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P-01

Ans to the Q.s no: 1.a

1.A List of blind search algorithm and their Properties :-

uniform search is a class of general-purpose search Algorithm which operates in brute force way. it is also called Blind search.

various types of blind search are below

(I) Breadth-first search
(II) Depth-first search
(III) Depth-limited search
(IV) Iterative depth-first search
(V) uniform cost search
(VI) Bidirectional search.

Breadth-first :- (I) It is the most common search strategy for traversing a tree or graph. this algorithm searches breadthwise in a tree. so its called breadth-first search.

(II) it is implemented using FIFO queue data structure search.

Depth-first Search:- (i) It is a recursive algorithm for traversing a tree or graph data structure.

(ii) It is called the depth first because it starts from root node and follows each path to its greatest depth node befor moving the next path.

(iii) DFS uses a Stack data structure for Implementation.

Depth Limited Search:- This search algorithm is similer to depth-first search with a predetermined limit.

(i) Depth limited search is memory efficient.

Uniform-cost :- (i) It is a searching algorithm used for traversing a weighted tree or grap.

(ii) uniform cost search is optimal because at every state the path with the least cost of chosen.

* Ans to the Qs no: 1.b *

1.b Four general steps of problem solving given are below:=

(I) Define the problem:- When ever a problem arises the agent must first define a problem to an extent. Specify underlying causes.

(II) Differentiate fact from opinion.

(III) State the problem specifically.

(IV) avoid trying to solve the problem without data

(II) State space: (I) Convert the problem statement into state space.

(I) A state space is the collection of all possible valid states that an agent can resize in

(II) Responde alternative initiality.

(IV) Seek alternative that may solve the problem.

(iii) Gather Knowledge:- (i) Collect and isolate the knowledge which is required by the agent to solve the current problem.

(ii) This knowledge gathering is done from both the pre-embedded knowledge in the system and the knowledge it has gathered.

(iii) Evaluate both proven and possible outcomes.

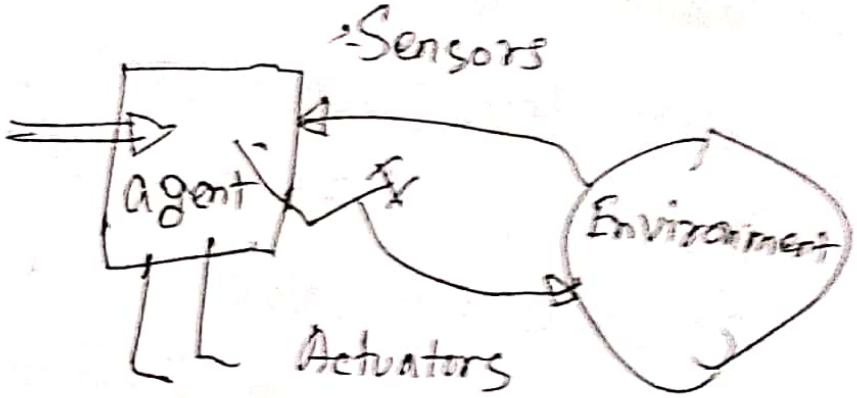
Planning:- (i) A problem may not always be an isolated problem. It may contain various related problem as well or some related areas where the decision made with respect to the current problem can effect those areas.

(ii) Plan and implement a pilot test of the chosen alternative.

(iii) Gather feedback from all affected parties.

4.A

Problem-Solving Agent with Diagram:-



① Formulate Goal
② Formulate problem
③ States
④ Action
⑤ Find Solution

Intelligent agents are supposed to maximize their Performance measure.

This can be simplified if the agent can adopt a goal and aim

Goal formulation:- based on the current situation and the agents performance measure, is the first step in problem solving. Goal is a set of states. the agents task is to find out which sequence of action get it to a goal state.

Problem formulation is the process of deciding what shorts of actions and states to consider, given a goal..

(i) An Agent with several immediate options of unknown value can decide what to do by first examining different possible sequences of actions that lead to states of known value.

(ii) ~~Look~~ Looking for such a sequence is called search.

(iii) A search Algorithm takes a problem as input and retuns a solution in the form of action sequence.

(iv) one a solution is found the action it recomends can be carried out execution phase.

(v) formulate, search, execute design for the agent.

(vi) After formulating a goal and a problem to solve the agent calls a search procedure to solve it.

(vii) Then removing that step from the sequence.

(viii) Once the solution has been executed the agent will formulate the new goal.

