

# Graph

## Important Questions:

- Create a class Graph and implement the following functions/methods in that class:

- addNewEdge(source, destination, distance)
- printAdjacencyList()
- bfsTraversal()

[Follow here: <https://www.geeksforgeeks.org/breadth-first-search-or-bfs-for-a-graph/>]

- dfsTraversal()

[Follow here: <https://www.geeksforgeeks.org/depth-first-search-or-dfs-for-a-graph/>]

[ For help: <https://1drv.ms/t/s!AqTOHF077CqEiRua06v1PATyiFg5> ]

- Detect cycle in a Directed graph using BFS algo and do the same using DFS algo

[Follow here: <https://www.geeksforgeeks.org/detect-cycle-in-a-graph/>]

- Detect cycle in a Undirected graph using BFS algo and do the same using DFS algo

[Follow here: <https://www.geeksforgeeks.org/detect-cycle-undirected-graph/>]

- Write a method to find the shortest path between two nodes using the bfs algorithm.

[Follow here: <https://www.geeksforgeeks.org/shortest-path-unweighted-graph/>]

- Write a method to find the shortest path between two nodes using Dijkstra's algorithm.

[Follow here: <https://www.geeksforgeeks.org/dijkstras-shortest-path-algorithm-greedy-algo-7/>]

- Minimum steps to reach target by a Knight

[Follow here: <https://www.geeksforgeeks.org/minimum-steps-reach-target-knight/>]

- Minimum number of jumps to reach end of given array

[Follow here: <https://www.geeksforgeeks.org/minimum-number-of-jumps-to-reach-end-of-a-given-array/>]

- Find the number of Islands

[Follow here: <https://www.geeksforgeeks.org/find-number-of-islands/> ]

- Find bridge in a graph

[Follow here: <https://www.geeksforgeeks.org/bridge-in-a-graph/> ]

- Implement Topological sorting algorithm

[Follow here: <https://www.geeksforgeeks.org/topological-sorting/> ]

- Given a sorted Dictionary of an Alien Language, find order of characters

[Follow here: <https://www.geeksforgeeks.org/given-sorted-dictionary-find-precedence-characters/>]

- Flood Fill Algorithm

[Follow here: <https://www.geeksforgeeks.org/flood-fill-algorithm-implement-fill-paint/> ]

- Rat in a Maze

[Follow here: <https://www.geeksforgeeks.org/rat-in-a-maze-backtracking-2/> ]

- N-Queen Problem

[Follow here: <https://www.geeksforgeeks.org/n-queen-problem-backtracking-3/> ]

- What is MST(Minimum Spanning Tree) ?

[Follow here: <https://www.hackerearth.com/practice/algorithms/graphs/minimum-spanning-tree/tutorial/> ]

- Implement Kruksal's Algorithm

[Follow here: <https://www.geeksforgeeks.org/kruskals-minimum-spanning-tree-algorithm-greedy-algo-2/>]

- Implement Prim's Algorithm

[Follow here: <https://www.geeksforgeeks.org/prims-minimum-spanning-tree-mst-greedy-algo-5/>]

- Total no. of Spanning tree in a graph

[Follow here: <https://www.geeksforgeeks.org/total-number-spanning-trees-graph/> ]

- Minimum Product Spanning Tree

[Follow here: <https://www.geeksforgeeks.org/minimum-product-spanning-tree/> ]

- Implement Bellman Ford Algorithm

[Follow here: <https://www.geeksforgeeks.org/bellman-ford-algorithm-dp-23/> ]

- **Implement Floyd warshall Algorithm**

[Follow here: <https://www.geeksforgeeks.org/floyd-warshall-algorithm-dp-16/> ]

- **Travelling Salesman Problem**

[Follow here: <https://www.geeksforgeeks.org/traveling-salesman-problem-tsp-implementation/> ]

- **Graph Colouring Problem**

[Follow here: <https://www.geeksforgeeks.org/graph-coloring-set-2-greedy-algorithm/> ]

- **Snake and Ladders Problem**

[Follow here: <https://www.geeksforgeeks.org/snake-ladder-problem-2/> ]

- **Count Strongly connected Components (Kosaraju Algo)**

[Follow here: <https://www.geeksforgeeks.org/strongly-connected-components/> ]

- **Check whether a graph is Bipartite or Not**

[Follow here: <https://www.geeksforgeeks.org/bipartite-graph/> ]

- **Clone a graph**

[Follow here: <https://www.geeksforgeeks.org/clone-an-undirected-graph/> ]

- **Detect Negative cycle in a graph**

[Follow here: <https://www.geeksforgeeks.org/detect-negative-cycle-graph-bellman-ford/> ]

- **Longest path in a Directed Acyclic Graph**

[Follow here: <https://www.geeksforgeeks.org/longest-path-directed-acyclic-graph-set-2/> ]

- **Minimum cost to connect all cities**

[Follow here: <https://www.geeksforgeeks.org/minimum-cost-connect-cities/> ]

- **Find if there is a path of more than k length from a source**

[Follow here: <https://www.geeksforgeeks.org/find-if-there-is-a-path-of-more-than-k-length-from-a-source/> ]

- **M-Colouring Problem**

[Follow here: <https://www.geeksforgeeks.org/m-coloring-problem-backtracking-5/> ]

- **Hamiltonian Cycle**

[Follow here: <https://www.geeksforgeeks.org/hamiltonian-cycle-backtracking-6/> ]

- Permutation of numbers such that sum of 2 consecutive numbers is a perfect square

[Follow here: <https://www.geeksforgeeks.org/permutation-numbers-sum-two-consecutive-numbers-perfect-square/> ]

- Minimum edges to reverse o make path from source to destination

[Follow here: <https://www.geeksforgeeks.org/minimum-edges-reverse-make-path-source-destination/>]

- Paths to travel each nodes using each edge(Seven Bridges)

[Follow here: <https://www.geeksforgeeks.org/paths-travel-nodes-using-edgeseven-bridges-konigsberg/> ]

- $K^{\text{th}}$  heaviest adjacent node in a graph where each vertex has weight

[Follow here: <https://www.geeksforgeeks.org/kth-adjacent-node-graph-vertex-weight/> ]

- Ford-Fulkerson Algorithm for maximum flow problem

[Follow here: <https://www.geeksforgeeks.org/ford-fulkerson-algorithm-for-maximum-flow-problem/>]

- Vertex Cover Problem

[Follow here: <https://www.geeksforgeeks.org/vertex-cover-problem-set-1-introduction-approximate-algorithm-2/> ]

- Chinese Postman or Route Inspection

[Follow here: <https://www.geeksforgeeks.org/chinese-postman-route-inspection-set-1-introduction/>]

- Number of Triangles in a Directed and Undirected Graph

[Follow here: <https://www.geeksforgeeks.org/number-of-triangles-in-directed-and-undirected-graphs/> ]

- Minimise the cashflow mong a given set of friends who have borrowed money from each other

[Follow here: <https://www.geeksforgeeks.org/minimize-cash-flow-among-given-set-friends-borrowed-money/> ]

- Two Clique Problem

[Follow here: <https://www.geeksforgeeks.org/two-clique-problem-check-graph-can-divided-two-cliques/> ]