



SRM INSTITUTE OF SCIENCE AND TECHNOLOGY
Ramapuram Campus, BharathiSalai, Ramapuram, Chennai - 600089

FACULTY OF ENGINEERING AND TECHNOLOGY

**DEPARTMENT OF COMPUTER SCIENCE AND
ENGINEERING**

QUESTION BANK

DEGREE / BRANCH: B.Tech/CSE with Specializations AIML, BDA,CS and IOT

SEMESTER: IV

SUB CODE/SUBJECT NAME: 21CSC206T/ARTIFICIAL INTELLIGENCE

Regulation– 2021

Academic Year: 2024-25

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SUBJECT : 21CSC206T/ARTIFICIAL INTELLIGENCE

SEM/YEAR: III/II

Course Outcomes

- CO-1** Formulate a problem as a state space search method and its solution using various AI techniques
:
CO-2 Apply appropriate searching techniques to solve a real-world problem
:
CO-3 Develop various game playing strategies to solve real world adversarial search problems
:
CO-4 Represent various knowledge representation techniques to solve complex AI problems
:
CO-5 Design an expert system to implement advance techniques in Artificial Intelligence
:

UNIT II			
PART-A (Multiple Choice Questions)			
Q. No	Questions	Course Outcome	Competence BT Level
1	The main task of a problem-solving agent is A) Solve the given problem and reach to goal B) To find out which sequence of action will get it to the goal state C) Both a) and b) D) Neither a) nor b)	2	1
2	What is state space? A) The whole problem B) Your Definition to a problem C) Problem you design D) Representing your problem with variable and parameter	2	2
3	A search algorithm takes ____ as an input and returns ____ as an output. A) Input, output B) Problem, solution C) Solution, problem D) Parameters, sequence of actions	2	1
4	A problem in a search space is defined by A) Initial state B) Goal test C) Intermediate states D) All of the above	2	1
5	The Set of actions for a problem in a state space is formulated by a ____. A) Intermediate states B) Initial state C) Successor function, which takes current action and returns next immediate state D) None of the mentioned	2	2

6	The process of removing detail from a given state representation is called ____ A) Extraction B) Abstraction C) Information Retrieval D) Mining of data	2	1
7	What kind of environment is strategic in artificial intelligence? A) Deterministic B) Rational C) Partial D) Stochastic	2	2
8	Where does the performance measure is included? A) Rational agent B) Task environment C) Actuators D) Sensor	2	2
9	Which search strategy is also called as blind search? A) Uninformed search B) Informed search C) Simple reflex search D) All of the mentioned	2	1
10	How many types are available in uninformed search method? A) 3 B) 4 C) 5 D) 6	2	1
11	Which search is implemented with an empty first-in-first-out queue? A) Depth-first search B) Breadth-first search C) Bidirectional search D) None of the mentioned	2	1
12	When breadth-first search is optimal? A) When there is less number of nodes B) When all step costs are equal C) When all step costs are unequal D) Both a & c	2	1
13	Which algorithm is used to solve any kind of problem? A) Breath-first algorithm B) Tree algorithm C) Bidirectional search algorithm D) None	2	1
14	Which search algorithm imposes a fixed depth limit on nodes? A) Depth-limited search B) Depth-first search C) Iterative deepening search D) Bidirectional search	2	1
15	. Which search implements stack operation for searching the states? A) Depth-limited search B) Depth-first search C) Breadth-first search D) None of the mentioned	2	2
16	A* algorithm is based A) Breadth-First-Search B) Depth-First –Search C) Best-First-Search	2	1

