

1. What is the purpose of asymptotic notation in algorithm analysis?
- a. To describe the actual running time of an algorithm
 - b. To provide a precise measurement of an algorithm's execution time
 - c. To analyze the efficiency of an algorithm in terms of its input size
 - d. To count the number of basic operations in an algorithm

View answer

Answer: c

2. Which sorting algorithm is based on the divide and conquer technique?
- a. Bubble Sort
 - b. Insertion Sort
 - c. Heap Sort
 - d. Selection Sort

View answer

Answer: c

3. What is the time complexity of binary search in the worst-case scenario?
- a. $O(1)$
 - b. $O(\log n)$
 - c. $O(n)$
 - d. $O(n^2)$

View answer

Answer: b

4. In the divide and conquer technique, which algorithm is used for matrix multiplication?

- a. Quick Sort
- b. Merge Sort
- c. Strassen's Algorithm
- d. Binary Search

View answer

Answer: c

5. Which strategy is used in Huffman coding?

- a. Dynamic Programming
- b. Greedy Method
- c. Divide and Conquer
- d. Backtracking

View answer

Answer: b

6. What problem does the Knapsack problem address?

- a. Sorting items in a backpack
- b. Maximizing the profit of selected items with limited capacity
- c. Finding the minimum spanning tree
- d. Searching for a specific item in a database

View answer

Answer: b

7. Which algorithm is commonly used for solving the Minimum Spanning Tree problem?

- a. Kruskal's Algorithm

- b. Prim's Algorithm
- c. Dijkstra's Algorithm
- d. Bellman-Ford Algorithm

View answer

Answer: a

8. Which algorithm is used for solving the All Pairs Shortest Path problem?

- a. Bellman-Ford Algorithm
- b. Dijkstra's Algorithm
- c. Floyd-Warshall Algorithm
- d. Kruskal's Algorithm

View answer

Answer: c

9. What type of problems are suitable for the backtracking technique?

- a. Optimization problems
- b. Search problems
- c. Sorting problems
- d. All of the above

View answer

Answer: d

10. Which problem involves finding a feasible solution incrementally and backing up when necessary?

- a. 0/1 Knapsack Problem

- b. Hamiltonian Cycle Problem
- c. Graph Coloring Problem
- d. Job Sequencing with Deadlines

View answer

Answer: a

11. The branch and bound method is used for which type of problems?

- a. Dynamic Programming
- b. Search problems
- c. Optimization problems
- d. Sorting problems

View answer

Answer: c

12. What is the primary purpose of the lower bound theory in algorithm analysis?

- a. To establish the lower limit of the algorithm's efficiency
- b. To prove the optimality of an algorithm
- c. To compare algorithms in terms of their upper bounds
- d. To analyze the average-case complexity of an algorithm

View answer

Answer: a

13. Which algorithmic design technique is characterized by breaking a problem into subproblems and solving each subproblem independently?

- a. Divide and Conquer

- b. Greedy Method
- c. Dynamic Programming
- d. Backtracking

View answer

Answer: a

14. In parallel algorithms, what is the goal?

- a. Minimizing the space complexity
- b. Maximizing the time complexity
- c. Simultaneous execution of multiple tasks
- d. Avoiding recursion

View answer

Answer: c

15. What is the key feature of binary search trees?

- a. All nodes in the left subtree are greater than the root
- b. All nodes in the right subtree are greater than the root
- c. The height of the tree is minimized
- d. Both a and b

View answer

Answer: d

16. Which tree structure is designed to maintain balance automatically?

- a. Binary Search Tree
- b. 2-3 Tree

- c. B-Tree
- d. AVL Tree

View answer

Answer: c

17. What is the primary advantage of B-trees over binary search trees?

- a. B-trees have a simpler structure
- b. B-trees have a lower space complexity
- c. B-trees are more efficient for disk-based storage
- d. B-trees have a faster search time

View answer

Answer: c

18. Which traversal technique visits nodes in the following order: left, root, right?

- a. Inorder
- b. Preorder
- c. Postorder
- d. Level order

View answer

Answer: b

19. What is NP-completeness related to in computer science?

- a. Polynomial time algorithms
- b. Non-deterministic Polynomial time problems
- c. Optimal algorithms

d. Parallel algorithms

View answer

Answer: b

20. What is the time complexity of heap sort in the worst-case scenario?

- a. $O(n)$
- b. $O(\log n)$
- c. $O(n \log n)$
- d. $O(n^2)$

View answer

Answer: c

21. Which algorithm is used for optimal merging of sorted sequences?

- a. Quick Sort
- b. Merge Sort
- c. Heap Sort
- d. Bubble Sort

View answer

Answer: b

22. Which of the following is a drawback of using the Greedy method?

- a. It may not always guarantee an optimal solution
- b. It is computationally expensive
- c. It is only suitable for small datasets
- d. It always results in the shortest path

View answer

Answer: a

23. What is the primary objective of the Floyd-Warshall algorithm?

- a. Finding the minimum spanning tree
- b. Shortest path in a graph with positive weights
- c. All Pairs Shortest Path in a weighted graph
- d. Sorting a list of elements

View answer

Answer: c

24. Which algorithm is used for job sequencing with deadlines?

- a. Greedy method
- b. Dynamic Programming
- c. Backtracking
- d. Divide and Conquer

View answer

Answer: a

25. In the context of dynamic programming, what is memoization?

- a. Storing the results of expensive function calls and returning the cached result when the same inputs occur again
- b. Breaking a problem into smaller overlapping subproblems
- c. Solving problems incrementally and backing up when necessary
- d. Searching for a feasible solution in a solution space

View answer

Answer: a

26. What problem does the 2-3 tree address?

- a. Sorting a list of elements
- b. Balancing binary search trees
- c. All Pairs Shortest Path
- d. Maintaining balance in a search tree

