**M. Sc. Computer Science Semester-IV**

**Paper-II (Artificial Intelligence and**

**Expert System)**

**UNIT-1**

1. What is Artificial intelligence?

a) Putting your intelligence into Computer

b) Programming with your own intelligence

**c) Making a Machine intelligent**

d) Playing a Game

Answer: c

2. How do you represent “All dogs have tails”?

**a) ۷x: dog(x) àhastail(x)**

b) ۷x: dog(x) àhastail(y)

c) ۷x: dog(y) àhastail(x)

d) ۷x: dog(x) àhasàtail(x)

Answer: a

3. Who is known as the -Father of AI"?

a. Fisher Ada

b. Alan Turing

**c. John McCarthy**

d. Allen Newell

Answer: c

4. The application/applications of Artificial Intelligence is/are

a. Expert Systems

b. Gaming

c. Vision Systems

**d. All of the above**

Answer :d

5. A technique that was developed to determine whether a machine could or could not demonstrate the artificial intelligence known as the

a. Boolean Algebra

**b. Turing Test**

c. Logarithm

d. Algorithm

Answer: b

6. An AI agent perceives and acts upon the environment using

a. Sensors

b. Perceiver

c. Actuators

**d. Both a and c**

Answer: d

7. Which rule is applied for the Simple reflex agent?

a. Simple-action rule

b. Simple &Condition-action rule

**c. Condition-action rule**

d. None of the above

Answer: c

8. Which agent deals with the happy and unhappy state?

**a. Utility-based agent**

b. Model-based agent

c. Goal-based Agent

d. Learning Agent

Answer : a

9. Rational agent always does the right things.

**a. True**

b. False

Answer : a

10. Which term describes the common-sense of the judgmental part of problem-solving?

a. Values-based

b. Critical

c. Analytical

**d. Heuristic**

Answer : d

11. Which AI technique enables the computers to understand the associations and relationships between objects and events?

a. Heuristic Processing

b. Cognitive Science

c. Relative Symbolism

**d. Pattern Matching**

Answer : d

12. The exploration problem is where .

a. Agent contains the knowledge of State and actions.

**b. Agent does not contain the knowledge of State and actions.**

c. Only actions are known to the agent.

d. None of the above

Answer: b

13. In the Wumpus World Problem, the reason for the uncertainty is that the agent's sensor gives only

a. Full & Global information

b. Partial & Global Information

c. Full & local information

**d. Partial & local Information**

Answer : d

14. Which instruments are used for perceiving and acting upon the environment?

**a) Sensors and Actuators**

b) Sensors

c) Perceiver

d) None of the mentioned

Answer : a

15. What is meant by agent’s percept sequence?

a) Used to perceive the environment

b) Complete history of actuator

**c) Complete history of perceived things**

d) None of the mentioned

Answer: c

16. How many types of agents are there in artificial intelligence?

a) 1

b) 2

c) 3

**d) 4**

Answer: d

17. What are the composition for agents in artificial intelligence?

a) Program

b) Architecture

**c) Both Program & Architecture**

d) None of the mentioned

Answer : c

18. In which agent does the problem generator is present?

**a) Learning agent**

b) Observing agent

c) Reflex agent

d) None of the mentioned

Answer: a

19. Which is used to improve the agents performance?

a) Perceiving

**b) Learning**

c) Observing

d) None of the mentioned

Answer : b

20. Which agent deals with happy and unhappy states?

a) Simple reflex agent

b) Model based agent

c) Learning agent

**d) Utility based agent**

Answer : d

21. Which action sequences are used to achieve the agent’s goal?

a) Search

b) Plan

c) Retrieve

**d) Both Search & Plan**

Answer : d

22. Which element in the agent are used for selecting external actions?

a) Perceive

**b) Performance**

c) Learning

d) Actuator

Answer : b

23.Which is not the commonly used programming language for AI?

a) PROLOG

b) Java

c) LISP

**d) Perl**

Answer : d

24.An omniscient agent knows the actual outcome of its actions and can act accordingly; but omniscience is impossible in reality. Rational Agent always does the right thing; but Rationality is possible in reality.

**a) True**

b) False

Answer : a

25. The Task Environment of an agent consists of

a) Sensors

b) Actuators

c) Performance Measures

**d) All of the mentioned**

Answer : d

26.What could possibly be the environment of a Satellite Image Analysis System?

a) Computers in space and earth

b) Image categorization techniques

c) Statistical data on image pixel intensity value and histograms

**d) All of the mentioned**

Answer : d

27. Categorize Crossword puzzle in Fully Observable / Partially Observable.

**a) Fully Observable**

b) partially Observable

c) All of the mentioned

d) None of the mentioned

Answer : a

28. The game of Poker is a single agent.

a) True

**b) False**

Answer : b

29. Satellite Image Analysis System is (Choose the one that is not applicable).

a) Episodic

b) Semi-Static

c) Single agent

**d) Partially Observable**

Answer : d

30.An agent is composed of

a) Architecture

b) Agent Function

c) Perception Sequence

**d) Architecture and Program**

Answer : d

31. Which depends on the percepts and actions available to the agent?

a) Agent

b) Sensor

**c) Design problem**

d) None of the mentioned

Answer : c

32.Which were built in such a way that humans had to supply the inputs and interpret the outputs?

a) Agents

**b) AI system**

c) Sensor

d) Actuators

Answer : b

33. Which technology uses miniaturized accelerometers and gyroscopes?

a) Sensors

b) Actuators

**c) MEMS**

d) None of the mentioned

Answer : c

34.What is used for tracking uncertain events?

