TITLE: Represent a communication network with adjacency and cost matrix.

PROBLEM STATEMENT: There is 5 node networks, with that network you have to represent this network with adjacency and cost matrix.

BRIFE THEORY & BACKGROUND:

A brief theory and background on adjacency matrices and cost matrices in the context of graph theory and communication networks.

Graph theory is a branch of mathematics that studies relationships between pairs of elements. It involves the study of graphs, which are mathematical structures used to model pairwise relations between objects. A graph consists of nodes (vertices) and edges that connect pairs of nodes. Graphs can be directed or undirected, and edges may have weights or costs associated with them.

In communication networks, the nodes can represent various entities (such as computers or routers), and edges can represent the communication links between them. The weights on the edges may represent factors like transmission delay, bandwidth, or any other relevant metric for network performance.

Using adjacency matrices and cost matrices, network analysts and engineers can model and analyze the structure and characteristics of communication networks. These matrix representations provide a powerful and convenient way to apply mathematical and algorithmic techniques to solve real-world problems related to communication networks, making them a fundamental tool in network analysis and optimization.

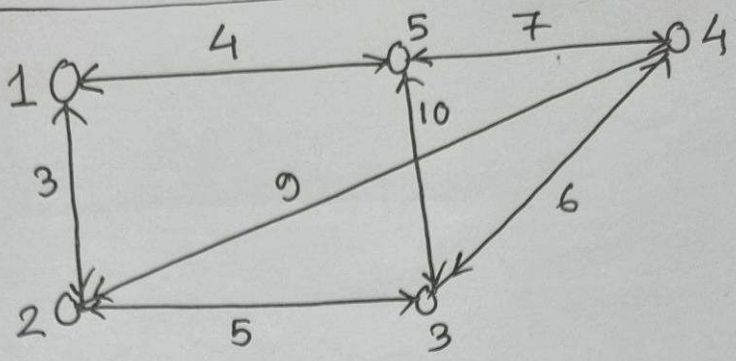
Adjacency Matrix: An adjacency matrix is a square matrix used to represent a finite graph. For an undirected graph with n vertices, the adjacency matrix is an n X n matrix where each element a_{ij} represents whether there is an edge between vertex i and vertex j. In the case of an unweighted graph, a_{ij} is 1 if there is an edge and 0 if there isn't. For weighted graphs, a_{ij} represents the weight of the edge.

Cost Matrix:

A cost Matrix is an essentially an adjacency matrix but with each entry representing the cost or weight associated with the corresponding edge in a weighted graph. It provides additional information about the expense or distance between nodes.

In below attached picture which one I designed in Lab to represent a Random 5 node network. Also, after the picture drawn, I wrote the Adjacency matrix & cost matrix for this random network.

Representation of Network-



Adjacency matrix

i \ j	1	2	3	4	5
1	0	1	0	0	1
2	1	0	1	1	0
3	0	1	0	1	1
4	0	1	1	0	1
5	1	0	1	1	0

Cost matrix

i \ j	1	2	3	4	5
1	0	3	0	0	4
2	3	0	5	9	0
3	0	5	0	6	10
4	0	9	6	0	7
5	4	0	10	7	0