**MCQ**

**ON**

**DESIGN AND ANALYSIS OF ALGORITHM**

**1. Which of the following data structures is best suited for implementing a recursive algorithm?**

a) Array  
b) Linked list  
c) Stack  
d) Queue

**Answer: c)** Stack

**2. Which of the following algorithms is an example of a greedy algorithm?**

a) Quick Sort  
b) Dijkstra’s shortest path algorithm  
c) Bellman-Ford algorithm  
d) Kruskal’s algorithm for minimum spanning tree

**Answer: d)** Kruskal’s algorithm for minimum spanning tree

**3. Which of the following is a dynamic programming problem?**

a) Longest Common Subsequence  
b) Binary Search  
c) Depth First Search  
d) Breadth First Search

**Answer: a)** Longest Common Subsequence

**4. Which of the following sorting algorithms has a worst-case time complexity of O(n^2)?**

a) Merge Sort  
b) Heap Sort  
c) Quick Sort  
d) Bubble Sort

**Answer: d)** Bubble Sort

**5. Which of the following algorithms is used to find the strongly connected components in a directed graph?**

a) Kruskal’s algorithm  
b) Prim’s algorithm  
c) Floyd-Warshall algorithm  
d) Kosaraju’s algorithm

**Answer: d)** Kosaraju’s algorithm

**6. Which of the following data structures is best suited for implementing a priority queue?**

a) Array  
b) Linked list  
c) Stack  
d) Heap

**Answer: d)** Heap

**7. Which of the following algorithms is used to find the shortest path between two vertices in a graph?**

a) Breadth First Search  
b) Depth First Search  
c) Dijkstra’s shortest path algorithm  
d) Bellman-Ford algorithm

**Answer: c)** Dijkstra’s shortest path algorithm

**8. Which of the following data structures is best suited for implementing a hash table?**

a) Array  
b) Linked list  
c) Stack  
d) Queue

**Answer: a)** Array

**9. Which of the following algorithms is used to find the maximum flow in a flow network?**

a) Kruskal’s algorithm  
b) Prim’s algorithm  
c) Ford-Fulkerson algorithm  
d) Bellman-Ford algorithm

**Answer: c)** Ford-Fulkerson algorithm

**10. Which of the following algorithms is used to find the minimum spanning tree of a weighted graph?**

a) Kruskal’s algorithm  
b) Prim’s algorithm  
c) Floyd-Warshall algorithm  
d) Bellman-Ford algorithm

**Answer: a)** Kruskal’s algorithm or b) Prim’s algorithm

**11. Which of the following algorithms is used to find the transitive closure of a directed graph?**

a) Floyd-Warshall algorithm  
b) Bellman-Ford algorithm  
c) Kosaraju’s algorithm  
d) Depth First Search

**Answer: a)** Floyd-Warshall algorithm

**12. Which of the following algorithms is used to find the maximum subarray sum?**

a) Merge Sort  
b) Heap Sort  
c) Quick Sort  
d) Kadane’s algorithm

**Answer: d)** Kadane’s algorithm

**13. Which of the following algorithms is used to find the articulation points in a graph?**

a) Bellman-Ford algorithm  
b) Floyd-Warshall algorithm  
c) Depth First Search  
d) Kruskal’s algorithm

**Answer: c)** Depth First Search

**14. Which of the following algorithms is used to find the shortest path between all pairs of vertices in a graph?**

a) Breadth First Search  
b) Depth First Search  
c) Dijkstra’s shortest path algorithm  
d) Floyd-Warshall algorithm

**Answer: d)** Floyd-Warshall algorithm

**15. Which of the following algorithms is used to find the longest increasing subsequence in a sequence?**

a) Merge Sort  
b) Heap Sort  
c) Quick Sort  
d) Dynamic Programming

**Answer: d)** Dynamic Programming

**16. Which of the following algorithms is used to find the topological order of a directed acyclic graph?**

a) Bellman-Ford algorithm  
b) Floyd-Warshall algorithm  
c) Depth First Search  
d) Kahn’s algorithm

**Answer: d)** Kahn’s algorithm

**17. Which of the following data structures is best suited for implementing a breadth-first search algorithm?**

a) Array  
b) Linked list  
c) Stack  
d) Queue

**Answer: d)** Queue

**18. Which of the following algorithms is used to find the maximum independent set in a graph?**

a) Dijkstra’s algorithm  
b) Bellman-Ford algorithm  
c) Depth First Search  
d) Bron-Kerbosch algorithm

