



Department of Computer Science and Engineering
CS8691 - Artificial Intelligence – (6th semester, 2017 Regulation)
MCQ Bank

Unit II – Problem Solving Methods

1. 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.

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**

Answer: d

Explanation: Because state space is mostly concerned with a problem

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

Answer: b

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

4. 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.

5. 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.

6. 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.

7. 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.

8. 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.

9. 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.

10. 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.

11. 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

12. 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.

13. 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.

14. 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.

15. 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.

16. 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.

17. 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.

18. 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.

19. What is the other name of informed search strategy?

- a) Simple search
- b) **Heuristic search**
- c) Online search
- d) None of the mentioned

Answer: b

Explanation: A key point of informed search strategy is heuristic function, So it is called as heuristic function.

20. Which search uses the problem specific knowledge beyond the definition of the problem?

- a) **Informed search**
- b) Depth-first search
- c) Breadth-first search
- d) Uninformed search

Answer: a

Explanation: Informed search can solve the problem beyond the function definition, So does it can find the solution more efficiently.

21. Which search uses only the linear space for searching?

- a) Best-first search
- b) **Recursive best-first search**
- c) Depth-first search
- d) None of the mentioned

Answer: b

Explanation: Recursive best-first search will mimic the operation of standard best-first search, but using only the linear space.

22. A heuristic is a way of trying _____

- a) To discover something or an idea embedded in a program
- b) To search and measure how far a node in a search tree seems to be from a goal
- c) To compare two nodes in a search tree to see if one is better than another

d) All of the mentioned

Answer: d

Explanation: In a heuristic approach, we discover certain idea and use heuristic functions to search for a goal and predicates to compare nodes.

23. A* algorithm is based on _____

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

Answer: c

Explanation: Best-first-search is giving the idea of optimization and quick choose of path, and all these characteristic lies in A* algorithm.

24. Uninformed search strategies are better than informed search strategies.

a) **True**

b) False

Answer: a

Explanation: Informed search strategies uses some problem specific knowledge, hence more efficient to finding goals.

25. Best-First search can be implemented using the following data structure.

a) Queue

b) Stack

c) **Priority Queue**

d) Circular Queue

Answer: c

Explanation: Best-first search can be implemented within our general search framework via a priority queue, a data structure that will maintain the fringe in ascending order of f-values.

26. Heuristic function $h(n)$ is _____

a) Lowest path cost

b) Cheapest path from root to goal node

c) **Estimated cost of cheapest path from root to goal node**

d) Average path cost

Answer: c

Explanation: Heuristic is an estimated cost.

27. Greedy search strategy chooses the node for expansion in _____

a) Shallowest

b) Deepest

c) **The one closest to the goal node**

d) Minimum heuristic cost

Answer: c

Explanation: Sometimes minimum heuristics can be used, sometimes maximum heuristics function can be used. It depends upon the application on which the algorithm is applied.

28. What is the space complexity of Greedy 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. Since this algorithm resembles the DFS.

29. What is the evaluation function in A* approach?

- a) Heuristic function
- b) Path cost from start node to current node
- c) Path cost from start node to current node + Heuristic cost**
- d) Average of Path cost from start node to current node and Heuristic cost

Answer: c

Explanation: The most widely-known form of best-first search is called A* search.

$$f(n) = g(n) + h(n)$$

30. _____ Is an algorithm, a loop that continually moves in the direction of increasing value – that is uphill.

- a) Up-Hill Search
- b) Hill-Climbing**
- c) Hill algorithm
- d) Reverse-Down-Hill search

Answer: b

Explanation: Refer the definition of Hill-Climbing approach.

31. When will Hill-Climbing algorithm terminate?

- a) Stopping criterion met
- b) Global Min/Max is achieved
- c) No neighbor has higher value**
- d) All of the mentioned

Answer: c

Explanation: When no neighbor is having higher value, algorithm terminates fetching local min/max.

32. What are the main cons of hill-climbing search?

- a) **Terminates at local optimum & Does not find optimum solution**
- b) Terminates at global optimum & Does not find optimum solution
- c) Does not find optimum solution & Fail to find a solution
- d) Fail to find a solution

Answer: a

Explanation: Algorithm terminates at local optimum values, hence fails to find optimum solution.

33. What are the two main features of Genetic Algorithm?

- a) **Fitness function & Crossover techniques**
- b) Crossover techniques & Random mutation
- c) Individuals among the population & Random mutation
- d) Random mutation & Fitness function

Answer: a

Explanation: Fitness function helps choosing individuals from the population and Crossover techniques defines the offspring generated.

34. _____ are mathematical problems defined as a set of objects whose 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.

35. 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.

36. 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.

37. 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 of the mentioned

Answer: a

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

38. 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.

39. 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.

40. 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.