1) What is AI? State and explain Turing test with diagram.

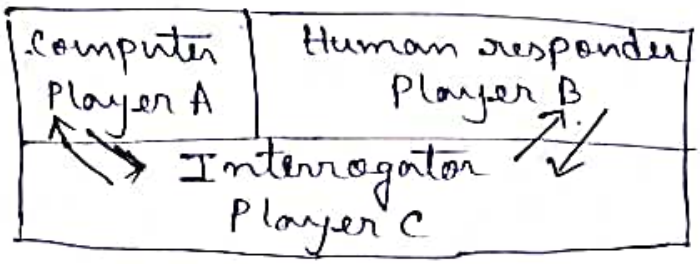
- AI → Artificial Intelligence is concerned with the design of intelligence in an artificial device which acts and thinks humanly as well as rationally.

- Turing test :—

State:

- The Turing test, developed by Alan Turing in 1950, is a test of a machine's ability to exhibit intelligent behavior.
- The artificial device can be easily understood by the concept of the Turing Test. Turing told that in future computers can be programmed to acquire abilities of acquiring human intelligence.
- As part of his argument Turing put forward the idea of an 'imitation game', in which a human being and a computer would be interrogated under conditions where the interrogator would not know which was which, the communication being entirely by textual messages.
- Turing argued that as the interrogator could not distinguish them by questioning, then it would be concluded the computer is intelligent.
- Turing's 'imitation game' is now usually called 'the Turing test' for intelligence.

Turing test.




- Consider the above setting. There are two rooms A and B.
- One of the rooms contains a computer and the other contains a human.
- The interrogator is outside and does not know which one is a computer.
- He can ask questions through a teletype and receives answers from both A and B.
- The interrogator needs to identify whether A or B are humans.
- To pass the Turing test, the machine has to fool the interrogator into believing that it is human.

2) What is Intelligent Agent? List the examples of Intelligent Agent.

Intelligent Agent:- An intelligent agent is an autonomous entity which act upon an environment using sensors and actuators for achieving goals. An intelligent agent may learn from the environment to achieve their goals.

Examples:-

- Alexa
- Siri
- thermostat

3) What is state space search? Explain state space algorith

State spach space search :-

A state-spach defined as a set of all Possible states of a problem. A state spach search representation allows for the formal definition of a Problem that makes the move from the initial state to the goal state.

State space search algorithm

Do until a solution state is found

(1) Check the current state
(2) Execute allowable actions to find the successor states
(3) Pick one of the new states
(4) Check if the new state is a solutions state or goal state.
(5) if it is not, the new state becomes the current state and the process is repeated.

4) State and explain various type of agent environments.

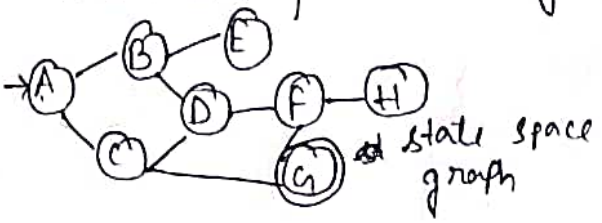
(1) Fully observable environments :- All of the environments relevant to the action being considered is observable.

(2) Partially observable environments :- The relevant features of the environment are only partially observable.

(3) The deterministic environments :- the next State of the enviroment is completely discribed by the current state and the action of the agent.

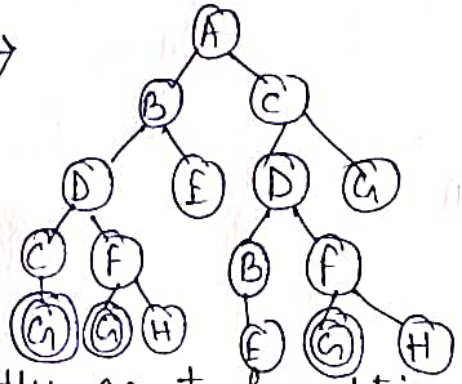
④ The stochastic environments :- New environment where uncertainty occurs.

