CADT IDT វិទ្យាស្ថានបច្ចេកវិទ្យាឌីជីថល Institute of Digital Technology

Airline Route Planner Using Graph Data Structure

I. Introduction

Our project is called Airline Route Planner Using Graphs. The main idea is to show how we can use a graph data structure to model real flight connections between airports. In real life, not every airport has a direct flight to another, so we need a smart way to find the shortest and most efficient route.
Graphs help us represent airports as points and flights as connections so we can calculate the best path.

II. Objective

In this project, we build a graph where:

- Each airport is a vertex,
- Each flight is an undirected, weighted edge,
- The weight is the flight distance.

We then apply Dijkstra's algorithm to find the shortest travel path between two airports. We also show the graph design, adjacency list, adjacency matrix, and an example route. Also, we implement deep first search and breadth-first search to find possible path and stop points respectively. This project helps us understand how graphs work in the real world, especially in planning airline routes and optimizing travel.

III. Task Division

1.Yan Sokmeng- Introduction & Overview

I am responsible for introducing the project and explaining the real-world problem of airline route planning, showing how airports and flight connections create routing challenges and why finding the shortest path is important. This is a scenario that shows how graphs affect real life.

2. Yun Eychhean

I will explain why the airline routing problem is best modeled using graphs. I clarify the roles of nodes, edges, weights, and direction in representing real flights between airports.

3. Seng Dina-Graph Design

In my part, I will do a presentation about our project graph-based model, in this project we use airport as a node, distance between airport to airport as edge. As we all know, graph projects always include graph type, so in our project we use Directed & Weighted Graph, because flight directed when they leave their source and go to their destination. And come back from their destination to their source again. Also, our project represents a Weighted Graph because each source and destination have a distance.

4. Chay Senghap

I described the algorithms applied in the project, including Dijkstra, BFS, and DFS. I explained why Dijkstra is suitable for finding the shortest path in weighted graphs and how BFS/DFS help check reachability (minimum stop) and connectivity (possible path). My explanation connects the algorithms directly to solving the airline route problem.

5. Ly Srongchhay

I show the user input and expect the output of our project. We give 6 options or choices that they can choose to see all available airports, direct routes, shortest path between two airports, minimum stop and they can input to see possible path between two airports in our project. I also help research the on the Dijkstra, DFS and BFS algorithms which we use these algorithms to search for the shortest path on each route.

6. Roth Sorayuth

I will cover the project's limitations and final conclusions. In my opinion, I will highlight the strengths and consequences of using graphs for airline routing. Before the end, I will reflect on what our team has done to complete this project with a successful result. My ending section will provide a clear and meaningful closure to the project.

IV. Conclusion

In this project, we learned how graphs can be used to solve real-world problems, especially in airline route planning. We can implement a graph with a real airline route by calculating the shortest path, possible route, and stopping point. By completing this project, we clearly understand the concept of graphs, and mainly, we can use graphs to implement real-world scenarios.