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Class : TY.B.Tech Division : CSE D Roll No. : PD31 Academic Year : 2019-2020  
Subject : AI Assignment / Test No. : TH-01 Date : \_\_\_\_\_

**PLEDGE**

I solemnly affirm that I have written this Assignment/Test based on my own preparation. I have neither copied it from others nor given it to others for coping. I know that this is to be submitted as a part of my submission at the end of the term.

Signature of the student

Q. No.	1	2	3	4	5	6	7	8	9	10	Total	Name & sign of the faculty Member
Marks/Grade												

(Please start writing assignment/ test from here)

Q1. List the different types of agent. Explain goal based agent in detail.

→ The different types of agents are

1. Simple ~~reflex~~ reflex agent.
2. Model Based agent
3. Goal Based Agent
4. Learning agent.
5. Utility Based agent

Goal Based Agents :

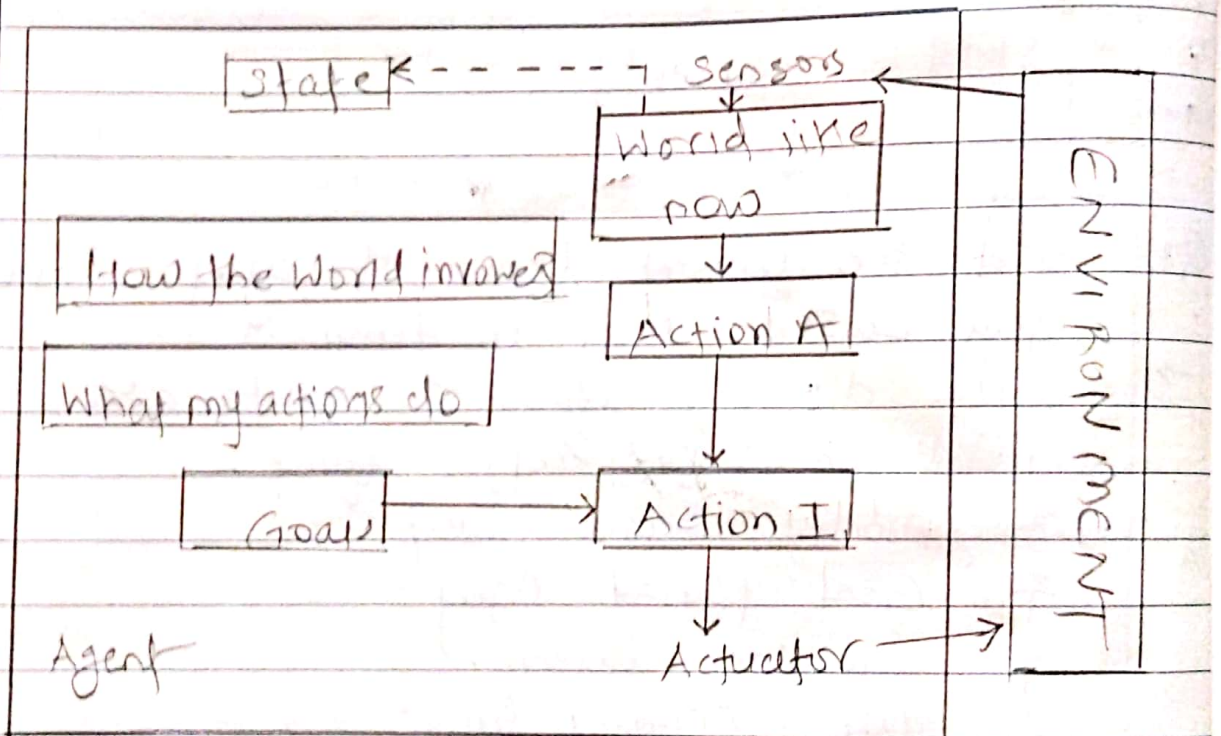
A goal based agent has flexibility to adjust its actions based on successfully reaching a goal.

It operates based on a goal in front of it and makes decisions based on how a goal based agent is capable of thinking beyond the present moment to decide the



best action to take it in order to achieve goal.

A goal-based agent operates as a search and planning function. it targets the goal ahead and find the right action in order to reach it.



These kind of agents take decision based on how far they are currently from their goal.

Their every action is intended to reduce its distance from the goal.

This allows the agent a way to choose among multiple possibilities selecting the one which reach the goal state.



