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CSI:341 - Artificial Intelligence.

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P-1

Ans to the Qns NO: 1 (a)

A list of blind search algorithms and write 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 first and most common Search Strategy for Traversing a tree or graph. this algorithm Searches breadth wise in a tree. So It's called breadth - first Search.

(ii) It is implemented using FIFO que. 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 follow each path to its greatest-depth node - before moving the next path.

(iii) DFS uses a stacks data Structure for implementation,

* Depth-limited Search :- (i) It is a Searching algorithm used for traversing a weighted tree or graph.

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

Ans to the Qus No-1 (b)

☐ Four general Steps of problem Solving given are below :-

* Define the problem :- When ever a problem arises the agent must first define problem to an extent

(i) Specify underlying causes.

(ii) Differentiate fact from opinion.

(iii) State the problem Specifically

(iv) avoid trying to solve the problem without data.

* State space :- (i) Convert the problem Statement

(ii) A State space is the collection of all possible valid States that an agent can reside in.

(iii) possesses alternative initiality.

(iv) Such alternative may solve the problem

* other knowledge :- (i) called 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 outcome.

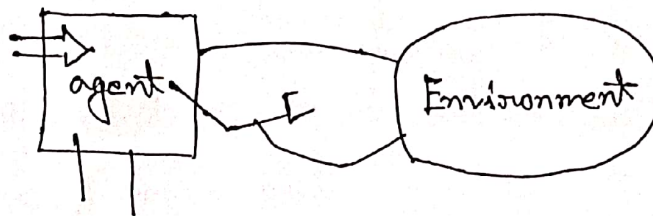
* planning :- (i) A problem may not always be an isolated problem. It may contain various related problem as well or some related areas where the decision made with respect to the current problem can affect those areas.

(ii) plan and implement a pilot test at the chosen alternative.

(iii) gather feedback from all affected parties.

Ans to the Qus NO- 4 (a)

▣ problem - Solving Agent with Diagram :-
Sensors



Actuators

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

* Intelligent agent are supposed to maximise their performance. more.

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

▣ Goal Formulation :- based on the current situation and the agent.

performance measure is the first step in possible solving goal is a set of state. The agent task is to find out which sequence of action get it to a goal state.

□ Problem Formulation:- is the process of deciding what sort of action and states to consider, given a goal.

① An agent with several immediate options of unknown value can decide what to do by first examining different possible sequences of action that lead to states of known value.

② Looking for such a sequence is called Search.

③ A Search algorithm takes a problem as input and returns a solution in the form of action sequence.

④ Once a solution is found the action it recommends can be carried out execution phase.

- (v) Formulate, Search execute design for the agent.
- (vi) After formulating a goal and problem to solve the agent call a search procedure to solve it.
- (vii) Then removing that state from the sequence
- (viii) Once the solution has been executed the agent will formulate the new goal

Ans to the Qus NO:- 4. (b)

Limitation of DFS :- Depth first search is an algorithm for traversing or searching tree or graph data structure. The algorithm starts at the root node and explores as far as possible along each branch before back-tracking.

Advantages of DFS :-
① The memory requirement is linear WRT nodes

② Less time and space complexity rather than BFS.

③ The solution can be found out without near more search.

Disadvantages of DFS :-
① Not assured that it will give you solution.

② Cut-off depth is smaller so time complexity is more

③ Determination of depth until the search has proceeded.

Application of DFS :-

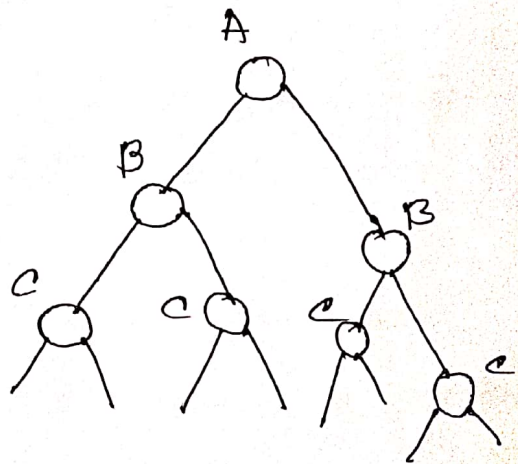
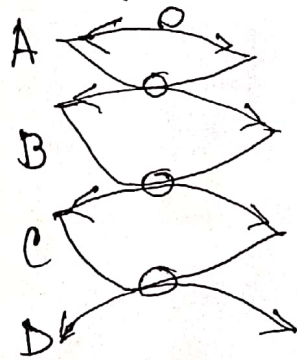
① Finding Connected Components.

② Topological sorting

③ Finding bridges depth graph

Ans to the Qm NO- 5.A

Avoiding Repeated 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 encountered



There are three way to deal repeated States in economy order of effective and complex,

(i) Do not return to the state you just come from.

(ii) Do not create path with cycle in them.

(iv) Do not generate any state that was ever generated before.

* Requires comparing state description

* Breadth-first Search:

* Keep track of all generated states

* if the state of new node already exists then discard the node.

☐ Solution-1 :- (i) Keep track of all states associated with nodes in current level

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

∴ avoids loops

☐ Solution-2 :- (i) Keep track of all state generated so far.

(ii) if the states of a new same here

∴ Space Complexity of breadth-first Algorithm,

Ans to the Qs No - 5 (B)

☐ Real-world problem :-

- (i) Touring problem :- visit every city atleast once. Starting Ending in Bucharest.
- (ii) Traveling Sales problem: exactly once
- (iii) Robot Navigation
- (iv) Internet searching :- Software robot.

☐ Example of algorithm :-

- (i) Sorting papers Imagine a teacher Sorting their students papers according to the alphabetical order on their first name.
 - (ii) Facial Recognition
 - (iii) Google Search.
 - (iv) Duplicates outcomes
 - (v) Traffic light.
 - (vi) Bus Schedule.
 - (vii)

- (vii) Tying your shoes Any step by step 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 que NO -
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