**Answer: d)** Bron-Kerbosch algorithm

**19. Which of the following algorithms is used to find the diameter of a tree?**

a) Breadth First Search  
b) Depth First Search  
c) Dijkstra’s shortest path algorithm  
d) Kruskal’s algorithm

**Answer: b)** Depth First Search

**20. Which of the following algorithms is used to find the longest path in a directed acyclic graph?**

a) Breadth First Search  
b) Depth First Search  
c) Dijkstra’s shortest path algorithm  
d) Bellman-Ford algorithm

**Answer: b)** Depth First Search

**21. Which of the following algorithms is used to find the minimum number of coins needed to make change for a given amount?**

a) Greedy algorithm  
b) Depth First Search  
c) Breadth First Search  
d) Dijkstra’s shortest path algorithm

**Answer: a)** Greedy algorithm

**22. Which of the following algorithms is used to find the maximum flow in a network?**

a) Dijkstra’s algorithm  
b) Bellman-Ford algorithm  
c) Ford-Fulkerson algorithm  
d) Prim’s algorithm

**Answer: c)** Ford-Fulkerson algorithm

**23. Which of the following algorithms is used to find the kth largest element in an unsorted array?**

a) Quick Sort  
b) Merge Sort  
c) Heap Sort  
d) Selection algorithm

**Answer: d)** Selection algorithm

**24. Which of the following algorithms is used to find the maximum sum of a subarray with a given sum constraint?**

a) Merge Sort  
b) Heap Sort  
c) Quick Sort  
d) Sliding Window algorithm

**Answer: d)** Sliding Window algorithm

**25. Which of the following algorithms is used to find the minimum cut in a network?**

a) Bellman-Ford algorithm  
b) Floyd-Warshall algorithm  
c) Ford-Fulkerson algorithm  
d) Prim’s algorithm

**Answer: c)** Ford-Fulkerson algorithm

**26. Which of the following algorithms is used to find the longest common subsequence between two sequences?**

a) Merge Sort  
b) Heap Sort  
c) Quick Sort  
d) Dynamic Programming

**Answer: d)** Dynamic Programming

**27. Which of the following algorithms is used to find the maximum matching in a bipartite graph?**

a) Dijkstra’s algorithm  
b) Bellman-Ford algorithm  
c) Hopcroft-Karp algorithm  
d) Kruskal’s algorithm

**Answer: c)** Hopcroft-Karp algorithm

**28. Which of the following algorithms is used to find the minimum vertex cover in a graph?**

a) Dijkstra’s algorithm  
b) Bellman-Ford algorithm  
c) Depth First Search  
d) Hungarian algorithm

**Answer: d)** Hungarian algorithm

**29. Which of the following algorithms is used to find the maximum weighted matching in a bipartite graph?**

a) Dijkstra’s algorithm  
b) Bellman-Ford algorithm  
c) Hungarian algorithm  
d) Kruskal’s algorithm

**Answer: c)** Hungarian algorithm

**30. Which of the following algorithms is used to find the minimum path cover in a directed acyclic graph?**

a) Breadth First Search  
b) Depth First Search  
c) Dijkstra’s shortest path algorithm  
d) Ford-Fulkerson algorithm

**Answer: b)** Depth First Search

**31. Which of the following algorithms is used to find the minimum spanning tree in a weighted graph?**

a) Dijkstra’s algorithm  
b) Prim’s algorithm  
c) Bellman-Ford algorithm  
d) Kruskal’s algorithm

**Answer: b)** Prim’s algorithm

**32. Which of the following algorithms is used to find the all-pairs shortest paths in a weighted graph?**

a) Dijkstra’s algorithm  
b) Floyd-Warshall algorithm  
c) Bellman-Ford algorithm  
d) Kruskal’s algorithm

**Answer: b)** Floyd-Warshall algorithm

**33. Which of the following algorithms is used to find the convex hull of a set of points?**

a) Graham’s scan  
b) Quick Sort  
c) Merge Sort  
d) Heap Sort

**Answer: a)** Graham’s scan

**34. Which of the following algorithms is used to find the maximum independent set in a bipartite graph?**

a) Dijkstra’s algorithm  
b) Bellman-Ford algorithm  
c) Depth First Search  
d) König’s theorem

**Answer: d)** König’s theorem

**35. Which of the following algorithms is used to find the maximum clique in a graph?**

a) Dijkstra’s algorithm  
b) Bellman-Ford algorithm  
c) Depth First Search  
d) Bron-Kerbosch algorithm

**Answer: d)** Bron-Kerbosch algorithm

**36. Which of the following algorithms is used to find the chromatic number of a graph?**

a) Dijkstra’s algorithm  
b) Bellman-Ford algorithm  
c) Depth First Search  
d) Greedy algorithm

