Ans 1. a) Blind Search also called Uninformed Search, works with no information about the search space, other than to distinguish the goal state from all the others. The following applets demonstrate four different blind Search Strategies using a small binary tree whose nodes contain words. Just enter a word in the text input field and click on the "Start Search" button in order to begin the search. The nodes will change color to red as they are they are visited by the search.

* Information about search strategies
* Breadth - first
# Depth   First
* Depth Limited
* Iterative Deepening
* Javadoc generated documentation for the applet
* directory containing the source for the applet.

Page-①

Breadth-first Search :- Breadth-first Search goes through the tree level by level, visiting all of the nodes on the top level first then all the nodes on the second level and so on. This strategy has the benefit of being complete and optimal as long as the shallowest solution is the best solution.

Depth-First Search :- Depth-first search goes through the tree branch by branch going all the way down to the leaf nodes at the bottom of the tree before trying the next branch over. This strategy requires much less memory than breadth first search since it only needs to store a single path from the root of the tree down to the leaf node. However, it is potentially incomplete, & since it will keep going on down one branch until

②

it finds a dead-end and it is no optimal if there's a solution at the fourth level in the fis first branch tried and a solution at the second level in the next one over the solution at the fourth level will be returned.

Depth-Limited Search:- Depth limited search essentially does a depth-first search with a cutoff at a specified depth limit. When the search hits a node at that depth, it stops going down that branch and moves over to the next one. This avoids the potential problem with depth-first search of going down one branch indefinitely.

Iterative Deepening Search:- Iterative deepening does repeated depth limited searches starting with a limit of zero and incrementing once epace saving benefits of depth first

③

Search but is also complete and optimal but is also Since it will ~~will~~ visit all the nodes on the Same Level first before continuing on to the next Level in the next round when the depth is incremented.

Ans 1. b):- In Artificial Intelligence search techniques are universal problem solving methods. Problem solving agents in AI mostly ~~use~~ Used these search strategies or algorithms to solve a specific problem and provide the best result Problem solving agents are the goal based agents and use atomic representation. In this topic we will learn various problem solving search algorithms. Obtain a description of the problem. This step is much more difficult than it appears. In the following discussion the word. ~~In the following discu~~ client refers to.

④

Someone who wants to find a solution to a problem and the word developer refers to someone who finds a way to solve the problem. The developer must create an algorithm that will solve the clients problem.

Analyze the Problem:- The purpose of this step is to determine both the starting and ending points for solving and ending the problem. This process is analagous to a mathematician determining what is given and what must be proven. A good problem description makes is easier to perform this step.

Develop a high level algorithm:- An algorithm is a plan for solving a problem but plans come in several levels of detail

⑤

40   30   20

detail. It's usually better to start with a high level algorithm that includes the major part of a solution but leaves the details until later. We can use an every day example to demonstrate a high level algorithm. Refine the algorithm by adding more detail

A high-level algorithm shows the major steps that need to be followed to solve a problem. Now we need to add details to these steps, but how much detail should we add? unfortunately, the answer to this question depends on the situation We have to consider who is going to implement the algorithm and how much that person already knows how to do. If someone is going to
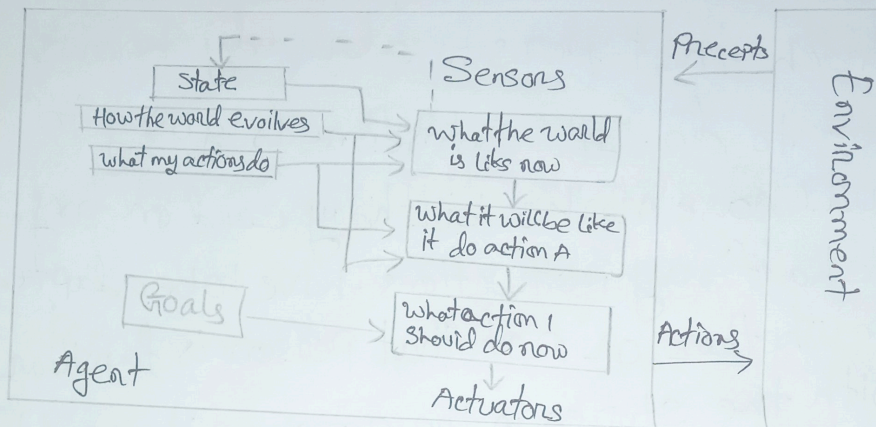
⑥   ↓

implement the algorithm and how much that person already knows how to do. If Someone is going to purchase Mark's birthday card on my behalf my instructions have to be adapted to whether or not that person is familiar with the stores in the community and how well the purchaser known my brothers taste in greeting cards.

Ans 4. a) Problem Solving Agent

An agent that tries to come up with a sequence of actions that will bring the environment into a desired state. Search. The Process of looking for such a sequence involving a systematic exploration of alternative actions.

(7)

Diagram labels: State, How the world evoilves, what my actions do, Sensors, what the world is liks now, What it willbe like it do action A, Goals, whataction I should do now, Agent, Actuators, Precepts, Environment, Actions

Ans 4. b)   Breadth first Search is an uninformed Search technique. we may sometimes Search the goal along with the largest depth of the tree and move up only when further traversal along the depth is not possible. we then attempt to find alternative offspring of the parent of the node last visited. If we visit the nodes of a tree using the above principles to Search the goal the traversal made is called depth first ↙

⑧

Traversal and consequently the search strategy is called depth first search

Algorithm: Depth-First Search

1. If the initial state is a goal state quit and return success.

2. Otherwise, do the following until success or failure is signaled:

   a) Generate a successor E of the initial state.