Ans to the qs no 4.b

4.b Limitation of DFS:- Depth first search is an algorithm for traversing or searching tree or graph data structures, the algorithm starts at the root node and explores as far as possible along each branch before backtracking.

Advantages of DFS:- (I) The memory requirement is linear WRT nodes.

(II) Less time and space complexity rather than BFS

(III) The solution can be found out without much more search.

disadvantages of DFS:- (I) Not guaranteed that it will Give you a solution.

(II) Cut-off depth is smaller so time complexity is more.

(III) determination of depth until the search has proceeded.

Application of DFS:-

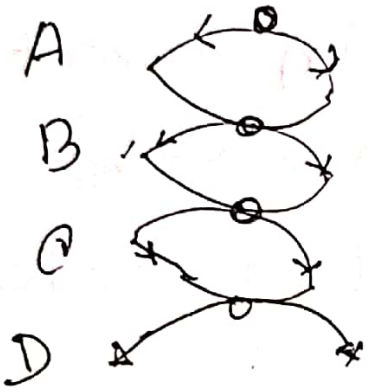
(I) Finding connected components.

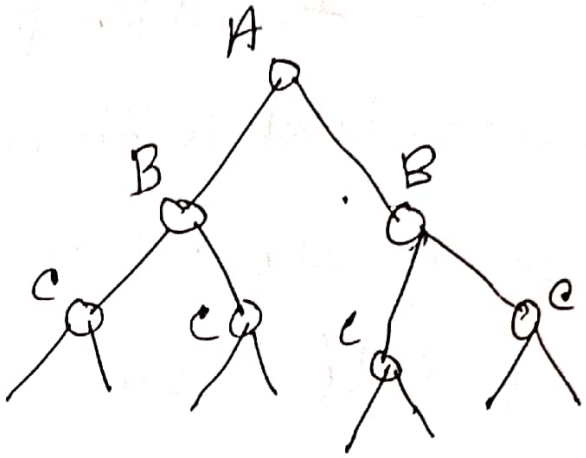
(II) Topological sorting.

(III) Finding bridges of the graph.

Ans to the Qs no; 5.A

5.B **Avoiding Reapeated States:-** WE have so far Ignored one of the most important Complications to the Search process. The possibility of wasting time by expanding States that have been already encountred.





There are Three way to deal repeated States in in erasing order of effietive and complex.

(i) Do not return to the State you just Came from.

(ii) Do not create paths with cyeles in them

(iii) Do no generate any state that was ever generated before.

P to

(V) Requires comparing state descriptions.

(VI) Breadth-first Strategy:

(i) Keep track of all generated states.

(ii) If the state of a new node already exists then discard the node.

Solution-1 :- (I) Keep track of all states associated with nodes in current tree.

(II) If the state of a new node already exists, then discard the node.

⇒ avoids loops

Solution-2 :- (I) Keep track of all states generated so far.

(II) If the gatetes of anew same here,

⇒ space complexity of breadth-first Algorithm.

* Ans to the Qs no: 5. B *

5.B

Real-world problems:-

(I) Touring problem:- visit every city at least once, starting & ending in Bucharest.

(II) Traveling Sales problem:- Exactly once

(III) Robot navigation.

(IV) Internet Searching: Software robots.

example of algorithm use:

① sorting papers, Imagine a teacher sorting their students papers according to the alphabetical order on their first name

(V) Facial Recognition

(VI) Google Search.

(VII) Duplicates outcomes.

(VIII) Traffic lights.

(IX) Bus Schedules.

(VII) Tying your Shoes Any Step bystep Process that is completed the same way every time is an algorithm.

(VIII) classifying objects.

(IX) Bed time Routines.

(X) Deciding What to eat.

(XI) Driving to from some where.