**Answer: d)** Greedy algorithm

**Explanation:** The chromatic number of a graph can be found using a greedy algorithm.

**37. Which of the following algorithms is used to find the maximum flow in a network with multiple sources and sinks?**

a) Dijkstra’s algorithm  
b) Bellman-Ford algorithm  
c) Edmonds-Karp algorithm  
d) Dinic’s algorithm

**Answer: d)** Dinic’s algorithm

**38. Which of the following algorithms is used to find the shortest path between all pairs of vertices in a graph with negative edges?**

a) Dijkstra’s algorithm  
b) Bellman-Ford algorithm  
c) Floyd-Warshall algorithm  
d) Kruskal’s algorithm

**Answer: c)** Floyd-Warshall algorithm

**39. Which of the following algorithms is used to find the maximum flow in a network with capacities that are fractional numbers?**

a) Dijkstra’s algorithm  
b) Bellman-Ford algorithm  
c) Edmonds-Karp algorithm  
d) Push-Relabel algorithm

**Answer: d)** Push-Relabel algorithm

**40. Which of the following algorithms is used to find the minimum spanning tree in an undirected graph with negative edges?**

a) Dijkstra’s algorithm  
b) Prim’s algorithm  
c) Bellman-Ford algorithm  
d) Kruskal’s algorithm

**Answer: c)** Bellman-Ford algorithm

**41. Which of the following algorithms is used to find the maximum flow in a network with capacities that can change over time?**

a) Dijkstra’s algorithm  
b) Bellman-Ford algorithm  
c) Edmonds-Karp algorithm  
d) Ford-Fulkerson algorithm

**Answer: d)** Ford-Fulkerson algorithm

**42. Which of the following algorithms is used to find the shortest path between two vertices in a graph with negative edges?**

a) Dijkstra’s algorithm  
b) Bellman-Ford algorithm  
c) Floyd-Warshall algorithm  
d) Kruskal’s algorithm

**Answer: b)** Bellman-Ford algorithm

**43. Which of the following algorithms is used to find the maximum flow in a network with capacities that are integers?**

a) Dijkstra’s algorithm  
b) Bellman-Ford algorithm  
c) Edmonds-Karp algorithm  
d) Ford-Fulkerson algorithm

**Answer: c)** Edmonds-Karp algorithm

**44. Which of the following algorithms is used to find the minimum spanning tree in an undirected graph with positive and negative edges?**

a) Dijkstra’s algorithm  
b) Prim’s algorithm  
c) Bellman-Ford algorithm  
d) Kruskal’s algorithm

**Answer: c)** Bellman-Ford algorithm

**45. Which of the following algorithms is used to find the maximum flow in a network with capacities that can be increased or decreased by a certain amount?**

a) Dijkstra’s algorithm  
b) Bellman-Ford algorithm  
c) Edmonds-Karp algorithm  
d) Push-Relabel algorithm

**Answer: d)** Push-Relabel algorithm

**46. Which of the following algorithms is used to find the shortest path between two vertices in a graph with positive and negative edges?**

a) Dijkstra’s algorithm  
b) Bellman-Ford algorithm  
c) Floyd-Warshall algorithm  
d) Kruskal’s algorithm

**Answer: b)** Bellman-Ford algorithm

**47. Which of the following algorithms is used to find the minimum cut in a network with capacities that are integers?**

a) Dijkstra’s algorithm  
b) Bellman-Ford algorithm  
c) Edmonds-Karp algorithm  
d) Ford-Fulkerson algorithm

**Answer: d)** Ford-Fulkerson algorithm

**48. Which of the following algorithms is used to find the maximum matching in a general graph?**

a) Hopcroft-Karp algorithm  
b) Edmonds-Karp algorithm  
c) Dinic’s algorithm  
d) Ford-Fulkerson algorithm

**Answer: c)** Dinic’s algorithm

**49. Which of the following algorithms is used to find the shortest path between all pairs of vertices in a graph with positive and negative edges?**

a) Dijkstra’s algorithm  
b) Bellman-Ford algorithm  
c) Floyd-Warshall algorithm  
d) Kruskal’s algorithm

**Answer: c)** Floyd-Warshall algorithm

**50. Which of the following algorithms is used to find the minimum cut in a network with capacities that can change over time?**

a) Dijkstra’s algorithm  
b) Bellman-Ford algorithm  
c) Edmonds-Karp algorithm  
d) Ford-Fulkerson algorithm

**Answer: d)** Ford-Fulkerson algorithm