

(ii)
Artificial Neural Networks

As we know that neural means relating to nervous system. Neural network means there are so many biological neurons present in our brain and they are connected together so they can share information among different parts of our body. Same as in brain, artificial systems are there which are capable to store & process data by using artificial neurons. This is called artificial neural network. It is a computational model based on the structure & function of biological neural networks.

Information that flows through the ~~structure~~ of ANN network affects the structure of ANN because it changes or learns in the sense based on that input or output.

(B) LearningForward Chaining:-

- (i) Starts with the known facts and asserts new.
- (ii) Similar to Breadth 1st Search.

Backward Chaining:-

- (i) Starts with goals & works backward to determine what facts must be asserted so that the goals can be achieved.
- (ii) Similar to Depth first Search.

(C)Supervised Learning:-

- (i) It is based on training set.
- (ii) It is used to classify future observations.
- (iii) It is used regression algorithms.

Unsupervised Learning:-

It has no prior knowledge.
used to understand explore data.
used clustering algos.

Question: 2

(a) Problems faced by Hill Climbing Search.

There are three kinds of problems faced by climbing search.

(i) Local Maxima

(ii) Plateau

(iii) Ridges.

(i) Local Maxima:

In this, person at peak of mountain which is highest than others but the lower than the global maxima which is the goal peak.

(ii) Plateau:

In this person is lost at flat area because there is difficulty to decide that in which direction should choose by person to reach goal point.

(iii) Ridges:

In this person faces the more than one local maxima of same height.

Question : 7 :- Seat # 16122065(i) Artificial Intelligence and its types

It is the branch of Computer Science that aims to build machines which can mimic like human.

There are two types of AI

1) Based on Capabilities:

- ↳ Narrow (Weak) AI
- ↳ General (Strong) AI
- ↳ Super AI

2) Based on Functionalities:

- ↳ Reactive Machines
- ↳ limited Memory
- ↳ Theory of Mind
- ↳ Self awareness :

1) Based On Capabilities :-

→ Narrow (Weak) AI :-

- * It is capable of performing only a limited set of predefined function.
- * Weak AI powered machines do not have mind of their own.

→ General (Strong) AI :-

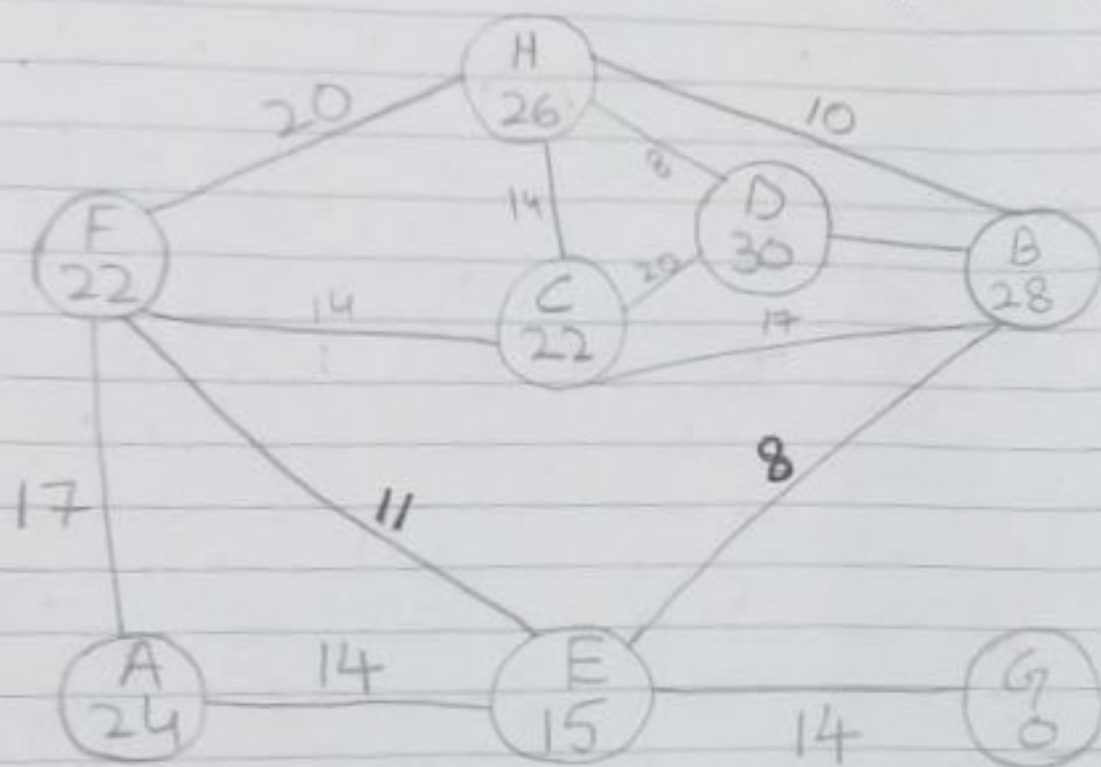
- * It is said to equal's the human's mind.
- * General AI powered machines have mind of their own.

