VICTORIA UNIVERSITY BANGLADESH

Assignment On

Course Name :Artificial Intelligence

Course code : CSI-341

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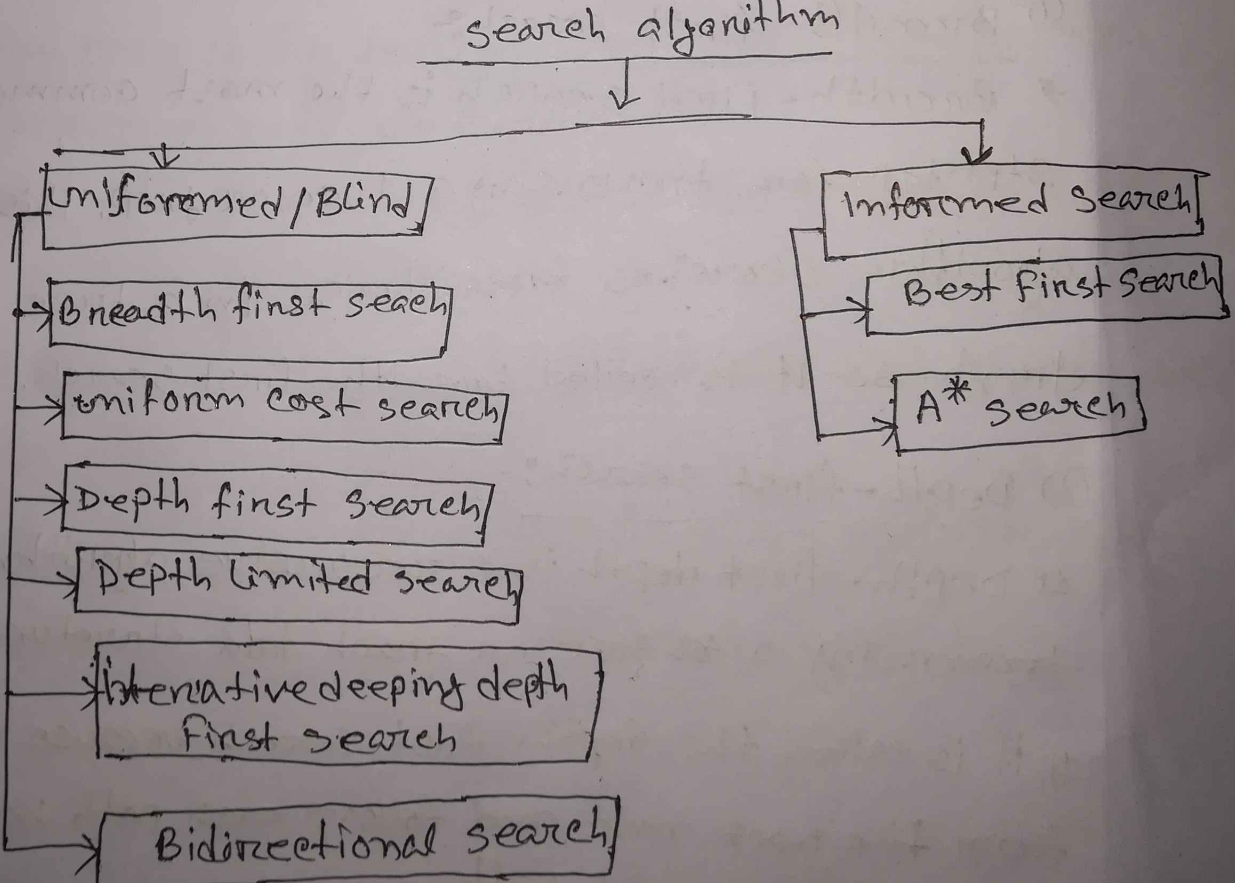
Ans. to. the. Q.NO-01.(a)

a Blind search, also called uninformed search, works with no information about the search space, other than to distinguish the goal stede from all the others. Just enter a word in the text input field and click on the "start search" button in order to being the search.

