ALGORITHMS AND PROBLEM SOLVING PROJECT

ROAD TRANSPORT

Submitted By:

Tanishq Sharma (20103214)

Kunwar Ubaid Zafar Khan (20103217)

Lakshaya Arora (20103218)

Yash Jauhari (20103219)

Submitted To:

Dr. Vivek Kumar Singh

Dr. Shikha Jain

ACKNOWLEDGEMENT

We give our deepest appreciation to our esteemed guide, Dr. Vivek Kumar Singh and Dr. Shikha Jain for providing us with the possibility to complete this project with the right guidance and advice.

We would also like give gratitude for allowing us to use the facilities available and also help us to coordinate my project Furthermore.

We would also like to acknowledge with much appreciation the crucial role of faculty members on this occasion.

Last but not least, we would like to thank group members who help us to assemble the parts and gave a suggestion about the project.

ROAD TRANSPORT

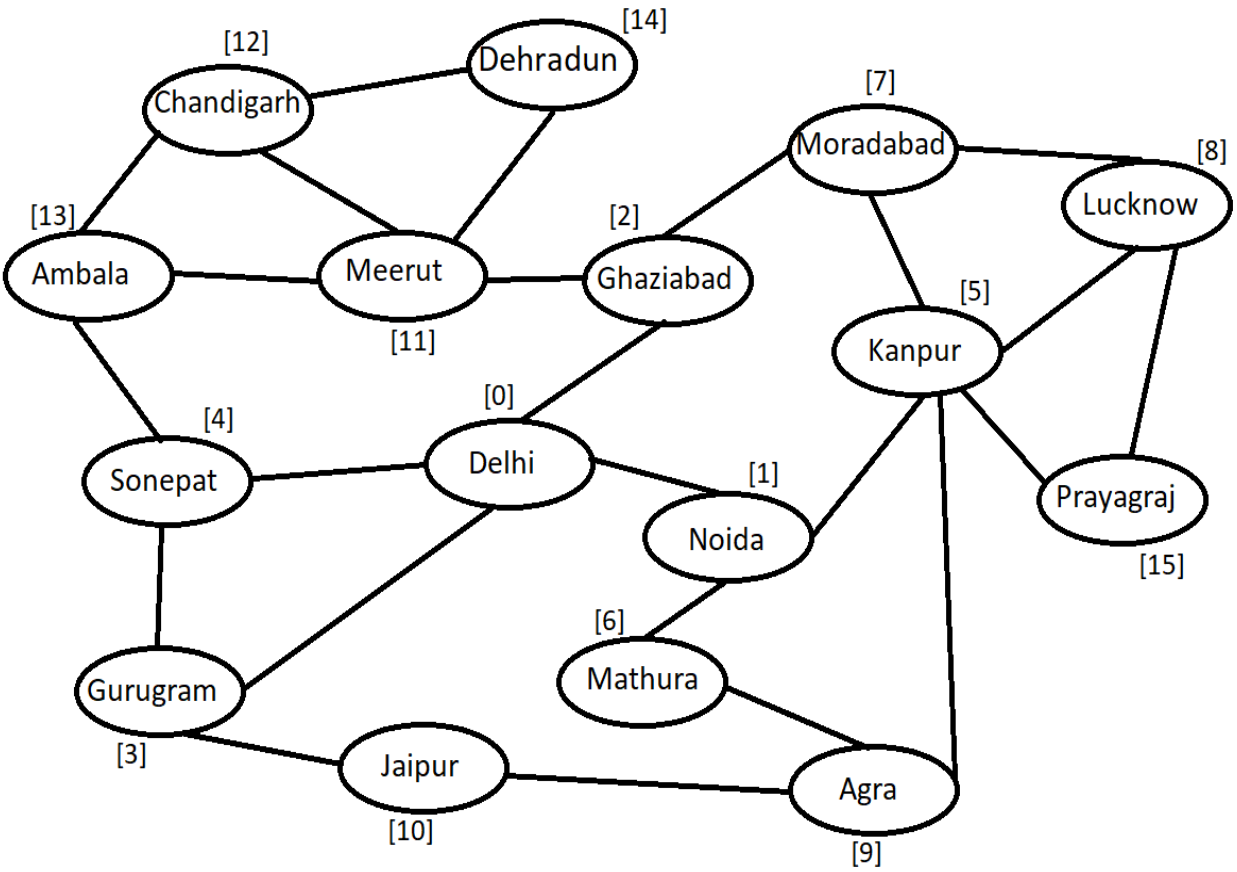
In our aspiring project, we are aiming to make an interesting and gripping project “ROAD TRANSPORT”.
This project aims to find the best suitable bus route for the user.