Question # 4Seed # 16122065

$$FE = 6 + 5 = 11$$

$$BE = 2 + 6 + 0 = 8$$

I am Solving by greedy Search algo (BFS).



Shortest Path from H to G is :-

$H \rightarrow B \rightarrow E \rightarrow G$

Semantic Networks:

It is technique used for knowledge representation in the form of graph which includes nodes and arrows that define relation ships b/w objects

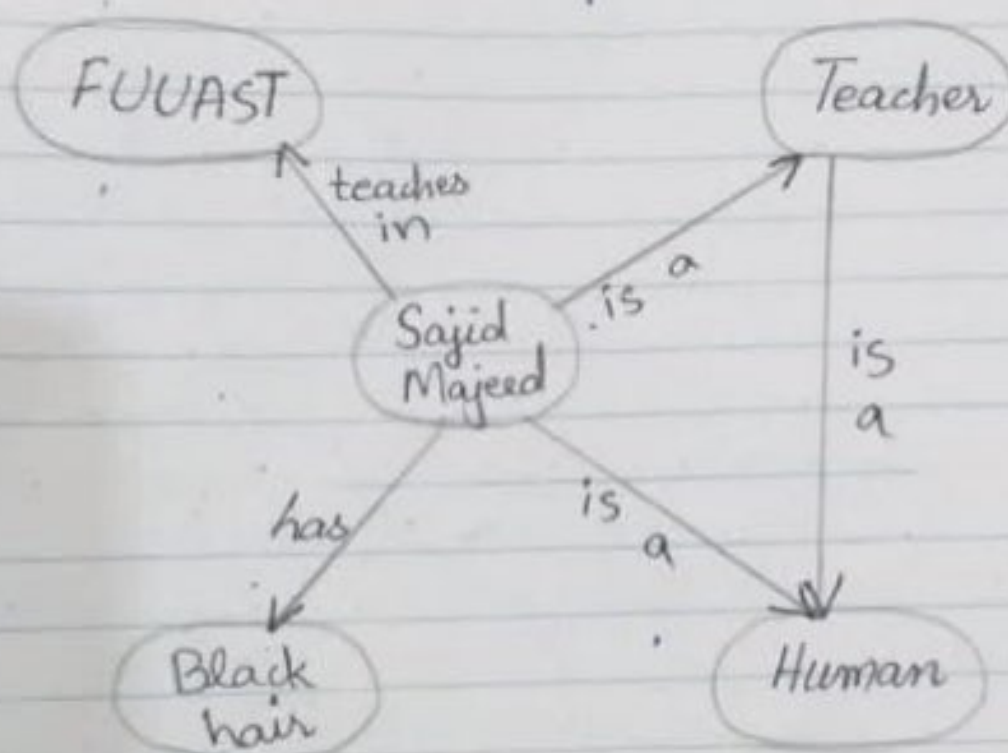
For Example:-

Sajid Majeed is a teacher

Sajid has black hair

Teacher is a human

Sajid teaches in FUUAST



Question: 6 : Set # 1612265

(a):

(i) Learning Agent

Learning agents are tools used in AI world. It has the capability to improve their performance by learning from their own experiences.

There are four components of learning agents:

- (i) critics :- generate feedback by learning inputs and compare it with performance standards.

- (ii) Learning Elements: it learns by with multiple behavior performance standards and generate from critics.

- (iii) Performance Elements:- Responsible for choice actions upon external environment. The actions are finalized by taking input from learning elements.

- (iv) Problem knowledge:- it kept on a alternative action which leads to more understanding.

Importance of Semantic:

Semantic Networks:

- (i) Semantic networks are very important in artificial intelligence in such a way that it permits a simple approach to investigate the problem space.
- (ii) It gives an approach to make branches of related components.