**a) Filtering algorithm**

b) Sensors

c) Actuators

d) None of the mentioned

Answer : a

35.What is not represented by using propositional logic?

a) Objects

b) Relations

**c) Both Objects & Relations**

d) None of the mentioned

Answer :c

36. Which functions are used as preferences over state history?

a) Award

**b) Reward**

c) Explicit

d) Implicit

Answer :b

37. Which kind of agent architecture should an agent an use?

a) Relaxed

b) Logic

c) Relational

**d) All of the mentioned**

Answer: d

38.Specify the agent architecture name that is used to capture all kinds of actions.

a) Complex

b) Relational

**c) Hybrid**

d) None of the mentioned

Answer : c

39.Which agent enables the deliberation about the computational entities and actions?

a) Hybrid

**b) Reflective**

c) Relational

d) None of the mentioned

Answer : b

40.What can operate over the joint state space?

a) Decision-making algorithm

b) Learning algorithm

c) Complex algorithm

**d) Both Decision-making & Learning algorithm**

Answer : d

**UNIT 2**

41. What is the main task of a problem-solving agent?

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) All of the mentioned**

d) None of the mentioned

Answer: c

Explanation: The problem-solving agents are one of the goal-based agents.

42. 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**

Answer: d

Explanation: Because state space is mostly concerned with a problem, when you try to solve a problem, we have to design a mathematical structure to the

problem, which can only be through variables and parameters. eg. You have given a 4-gallon jug and another 3-gallon jug. Neither has measuring marker on it. You have to fill the jugs with water. How can you get exactly 2 gallons of water in to 4 gallons. Here the state space can defined as set of ordered pairs integers(x,y), such that x=0,1,2,3 or 4 and y=0,1,2 or 3; X represents the number of gallons in 4 gallon jug and y represents the quantity of water in the 3-gallon jug.

43. The problem-solving agent with several immediate options of unknown value can decide what to do by just examining different possible sequences of actions that lead to states of known value, and then choosing the best sequence. This process of looking for such a sequence is called Search.

**a) True**

b) False

Answer: a

Explanation: Refer to the definition of problem-solving agent.

44.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

Answer: b

Explanation: A search algorithm takes input as a problem and returns a solution to the problem as an output.

45.A problem in a search space is defined by one of these state.

**a) Initial state**

b) Last state

c) Intermediate state

d) All of the mentioned

Answer: a

Explanation: A problem has four components initial state, goal test, set of actions, path cost.

46. 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

Answer: c

Explanation: The most common formulation for actions uses a successor function. Given a particular state x, SUCCESSOR-FN(x) returns a set of (action, successor) ordered pairs, where each action is one of the legal actions in state x and each successor is a state that can be reached from x by applying the action.

47.A solution to a problem is a path from the initial state to a goal state. Solution quality is measured by the path cost function, and an optimal solution has the highest path cost among all solutions.

**a) True**

b) False

Answer: a

Explanation: A solution to a problem is a path from the initial state to a goal state. Solution quality is measured by the path cost function, and an optimal solution has the lowest path cost among all solutions.

48. The process of removing detail from a given state representation is called

a) Extraction

**b) Abstraction**

c) Information Retrieval

d) Mining of data

Answer: b

Explanation: The process of removing detail from a representation is called abstraction.

49.A problem solving approach works well for

a) 8-Puzzle problem

b) 8-queen problem

c) Finding a optimal path from a given source to a destination

**d) Mars Hover (Robot Navigation)**

Answer: d

Explanation: Problem-solving approach works well for toy problems and real world problems.

50.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

Answer: b

Explanation: Refer the TSP problem.

51.Web Crawler is a/an

**a) Intelligent goal-based agent**

b) Problem-solving agent

c) Simple reflex agent

d) Model based agent

Answer: a

Explanation: Web Crawling is type of search for a relevant document from given seed documents. Focused crawlers exists, helps to improvise the search efficiency.

52.What is the major component/components for measuring the performance of problem solving?

a) Completeness

b) Optimality

c) Time and Space complexity

**d) All of the mentioned**

Answer: d

Explanation: For best performance consideration of all component is necessary.

53.A production rule consists of

a) A set of Rule

b) A sequence of steps

**c) Set of Rule & sequence of steps**

d) Arbitrary representation to problem

Answer: c

Explanation: When you are trying to solve a problem, you should design how to get a step-by-step solution with constraints condition to your problem, e.g Chess board problem.

54.Which search method takes less memory?

**a) Depth-First Search**

b) Breadth-First search

c) Linear Search

d) Optimal search

Answer: a

Explanation: Depth-First Search takes less memory since only the nodes on the current path are stored, but in Breadth First Search, all of the tree that has generated must be stored.

55.Which is the best way to go for Game playing problem?

a) Linear approach

**b) Heuristic approach (Some knowledge is stored)**

c) Random approach

d) An Optimal approach

Answer: b

Explanation: We use a Heuristic approach, as it will find out brute force computation, looking at hundreds of thousands of positions. e.g Chess competition between Human and AI based Computer.

56.Which search strategy is also called as blind search?

**a) Uninformed search**

b) Informed search

c) Simple reflex search

d) All of the mentioned

Answer: a

Explanation: In blind search, We can search the states without having any additional information. So uninformed search method is blind search.

57. How many types are available in uninformed search method?

a) 3

b) 4

**c) 5**

d) 6

Answer: c

Explanation: The five types of uninformed search method are Breadth-first, Uniform-cost, Depth-first, Depth-limited and Bidirectional search.

58.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

Answer: b

Explanation: Because of FIFO queue, it will assure that the nodes that are visited first will be expanded first.

59.When is 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) None of the mentioned

Answer: b

Explanation: Because it always expands the shallowest unexpanded node.