There are multiple cities connected to each other. Some are directly connected; some are connected via intermediate cities. Buses are a mode of transport between the cities. We will be storing the fares of the buses and the starting time and reaching time. Between any pair of cities there may be multiple buses running and they have different fares and starting time.
Buses run between the cities at a specific time and it can travel to the destination either directly or via other cities. But the cost of travel between the cities will be different. Here the user would be given two choices:

1) whether he wants to reach the destination in minimum time or

2) whether he wants to reach the destination in minimum cost. The user can either select the buses which will take him to the destination within the shortest period of time or he can select the buses whose cost (bus fare) is minimum.

GRAPH OF THE CITIES

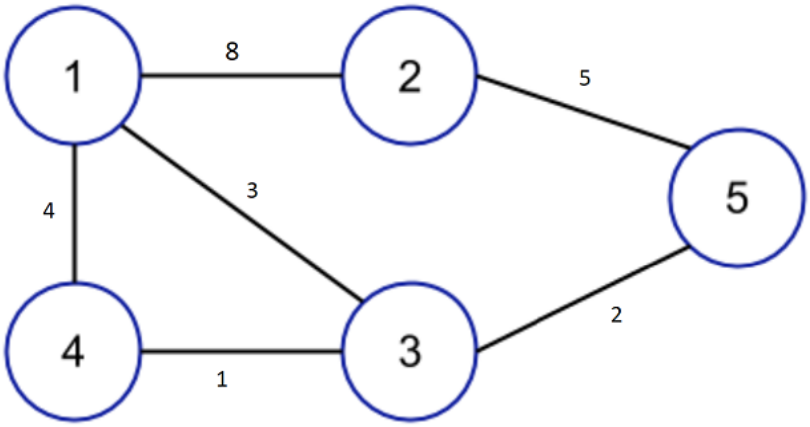


THEORY USED

The concept of Graphs, DFS & Backtracking have been used to implement the project. Here we will be considering an undirected graph because if a bus runs from A to B then there will be bus that runs from B to A. DFS and backtracking has been used to find all the paths that are possible from source to destination.

Here, for each path we will find what buses are running and then select those buses that have the minimum cost. Similarly, we will find the bus that reaches destination in minimum time. After considering all the paths we find the best possible route.

For Example:



If the user wants to go from city 1 to city 3

The possible paths are 1->3,1->4->3,1->2->5->3.

For path 1->2->5->3

We will first check what buses are running from 1 to 2 and select the best one, then similarly we check for the path from 2

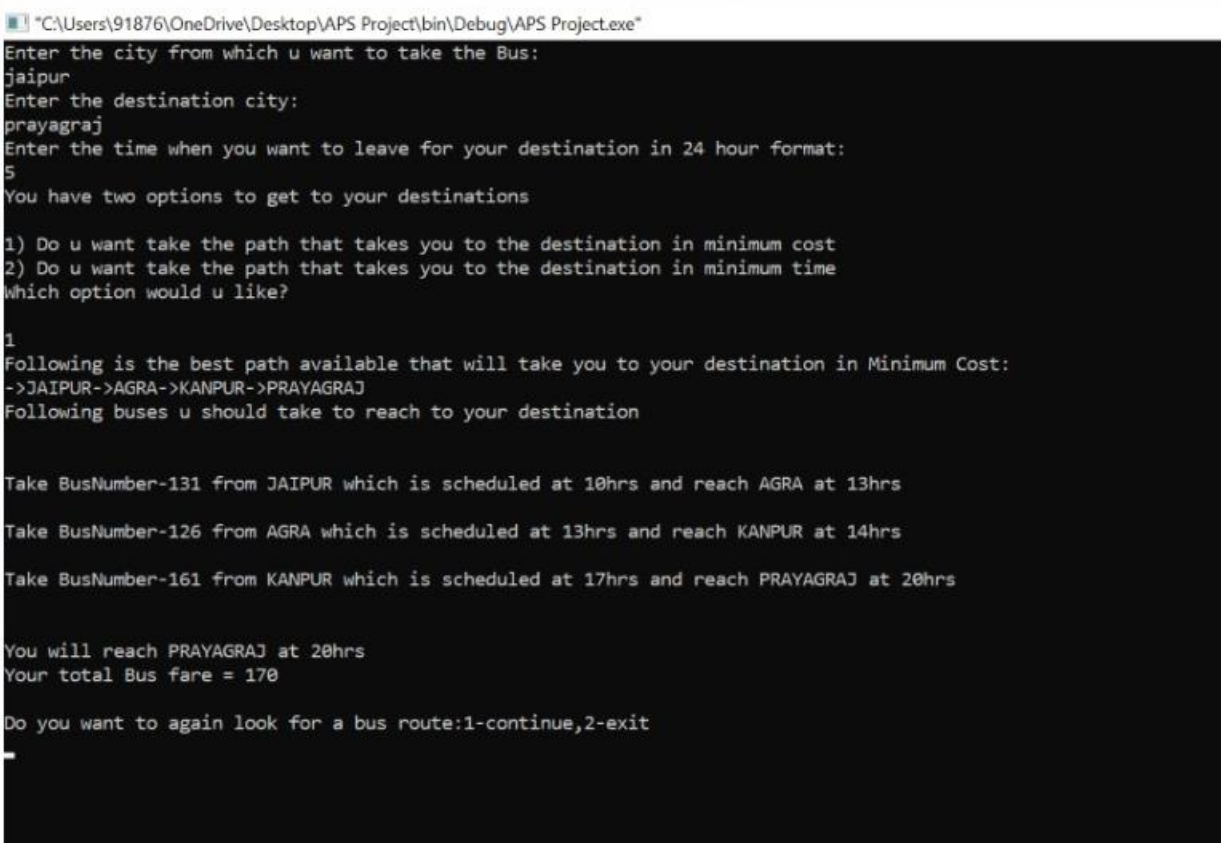
to 5 and finally for the path from 5 to 3. Add the costs for each path and compare it with the other paths found from city 1 to city 3.