Uses of Semantic Networks:

- (i) It is used in knowledge representation and crosslingual applications.
- (ii) It is used in natural language processing, word sensing etc.

(b) Ques # 16122065

(i) Medical Diagnose System

Agent type :- Medical diagnose System
 Performance Measure :- Healthy patient induced costs
 Environments :- Patient, Hospital, Staff
 Actuators :- Display of questions, tests
 diagnoses, treatments regards.
 Sensors :- Keyboard entry of symptoms
 findings, patients answers.

(ii) Robot Soccer Player

Agent type :- Robot Soccer player
 Performance Measure :- play, make goal, win or best
 Score in game.
 Environments :- Ground, Team members, Referee,
 Audience, Opponents.
 Actuators :- Movement of legs of Robot.
 Sensors :- Camera, Communicators, Touch
 Sensors.

Question : 5

(a)

Knowledge Representation:-

In order to solve complex problem in artificial intelligence we need large amount of knowledge and some mechanisms for manipulating that knowledge to create solution.

Primary purpose of knowledge representation includes modeling intelligent behaviour for an agent.

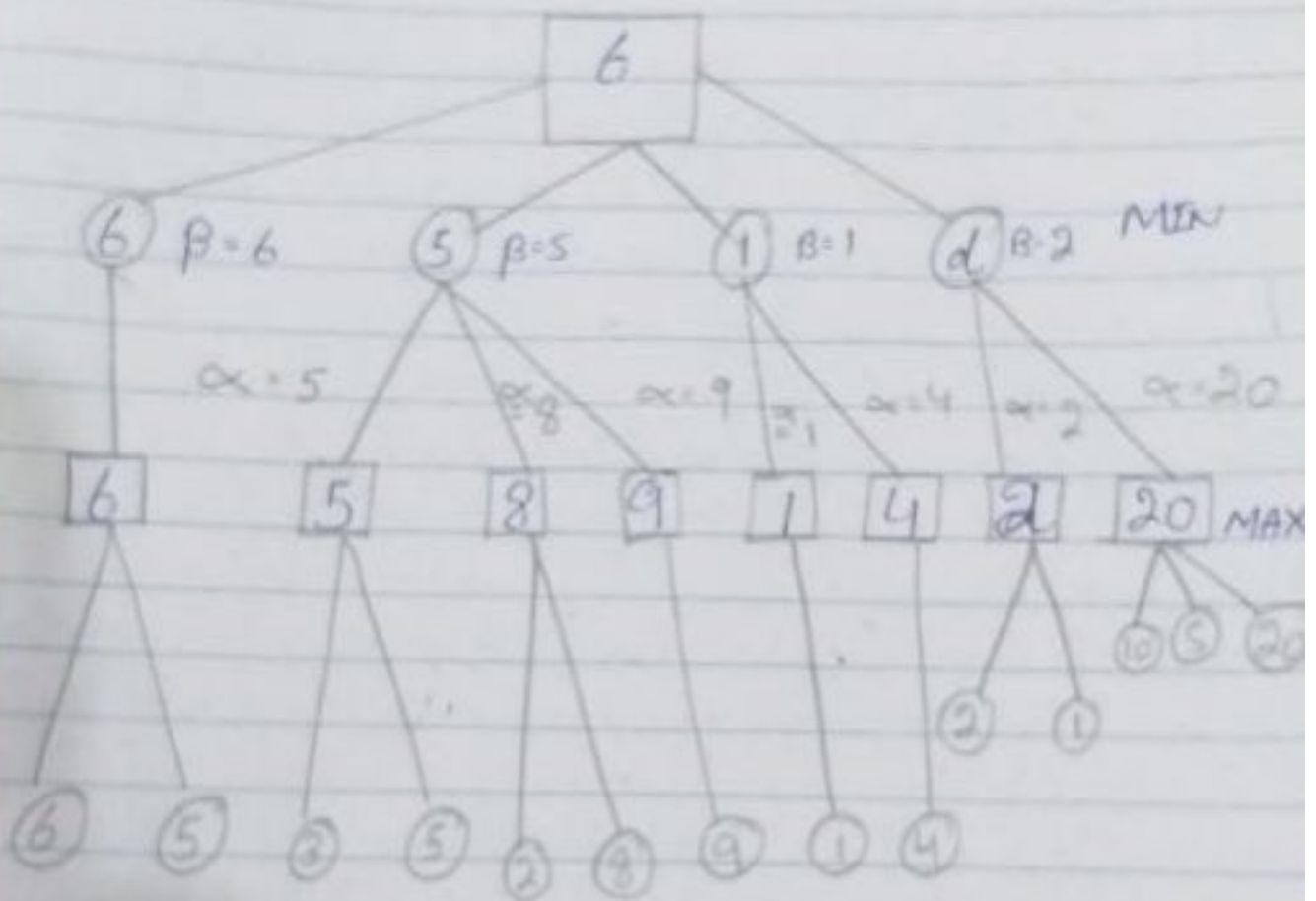
There are different ways to represent knowledge.