60. How many successors are generated in backtracking search?

**a) 1**

b) 2

c) 3

d) 4

Answer: a

Explanation: Each partially expanded node remembers which successor to generate next because of these conditions, it uses less memory.

61.What is the space complexity of Depth-first search?

a) O(b)

b) O(bl)

c) O(m)

**d) O(bm)**

Answer: d

Explanation: O(bm) is the space complexity where b is the branching factor and m is the maximum depth of the search tree.

62. How many parts does a problem consists of?

a) 1

b) 2

c) 3

**d) 4**

Answer: d

Explanation: The four parts of the problem are initial state, set of actions, goal test and path cost.

63.Which algorithm is used to solve any kind of problem?

a) Breadth-first algorithm

**b) Tree algorithm**

c) Bidirectional search algorithm

d) None of the mentioned

Answer: b

Explanation: Tree algorithm is used because specific variants of the algorithm embed different strategies.

64.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

Answer: a

Explanation: None.

65.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

Answer: b

Explanation: It implements stack operation because it always expands the deepest node in the current tree.

66. What is the general term of Blind searching?

a) Informed Search

**b) Uninformed Search**

c) Informed & Unformed Search

d) Heuristic Search

Answer: b

Explanation: In case of uninformed search no additional information except the problem definition is given.

67.Strategies that know whether one non-goal state is “more promising” than another are called

a) Informed & Unformed Search

b) Unformed Search

c) Heuristic & Unformed Search

**d) Informed & Heuristic Search**

Answer: d

Explanation: Strategies that know whether one non-goal state is “more promising” than another are called informed search or heuristic search strategies.

68.Which of the following is/are Uninformed Search technique/techniques?

a) Breadth First Search (BFS)

b) Depth First Search (DFS)

c) Bidirectional Search

**d) All of the mentioned**

Answer: d

Explanation: Several uninformed search techniques includes BFS, DFS, Uniform-cost, Depth-limited, Bidirectional search etc.

69.Which data structure conveniently used to implement BFS?

a) Stacks

**b) Queues**

c) Priority Queues

d) All of the mentioned

Answer: b

Explanation: Queue is the most convenient data structure, but memory used to store nodes can be reduced by using circular queues.

70.Which data structure conveniently used to implement DFS?

**a) Stacks**

b) Queues

c) Priority Queues

d) All of the mentioned

Answer: a

Explanation: DFS requires node to be expanded the one most recent visited, hence stack is convenient to implement.

71. The time and space complexity of BFS is (For time and space complexity problems consider b as branching factor and d as depth of the search tree.)

**a) O(bd+1) and O(bd+1)**

b) O(b2) and O(d2)

c) O(d2) and O(b2)

d) O(d2) and O(d2)

Answer: a

Explanation: We consider a hypothetical state space where every state has b successors. The root of the search tree generates b nodes at the first level, each of which generates b more nodes, for a total of b2 at the second level. Each of these generates b more nodes, yielding b3 nodes at the third level, and so on. Now suppose that the solution is at depth d. In the worst case, we would expand all but the last node at level d (since the goal itself is not expanded), generating bd+1- b nodes at level d+1.

72.Breadth-first search is not optimal when all step costs are equal, because it always expands the shallowest unexpanded node.

a) True

**b) False**

Answer: b

Explanation: Breadth-first search is optimal when all step costs are equal, because it always expands the shallowest unexpanded node. If the solution exists in shallowest node no irrelevant nodes are expanded.

73. uniform-cost search expands the node n with the \_

**a) Lowest path cost**

b) Heuristic cost

c) Highest path cost

d) Average path cost

Answer: a

Explanation: Uniform-cost search expands the node n with the lowest path cost. Note that if all step costs are equal, this is identical to breadth-first search.

74. Depth-first search always expands the node in the current fringe of the search tree.

a) Shallowest

b) Child node

**c) Deepest**

d) Minimum cost

Answer: c

Explanation: Depth-first search always expands the deepest/leaf node in the current fringe of the search tree.

75.Breadth-first search always expands the node in the current fringe of the search tree.

**a) Shallowest**

b) Child node

c) Deepest

d) Minimum cost

Answer: a

Explanation: Breadth-first search always expands the shallowest node in the current fringe of the search tree. Traversal is performed level wise.

76. Optimality of BFS is

a) When there is less number of nodes

**b) When all step costs are equal**

c) When all step costs are unequal

d) None of the mentioned

Answer: b

Explanation: It always expands the shallowest unexpanded node.

77. LIFO is where as FIFO is

**a) Stack, Queue**

b) Queue, Stack

c) Priority Queue, Stack

d) Stack. Priority Queue

Answer: a

Explanation: LIFO is last in first out – Stack. FIFO is first in first out – Queue.

78. For general graph, how one can get rid of repeated states?

**a) By maintaining a list of visited vertices**

b) By maintaining a list of traversed edges

c) By maintaining a list of non-visited vertices

d) By maintaining a list of non-traversed edges

Answer: a

Explanation: Other techniques are costly.

79. DFS is efficient and BFS is efficient.

a) Space, Time

b) Time, Space

c) Time, Time

d) Space, Space

Answer: a

Explanation: None.

80. The main idea of Bidirectional search is to reduce the time complexity by searching two way simultaneously from start node and another from goal node.

a) True

b) False

Answer: a

Explanation: The idea behind bidirectional search is to run two simultaneous searches-one forward from the initial state and the other backward from the goal, stopping when the two searches meet in the middle. The motivation is that bd/2 + bd/2 is much less than bd.

81. are mathematical problems defined as a set of objectswhose state must satisfy a number of constraints or limitations.

a) Constraints Satisfaction Problems

b) Uninformed Search Problems

c) Local Search Problems

d) All of the mentioned

Answer: a

Explanation: Refer definition of CSPs.