DETAILED DESCRIPTION

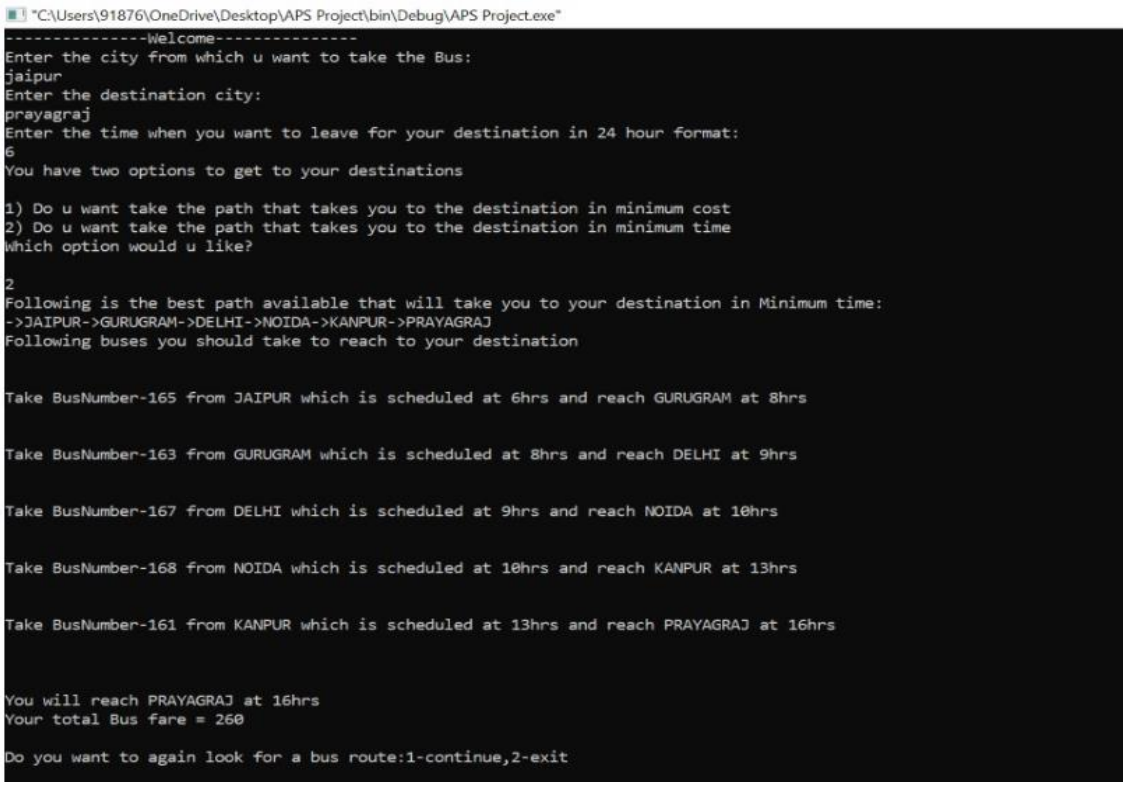
Firstly, a graph is created having cities as nodes and edge between them as a path. It is not necessary that all the cities are connected to each other directly or indirectly. To reach to destination city various paths may be available. Class node holds the details of the buses which travels from one city to another. Details such as Bus no, cost, start time and end time has been stored. Class travel holds the details of the various functions that have been used to implement the project. Function findAllpaths has been implemented using DFS, which stores the paths from the starting city to the destination city. Functions MinCostUtil and MinCostTime have been used to find out the minimum cost and minimum time required to reach the destination. There can be a case in which the user wants to leave the station at a time when no further buses travel then in that case user has to either wait or they can exit the bus station. There can also be a case in which the there are two possible paths which have the same cost but the time of travel may be different, thus it depends upon the user requirement that which path should be taken in order to reach the destination. Function printMinCost and printMinTime have been used to print minimum cost and minimum time.