   If there are no more successors Signal ~~Stats~~ failure.

   b) call Depth First Search with E as the initial state.

   c) If success is returned Signal success Otherwise continue in this loop.

Depth- First Search - Example: Let us consider the following tree. Here node 'A.

⑨

is the source or start or initial node and node 'G' is the goal node.

Step 1: Initially NODE-LIST contains only one node corresponding to the source state A.
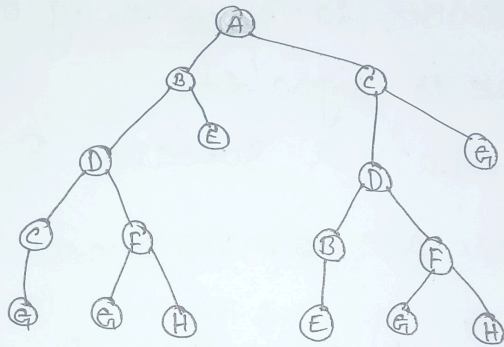
Step 2: Node A is removed from NODE LIST. A is expanded and its children B and c are put in front of NODE-LIST,
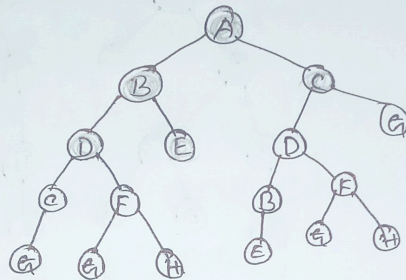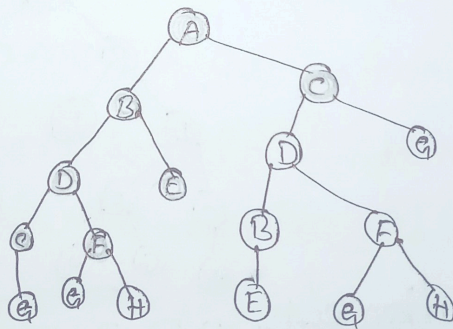
NODE LIST: BC
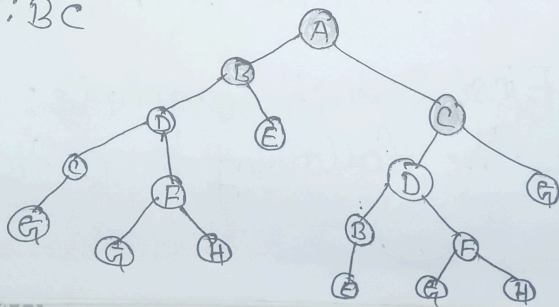
(10)

Step 3: Node B is removed from NODE LIST and its children D and E are pushed in front of NODE List

NODE-LIST: DEC

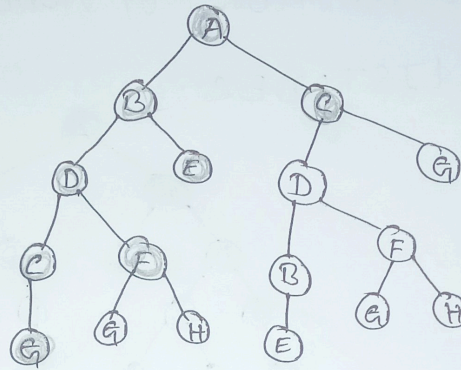**Step 4** Node D is removed from NODE LIST C and are pushed in front of NODE-LIST.
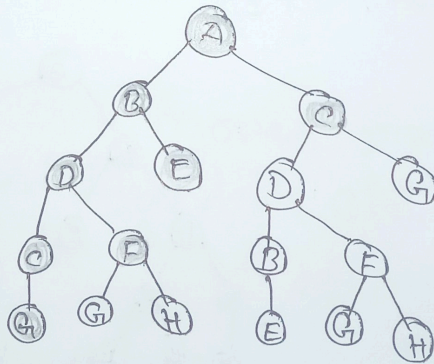
NODE-LIST: C FEC

Step 5: Node c is removed from NODE LIST its child G is Pushed in front of NODE-LIST

NODE-LIST: G F E C

Step 6: Node G is expanded and found to be a goal node.

NODE LIST: G F E C

The Solution Path A-B-D-C-G is returned and the algorithm terminates.

(12)

Ans 5. a) Avoiding Repeated States

* Do not return to the parent state
(e.g., in 8 puzzle problem do not allow the up move right after a Down move)
* Do not create solution paths with cycles
* Do not generate any repeated states
(no (need to store and check a potentially large number of states)

Ans 5. b) A search algorithm is the step by step procedure used to locate specific data among a collection of data. It is cons considered a fundamental procedure in computing. In computer science, when searching for data the difference between a fast application and a slower one often lies in the use of the proper search algorithm.

(13)

Typical Real world Problem

\# Transaction

* ATM Machine

\#* Web Application

\# ~~Des~~ Decision making

* Forecasting

\# control Problem

* Traffic controller

\# Searching Problem

* Search engines

\# Sorting Problem

* Transport Schedule