Type of search algorithms:



#uninformed/Blind search:- The uninformed search dose not contain any domain knowledge such as closeness, The location of the goal. It operates in a brute-force way as it only includes information about how to traveres the tree and How to Identify leaf and goal nodes.

Following are the various types of uninformed search algorithms:

① **Breadth first search:-**

* Breadth-First search is the most common search strategy for traversing a tree or graph. This algorithm searches breadthwise in a tree or graph. so it is called breadth-first search.

② **Depth-first search:-**

Depth-first depth is a recursive algorithm for traversing a ~~tol~~ tree or graph data structure.

It is called the depth-first search because it starts from the root node and follows each path before moving to the next path.

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DFS uses a stack data structure for its implomention.

The process of the DFS algorithm is similer to The BFS algorithm.

3) Depth-Limited search Algorithm:

~~#~~ ~~AD~~ A Depth-limited search algorithm is similer to depth-First Search with a predetermined limit. Depth-limited search can solve drawback of the infinite path in the Depth-First search. In the algorithm the node at the depth limit will treat as it has ~~o~~ no successor nods ~~fot~~ further.

Depth-limited search can be terminated with two conditions of failure:

Standard failure value: it indicates that problem does not have any solution.

cutoff failur value: it defines no solution for the problem ~~at~~ within a given depth limit. (etc)

(page-to page-3)

Informed search Algorithm:-

so far we have talked the uninformed search algorithm which looked through search space for all possible solutions of the problem without having any additional knowledge about search space.

In the informed search we will discuss two ~~car~~ main Algorithm which are given below:

- * Best First search Algorithm.
- * A* search Algorithm.

1 Best First search Algorithm:-

Greedy best-first search algorithm always selects the path which appears best at that moment. it is the combination of Depth-first search algorithm.

② A* search Algorithm: A* search is the most commonly known~~ty~~ form of best-first search. it uses heuristic function h(n) and cost to reach the node n from the start state g(n). it has combined feature of ucs and greedy best-first search.

Ans. to. the. Q. No-1 (b)

b An Artificial Intelligence, search techniques are universal problem-solving methods. problem-solving & agents in AI mostly used these search strategies or algorithms to solve a specific problem and provide the best resut. problem solving agents are the goal-based agents and use automile representation. In this Topic, we will learn various problem solving search algorithms.

Step-1: obtain a description of the problem:
The step is much more difficult than it appears. in the following discussion the word client refers to someone who wants to find a solution to a problem, and the word developer refers to someone who finds a way solve the problem. The developer must creat an algorithm that will solve the client's problem..

Step-2: Analyze the Problem:
~~An algorithm~~ The purpose of the step is to determine both the starting and ending points for solving the problem. this process is analogous to a mathematicia

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Determining what is given and what must be proven, a good problem description makes it eaiser to perform ~~to~~ this step.

<u>step-3</u> :- Develop a high-Level algorithm:-

An algorithm is a plan for solving a problem. But plans come in several levels of detail. Its usually better to start with a high-level algorithm that includs the mejor part of a solution. but leaves the details until later. we can use an every day Example to demonstrate a high-level algorithm.

<u>step-4</u> :- Refine the algorithm by adding more detail:-

~~An~~ high-Level algorithm shows the major steps that need to be followed to solved a problem. Now we need to add details to these steps, but howmuch detail ~~shod~~ should we add. unfortunatly, the answer to this question depends on the situation.

if someone is going to purcess marks birthday card on my behalf.

Ans. to. the. Q. NO-4(a)

a

problem solving Agent :-

~~A prop~~ problem solving agent is one which decides what actions and states to consider in completing a goal

Examples:

Finding the shortest path from one city to another.

8-puzzle

Example: The 8-puzzle

5	4	
6	1	8
7	3	2

Start state

1	2	3
8		4
7	6	5

Goal state

8-puzzle.