82.Which of the Following problems can be modeled as CSP? a) 8-Puzzle problem

b) 8-Queen problem

c) Map coloring problem

d) All of the mentioned

Answer: d

Explanation: All of above problems involves constraints to be satisfied.

83.What among the following constitutes to the incremental formulation of CSP? a) Path cost

b) Goal cost

c) Successor function

d) All of the mentioned

Answer: d

Explanation: Initial state: The empty assignment ( ), in which all variables are unassigned.

Successor function: A value can be assigned to any unassigned variable, provided it does not conflict with previously assigned variables. Goal test: The current assignment is complete.

Path cost: A constant cost (e.g., 1) for every step.

84. 4. The term is used for a depth-first search that chooses values for one variable at a time and returns when a variable has no legal values left to assign.

a) Forward search

b) Backtrack search

c) Hill algorithm

d) Reverse-Down-Hill search

Answer: b

Explanation: Refer definition of backtracking algorithm.

85. To overcome the need to backtrack in constraint satisfaction problem can be eliminated by

a) Forward Searching

b) Constraint Propagation

c) Backtrack after a forward search

d) Omitting the constraints and focusing only on goals

Answer: a

Explanation: Forward Searching is technique in which a forward check till k steps is made to analyze that the goal can be achieved satiating all constraints. With constraint propagation, constraints on a variable can be propagated to next level/hierarchy and satisfied at that level, eliminating need to backtrack.

86. Consider a problem of preparing a schedule for a class of student. What type of problem is this?

a) Search Problem

b) Backtrack Problem

c) CSP

d) Planning Problem

Answer: c

Explanation: Schedule developer needs to consider all constraints on teacher as well as students.

87. Constraint satisfaction problems on finite domains are typically solved using a form of

a) Search Algorithms

b) Heuristic Search Algorithms

c) Greedy Search Algorithms

d) All of the mentioned

Answer: d

Explanation: Any Search techniques can be used

88.Solving a constraint satisfaction problem on a finite domain is an/a problem with respect to the domain size.

a) P complete

b) NP complete

c) NP hard

d) Domain dependent

Answer: b

Explanation: None.

89. is/are useful when the original formulation of a problem is altered in some way, typically because the set of constraints to considerevolves because of the environment.

a) Static CSPs

b) Dynamic CSPs

c) Flexible CSPs

d) None of the mentioned

Answer: b

Explanation: Refer to the definition of Dynamic CSPs algorithm.

90. Flexible CSPs relax on

a) Constraints

b) Current State

c) Initial State

d) Goal State

Answer: a

Explanation: Definition of flexible CSPs.

91. Language/Languages used for programming Constraint Programming includes

a) Prolog

b) C#

c) C

d) Fortrun

Answer: a

Explanation: None.

92.Backtracking is based on

a) Last in first out

b) First in first out

c) Recursion

d) Both Last in first out & Recursion

Answer: d

Explanation: Recursion uses LIFO.

93. Constraint Propagation technique actually modifies the CSP problem. a) True

b) False

Answer: a

Explanation: Constraints are propagated towards goal node, modifying the actual problem.

94.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 of the mentioned

Answer: b

Explanation: Provides backtrack facility.

95.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

Answer: c

Explanation: The alpha-beta search computes the same optimal moves as minimax, but eliminates the branches that can’t influence the final decision.

96.Which values are independant in minimax search algorithm? a) Pruned leaves x and y

b) Every states are dependant

c) Root is independant

d) None of the mentioned

Answer: a

Explanation: The minimax decision are independant of the values of the pruned values x and y because of the root values.

97. To which depth does the alpha-beta pruning can be applied? a) 10 states

b) 8 States

c) 6 States

d) Any depth

Answer: d

Explanation: Alpha–beta pruning can be applied to trees of any depth and it is possible to prune entire subtree rather than leaves.

98.Which search is similar to minimax search?

a) Hill-climbing search

b) Depth-first search

c) Breadth-first search

d) All of the mentioned

Answer: b

Explanation: The minimax search is depth-first search, So at one time we just have to consider the nodes along a single path in the tree.

99.Which value is assigned to alpha and beta in the alpha-beta pruning? a) Alpha = max

b) Beta = min

c) Beta = max

d) Both Alpha = max & Beta = min

Answer: d

Explanation: Alpha and beta are the values of the best choice we have found so far at any choice point along the path for MAX and MIN.

100. Where does the values of alpha-beta search get updated? a) Along the path of search

b) Initial state itself

c) At the end

d) None of the mentioned

Answer: a

Explanation: Alpha-beta search updates the value of alpha and beta as it gets along and prunes the remaining branches at node.

101. How the effectiveness of the alpha-beta pruning gets increased? a) Depends on the nodes

b) Depends on the order in which they are executed

c) All of the mentioned

d) None of the mentioned

Answer: a

Explanation: None.

102. What is called as transposition table?

a) Hash table of next seen positions

b) Hash table of previously seen positions

c) Next value in the search

d) None of the mentioned

Answer: b

Explanation: Transposition is the occurrence of repeated states frequently in the search.

103. Which is identical to the closed list in Graph search?

a) Hill climbing search algorithm

b) Depth-first search

c) Transposition table

d) None of the mentioned

Answer: c

Explanation: None.

104. Which function is used to calculate the feasibility of whole game tree? a) Evaluation function

b) Transposition

c) Alpha-beta pruning

d) All of the mentioned

Answer: a

Explanation: Because we need to cut the search off at some point and apply an evaluation function that gives an estimate of the utility of the state.

105. General games involves

a) Single-agent

b) Multi-agent

c) Neither Single-agent nor Multi-agent

d) Only Single-agent and Multi-agent

Answer: d

Explanation: Depending upon games it could be single agent (Sudoku) or multi-agent (Chess).