5) In the following graph, G represents the goal node. Draw the search tree from this graph.



state space graph

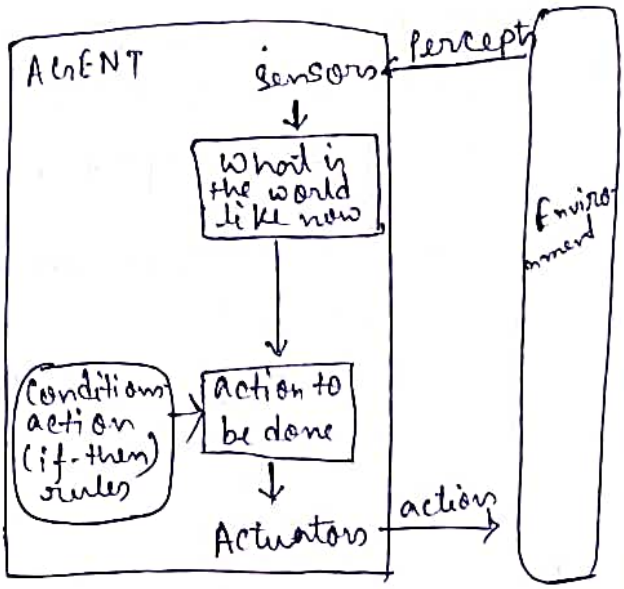
Search Tree →




6) State and Explain the agent faculties with diagram

Agent faculties:-

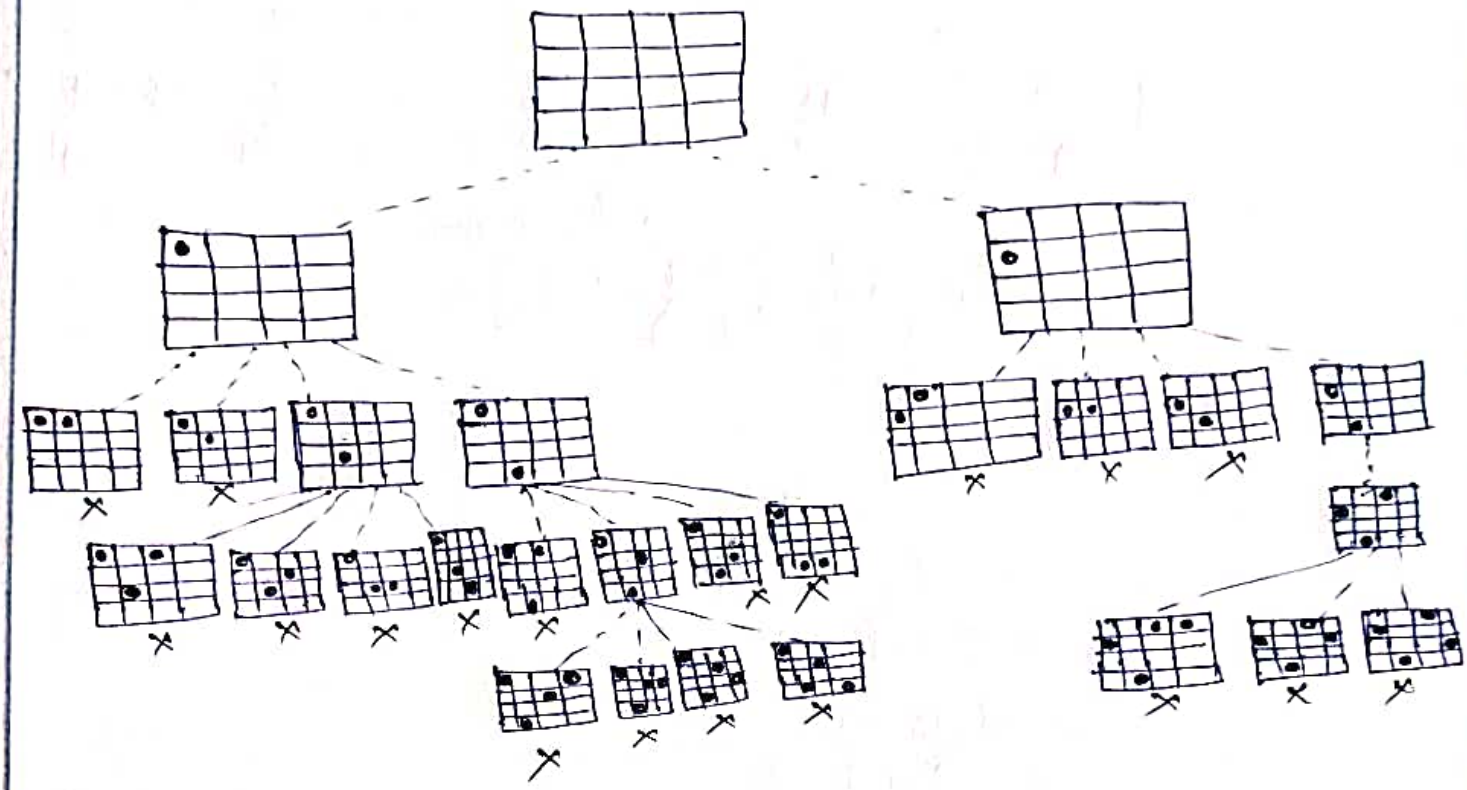
- Sensing
- Understanding
- Reasoning
- Learning
- Acting




⑦ What is N-Queens problems? Solve the 4-queens problem.

