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Ans: to the Q: No: 01 (a)

Ans: Blind Search Algorithm: These algorithms are brute force operations & They don't have additional information about the search space the only information they have to is on how to traverse or visit the nodes in the tree. Thus informed search algorithms are also called blind Search algorithms.

* Types of Uniformed search algorithms: → The different types of uniformed search algorithms used in AI are as followes :-

→ Depth first Search.
→ Breadth - first search,
→ Dept limited Search.
→ Unifrom Cost Search.
→ Interactive deepening depth first Search.
→ Bidirectional Search (if applicable)

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But before we go into these search type & you go a step further wandering into any artificeal Intelligence Course lets get to know the few terms which will be frequency used in the upcoming sections.

Here are some common blind Search algorithms along their Propeties.

1. Breadth-first Search (BFS):-

→ Property:- BFS expands the shallwest unexpanded node first, i.e it explores all the neighboaring nodes before moving to the next level of the search tree.

→ Completeness:- BFS is Complete if the branching factor is finiste & there is a Solution.

→ Optimality: BFS Guarantees an optimal solution when the Cost of each step is uniform.

(2) Depth-first Search (DFS) & (3) Interactive Deepining Depth first Search (IDDFS)

(3) → Property :- IDDFS is a combination of depth-first Search and breadth-first Search. It perform depth-limited Search Intenatively, gradially increasing the depth limited until a solution is found.

(2) → Property:- DFS expends 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 paths.

(4) Depth - limited Search (DLS) :- DLS limits the depth of the search to a pre defined level, beyond which nodes are not expanded.

(5) Bidirectional Search : (Property) : Bidirectional Search explores the search space from both the initial and goal states, meeting in the ~~di~~middle.

There are just a few examples of blind Search algorithms.

Ans: to the q: no: 01 (b)

The four general steps of problem solving are a systematic approach to finding solutions to problems in a structured manner. Here is a brief description of each step.

(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 & boundaries, & gathering all relevant information. By clearly define the problem. You set the foundation for finding an effective solution.

(2) Generate possible Solution: Once the Solutions is defined, the nxt step is to generate a range of possible solutions. This involves brainstorming & considering different ideas, approaches & perspective. The goal is to explore various options & be Open to creative solutions without judement on evalution, at this stage.

(3) Evaluate & select a solution: After generating a list of possible solutions, the next step is to evalated each option & selected the most appropriate One. This involves analyzing the potential prog & cons of each solutions.

Considering factors such as feasiblity, effectiveness, Resources required, & potential outcomes. It's important to critically asses the solutions & choose the one that best aligns with the defined problem & desired Outcome.

(4) Implement & Review:

Once a solution is chosen, the next step is to implontant it. This involves puting the selected Solution into action and executing the necessary steps. It's important to monito the progress, gather feedback of the impemented Solution.

Ans: to the Q: NO: 02 (a)

Ans: * States: According to one definition, a state is a community formed by people & exercing permanent power within a specified territory. According internation low, a satate is typically defind is being based.

* In AI a process known as state space search is used. To explore all potential configaration or state of an instance untill one with the necessary feature is found. A State is a time snapshot - Representing some aspect of the problem.

* Initial state:

Initial state that agent starts in.

* Path: A Sequence of state that the agent starts in, connected by the sequence of action.

* Predecessor: Any node that is higer upon the tree. then the one that is being considered.

* Succesor: 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 by analized by the machine to understand -

what is has to do next to get closer to the solution of the problem.

Goal test: A test that determines weather a 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.