106. Zero sum games are the one in which there are two agents whose actions must alternate and in which the utility values at the end of the game are always the same.

a) True

b) False

Answer: b

Explanation: Utility values are always same and opposite.

107. Zero sum game has to be a game.

a) Single player

b) Two player

c) Multiplayer

d) Three player

Answer: c

Explanation: Zero sum games could be multiplayer games as long as the condition for zero sum game is satisfied.

108. A game can be formally defined as a kind of search problem with the following components.

a) Initial State

b) Successor Function

c) Terminal Test

d) All of the mentioned

Answer: d

Explanation: The initial state includes the board position and identifies the player to move. A successor function returns a list of (move, state) pairs, each indicating a legal move and the resulting state. A terminal test determines when the game is over. States where the game has ended are called terminal states. A utility function (also called an objective function or payoff function), which gives a numeric value for the terminal states. In chess, the outcome is a win, lose, or draw, with values +1, -1, or 0.

109. General algorithm applied on game tree for making decision of win/lose is

a) DFS/BFS Search Algorithms

b) Heuristic Search Algorithms

c) Greedy Search Algorithms

d) MIN/MAX Algorithms

Answer: d

Explanation: Given a game tree, the optimal strategy can be determined by examining the min/max value of each node, which we write as MINIMAX VALUE(n). The min/max value of a node is the utility (for MAX) of being in the corresponding state, assuming that both players play optimally from there to the end of the game. Obviously, the min/max value of a terminal state is just its utility. Furthermore, given a choice, MAX will prefer to move to a state of maximum value, whereas MIN prefers a state of minimum value.

110. What is the complexity of minimax algorithm?

a) Same as of DFS

b) Space – bm and time – bm

c) Time – bm and space – bm

d) Same as BFS

Answer: a

Explanation: Same as DFS.

UNIT 3

111. There exist only two types of quantifiers, Universal Quantification and Existential Quantification.

a) True

b) False

Answer: a

Explanation: None.

112. Translate the following statement into FOL.

“For every a, if a is a philosopher, then a is a scholar”

a) ∀ a philosopher(a) scholar(a)

b) ∃ a philosopher(a) scholar(a)

c) All of the mentioned

d) None of the mentioned

Answer: a

Explanation: None.

113. is used to demonstrate, on a purely syntactic basis, that one formula is a logical consequence of another formula.

a) Deductive Systems

b) Inductive Systems

c) Reasoning with Knowledge Based Systems

d) Search Based Systems

Answer: a

Explanation: Refer the definition of Deductive based systems.

114. A common convention is:

• is evaluated first

• and are evaluated next

• Quantifiers are evaluated next

• is evaluated last.

a) True

b) False

Answer: a

Explanation: None.

115. A Term is either an individual constant (a 0-ary function), or a variable, or an n-ary function applied to n terms: F(t1 t2 ..tn).

a) True

b) False

Answer: a

Explanation: Definition of term in FOL.

116. First Order Logic is also known as

a) First Order Predicate Calculus

b) Quantification Theory

c) Lower Order Calculus

d) All of the mentioned

Answer: d

Explanation: None.

117. The adjective “first-order” distinguishes first-order logic from in which there are predicates having predicates or functions as arguments, or in which one or both of predicate quantifiers or function quantifiers are permitted.

a) Representational Verification

b) Representational Adequacy

c) Higher Order Logic

d) Inferential Efficiency

Answer: c

Explanation: None.

118. Which condition is used to cease the growth of forward chaining? a) Atomic sentences

b) Complex sentences

c) No further inference

d) All of the mentioned

Answer: c

Explanation: Forward chain can grow by adding new atomic sentences until no further inference is made.

119. Which closely resembles propositional definite clause?

a) Resolution

b) Inference

c) Conjunction

d) First-order definite clauses

Answer: d

Explanation: Because they are disjunction of literals of which exactly one is positive.

120. What is the condition of variables in first-order literals?

a) Existentially quantified

b) Universally quantified

c) Both Existentially & Universally quantified

d) None of the mentioned

Answer: b

Explanation: First-order literals will accept variables only if they are universally quantified.

121. Which are more suitable normal form to be used with definite clause? a) Positive literal

b) Negative literal

c) Generalized modus ponens

d) Neutral literal

Answer: c

Explanation: Definite clauses are a suitable normal form for use with generalized modus ponen.

122. Which will be the instance of the class datalog knowledge bases? a) Variables

b) No function symbols

c) First-order definite clauses

d) None of the mentioned

Answer: b

Explanation: If the knowledge base contains no function symbols means, it is an instance of the class datalog knowledge base.

123. Which knowledge base is called as fixed point?

a) First-order definite clause are similar to propositional forward chaining b) First-order definite clause are mismatch to propositional forward chaining c) All of the mentioned

d) None of the mentioned

Answer: a

Explanation: Fixed point reached by forward chaining with first-order definiteclause are similar to those for propositional forward chaining.

124. How to eliminate the redundant rule matching attempts in the forward chaining?

a) Decremental forward chaining

b) Incremental forward chaining

c) Data complexity

d) None of the mentioned

Answer: b

Explanation: We can eliminate the redundant rule matching attempts in the forward chaining by using incremental forward chaining.

125. From where did the new fact inferred on new iteration is derived? a) Old fact

b) Narrow fact

c) New fact

d) All of the mentioned

Answer: c

Explanation: None.

126. Which will solve the conjuncts of the rule so that the total cost is minimized? a) Constraint variable

b) Conjunct ordering

c) Data complexity

d) All of the mentioned

Answer: b

Explanation: Conjunct ordering will find an ordering to solve the conjuncts of the rule premise so that the total cost is minimized.