	D) Hill climbing		
17	The search strategy the uses a problem specific knowledge is known as A) Informed Search B) Uniform-Cost Search C) Heuristic Search D) Best First Search	2	1
18	Best-First search is a type of informed search, which uses ____ to choose the best next node for expansion. A) Evaluation function returning lowest evaluation B) Evaluation function returning highest evaluation C) Both a & b can be used D) None of them is applicable	2	2
19	Best-First search can be implemented using the following data structure. A) Queue B) Stack C) Priority Queue D) Circular Queue	2	1
20	Components of AI program are Knowledge base, Inference mechanism and ____ A) Control System B) Control flow C) Control Strategy D) None	2	1
21	System that thinks like human requires ____ modeling approach? A) Rational B) Cognitive C) Conjunctive D) Controllable	2	1
22	System which's thinks rationally relies on Logic rather than human to ____ A) Measure correctness B) Measure rationality C) Measuring Logic D) Predicate Logic	2	1
23	The ____ is a touring problem in which each city must be visited exactly once. The aim is to find the shortest tour. A) Finding shortest path between a source and a destination B) Travelling Salesman problem C) Map coloring problem D) Depth first search traversal on a given map represented as a graph	2	2
24	What kind of observing environments are present in artificial intelligence? A) Partial B) Fully C) Learning D) Both a & b	2	2
25	What kind of behavior does the stochastic environment possess? A) Local B) Deterministic C) Rational D) Primary	2	2
PART B (12 Marks)			
1	Write an algorithm for Push and Pop operations on Stack using Linked list.	2	2
2	Formulate why heuristic search techniques are considered to be powerful than the traditional search techniques?	2	3
3	Differentiate A* and AO* algorithm with example	2	3
4	Infer in brief about problem space and search strategies.	2	3

5	(i)How to minimize total estimated cost using A* search with an example	2	4
	(ii)Write the proof of optimality of A*.	2	4
6	Explain Control Strategy with example	2	1
7	Discuss the role of evaluation functions in guiding the search process in AI problems, particularly in domains like game-playing (e.g., chess, tic-tac-toe) and pathfinding .	2	4
8	Compare between Informed and Uninformed Search strategies.	2	2
9	Explain how a problem-solving agent works?	2	3
10	Explain Exhaustive Searches? Discuss Space Search	2	4
PART C (16 Marks)			
1	What is A* search? Explain various stages of A* search with an example.	2	2
2	Evaluate the performance problem solving method based on (i) Best First Search (ii) Depth limited search algorithms.	2	3
3	Evaluate the performance problem solving method based on (i) Breadth first strategy. (ii) Depth first search algorithms.	2	3
4	Explain the state space representation of Water –Jug problem.	2	3
5	Discuss the underlying concept of combining Depth-First Search (DFS) and A search* in IDA*. How does IDA* overcome the memory limitations of A* while still maintaining optimality and completeness?	2	4
6	(i)The task is to place 8 queens on a chessboard such that no two queens threaten each other (no two queens can be in the same row, column, or diagonal). A "Generate and Test" approach is used. Generate: Place 8 queens randomly on the board. Test: Check if the placement is valid. Question: How does the Generate and Test method solve this problem, and what challenges might arise?	2	4
	(ii) A hacker attempts to crack a 4-character password where each character is a digit (0–9). The hacker uses the Generate and Test method. Generate: Create a random 4-digit combination. Test: Compare it with the correct password. Question: What is the worst-case time complexity, and how can this method be improved?	2	4

Note:

1. **BT Level** – Blooms Taxonomy Level

2. **CO – Course Outcomes**

BT1 –Remember BT2 – Understand BT3 – Apply BT4 – Analyze BT5 – Evaluate BT6 – Create

UNIT III			
PART-A (Multiple Choice Questions)			
Q. No	Questions	Course Outcome	Competence BT Level
1	Which environment is called as semi dynamic? A) Environment does not change with the passage of time B) Agent performance changes C) Environment will be changed D) Both a & b	3	1
2	Where does the performance measure is included? A) Rational agent B) Task environment C) Actuators D) Sensor	3	2
3	To which depth does the alpha-beta pruning can be applied? A) 10 states B) 8 States C) 6 States D) Any depth	3	2
4	Which search is equal to minimax search but eliminates the branches that can't influence the final decision? A) Depth-first search B) Breadth-first search C) Alpha-beta pruning D) None of the mentioned	3	2
5	Which values are independent in minimax search algorithm? A) Pruned leaves x and y B) Every states are dependent C) Root is independent D) None	3	2
6	Which search is similar to minimax search? A) Hill-climbing search B) Depth-first search C) Breadth-first search D) All of the mentioned	3	1
7	Flexible CSPs relax on ____ A) Constraints B) Current State C) Initial State D) Goal State	3	2
8	Language/Languages used for programming Constraint Programming includes A) Prolog B) C++ C) C D) Fortran	3	1
9	Which search agent operates by interleaving computation and action? A) Offline search	3	2