Action: move blank squaor up, down, left, or Right.

State: arrangement of squares including Blank.

Goal test: Is it in correct order?

cost: 1 for each move it took.

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problem statement:

How do I get from initial state to goal?
use a search algorithm.

From initial state, generate more states.

Choose one of the adjacent states, and expand the state from there.

continue until you find solution.

Search strategy: which states do you expend first.

Picture of 8-puzzle search tree.

Ans. to. the. Q. No-4(b)

~~#~~ b Breadth-First-search is an uninformed search technique we may sometimes search the goal along with the largest depth of the tree, and moved up only when ~~fod~~ further travels along the depth is not possible.

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 signaled:
ⓐ Generat a successor, E, of the initial state.

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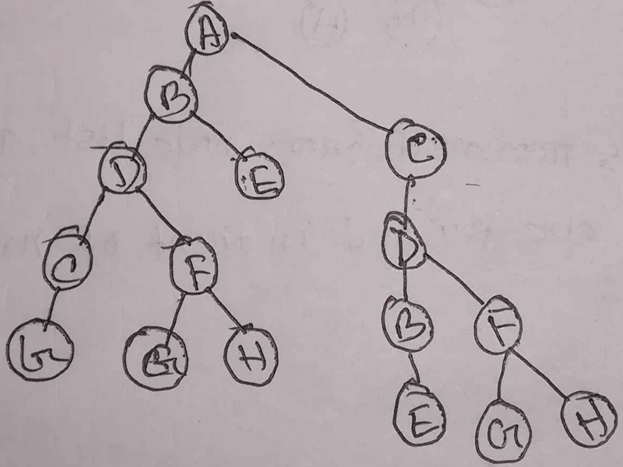
b call Depth-First search with E as the initial state.,

A Depth-First search - Example:

Let us consider the following tree, Here node 'A' is the source or start or initial node and node 'G' is the goal node.

Step-1: Initially ~~Nod~~ ~~Nood~~ Node-List contains only one node corresponding to the source state A.

Node-List: 'A'



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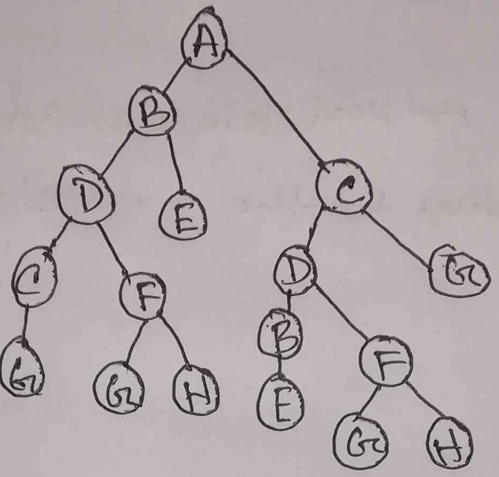
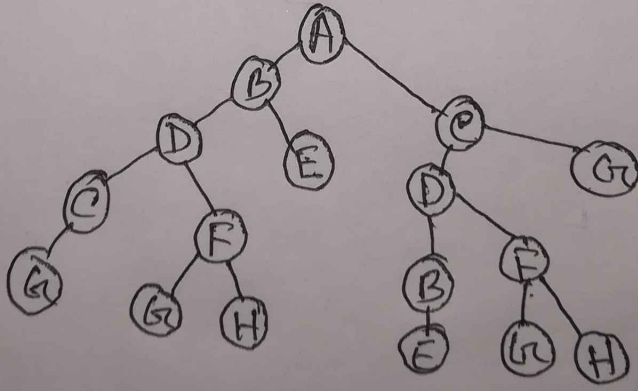
Step-2: Node A is removed from node-list. A is expanded and its children B and e are put in front of Node-List.