127. How many possible sources of complexity are there in forward chaining? a) 1

b) 2

c) 3

d) 4

Answer: c

Explanation: The three possible sources of complexity are an inner loop, algorithm rechecks every rule on every iteration, algorithm might generate many facts irrelevant to the goal.

128. Which algorithm will work backward from the goal to solve a problem? a) Forward chaining

b) Backward chaining

c) Hill-climb algorithm

d) None of the mentioned

Answer: b

Explanation: Backward chaining algorithm will work backward from the goal and it will chain the known facts that support the proof.

129. Which is mainly used for automated reasoning?

a) Backward chaining

b) Forward chaining

c) Logic programming

d) Parallel programming

Answer: c

Explanation: Logic programming is mainly used to check the working process of the system.

130. What will backward chaining algorithm will return?

a) Additional statements

b) Substitutes matching the query

c) Logical statement

d) All of the mentioned

Answer: b

Explanation: It will contains the list of goals containing a single element and returns the set of all substitutions satisfying the query.

131. How can be the goal is thought of in backward chaining algorithm? a) Queue

b) List

c) Vector

d) Stack

Answer: d

Explanation: The goals can be thought of as stack and if all of them us satisfied means, then current branch of proof succeeds.

132. What is used in backward chaining algorithm?

a) Conjuncts

b) Substitution

c) Composition of substitution

d) None of the mentioned

Answer: c

Explanation: None.

133. Which algorithm are in more similar to backward chaining algorithm? a) Depth-first search algorithm

b) Breadth-first search algorithm

c) Hill-climbing search algorithm

d) All of the mentioned

Answer: a

Explanation: It is depth-first search algorithm because its space requirements are linear in the size of the proof.

134. Which problem can frequently occur in backward chaining algorithm? a) Repeated states

b) Incompleteness

c) Complexity

d) Both Repeated states & Incompleteness

Answer: d

Explanation: If there is any loop in the chain means, It will lead to incompleteness and repeated states.

135. How the logic programming can be constructed?

a) Variables

b) Expressing knowledge in a formal language

c) Graph

d) All of the mentioned

Answer: b

Explanation: Logic programming can be constructed by expressing knowledge in a formal expression and the problem can be solved by running inference process.

136. What form of negation does the prolog allows?

a) Negation as failure

b) Proposition

c) Substitution

d) Negation as success

Answer: a

Explanation: None.

137. Which is omitted in prolog unification algorithm?

a) Variable check

b) Occur check

c) Proposition check

d) Both Occur & Proposition check

Answer: b

Explanation: Occur check is omitted in prolog unification algorithm because of unsound inferences.

138. Which is a refutation complete inference procedure for propositional logic? a) Clauses

b) Variables

c) Propositional resolution

d) Proposition

Answer: c

Explanation: Propositional resolution is a refutation complete inference procedure for propositional logic.

139. What kind of clauses are available in Conjunctive Normal Form? a) Disjunction of literals

b) Disjunction of variables

c) Conjunction of literals

d) Conjunction of variables

Answer: a

Explanation: First-order resolution requires the clause to be in disjunction of literals in Conjunctive Normal Form.

140. What is the condition of literals in variables?

a) Existentially quantified

b) Universally quantified

c) Quantified

d) None of the mentioned

Answer: b

Explanation: Literals that contain variables are assumed to be universally quantified.

141. Which can be converted to inferred equivalent CNF sentence? a) Every sentence of propositional logic

b) Every sentence of inference

c) Every sentence of first-order logic

d) All of the mentioned

Answer: c

Explanation: Every sentence of first-order logic can be converted to inferred equivalent CNF sentence.

142. Which sentence will be unsatisfiable if the CNF sentence is unsatisfiable? a) Search statement

b) Reading statement

c) Replaced statement

d) Original statement

Answer: d

Explanation: The CNF statement will be unsatisfiable just when the original sentence is unsatisfiable.

143. Which rule is equal to the resolution rule of first-order clauses? a) Propositional resolution rule

b) Inference rule

c) Resolution rule

d) None of the mentioned

Answer: a

Explanation: The resolution rule for first-order clauses is simply a lifted version of the propositional resolution rule.

144. At which state does the propositional literals are complementary? a) If one variable is less

b) If one is the negation of the other

c) All of the mentioned

d) None of the mentioned

Answer: b

Explanation: Propositional literals are complementary if one is the negation of the other.

145. What is meant by factoring?

a) Removal of redundant variable

b) Removal of redundant literal

c) Addition of redundant literal

d) Addition of redundant variable

Answer: b

Explanation: None.

146. What will happen if two literals are identical?

a) Remains the same

b) Added as three

c) Reduced to one

d) None of the mentioned

Answer: c

Explanation: Propositional factoring reduces two literals to one if they are identical.

147. When the resolution is called as refutation-complete?

a) Sentence is satisfiable

b) Sentence is unsatisfiable

c) Sentence remains the same

d) None of the mentioned

Answer: b

Explanation: Resolution is refutation-complete, if a set of sentence is unsatisfiable, then resolution will always be able to derive a contradiction.

148. Knowledge and reasoning also play a crucial role in dealing with environment.

a) Completely Observable

b) Partially Observable

c) Neither Completely nor Partially Observable

d) Only Completely and Partially Observable

Answer: b

Explanation: Knowledge and reasoning could aid to reveal other factors that could complete environment.

149. Treatment chosen by doctor for a patient for a disease is based on

a) Only current symptoms

b) Current symptoms plus some knowledge from the textbooks c) Current symptoms plus some knowledge from the textbooks plus experience

d) All of the mentioned

Answer: c

Explanation: None.