SCREEN SHOTS

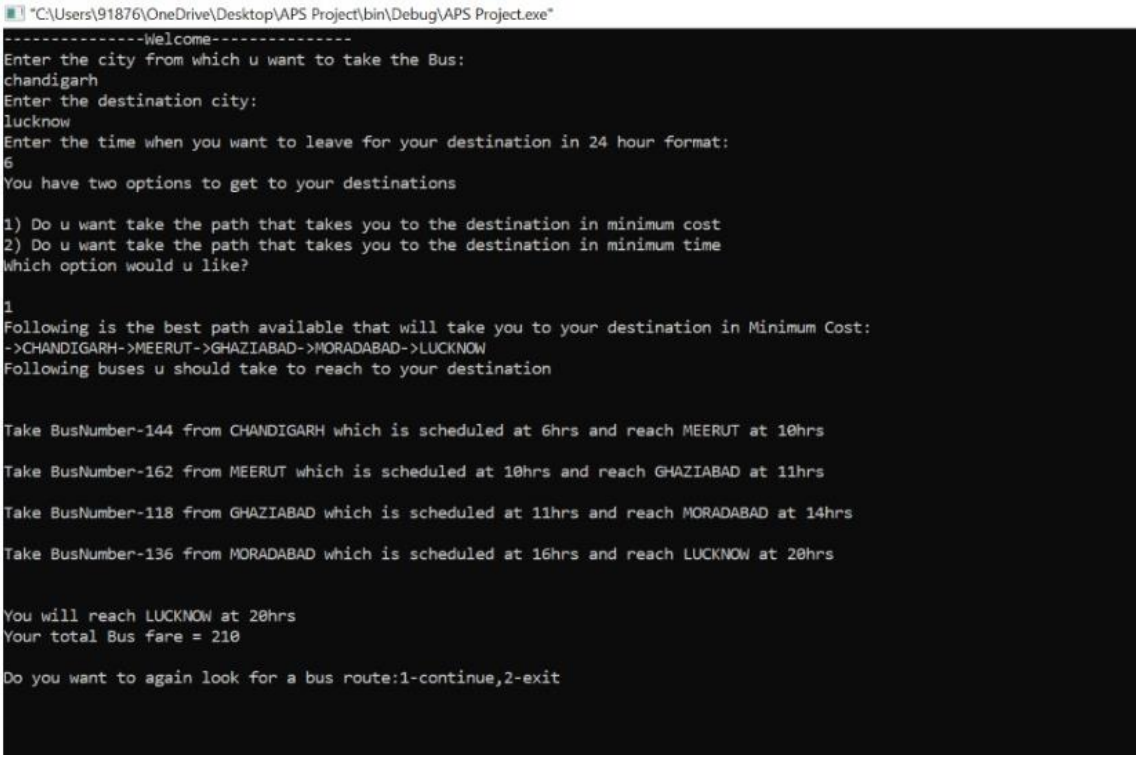
1.User wants to travel from Jaipur to Prayagraj sand wants to reach in minimum cost:



