Team Lead:

- **Muskan Ahmed – 23i-4145**

Team Members:

- **Anaya Noor – 23i-5521**
- **Hamza Tahir – 23i-5519**
- **Ahsan Shah – 23i-5010**

Fast Explorer Final Project

Our C++ project, inspired by platforms like Google Maps and Baidu, features the Map of Pakistan where, upon the user's selection of source city and destination city, the distance between them is calculated by making use of Dijkstra's Algorithm. The project is divided into four main modules:

1. **Data Compilation and Dijkstra's Algorithm (Muskan):**
   Gathering and compiling data for 85 cities in Pakistan, including geographical coordinates, and road connections, is essential for our project. Additionally, this module implements Dijkstra's Algorithm for efficient pathfinding by managing visited and unvisited sets of nodes.

2. **Linked List and Feature Augmentation (Anaya):**
   A singly linked list will be used to store the shortest path of a certain vertex (node) with respect to source vertex. Furthermore, certain features such as calculating travel costs based on distance travelled will also be implemented.

3. **Graph and Quicksort Algorithm (Hamza):**
   The use of undirected weighted graph will provide structure for data storing where each edge represents a two-way road, and the weight, the distance between the two cities. All cities will be stored as vertices of the graph, and their neighboring cities, as the ones adjacent to them.

4. **Min Heap Tree (Ahsan):**
   The minimum heap binary tree prioritizes which city to explore next based on the smallest tentative distance (the next closest city) at each step of the algorithm making it efficient, therefore, ensuring effective data retrieval.

Overall, our project is essentially about using appropriate OOP principles, alongside Data Structures and Algorithms to solve daily life problems. In our case, we make use of them to create a shortest path finder between any two cities in Pakistan, by focusing on optimizing both auxiliary space and time complexity.

Thank you! :)