150. A knowledge-based agent can combine general knowledge with current percepts to infer hidden aspects of the current state prior to selecting actions.

a) True

b) False

Answer: a

Explanation: Refer definition of Knowledge based agents.

151. A) Knowledge base (KB) is consists of set of statements. B) Inference is deriving a new sentence from the KB.

Choose the correct option.

a) A is true, B is true

b) A is false, B is false

c) A is true, B is false

d) A is false, B is true

Answer: a

Explanation: None.

152. Wumpus World is a classic problem, best example of \_ a) Single player Game

b) Two player Game

c) Reasoning with Knowledge

d) Knowledge based Game

Answer: c

Explanation: Refer the definition of Wumpus World Problem.

153. ‘α |= β ‘(to mean that the sentence α entails the sentence β) if and only if, in every model in which α is β is also \_

a) True, true

b) True, false

c) False, true

d) False, false

Answer: a

Explanation: Refer the definition of law of entailment.

154. Which is not a property of representation of knowledge? a) Representational Verification

b) Representational Adequacy

c) Inferential Adequacy

d) Inferential Efficiency

Answer: a

Explanation: None.

155. Which is not Familiar Connectives in First Order Logic?

a) and

b) iff

c) or

d) not

Answer: d

Explanation: “not” is coming under propositional logic and is therefore not a connective.

156. Inference algorithm is complete only if \_

a) It can derive any sentence

b) It can derive any sentence that is an entailed version

c) It is truth preserving

d) It can derive any sentence that is an entailed version & It is truth preserving

Answer: d

Explanation: None.

157. An inference algorithm that derives only entailed sentences is called sound or truth-preserving.

a) True

b) False

Answer: a

Explanation: None.

**UNIT 4**

158. What is the name for information sent from robot sensors to robot controllers?

a) temperature

b) pressure

c) feedback

d) signal

Answer: c

Explanation: None.

159. Which of the following terms refers to the rotational motion of a robot arm? a) swivel

b) axle

c) retrograde

d) roll

Answer: d

Explanation: None.

160. What is the name for space inside which a robot unit operates? a) environment

b) spatial base

c) work envelope

d) exclusion zone

Answer: c

Explanation: None.

161. Which of the following terms IS NOT one of the five basic parts of a robot? a) peripheral tools

b) end effectors

c) controller

d) drive

Answer: a

Explanation: None.

e) Answer: d

Explanation: None.

162. What are periodic changes in pressure that propagate through the air? a) Air waves

b) Sound waves

c) Rate

d) None of the mentioned

Answer: b

Explanation: Sound waves are periodic changes in pressure that propagate through the air and it can be measured by a microphone.

163. What is called as the properties of the signal that extend over interval? a) Hops

b) Rate

c) Frames

d) All of the mentioned

Answer: c

Explanation: Speech system summarize the properties of the signal that extend over interval called frames.

164. Which is used to capture the internal structure of the phones? a) One-state phone model

b) Two-state phone model

c) Three-state phone model

d) All of the mentioned

Answer: c

Explanation: None.

165. Which are partially captured by triphone model?

a) Articulation effects

b) Coarticulation effects

c) Both Articulation & Coarticulation effects

d) None of the mentioned

Answer: b

Explanation: Coarticulation effects are partially captured by triphone model, which can be manipulated by acoustic model.

166. The process by which you become aware of messages through your sense is called

a) Organization

b) Sensation

c) Interpretation-Evaluation

d) Perception

Answer: d

Explanation: None.

167. Susan is so beautiful; I bet she is smart too. This is an example of \_ a) The halo effect

b) The primary effect

c) A self-fulfilling prophecy

d) The recency effect

Answer: a

Explanation: None.

168. prevents you from seeing an individual as an individual rather than as a member of a group.

a) Cultural mores

b) Stereotypes

c) Schematas

d) Attributions

Answer: c

Explanation: None.

169. When you get fired from your job and you determine it is because your boss dislikes you, you are most likely exhibiting?

a) Self-promotion

b) Fundamental attribution error

c) Over-attribution

d) Self-serving bias

Answer: d

Explanation: None.

170. What is Mindless processing?

a) careful, critical thinking

b) inaccurate and faulty processing

c) information processing that relies heavily on familiar schemata d) processing that focuses on unusual or novel events

Answer: c

Explanation: None.

171. Selective retention occurs when?

a) we process, store, and retrieve information that we have already selected, organized, and interpreted

b) we make choices to experience particular stimuli

c) we make choices to avoid particular stimuli

d) we focus on specific stimuli while ignoring other stimuli

Answer: a

Explanation: None.

172. Which of the following strategies would NOT be effective at improving your communication competence?

a) Recognize the people, objects, and situations remain stable over time b) Recognize that each person’s frame of perception is unique c) Be active in perceiving

d) Distinguish facts from inference

Answer: a

Explanation: None.

173. is measured by the number of mental structures we use, how abstract they are, and how elaborate they interact to shape our perceptions. a) intrapersonal structure

b) perceptual set

c) self-justification

d) none of the mentioned

Answer: d

Explanation: None.

174. What is a perception check?

a) a cognitive bias that makes us listen only to information we already agree with

b) a method teachers use to reward good listeners in the classroom c) any factor that gets in the way of good listening and decreases our ability to interpret correctly

d) a response that allows you to state your interpretation and ask your partner whether or not that interpretation is correct

Answer: d

Explanation: None.