View answer

Answer: d

27. Which algorithm is used for solving the traveling salesman problem using the branch and bound method?

- a. Dijkstra's Algorithm
- b. Prim's Algorithm
- c. Bellman-Ford Algorithm
- d. Held-Karp Algorithm

View answer

Answer: d

28. What does the term "NP" stand for in NP-completeness?

- a. Non-Polynomial
- b. Non-Parallel
- c. Non-Practical
- d. Non-Predictable

View answer

Answer: c

29. Which traversal technique visits nodes in the following order: left, right, root?

- a. Inorder
- b. Preorder
- c. Postorder
- d. Level order

View answer

Answer: c

30. What is the primary characteristic of a Hamiltonian cycle in a graph?

- a. It visits each vertex exactly once and returns to the starting vertex
- b. It visits each edge exactly once
- c. It has the minimum number of edges
- d. It does not visit all vertices

View answer

Answer: a

31. In the context of parallel algorithms, what does "task parallelism" refer to?

- a. Breaking down a task into smaller parallel tasks
- b. Executing tasks sequentially
- c. Avoiding parallelism
- d. Parallel execution of unrelated tasks

View answer

Answer: a

32. What is the primary goal of a 3-4 tree?
- a. Maintaining balance in a search tree
 - b. Sorting a list of elements
 - c. Searching for the shortest path in a graph
 - d. All Pairs Shortest Path

View answer

Answer: a

33. Which algorithm is used for optimal merge patterns?
- a. Quick Sort
 - b. Merge Sort
 - c. Heap Sort
 - d. Bubble Sort

View answer

Answer: b

34. What is the purpose of the Knapsack problem?
- a. Sorting items in a backpack
 - b. Maximizing the profit of selected items with limited capacity
 - c. Finding the minimum spanning tree
 - d. Searching for a specific item in a database

View answer

Answer: b

35. Which algorithm is used for optimal merge patterns?

- a. Quick Sort
- b. Merge Sort
- c. Heap Sort
- d. Bubble Sort

View answer

Answer: b

36. What does the term “backtracking” imply?

- a. Iterating backward through a list
- b. Solving problems incrementally and backing up when necessary
- c. Reversing the order of elements in an array
- d. Searching for a solution in a forward direction

View answer

Answer: b

37. What does the term “reliability design” refer to in dynamic programming?

- a. Designing algorithms with high reliability
- b. Ensuring the correctness of a solution
- c. Designing systems that can withstand failures
- d. Searching for reliable paths in a graph

View answer

Answer: c

38. What is the primary objective of the 0/1 Knapsack problem?

- a. Maximizing the profit of selected items with limited capacity
- b. Sorting items in a backpack
- c. Finding the minimum spanning tree
- d. Searching for a specific item in a database

View answer

Answer: a

39. Which algorithm is used for optimal merge patterns?

- a. Quick Sort
- b. Merge Sort
- c. Heap Sort
- d. Bubble Sort

View answer

Answer: b

40. What is the primary goal of Huffman coding?

- a. Sorting a list of elements
- b. Minimizing the length of encoded messages
- c. Finding the minimum spanning tree
- d. Searching for a specific item in a database

View answer

Answer: b

41. What is the primary objective of the 0/1 Knapsack problem?

- a. Maximizing the profit of selected items with limited capacity

- b. Sorting items in a backpack
- c. Finding the minimum spanning tree
- d. Searching for a specific item in a database

View answer

Answer: a

42. Which algorithm is commonly used for solving the Minimum Spanning Tree problem?

- a. Kruskal's Algorithm
- b. Prim's Algorithm
- c. Dijkstra's Algorithm
- d. Bellman-Ford Algorithm

View answer

Answer: a

43. What is the primary goal of Huffman coding?

- a. Sorting a list of elements
- b. Minimizing the length of encoded messages
- c. Finding the minimum spanning tree
- d. Searching for a specific item in a database

View answer

Answer: b

44. What is the time complexity of the Bubble Sort algorithm in the worst-case scenario?

- a. $O(1)$
- b. $O(n)$

- c. $O(n^2)$
- d. $O(n \log n)$

View answer

Answer: c

45. What is the primary purpose of asymptotic notation in algorithm analysis?
- a. To describe the actual running time of an algorithm
 - b. To provide a precise measurement of an algorithm's execution time
 - c. To analyze the efficiency of an algorithm in terms of its input size
 - d. To count the number of basic operations in an algorithm

View answer

Answer: c

46. Which algorithm is used for solving the traveling salesman problem using the branch and bound method?
- a. Dijkstra's Algorithm
 - b. Prim's Algorithm
 - c. Bellman-Ford Algorithm
 - d. Held-Karp Algorithm

View answer

Answer: d

47. What is the primary objective of the Floyd-Warshall algorithm?
- a. Finding the minimum spanning tree
 - b. Shortest path in a graph with positive weights

- c. All Pairs Shortest Path in a weighted graph
- d. Sorting a list of elements

View answer

Answer: c

48. Which traversal technique visits nodes in the following order: left, root, right?
- a. Inorder
 - b. Preorder
 - c. Postorder
 - d. Level order

View answer

Answer: b

49. What is the primary objective of the Floyd-Warshall algorithm?
- a. Finding the minimum spanning tree
 - b. Shortest path in a graph with positive weights
 - c. All Pairs Shortest Path in a weighted graph
 - d. Sorting a list of elements

View answer

Answer: c

50. What does the dynamic programming approach focus on?
- a. Greedy optimization
 - b. Solving problems recursively
 - c. Memoization of subproblem solutions

d. Breaking down a problem into smaller overlapping subproblems

View answer

Answer: d