GOVT.WOMEN ENGINEERING COLLEGE,AJMER

MCA –IV Semester   **Subject-Artificial Intelligence**

Time-1 hr   **Ist Midterm Exam Session 2017-2018**   **Max.Marks:20**

1.Write Difference Between Forward and Backward Chaining?   **3**

2.Compare BFS and DFS with Algorithm.   **8**

3.What is Artificial Intelligence?Explain its applications   **2+2=4**

4.What is Production System?   **3**

5.Write Characterstics of AI.   **2**

1.Difference Between Forward and Backward Chaining

Forward Chaining	Backward Chaining
• Known as Data Driven Interface Technique.	• Known as Goal Driven Interface Technique.
• It is Bottom up Reasoning	• It is Top Down Reasoning
• It is a Breadth First Search	• It is a Depth First Search
• It matches the set of conditions and infer results from these conditions.	• It is a Backward search from goal to the conditions used to set the goal.
• It starts from a new data and aims for any conclusion.	• It start from possible conclusion or goal and aim for necessary data.
• It continue until no more rules can be applied or some cycle limit is met.	• It process operation in backward direction from end to start,it will stop when the matching initial condition is met.
• It can create an infinite no.of possible conclusions.	• No.of possible Final answer is reasonable.

2.

BFS Stands for "Breadth First Search".	DFS stands for "Depth First Search".
BFS starts traversal from the root node and then explore the search in the level by level manner i.e. as close as possible from the root node.	DFS starts the traversal from the root node and explore the search as far as possible from the root node i.e. depth wise.
Breadth First Search can be done with the	Depth First Search can be done with the help

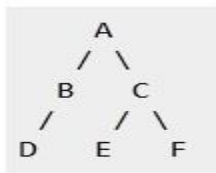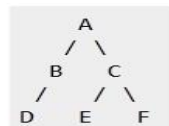|	
help of queue i.e. FIFO implementation.	of Stack i.e. LIFO implementations.
This algorithm works in single stage. The visited vertices are removed from the queue and then displayed at once.	This algorithm works in two stages – in the first stage the visited vertices are pushed onto the stack and later on when there is no vertex further to visit those are popped-off.
BFS is slower than DFS.	DFS is more faster than BFS.
BFS requires more memory compare to DFS.	DFS require less memory compare to BFS.
Applications of BFS > To find Shortest path > Single Source & All pairs shortest paths > In Spanning tree > In Connectivity	Applications of DFS > Useful in Cycle detection > In Connectivity testing > Finding a path between V and W in the graph. > useful in finding spanning trees & forest.
BFS is useful in finding shortest path.BFS can be used to find the shortest distance between some starting node and the remaining nodes of the graph.	DFS in not so useful in finding shortest path. It is used to perform a traversal of a general graph and the idea of DFS is to make a path as long as possible, and then go back (backtrack) to add branches also as long as possible.
Example : A, B, C, D, E, F	A, B, D, C, E, F

Algorithm of BFS-

Step 1:	Initialize all nodes to the ready state.(STATUS=1)
Step 2:	Put the starting node in the queue and change its status to the waiting state.(STATUS=2)
Step 3:	Repeat Step 4 and 5 until queue is empty.
Step 4:	Remove the front node N of queue.Process N and change the status of N to the processed state.(STATUS=3)
Step 5:	Add to the rear of queue all the neighbours of N that are in the ready state and change their status to the waiting state.
Step 6:	Exit

Algorithm of DFS-

Step 1:	Initialize all nodes to the ready state.(STATUS=1)
Step 2:	Put the starting node in the stack and change its status to the waiting state.(STATUS=2)
Step 3:	Repeat Step 4 and 5 until stack is empty.
Step 4:	Pop the top node N of stack.Process N and change the status of N to the processed state.(STATUS=3)
Step 5:	Push onto the stack all the neighbours of N that are in the ready state and change their status to the waiting state.
Step 6:	Exit

3. Artificial intelligence (AI) is an area of computer science that emphasizes the creation of intelligent machines that work and react like humans.

Artificial Intelligence is a way of making a computer, a computer-controlled robot, or a software think intelligently, in the similar manner the intelligent humans think.

Applications of AI:

- Gaming − AI plays crucial role in strategic games such as chess, poker, tic-tac-toe, etc., where machine can think of large number of possible positions based on heuristic knowledge.
- Natural Language Processing − It is possible to interact with the computer that understands natural language spoken by humans.
- Expert Systems − There are some applications which integrate machine, software, and special information to impart reasoning and advising. They provide explanation and advice to the users.
- Vision Systems − These systems understand, interpret, and comprehend visual input on the computer. For example
    - A spying aeroplane takes photographs, which are used to figure out spatial information or map of the areas.
    - Doctors use clinical expert system to diagnose the patient.
- Speech Recognition − Some intelligent systems are capable of hearing and comprehending the language in terms of sentences and their meanings while a human talks to it. It can handle different accents, slang words, noise in the background, change in human's noise due to cold, etc.
- Handwriting Recognition − The handwriting recognition software reads the text written on paper by a pen or on screen by a stylus. It can recognize the shapes of the letters and convert it into editable text.
- Intelligent Robots − Robots are able to perform the tasks given by a human. They have sensors to detect physical data from the real world such as light, heat, temperature, movement, sound, bump, and pressure. They have efficient processors, multiple sensors and huge memory, to exhibit intelligence. In addition, they are capable of learning from their mistakes and they can adapt to the new environment.

4.Production System:

It defines the set of rules which acted on the sets of states,means transformation of states.

It consist of:-

1. Set of rules represented by
    A → B
    Where A is the initial state & B is the final state ,(→)called production.

2. Contains Knowledge/database that contains appropriate information for a particular task.
3. Requires a Control Strategy for deciding the appropriate production.
4. The Ruler Applied .

    - The problem of solving a problem can usefully be modeled as a production System.
    - But to solve a problem,selection of a particular production system can be done using control strategy.

      There are 2 Essential requirements for control Strategy.
      a. A good Control strategy causes motion.
      b. A good Control strategy is Systematic.

5.Characterstics Of AI:

a. Artificial intelligence problem have large number of solution set.
b.   can manipulate large number of symbolic information to a large extent.
c. AI problems have ability to learn.
d. It is possible to solve AI problem with or without AI technique.
e. Rational Thinking.
f. Fast Decision Making.