Q.2.

What are informed Search method? Explain any one informed search method in detail.

Ans.

The informed search method algorithm is more useful for large scale search.

Informed search algorithm uses an idea of heuristics, so it is also called heuristic search.

The informed search discusses 2 main algorithm

1. Best first search algorithm (Greedy Search)

2. A\* Search algorithm.

Greedy Search :

Greedy best first algorithm always selects the pattern which appears best at that moment.

It is the combination of depth first search and breadth first search.

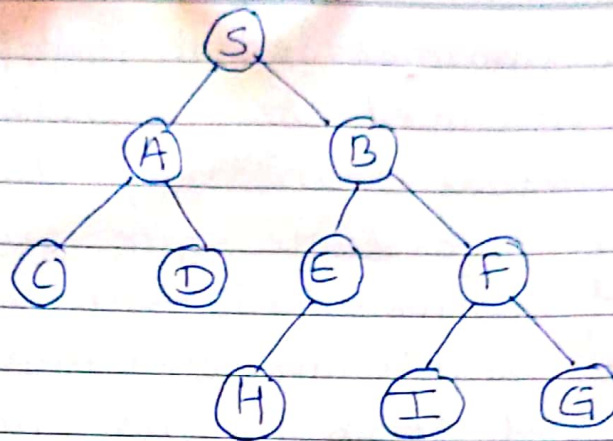
In the best first search algorithm we expand the node which is closest to the goal. node and the closest cost is estimated by heuristic function  $f(A) = g(n)$ .

advantage : Efficient than BFS and DFS.

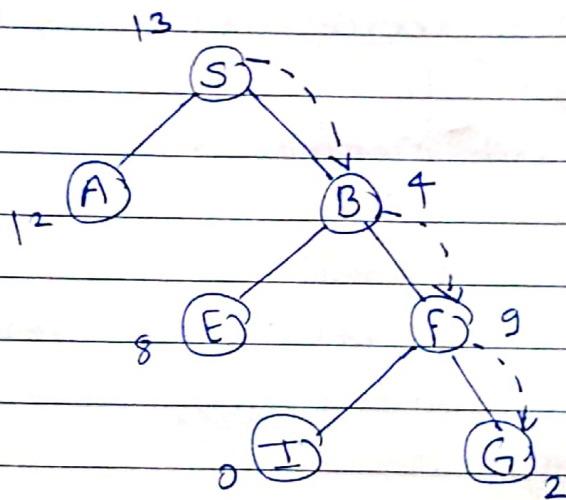
Disadvantage : Not an optimal algorithm.



e.g.



Node	H(n)
A	12
B	4
C	7
D	3
E	8
F	2
H	4
I	9
S	13
G	0



Time Complexity -  $O(b^m)$   
 Space Complexity -  $O(b^m)$

Q.3. Explain A\* Algorithm with example. Write any two heuristic function for solving 8 puzzle problem.

Ans. A\* Algorithm is one of the best and popular technique used for path finding and graph traversals. A\* Algorithm extends the paths that minimizes the following function.

$$f(n) = g(n) + h(n)$$

The implementation of A\* Algorithm involves maintaining two list - OPEN and CLOSED - OPEN contains those nodes that have been evaluated by the heuristic function but have not been expanded into successor yet. CLOSED contains those nodes that have already been visited.

Example :

2	8	3
1	6	4
7		5

Initial state

1	2	3
8		4
7	6	5

final state



Soln.

2	8	3
1	6	4
7		5

$g = 0$   
 $h = 4$   
 $f = 4$

$g = 1$   
 $h = 5$   
 $f = 6$

2	8	3
1	6	4
	7	5

2	8	3
1		4
7	6	5

$g = 1$   
 $h = 3$   
 $f = 4$

2	8	3
1	6	4
7	5	

$g = 1$   
 $h = 5$   
 $f = 6$

2	8	3
	1	4
7	6	5

2		3
1	8	4
7	6	5

2	8	3
1	4	
7	6	5

2	8	3
7	1	4
	6	5

	2	3
1	8	4
7	6	5

2	3	
1	8	4
7	6	5

	8	3
2	1	4
7	6	5

1	2	3
	8	4
7	6	5

1	2	3
8		4
7	6	5

1	2	3
7	8	4
	6	5

The heuristic function is used to generate heuristic value.

Different heuristic function can be designed depending on searching algorithm.