**175.** Which of the following mentioned problems are CSP (Constraint Satisfactory Problems)?

i.N queens Problem

ii.Crypt- arithmetic problem

iii.Map coloring problem

iv.Sudoku

**Options:**

a. Only iv.

b. All i., ii., iii. and iv.

c. ii. and iv.

d. None of the above

**Correct answer: 2**

**All i., ii., iii. and iv.**

**176.** Natural language processing is divided into the two subfields of:

(A) Symbolic and numeric

(B) Time and motion

(C) Algorithmic and heuristic

(D) Understanding and generation

Answer:A

Que:3Constraint Propagation technique actually modifies the CSP problem. a) True

b) False

**Answer:a**

Que :4Which 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 of the mentioned

**Answer:b**

Que:5Modern NLP algorithms are based on machine learning, especially statistical machine learning.

a) True

b) False

**Answer:b**

Que:6Which is used to mediate between syntax and semantics?

a) Form

b) Intermediate form

c) Grammer

d) All of the mentioned

**Answer:b**

Que:7In a semantic network, the fundamental inference mechanism is to follow the links between the nodes.

(A). True

(B). False (C). Partially True

**Answer is: a**

Que:8Which algorithm takes two sentences and returns a unifier?

a) Inference

b) Hill-climbing search

c) Depth-first search

d) Unify algorithm

**Answer:d**

Que:9Semantic grammars are \_\_\_\_\_\_\_\_\_\_\_\_\_

a) Encode semantic information into a syntactic grammar

b) Decode semantic information into a syntactic grammar

c) Encode syntactic information into a semantic grammar

d) Decode syntactic information into a semantic grammar

**Answer:d**

Que:10What kind of perception is used in printing?

a) Optical character recognition

b) Speech recognition

c) Perception

d) None of the mentioned

**Answer:a**

Que 11Consider the following statement:

"While solving a CSP (Constraint Satisfactory Problem), the agent cannot violate any of the rules and regulations or disobey the restrictions mentioned as the constraints." Which of the following problems do not fall under the category of CSP?

a. N- Queens Problem

b. Chess

c. Sudoku

d. None of the above

**Answe:d**

Que12 Which of the following is an examples of Pattern Recognition? A. Speech recognition

B. Speaker identification

C. MDR

D. All of the above

**Ans : D**

Que:13\_\_\_\_\_\_\_\_\_\_ is used to test the system.

A. Training set

B. Testing data

C. Both A and B

D. None of the above

**Answer: B**

Que:14\_\_\_\_\_\_\_\_\_\_ is used to test the system.

A. Training set

B. Testing data

C. Both A and B

D. None of the above

**Answer:A**

Que:15In a typical pattern recognition application, the raw data is processed and converted into a form that is amenable for a machine to use.

A. TRUE

B. FALSE

C. Can be true or false

D. Can not say

**Answer:A**

Que:16Generally, \_\_\_\_\_\_\_\_\_\_\_\_ of the data of the dataset is taken for training data.

A. 0.5

B. 0.6

C. 0.7

D. 0.8

**Answer:D**

Que: 17 Computer system of a parallel computer is capable of

A. Decentralized computing

B. Parallel computing

C. Centralized computing

D. Decentralized computing

**Answer:A**

Que:18Significant characteristics of Distributed systems have of

A. 5 types

B. 2 types

C. 3 types

D. 4 types

**Answer:C**

Que:19A whole micro-computer system consists of which of the following? (A). microprocessor

(B). memory

(C). peripheral equipment

(D). all of these

**Answer:D**

Que:**20**Natural language understanding is used in:

A Natural language interfaces

B Natural language front ends

C Text understanding systems

D All of the above

**Ans D**

Que:21The face recognition system is based on?

A Strong artificial intelligence approach

B Weak artificial intelligence approach

C Cognitive artificial intelligence approach

D Applied artificial intelligence approach

Ans D

Que:22 In language understanding, the levels of knowledge that does not include?

A Phonological

B Syntactic

C Empirical

D Logical

Ans C

Que:23In LISP, the addition of 5+8 is entered as\_\_\_\_\_\_\_.

a. 5+8

b. 5 add 8

c. 5+8=

d. (+5 8)

**Answer:** d. (+5 8)

Que:24The area of ai that investigates methods of facilitating communication between people and computers is

A .Natural language processing

B. Symbolic processing

C. Robotics

Ans. A

Que:25Which of the following is not the promise of artificial neural network?

A It can explain result

B It can survive the failure of some nodes

C It has inherent parallelism

Ans. A

Que:26What kind of interpretation is done by adding context-dependant information? a) Semantic

b) Syntactic

c) Pragmatic

d) None of the mentioned

**Answer:c**

Que:27The best AI agent is one which\_\_\_\_\_\_\_\_\_\_\_\_

a. Needs user inputs for solving any problem

b. Can solve a problem on its own without any human intervention

c. Need a similar exemplary problem in its knowledge base

d. All of the above

**Answer:B**

Que:28Modern NLP algorithms are based on machine learning, especially statistical machine learning.

a) True

b) False

**Answer: a**

Que:29What is the main task of a problem-solving agent?

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 c

d. None of the Above

**Answer : C**

Que:30 Knowledge and reasoning also play a crucial role in dealing with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ environment.

a) Completely Observable

b) Partially Observable

c) Neither Completely nor Partially Observable

d) Only Completely and Partially Observable

**Answer:b**

Que:31 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

**Answer:b**

Que:32 Using logic to represent and reason we can represent knowledge about the world with facts and rules.

a) True

b) False

**Answer:a**

Que:33 Which is not Familiar Connectives in First Order Logic?

a) and

b) iff

c) or

d) not

**Answer:d**

Que:34The inference engine works on \_\_\_\_\_\_.

a. Forward Chaining

b. Backward Chaining

c. Both a and b

d. None of the above

**Answer: c**

Que:35The probabilistic reasoning depends upon\_\_\_\_\_\_\_\_\_\_\_\_.

a. Estimation

b. Observations

c. Likelihood

d. All of the above

**Answer: d**