# Introduction:

The "Road Network Analysis" project is a program designed to analyse and gain insights from road networks represented as undirected graphs. The project provides a set of tools and functionalities for processing road network data, performing graph-based calculations, and helping users understand the properties and characteristics of the network.

This project accomplishes the following objectives:

1. Identify the junction with the highest congestion level.

2. Identify the junction with the lowest congestion level.

3. Determine the shortest route between specified source and destination junctions.

4. Calculate the shortest path from a source junction to a destination junction through an intermediate junction.

5. Uncover the Eulerian path within the road network.

6. Reveal the Hamiltonian cycle in the provided road network.

7. Display all possible paths from a designated source to a given destination.

8. Determine the nth neighbour junction of a specified junction.

# ADT Definitions of the Data Structures Used:

The data structures used in this project are graphs and stacks.

ADT Definition of Graph:

1. Data:

int n // Number of nodes in the graph

int a[MAX][MAX] // Adjacency matrix representing edges between nodes

1. Operations:

void create\_graph(GRAPH \*g) // Creates an empty graph

void display(GRAPH \*g) // Displays the graph

void degree(GRAPH \*g) // Calculate the degree of a specific node

void DFS(GRAPH \*g, int v, int \* visited, int k) //Performs depth-first traversal in a graph, starting from a specified node, while marking visited nodes and customizing traversal depth if needed.

ADT Definition of Stack:

1. Data:

int a[n] // An array of length n that behaves as a stack

1. Operations:

Insertion // Inserts elements to an empty stack

Display // Displays the stack from the last to first element(LIFO)

# Contribution of each Team Member:

Mohammed Ashfaq Ali:

Eulerian Path,

Number of Paths, and

Print all Paths

MV Parth:

Least Congested Junction,

Most Congested Junction, and

Number of Connections of a Junction

Mohit Prasad Singh:

Shortest Path, and

Shortest Path via a Junction

Motamarri Sai Sathvik:

Hamiltonian Cycle,

Nth Neighbor Junctions,

Create Network, and

Display Network