1. The Floyd-Warshall algorithm is used to find the shortest paths between:

a) A single pair of vertices

**b) All pairs of vertices**

c) Vertices in a directed acyclic graph

d) Vertices in a connected graph

2. Consider the following adjacency matrix for a directed graph:

a b c

a 0 ∞ -2

b 3 0 ∞

c ∞ 1 0

After applying the Floyd-Warshall algorithm, what will be the distance from vertex 'b' to vertex 'c'?

a) 0

b) -2

**c) 1**

d) ∞

3. Consider the following adjacency matrix for a directed graph:

a b c

a 0 2 ∞

b ∞ 0 -4

c 5 ∞ 0

After applying the Floyd-Warshall algorithm, what will be the distance from vertex 'b' to vertex 'a'?

a) 0

b) -4

**c) 1**

d) ∞

4. What type of graph does the Floyd-Warshall algorithm work on?

a) Undirected graph

**b) Directed graph**

c) Weighted graph

d) Bipartite graph

5. In the Floyd-Warshall algorithm, the initial distance matrix is formed from:

**a) Adjacency matrix**

b) Incidence matrix

c) Edge weight matrix

d) Shortest path matrix

6. The time complexity of the Floyd-Warshall algorithm is:

a) O(V)

b) O(V^2)

**c) O(V^3)**

d) O(E)

7. Consider the following adjacency matrix for a directed graph:

a b c

a 0 -1 ∞

b 3 0 ∞

c 2 ∞ 0

After applying the Floyd-Warshall algorithm, what will be the distance from vertex 'a' to vertex 'b'?

a) 0

**b) -1**

c) 2

d) ∞

8. Consider the following adjacency matrix for a directed graph:

a b c

a 0 ∞ 1

b ∞ 0 ∞

c ∞ 2 0

After applying the Floyd-Warshall algorithm, what will be the distance from vertex 'c' to vertex 'b'?

a) 0

b) 1

**c) 2**

d) ∞

9. The Floyd-Warshall algorithm detects negative cycles by:

a) Tracking the shortest path distances

b) Applying the Bellman-Ford algorithm

**c) Checking the diagonal elements of the distance matrix**

d) Performing depth-first search

10. Consider the following adjacency matrix for a directed graph:

a b c

a 0 ∞ 3

b ∞ 0 -2

c ∞ 1 0

After applying the Floyd-Warshall algorithm, what will be the distance from vertex 'a' to vertex 'b'?

a) 0

b) 1

**c) 4**

d) ∞

11. Consider the following adjacency matrix for a directed graph:

a b c

a 0 2 ∞

b 1 0 ∞

c ∞ 3 0

After applying the Floyd-Warshall algorithm, what will be the distance from vertex 'c' to vertex 'a'?

a) 0

**b) 4**

c) 1

d) ∞

12. The Floyd-Warshall algorithm is suitable for finding shortest paths in graphs with:

a) Small number of vertices

**b) Large number of vertices**

c) Only positive edge weights

d) Only negative edge weights

13. The Floyd-Warshall algorithm guarantees correct results when there are:

**a) No negative cycles**

b) No positive cycles

c) Equal edge weights

d) A single source vertex

14. Consider the following adjacency matrix for a directed graph:

a b c

a 0 3 ∞

b ∞ 0 -2

c ∞ ∞ 0

After applying the Floyd-Warshall algorithm, what will be the distance from vertex 'a' to vertex 'c'?

a) 0

**b) 1**

c) 3

d) ∞

15. Consider the following adjacency matrix for a directed graph:

a b c

a 0 ∞ -1

b 2 0 ∞

c ∞ 1 0

After applying the Floyd-Warshall algorithm, what will be the distance from vertex 'b' to vertex 'a'?

a) 0

**b) 2**

c) -1

d) ∞

16. The Floyd-Warshall algorithm uses dynamic programming to find shortest paths based on:

a) Dijkstra's algorithm

b) Bellman-Ford algorithm

c) Prim's algorithm

**d) Bellman-Kalaba algorithm**

17. Consider the following adjacency matrix for a directed graph:

a b c

a 0 ∞ 2

b 1 0 ∞

c ∞ 3 0

After applying the Floyd-Warshall algorithm, what will be the distance from vertex 'c' to vertex 'a'?