- (i) Propositional logic
- (ii) First order logic
- (iii) Rule based system
- (iv) Semantic Network
- (v) Frames

Question : 1

Solution :-

Let $\alpha = 6$



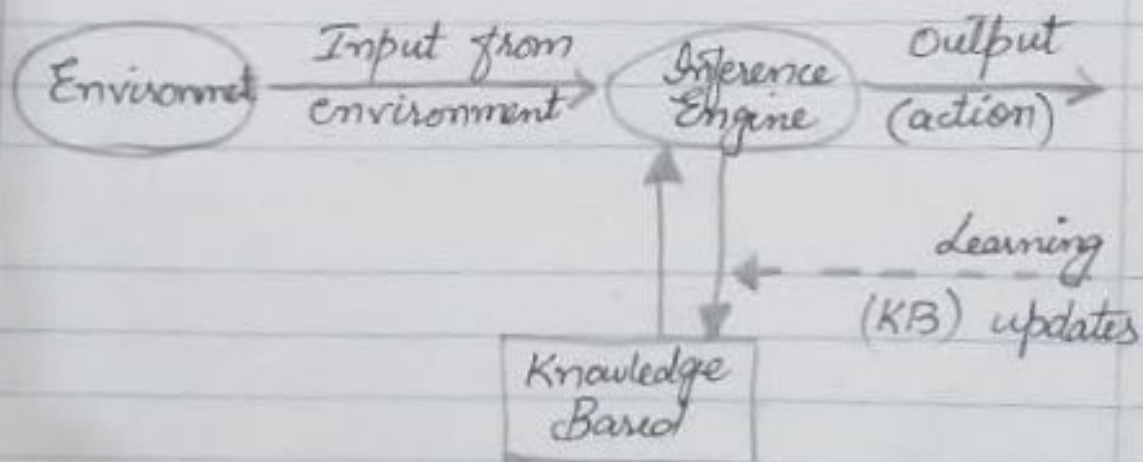
Q. : ~~write in D.~~
(ii) Model Based Agent

It is also called model of the world.
It have some kind of historical data.
keep track of the current state of the
world using an internal model. it done
chooses an action in the same way as
Reflex agent.

Example:- near to traffic light, means
when to stop or move, by
understanding model of traffic
light.

Construction of knowledge based Agent

- (i) The knowledge based agent take input from the environment.
- (ii) The input is taken by the inference engine of the agent which derives new sentences from knowledge base and also communicate with knowledge base to take decision.
- (iii) The learning elements of knowledge base agent regularly updates.



• F : Function

• Super AI :-

- 1) It is one which with one day could human intelligence and completely take over the world.
- 2) Demonstrates intelligence beyond human capabilities.

2) Based On Functionalities :-

→ Reactive Machines :-

are perceive the real world directly and react a/c to environment

→ Limited Memory :-

Machines are those that can retain memory for a short span of time.

→ Theory of Mind :-

It is decision making ability equal to extent of a human mind, but by machines.

→ Self awareness :- involves machines that have human-level consciousness.

(b)

(i)
 $\neg (\forall x) \text{Take}(x, \text{Computer Science})$
 $\wedge \text{take}(x, \text{History})$

(ii)
 $\exists \text{Students}(s) \leftrightarrow \text{failed}(s, \text{History}) \wedge$
 $\text{failed}(s, \text{Computer Science})$

(iii)
 $\text{like}(I, \text{Sandy}) \wedge \neg \text{like}(I, \text{Sandy})$

(iv)

$\text{outburst}(\text{you}) \leftrightarrow \text{Content of Court}(\text{you})$

(v)

$\exists b \forall m \text{Barber}(b) \wedge \text{Man}(m) \wedge$
 $\neg \text{shaves}(m, m) \Rightarrow \text{shaves}(m, b)$