**Graphs**

1. What is a graph?
2. How is a graph different from a tree?
3. What are the different methods of graph representation?

**Algorithms Related to Graphs**

1. What is Dijkstra's shortest path algorithm?
2. Explain Dijkstra's shortest path algorithm.
3. Find the shortest path from Node 1 to Node 4 using Dijkstra's algorithm.
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**Algorithmic Paradigms**

1. What is a Greedy algorithm?
2. What is dynamic programming?

**Graph Traversal Algorithms**

1. Explain BFS (Breadth-First Search
2. Explain Depth First Search (DFS) algorithm.
3. Differentiate between breadth-first search (BFS) and depth-first search (DFS) algorithms.

**Graph Basics and Representations:**

1. How is a graph different from a tree?
2. What are the different methods of graph representation?

**Shortest Path Algorithm:**

1. What do you mean by single source shortest path problem?
2. Write and explain Dijkstra's algorithm with suitable example.
3. Explain Dijkstra's shortest path algorithm.
4. Find the shortest path from Node A to Node C using Dijkstra's algorithm.

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**1. Graph Theory Concepts**

* Define cyclic and acyclic graph with an example of each.
* Define graph data structure.
* Define topological sort with a suitable example.
* How many edges are there in a complete graph having 10 vertices?

**Spanning Tree Algorithms:**

1. What is a Minimum Spanning Tree (MST)?
2. Define minimum spanning tree with an example.
3. What are the differences between Kruskal's and Prim's algorithm that finds MST?
4. Create a minimum spanning tree for the following graph using Kruskal's algorithm.
5. Calculate MST of the given graph using Prim's algorithm and Show step-by-step solution

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1. A diagram of a network

   Description automatically generated**Calculate MST of the given graph using Kruskal's Minimum Spanning Tree Algorithm.**

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A diagram of a mathematical equation

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**Topological Sorting**

* Determine the breadth-first and depth-first topological sorting for the following graph.

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**1. Graph Traversal: Depth-First and Breadth-First Traversal**

* Define depth-first and breadth-first traversal.
* Explain depth-first traversal in a graph.

**2. Kruskal's Algorithm**

* Construct the minimum spanning tree (MST) for the given graph using Kruskal's algorithm.

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* Explain Kruskal's algorithm to find the Minimum Spanning Tree with an example.
* Create a minimum spanning tree for the following graph using Kruskal's algorithm.

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**3. Graph Representation**

* What are different representation methods of graphs?

**4. Warshall's Algorithm**

* Write an algorithm for Warshall's algorithm and illustrate with an example.

**1. Graph Traversal: Breadth-First and Depth-First Traversal**

* Define breadth-first traversal and depth-first traversal with an example.
* Explain a breadth-first traversal in a graph with a suitable example.
* Discuss the Depth-First Traversal (DFT) and Breadth-First Traversal (BFT) with suitable examples.

**2. Kruskal's Algorithm**

* Define Kruskal's algorithm with a suitable example.
* Explain Kruskal's algorithm to find the minimum spanning tree with a suitable example.
* What are the implementation differences between round robin and Kruskal's algorithms?

**3. Warshall's Algorithm**

* Write an algorithm for Warshall's algorithm with a suitable example.

**4. Dijkstra's Algorithm**

* Use Dijkstra's algorithm to find the shortest path from node A to other nodes in the given graph.

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**5. Graph Concepts: In-degree, Out-degree, and Graph Types**

* Define in-degree and out-degree in a directed graph.
* Define directed, undirected graph, spanning forest, minimum spanning trees.

**6. Transitive Closure**

* Write short notes on Transitive Closure Graph.

**1. Graph Algorithms: Shortest Path**

* Explain Dijkstra's algorithm for finding the shortest path with the help of an algorithm.
* What do you mean by shortest path? Write the Dijkstra's algorithm and explain the algorithm with suitable example.

**2. Graph Connectivity**

* Describe a strongly and weakly connected graph.
* Describe a strongly and weakly connected graph with suitable examples.

**3. Graph Traversal**

* How are the depth-first search algorithm and breadth-first search algorithm implemented? Explain with suitable example.
* Write algorithms for Depth-First and Breadth-First topological sorting and trace your algorithms for a given acyclic directed graph.

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* Write an algorithm of depth-first topological sorting.

**4. Minimum Cost Spanning Trees**

* Write short notes on Minimum cost spanning trees.
* Create spanning tree using depth first traversal method of a given graph. Show the steps clearly.

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**5. Time Complexity**

* Write short notes on Big 'O' notation.

**1. Graph and Tree Data Structures**

* Define graph and tree data structure. Explain breadth-first traversal and depth-first traversal with example.
* Differentiate between tree and graph. What are spanning forest and spanning tree?
* What is a weighted graph?
* What is graph traversal? Discuss depth-first traversal technique with suitable example.
* Discuss depth first and breadth first traversal of a graph with suitable example.

**2. Graph Traversal**

* What do you mean by graph traversal? Explain Prime's algorithm with example.
* What do you mean by graph traversal? Discuss depth-first traversal technique with suitable example.

**3. Minimum Spanning Tree (MST)**

* What do you mean by MST? Explain Kruskal's algorithm with example.
* Explain Kruskal's algorithm with example.
* What are spanning forest and spanning tree? Explain MST (Minimum cost Spanning Tree) problem.
* State the Minimum Cost Spanning Tree (MST) problem and the shortest path problem (single source and all other destinations). Name algorithms for solving these problems.

**4. Kruskal's Algorithm**

* Explain Kruskal's algorithm with example.
* What is a graph? Explain Kruskal's algorithm to construct minimum spanning tree with example.

**5. Graph Connectivity**

* Describe strong and weakly connected graphs with examples.