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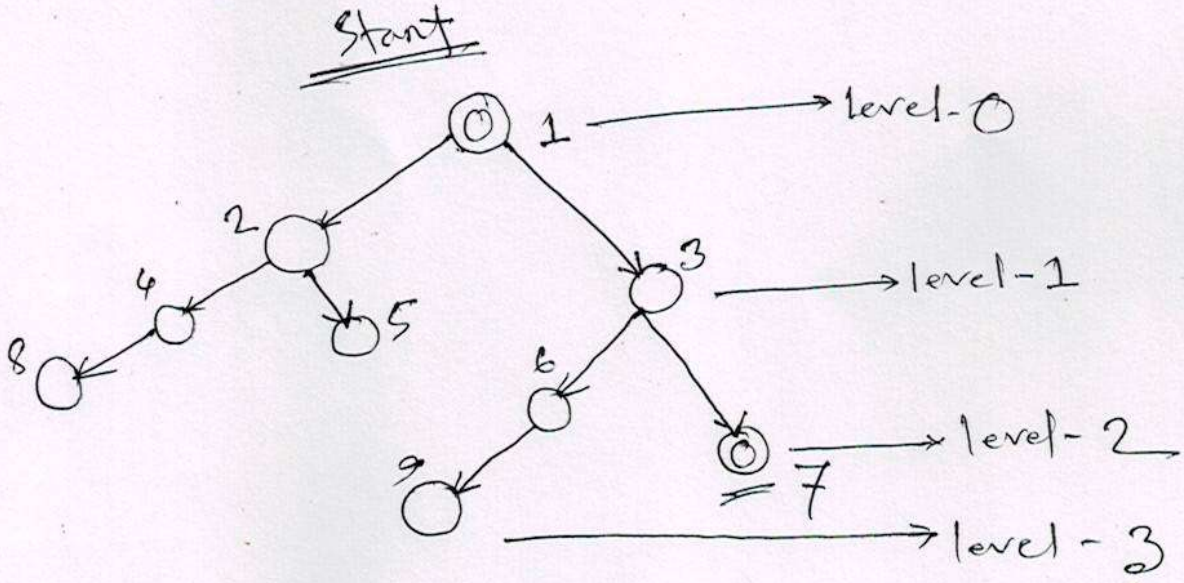
Ans: Ans to the Q. NO: 02(b)

Ans:



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

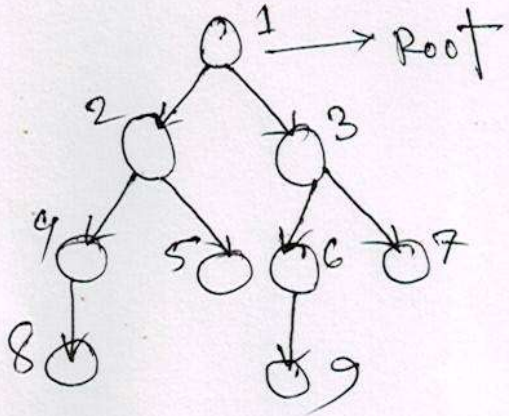
Ans: the: Q: NO: 03 (a)

Ans: DFS: DFS normally 3 step steag follow prossidar.

(i) Pre order (Root → left → Right)

(ii) In Order (left → Root → left)

(iii) 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, 9, 6, 3, 7

Ans: the. 9: NO: 03(b)

Ans: The appropriate ~~is~~ Search - strategy for the above tree is to apology explores nodes.

Generally, a tree search starts at the root and explores nodes from there, looking for a goal node which satisfies certain conditions, depending on the problem. For some problems, any goal node is accepable. In other problems, a minimum - dept goal node. A goal node nearest the root like only that fig. is accepable.