a) 0

b) 2

**c) 4**

d) ∞

18. The Floyd-Warshall algorithm can handle graphs with:

a) Positive edge weights only

b) Negative edge weights only

**c) Positive and negative edge weights**

d) Equal edge weights

19. Consider the following adjacency matrix for a directed graph:

a b c

a 0 1 ∞

b ∞ 0 -3

c 2 ∞ 0

After applying the Floyd-Warshall algorithm, what will be the distance from vertex 'b' to vertex 'c'?

a) 0

**b) -3**

c) 1

d) ∞

20. In the Floyd-Warshall algorithm, if there is no direct edge between two vertices, the distance is typically set to:

a) 0

b) 1

**c) ∞**

d) -1

21. What is the time complexity of finding the shortest path between two nodes in a weighted graph using Dijkstra's algorithm?

a) O(V^2)

b) O(V + E)

**c) O(E log V)**

d) O(V log E)

22. Which algorithm is used to find the strongly connected components in a directed graph?

a) Dijkstra's algorithm

b) Floyd-Warshall algorithm

c) Kruskal's algorithm

**d) Tarjan's algorithm**

23. Which graph algorithm can be used to detect cycles in a directed graph?

a) Prim's algorithm

b) Bellman-Ford algorithm

**c) Depth-First Search (DFS)**

d) Breadth-First Search (BFS)

24. A graph with no cycles is called a:

a) Bipartite graph

**b) Tree**

c) Eulerian graph

d) Complete graph

25. Which data structure is commonly used to implement the priority queue in graph algorithms like Prim's and Dijkstra's?

a) Stack

b) Queue

c) Binary Search Tree

**d) Heap**

26. The Bellman-Ford algorithm can handle graphs with:

**a) Negative weights but no negative cycles**

b) Negative cycles but no negative weights

c) Both negative weights and negative cycles

d) Neither negative weights nor negative cycles

27. What does the term "bipartite" mean in the context of a graph?

a) A graph with two connected components

b) A graph with two vertices

c) A graph with two edges between each pair of vertices

**d) A graph whose vertices can be divided into two sets such that no two vertices within the same set are adjacent.**

28. Kruskal's algorithm is used for:

a) Finding shortest paths in a graph

**b) Finding minimum spanning tree of a graph**

c) Detecting cycles in a graph

d) Finding strongly connected components

29. In topological sorting of a directed acyclic graph (DAG), which vertex is processed last?

a) Source vertex (a vertex with no incoming edges)

**b) Sink vertex (a vertex with no outgoing edges)**

c) Random vertex

d) Vertex with the maximum number of incoming edges

30. The Floyd-Warshall algorithm is used to:

a) Find the shortest path in a weighted directed graph

b) Find the longest path in an unweighted graph

c) Detect cycles in a directed graph

**d) Find all-pairs shortest paths in a weighted graph**

31. What is the maximum number of edges in a bipartite graph with 'n' vertices on one side and 'm' vertices on the other side?

a) n

b) m

c) n + m

**d) nm**

32. Which algorithm is used to find the maximum flow in a flow network?

a) Kruskal's algorithm

b) Dijkstra's algorithm

c) Bellman-Ford algorithm

**d) Ford-Fulkerson algorithm**

33. What is the chromatic number of a graph?

a) The maximum degree of a vertex in the graph

b) The minimum degree of a vertex in the graph

**c) The minimum number of colors needed to color the vertices such that no two adjacent vertices share the same color**

d) The maximum number of colors that can be assigned to the vertices

34. Which algorithm is used to find the articulation points (cut vertices) in a graph?

a) Prim's algorithm

b) Kruskal's algorithm

**c) Tarjan's algorithm**

d) Hopcroft-Karp algorithm

35. A Hamiltonian cycle in a graph is a cycle that:

**a) Visits every vertex exactly once and returns to the starting vertex**

b) Visits every edge exactly once

c) Visits some vertices more than once

d) Visits some edges more than once