**1. Graph Theory Concepts**

1. What is a graph?
2. How is a graph different from a tree?
3. What are the different methods of graph representation?
4. Define graph data structure.
5. Define cyclic and acyclic graph with an example of each.
6. How many edges are there in a complete graph having 10 vertices?
7. What is a weighted graph?

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

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.
4. Define depth-first and breadth-first traversal.
5. Explain depth-first traversal in a graph.
6. Explain a breadth-first traversal in a graph with a suitable example.
7. Discuss the Depth-First Traversal (DFT) and Breadth-First Traversal (BFT) with suitable examples.
8. How are the depth-first search algorithm and breadth-first search algorithm implemented? Explain with suitable example.
9. What do you mean by graph traversal? Discuss depth-first traversal technique with suitable example.

**Algorithmic Paradigms**

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

**1. Graph Algorithms: Shortest Path**

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.

A diagram of a diagram

Description automatically generated

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

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

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

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.

A diagram of a network

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A diagram of a network

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1. Calculate MST of the given graph using Prim's algorithm and show step-by-step solution

A diagram of a network

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1. Calculate MST of the given graph using Kruskal's Minimum Spanning Tree Algorithm.

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A diagram of a network

Description automatically generatedA diagram of a triangle with circles and lines with Silverstone Circuit in the background

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A diagram of a mathematical equation

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1. Explain Kruskal's algorithm to find the Minimum Spanning Tree with an example.
2. Define Kruskal's algorithm with a suitable example.
3. What are the implementation differences between round robin and Kruskal's algorithms?
4. What do you mean by MST? Explain Kruskal's algorithm with example.
5. Explain Prime's algorithm with example.

**Topological Sorting**

1. Define topological sort with a suitable example.
2. Determine the breadth-first and depth-first topological sorting for the following graph.

A diagram of a network

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1. Write algorithms for Depth-First and Breadth-First topological sorting and trace your algorithms for a given acyclic directed graph.

A diagram of a network

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1. Write an algorithm of depth-first topological sorting.

**5. Graph Connectivity**

1. Define in-degree and out-degree in a directed graph.
2. Define directed, undirected graph, spanning forest, minimum spanning trees.
3. Describe a strongly and weakly connected graph.
4. Describe a strongly and weakly connected graph with suitable examples.

**1. Other Graph Algorithms**

1. Write an algorithm for Warshall's algorithm and illustrate with an example.
2. Write short notes on Transitive Closure Graph.