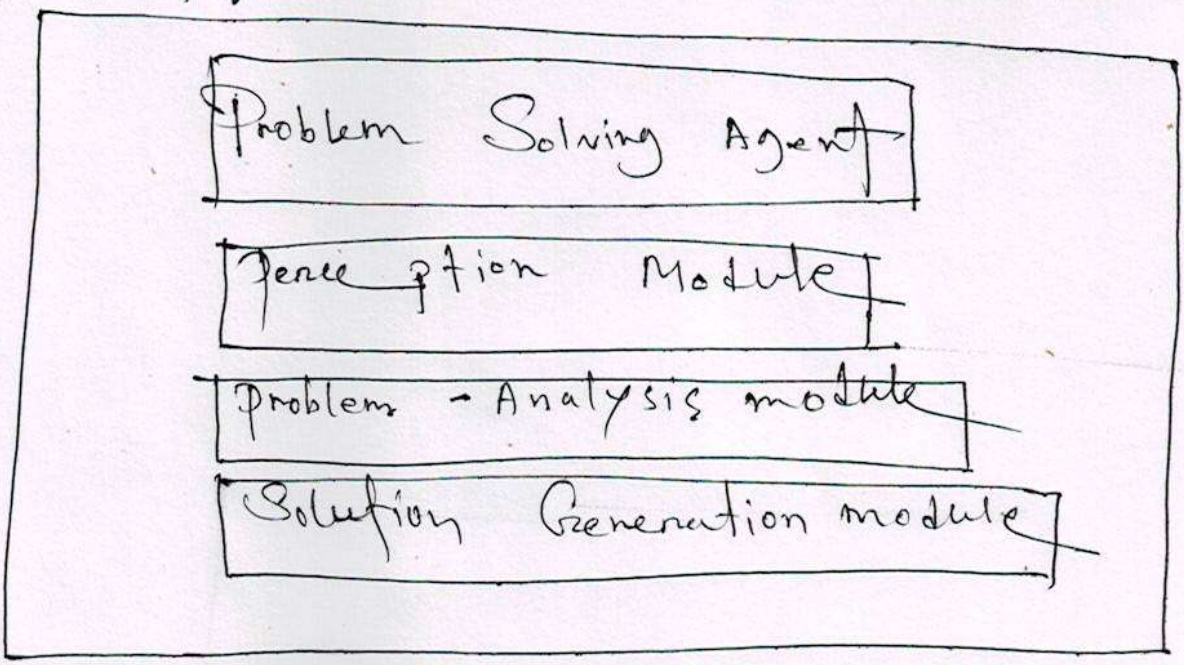
Dept first Search (DFS) is way of traversing graphs, which is closed related to preorder traversal of a tree. It explores a path all the way to a leaf before backtracking and exploring another path.

In this case ~~Nodes~~ are explored in the order 1, 2, 3, 4, 5, 6, 7, 8 & 9 will be found befored.

And that is the appropriate Seaarch - strategy for the above tree.

Ans: the: Q: NO: 04 (a)

My: These four steps provides a structured approach to problem solving, guiding invivialy through the process of define., generating evaluating & implenting solustions. By following these steps, problem Solving can increase their chances of inting effective and efficiant solutions to a wide range of problems. Here is the diagram of a problem Solving agent:-



These modules work together in a coordinated manner to enable the problem- Solving agent to understand, analyze & solve problems efficiently.

A Problem - Solving Agent is an entity typically system or programme.

① Sensors: Sensors are responsible for perceiving the environment and gathering relevant information about the current state of the agent, allowing it to observe & 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 & heuristics about the problem domain. It contains pre existing knowledge & learned information that the agent can use to reason, make decision & generate solution.

③ Problem formulation: Problem formulation involves converting the pre-received problem into a well-defined representation that the agent can work with. It includes defining the initial state. The goal state the available operation whe the problem space.

④ Search & problening: The search an planning component is responsible for exploring the problem space, Searching for possible solution & planning a sequence of action to reaches the desire goal step.

Ans to the Q NO: 04 (b)

Ans: The depth-first search (DFS) strategy has several limitations 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. The agent can use to reason, make decisions and generate solutions.

(3) Problem formulation:

problem formulatio involves converting the perceived problem into a well-denied representation that the agent can work with. It includes defining the initial state, the goal state—

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the available actions or operations, and any constraints or limitations within the problem space.

(4) Search and planning: The search & planning component is responsible for exploring the problem space, searching for possible solutions, & planning a sequences of actions to reach the desired goal state. It uses various search algorithms, heuristic methods, & planning techniques to navigate throughout the problem domain efficiently.

(5) Decision making:

The decision-making component analyzes the available information, evaluates potential solutions, and selects the most appropriate action or plan based on the state.