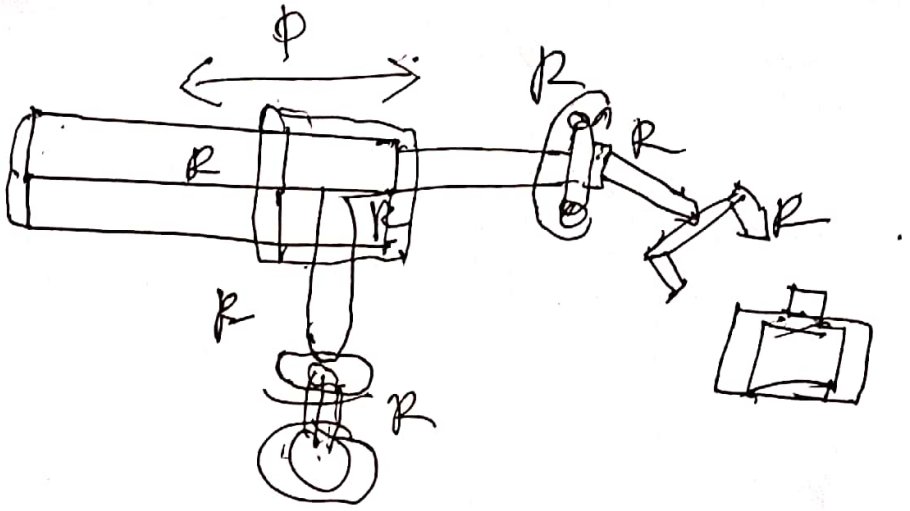
(XII) finding library. Book.

(XIII) Following the Recipe.

Ans to the Qs no: 2.a

2.A

Robot Assembly :-



States :- Real-valued coordinates of robot joint angles; parts of the object to be assembled.

Actions :- Continuous motion of robots joints.

Initial State :- Any arm position and object configuration.

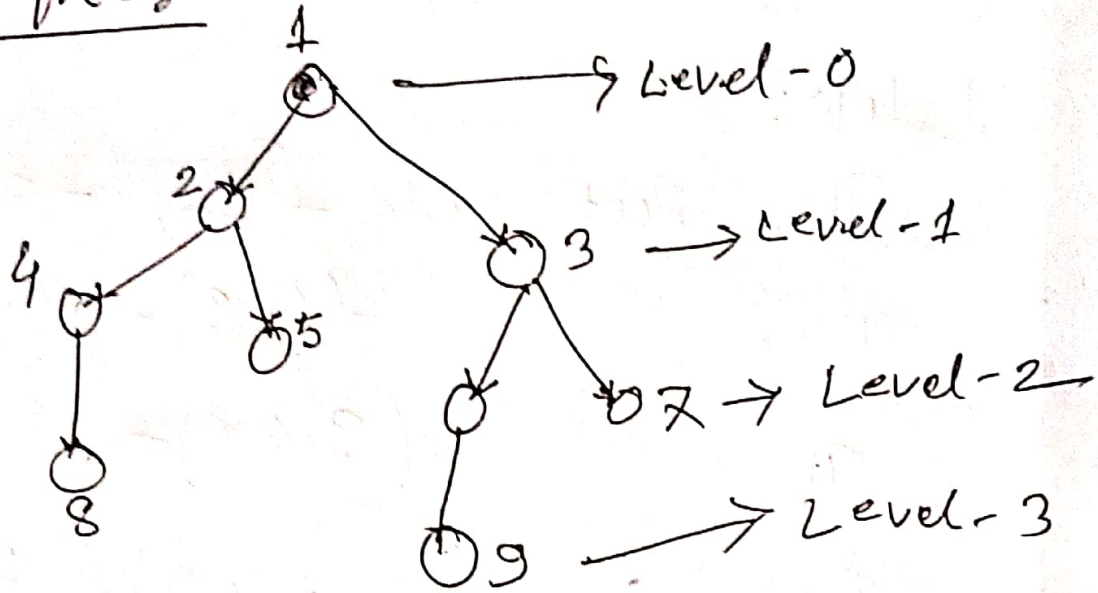
Goal test :- Complete assembly (without robot)

Path Cost :- Time to execute.

2.b

Ans to the Qs no: 2.6

BFS tree:-



Solution:-

(i) 1 is Root node

(ii) Once the starting node has been Searched, 2 and 3 are then added to the queue.

(iii) If 2 and 3 are not the goal nodes then, 4, 5, 6, 7 are explored in that order.

(iv) Finally the node remaining is node 8, and 9 is explored after 7.

ii.

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Given FRINGE Step by Step are below:

(I) Root node (1) - FRINGE

(II) (2, 3) - FRINGE

(III) (3, 4, 5) - FRINGE

(IV) (4, 5, 6, 2) - FRINGE

(V) (5, 6, 2, 8) - FRINGE

(VI) (6, 2, 8) - FRINGE

(VII) (7, 8, 9) - FRINGE

(VIII) (8, 9) - FRINGE

The Final Result 1, 2, 3, 4, 5, 6, (2) & 9

There are 2 is a goal node.

END