	B) Online search C) Breadth-first search D) Depth-first search		
10	Backtracking is based on, A) Last in first out B) First in first out C) Recursion D) Both a & c	3	1
11	How many the new states are generated in backtracking algorithm? A) 1 B) 2 C) 3 D) 4	3	1
12	Which of the following algorithm is generally used CSP search algorithm? A) Breadth-first search algorithm B) Depth-first search algorithm C) Hill-climbing search algorithm D) None	3	1
13	Which type of network can be trained by using back-propagation algorithm? A) Recurrent B) Stable network C) Structured network D) All	3	1
14	Internet agent is also known as _____ Agent A) Flexible B) Transfer C) Information D) None	3	1
15	. Which of the following is the primary goal of an adversarial search in game theory? a) To maximize the agent's score while minimizing the opponent's score b) To make random moves to ensure fairness c) To minimize the agent's score while maximizing the opponent's score d) To optimize the moves for all players involved	3	2
16	In adversarial search, what does the term "game tree" refer to? a) A structure that stores all possible states and actions of a game b) A structure that stores the moves of a single agent only c) A strategy used by both players d) The collection of moves made by one player during the game	3	1
17	Which of the following algorithms is commonly used for solving zero-sum, two-player games with perfect information? a) Minimax algorithm b) Breadth-first search c) A* search algorithm d) Hill climbing	3	1
18	Which of the following is true about the minimax algorithm with alpha-beta pruning? a) It guarantees finding the optimal move, but with a reduced search tree size. b) It guarantees finding the optimal move, but without reducing the search tree size. c) It finds an optimal move but can sometimes prune useful branches. d) It does not guarantee optimality, even with pruning.	3	2
19	In the context of adversarial search, what does the term "pruning" mean? a) Adding new branches to the search tree to explore more possible outcomes b) Removing unimportant branches of the game tree that do not affect the final decision	3	1

	c) Expanding the search tree to find better outcomes d) Searching deeper into the game tree to maximize the agent's score		
20	In the minimax algorithm, the "min" part refers to: a) The player minimizing the score of the opponent b) The player maximizing their own score c) A strategy for minimizing the opponent's options d) The player who moves first	3	1
21	What is the purpose of alpha-beta pruning in the minimax algorithm? a) To eliminate redundant computations by pruning the search tree b) To speed up the minimax algorithm by cutting off branches that cannot influence the final decision c) To reduce the search space by randomly selecting branches d) To guarantee optimal play in an adversarial search	3	1
22	Which of the following is NOT a typical component of a CSP? a) Variables b) Domain c) Constraints d) Heuristic functions	3	1
23	In a CSP, what does the domain refer to? a) The set of constraints that must be satisfied b) The specific values that variables can take c) The set of variables involved in the problem d) The possible solutions to the problem	3	2
24	Which of the following is a common search algorithm used to solve CSPs? a) Depth-first search b) Breadth-first search c) Backtracking d) Genetic algorithms	3	2
25	Which of the following is an example of a real-world problem that can be modeled as a CSP? a) Pathfinding in a maze b) Sudoku puzzles c) Sorting a list of numbers d) Matrix multiplication	3	2

PART B (12 Marks)

1	Give a brief note on Alpha-Beta Pruning	3	2
2	How do rational agents ensure they achieve their goals in a dynamic environment?	3	3
3	What are the four basic types of agent program in any intelligent system?	3	3
4	Explain the Constraint Satisfaction search strategies with example.	3	3
5	How does a rational agent handle trade-offs between multiple competing goals?	3	4
6	Explain the properties key Components of the Task Environment	3	2
7	Explain the basic Structure of Cryptarithmic Puzzles with solution approach	3	4
8	How does backtracking handle constraint violations during the search process?	3	2

9	How would you demonstrate that alpha–beta pruning outperforms the minimax search algorithm?	3	2
10	Explain how a constraint satisfaction problem (CSP) may be solved	3	2
PART C (16 Marks)			
1	Discuss how performance measures might differ depending on the task at hand. For example, how would the performance of a game-playing agent differ from that of a robotic navigation agent?	3	3
2	Explore scenarios where agents must operate under resource constraints, such as limited processing power or energy, and how these limitations affect performance evaluation.	3	4
3	Evaluate the performance of adversarial search problems with examples in the competitive environment	3	3
4	What inference can you draw about how minimax can be extended to a game of chance?	3	3
5	Explain CSP with search problem of room coloring in AI	3	3
6	Explain the different types of agents and give examples	3	3

Note:

3. BT Level – Blooms Taxonomy Level

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