amount of memory when traversing deep path. It store all visited nodes on the stack which can lead to stack over flow if the especially problem.

(4) Time complexity: the time complexity of DFS can be high in the worst case scenario particulary when the search space is large and unbonded.