P P SAVANI UNIVERSITY

Fifth Semester of B.Sc. IT Examination

December 2021

SSIT3540 Artificial Intelligence

09.12.2021, Thursday **Time: 09:00 a.m. To 11:30 a.m.** **Maximum Marks: 60**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

SECTION – I

Q - 1 Attempt any Five. **[05]**

(i) What is Artificial Intelligence?

(ii) Translate these sentences in predicate logic.
1. Mangoes are fruit.
2. Cabbage is not fruit.

(iii) What is state space?

(iv) What is knowledge?

(v) Translate these sentences in predicate logic.
1. Rich people have fast cars.
2. Fast cars consume a lot of petrol.

(vi) A* algorithm is based on

(a) Breadth-First-Search (b) Depth-First –Search
(c) Best-First-Search (d) Hill climbing

(vii) Translate these sentences in predicate logic.
1. Prince is a mega star.
2. Mega stars are rich.

Q - 2 (a) Explain task domain of AI. **[05]**

Q - 2 (b) Explain difference between procedure and declarative knowledge. **[05]**

OR

Q - 2 (a) Explain water jug problem. **[05]**

Q - 2 (b) Explain 8 puzzle problem with one example. **[05]**

Q - 3 (a) Explain depth first search with example. **[05]**

Q - 3 (b) Explain hill climbing problem and there solution. **[05]**

OR

Q - 3 (a) Explain difference between BFS and DFS. **[05]**

Q - 3 (b) Explain simple hill climbing. **[05]**

Q - 4 Attempt any one. **[05]**

(i) Explain best first search.

(ii) Explain difference between forward and backward reasoning.

SECTION – II

Q - 1 Attempt any five. **[05]**

(i) List out the applications of AI in Healthcare.

(ii) The Bayesian network graph does not contain any cyclic graph. Hence, it is known as a

(iii) There is a technique by which without checking each node of the game tree we cancompute the correct minimax decision, and this technique is called?

(iv) List out the examples of Chatbot.

(v) Which chaining rule has inductive approach?

(vi) List out the applications of Natural Language Processing.

(vii)	Define : Crisp Logic	
Q - 2 (a)	Discuss Min-Max search method.	[05]
Q - 2 (b)	Explain Fuzzy Inference System.	[05]
	OR	
Q - 2 (a)	Explain Bayesian Network with example.	[05]
Q - 2 (b)	Explain Defuzzification methods.	[05]
Q - 3 (a)	What is the importance of Fuzzy logic? How do you perform union, intersection and complement operation on the Fuzzy sets ?	[05]
Q - 3 (b)	Explain alpha-beta cut off search with an example. State a case when to do alpha pruning.	[05]
	OR	
Q - 3 (a)	What is Artificial Neural Network? Discuss applications of Artificial Neural Network.	[05]
Q - 3 (b)	Define Natural language processing and explain Discourse and Pragmatic processing.	[05]
Q - 4	Attempt any one.	[05]
(i)	List out the property of Monotonic and Non monotonic reasoning.	
(ii)	Discuss Iterative Deepening Search. Also give one example to explain.	

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SECTION – I

Q - 1	Attempt any five.	**[05]**
(i)	A technique that was developed to determine whether a machine could or could not demonstrate the artificial intelligence known as the_____	
(ii)	Which algorithm is used in the Game tree to make decisions of Win/Lose?	
(iii)	The available ways to solve a problem of state-space-search _____	
(iv)	Which AI technique enables the computers to understand the associations and relationships between objects and events?	
(v)	Define Weak AI.	
(vi)	First-order logic is symbolized reasoning in which each sentence, or statement, is broken downinto a subject and a predicate (True/False).	
(vii)	Define Semantic Net.	
Q - 2 (a)	Explain Water Jug Problem.	**[05]**
Q - 2 (b)	Discuss the concept of "Heuristic" with an example.	**[05]**
	OR	
Q - 2 (a)	Represent the following sentences in first-order logic 1. Some students took English subject. 2. Every student who takes English passes it. 3. Every person who buyes policy is a smart. 4. No person buyes an expensive policy.	**[05]**
Q - 2 (b)	Take any instance of 8 Puzzle problem and show its solution with A* algorithm.	**[05]**
Q - 3 (a)	Explain difference between forwards reasoning and backward reasoning.	**[05]**
Q - 3 (b)	Explain Depth first search with example.	**[05]**
	OR	
Q - 3 (a)	Consider the following sentences: Raj likes all kinds of food. Apples are food. Anything anyone eats and isn't killed by is food. Sachin eats peanuts and is still alive. Vinod eats everything Sachin eats. Now, attempt following: i. Translate these sentences into formulas in predicate logic ii. Use resolution to answer the question, "What food does Vinod eat ?"	**[05]**
Q - 3 (b)	Explain Breadth First Search algorithm with example.	**[05]**
Q - 4	Attempt any one.	**[05]**
(i)	Discuss hill climbing search method. Also discuss limitations and ways to overcome these limitations.	
(ii)	Explain Constraint Satisfaction.	

SECTION – II

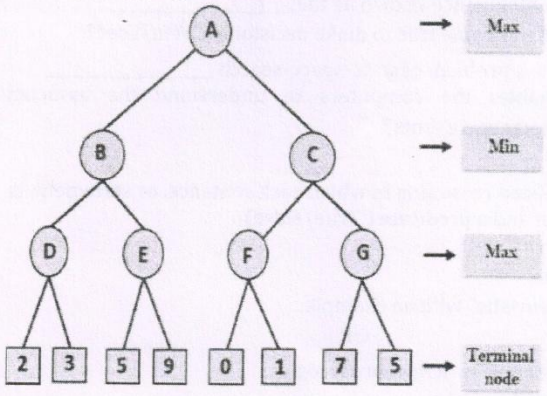
Q - 1	Attempt any five.	**[05]**
(i)	What is certainty factor?	
(ii)	What is fuzzy set?	
(iii)	What is neural network?	
(iv)	What is activation function?	

(v)	Prolog stands for.....	
(vi)	What is neural network?	
(vii)	What is heuristic function?	
Q - 2 (a)	Explain bayes theorem.	[05]
Q - 2 (b)	Explain fuzzy Inference System.	[05]

OR

Q - 2 (a)	Explain minimax search algorithm with example.	[05]
Q - 2 (b)	Explain phases of Natural Language Processing.	[05]
Q - 3 (a)	Explain perceptron network.	[05]
Q - 3 (b)	Explain multilayer neural network.	[05]

OR

Q - 3 (a)	Write a prolog program for factorial of given number.	[05]
Q - 3 (b)	Write a prolog program for find the length of list.	[05]
Q - 4	Attempt any one.	[05]
(i)	Write a prolog program to find maximum number from a list.	
(ii)		

Solve above example using alpha beta cut off algorithm and Find how many number of nodes are not explored?

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