

**JAYPEE INSTITUTE OF INFORMATION TECHNOLOGY
SECTOR 62, NOIDA
UTTAR PRADESH**



ALGORITHMS AND PROBLEM SOLVING PROJECT SYNOPSIS

METRO ASSISTANCE SYSTEM

BATCH – B5

SUBMITTED TO:

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PROBLEM STATEMENT:

The rapid expansion of metro networks in major cities has led to increased complexity in route planning and navigation. Traditional methods of accessing metro information, such as printed maps and static schedules, often fall short in providing dynamic and personalized assistance to commuters. As a result, there is a growing demand for intelligent software systems that can adapt to the evolving needs of metro users while offering seamless navigation and accessibility features. The Metro Assistance project seeks to bridge this gap by leveraging the power of C++ programming language to develop a user-friendly software application. By integrating advanced algorithms, data structures, and user interface design principles, the system aims to revolutionize the way commuters interact with metro networks.

ABSTRACT:

The Metro Assistance project aims to develop a comprehensive software system using C++ to enhance the efficiency, safety, and convenience of metro commuters. This project addresses the challenges faced by metro users in navigating through complex metro networks and ensuring a seamless travel experience. The software incorporates features such as route planning, fare calculation, station information and emergency assistance to cater to diverse commuter needs. By leveraging object-oriented programming principles and data structures, the system provides an intuitive user interface and robust backend functionality.

DATA STRUCTURE AND TECHNOLOGIES USED:

- 1) Graph
- 2) Vector
- 3) File Handling
- 4) Priority queue (Heap)

ALGORITHMS USED:

1. **Kruskal's algorithm:** A method for finding the minimum spanning tree of a graph, can be employed in our project in several ways to optimize route planning and exploration experiences.
2. **Dijkstra's Algorithm:** Employed for finding the shortest path between nodes in a graph, crucial for identifying optimal travel routes.
3. **Prim's Algorithm:** Used to construct minimum spanning trees, facilitating efficient exploration of all city landmark
4. **Havell Hakimi :** It is crucial to ascertain whether a degree order can result in a simple graph, or a graph without parallel or self-looping edges.(it is an external feature which will be covered under future scope)

HERE ARE SOME KEY FEATURES OF OUR PROJECT:-

1. Providing All Paths From One Source To Destination
2. Providing Shortest Path From Source To Destination
3. Providing A Way If User Wants To Visit All The Places In Map
4. Providing Transport Guidance To The User

CONCLUSION:

The Metro Assistance project represents a significant step forward in enhancing the efficiency, safety, and convenience of metro commuting for passengers around the world. Through the development of a comprehensive software solution using C++, we have addressed key challenges faced by metro users and introduced innovative features to streamline the travel experience.

The Metro Assistance project represents a good way of the power of technology to transform urban mobility and enhance the quality of life for millions of metro commuters. As we continue to innovate and refine the system, we remain committed to delivering exceptional value to passengers and contributing to the advancement of public transportation infrastructure.