Node-List: BC



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



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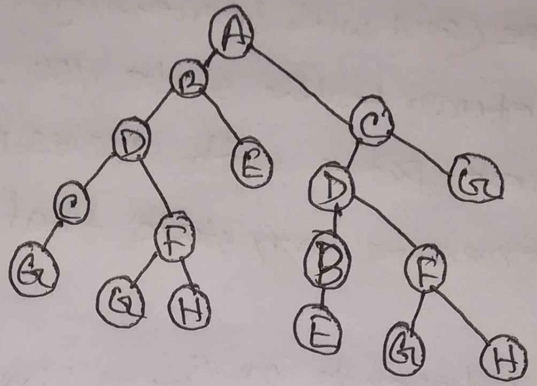
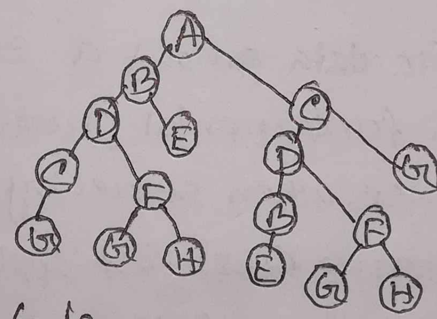
Step-4: Nod D is removed from node-list, e and F are pushed in front of Node-list,

Node-List: eFEC



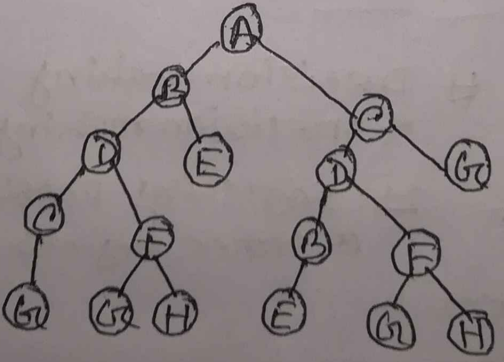
Step-5: Node C i Removed from Node-list. its child G is pushed in ~~Fornt~~ Front of Node-list.

Node-List: GFEC



Step-6: Node G is expended and found to b a goal node.

Node-List: GFEC



The solution path A-B-D-e-G is returned and the algorithm terminets

Ans.to the. Q. No-5 (a)

a

'Avoiding Repeated stateds:

#in increasing order of effectiveness in reducing size of state space (and with increasing computational costs.)

① Do 'not return to the stale you Just come from.

② Do not creat paths with cycles in them

③ Do not generate any state that was ever created before.

Net effect depends on "loops" in state-space.

Ans.to.the.Q.No5(b)

b A search algorith is the step-by-step procedure used to Locate specific data among a collection of Data. it is considered a fundamental proceder in computing. in computer science, when searching for Data, the difference between a ~~first~~ fast application and a slower on often lies in the use of the proper search algorithm.

Typical Real world problem:

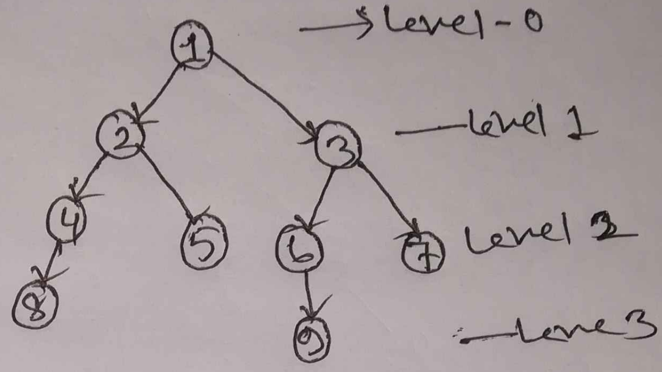
Transaction
#ATM machine.
* web ~~machine~~.
A Application.

Decision making
*Foredecision making
searching problem
* Search Engines (Etc)

control problem
* Traffic controller

Ans. to the Q. NO - 2 (b)

B| Tree using BFS search strategy Algorithms



Goal Node - 9

1, 2, 3, 4, 5, 6, 7, 8, 9