N-Queens problems :- The 8-queens problems, which can be generalized to the N-queens problems. The problems is to place 8 queens on a chessboard so that no two queens are in the same row, column or diagonal.

4- Queens problems



8) What is blind search? List the types of blind search Explain Breadth first search algorithm.

- Blind search:- A blind search is a search that has no information about its domain. The only thing that a blind search can do is distinguish a non-goal state from a goal state.

- List the types of blind search:-
  - Breadth - First search
  - Uniform - cost search
  - Depth - First search
  - Depth - Limited search
  - Iterative Deepening search

- Breadth First Search

Let fringe be a list containing the initial state.

Loop.

if fringe is empty return failure

Node ← remove-first(fringe)

if Node is a goal

then return the path from initial state to Node

else generate all successors of Node, and add generated nodes to the back of fringe.

End Loop.

(9) State and explain the evaluating factors of searching algorithm.

The characteristics of the different search algorithms and their efficiency, performance depends on the following three factors:-

(1) Completeness:- Is the strategy guaranteed to find a solution if one exists?

(2) Optimality:- Does the solutions have low cost or the minimal cost.

(3) Search cost:-

(a) Time complexity:- Time taken (number of nodes expanded) (worst or average case) to find a solution.

(b) Space complexity:- Space used by the algorithm measured in terms of the maximum size of fringe

10) What AI can do and can not do?

AI can do :-

1. Drive you around in relative safety.
2. Book things for you by phone
3. Diagonose skin cancer more effectively than dermatologists.

AI can not do :-

1. AI can not create, conceptualize, or plan strategically.

(11) How artificial device acquire Intelligence? What are the constituent intelligent behaviors)

- Logic and laws of thought deals with studies of ideal or rational thought proces and inference.
- The emphasis in this case is on the inferencing mechanism, and its properties.
- That is how the system arrives at a conclusion, or the reasoning behind its selection of actions is very important in this point of view.
- The soundness and completeness of the inference mechanisms are important here.
- The focus is on how the system acts and performs as rational agents. A rational agents is one that acts rationally in the best possible manner.

(12) Explain different types of AI.

① Weak AI (Type I AI - reactive)

- It deals with the creation computer-based artificial intelligence that can not truly reason and solve problems, but can act as intelligent.

② Applied AI (Type II AI - limited memory)

- It can handle complex classification tasks and Prediction using historical data.

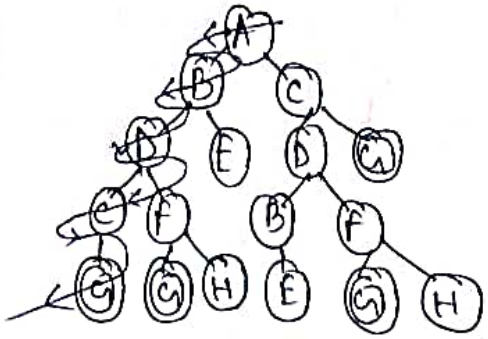
③ Cognitive AI (Type III AI - theory of mind)

- Theory of Mind researches hope to build computers that imitate our mental models.

④ Strong AI (Type IV AI - acquire self-awareness)

- It aims to build machines that can truly reason and solve problems.

(13) Apply DFS on the search tree to reach the goal (G) and find the expansion order




→ DFS( Stack)

~~A~~

~~BC~~

~~DEC~~

~~GFEC~~

(G) FEC success stop

(A → B → D → C → G)

(14) State the Limitations of Uninformed search.

The uninformed search strategies for searching is a multipurpose strategy that combines the power of unguided search and works in a brute force way. The algorithms of this strategy can be applied in a variety of problems in a computer science as they don't have the information related to state space and target problems.

(15) What is Informed search or Heuristic search?

A Heuristic is a technique to solve a Problem faster than classic methods, or to find an approximate solution when classic methods cannot.

(16) What is Heuristic function?

Heuristic is a function which is used in informed search, and it finds the most promising path. It takes the current state of the agent as its input and Produces the estimation of how close agent is from the goal.

(17) Apply Best First search on the search tree to reach the goal (G) and find the expansion order.

(18) Explain greedy Best first search.

- greedy Best-first search tries to expand the node that is closest to the goal, on the grounds that this is likely to lead to a solution quickly.
- Thus, the evaluation function is $f(n) = h(n)$
- greedy search ignores the cost of the path that has already been traversed to reach n.
- Therefore, the solution given is not necessarily ~~opt~~ optimal.