**UCS308--Data Structures Lab : Mini Project**

AIM:

To create and implement an application to generate a “DOMESTIC FLIGHT ITINERARAY PLANNER”

using data structures and related algorithms.

DATA STRUCURES AND ALGORITHMS USED:

Data Structure:

* The database is a map which is implemented using a GRAPH ADT. This is stored using Adjacency matrices.

Directed, Weighted Graph; Each node is a particular destination; Each edge is a connecting flight between two destinations; Each edge is designed to have two weights: the travel time, the cost of the flight.

Algorithm:

* DIJKSTRA’S ALGORITHM is used to determine the desired path.
* The options provided are:
  1. Least cost
  2. Least time
  3. Economy
  4. Min. no. of flights: Unweighted shortest path
* For options 1 & 2 we use the respective adjacency matrices containing details of flight cost and time respectively.
* For option 3, a combined adjacency matrix is used.
* For option 4, Unweighted shortest path algorithm is used.

FUNCTION PROTOTYPES:

* ADMIN MODULE: (admin.h)
  + 1. void addcity(): Add a city to the database with all the flight details.
    2. void changetime(): Change the time of an already existing flight.
    3. void changecost(): Change the cost of an already existing flight.
* USER MODULE: (GraphADT.h & dijkstra.h)

1. void matrix(): Retrieves the required adjacency matrix from the file.
2. dijkstra\_shortest\_time(): Finds the shortest time route between source and destination.
3. dijkstra\_shortest\_cost(): Finds the shortest cost route between source and destination.
4. dijkstra\_shortest\_flight (): Finds the route with min. no. of flights between source and destination.
5. dijkstra\_shortest\_economy (): Finds the route which has combined best time and cost between source and destination.

LEARNING EXPERIENCE:

* We learnt to implement header files and thus abstract data types in C.
* We learnt to implement graph ADT using adjacency matrix.
* We learnt modular problem solving and programming.
* We learnt to implement the Dijkstra’s shortest path Algorithm.
* We learnt to address real-life scenario programming problems.
* We learnt to maintain and manipulate data using files in C.

RESULT:

Thus, an application to generate “DOMESTIC FLIGHT ITINERARAY PLANNER” was implemented using data structures and related algorithms.

* To execute: compile and run “runme.c” file.