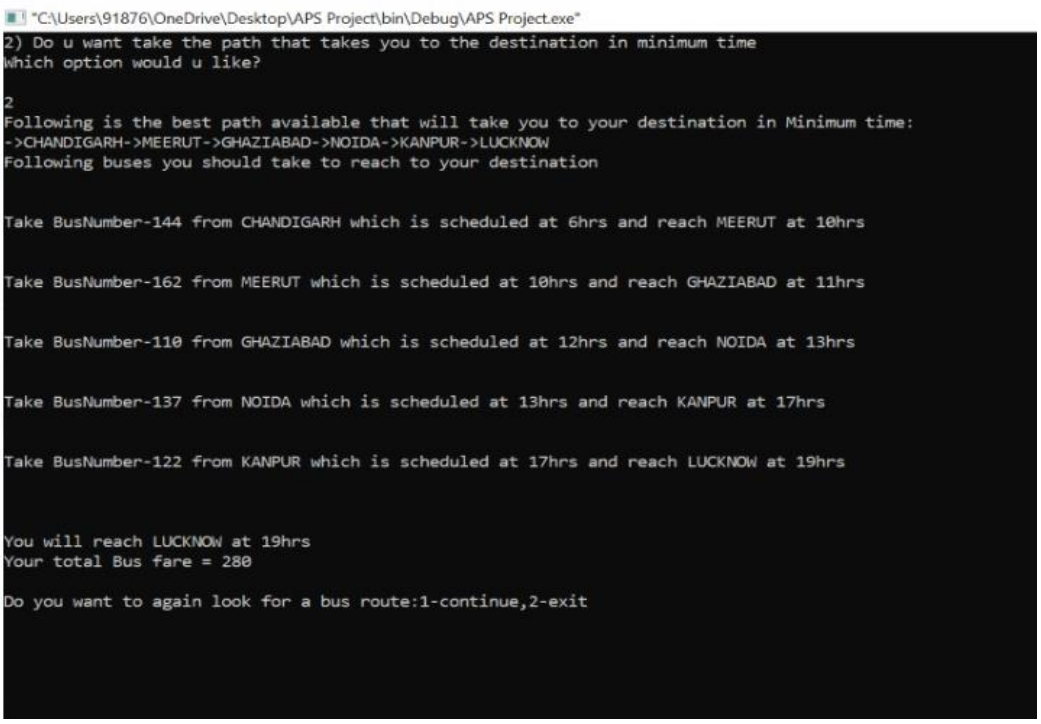
2. User wants to travel from Jaipur to Prayagraj sand wants to reach in minimum time:



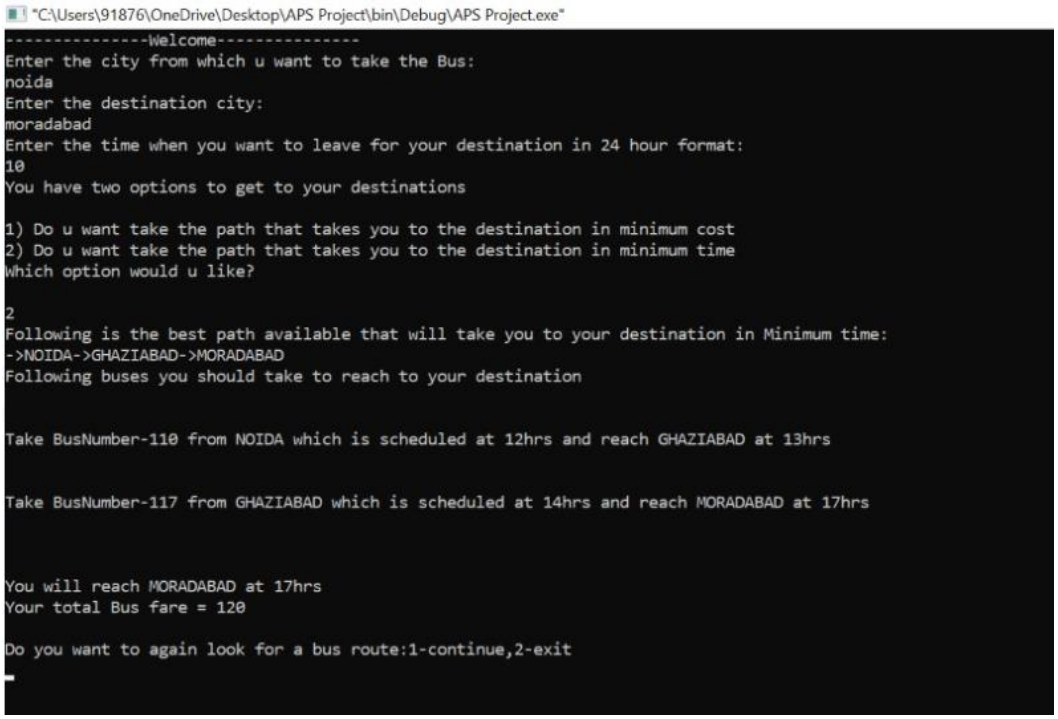
3. User wants to travel from Chandigarh to Lucknow and wants to reach in minimum cost:



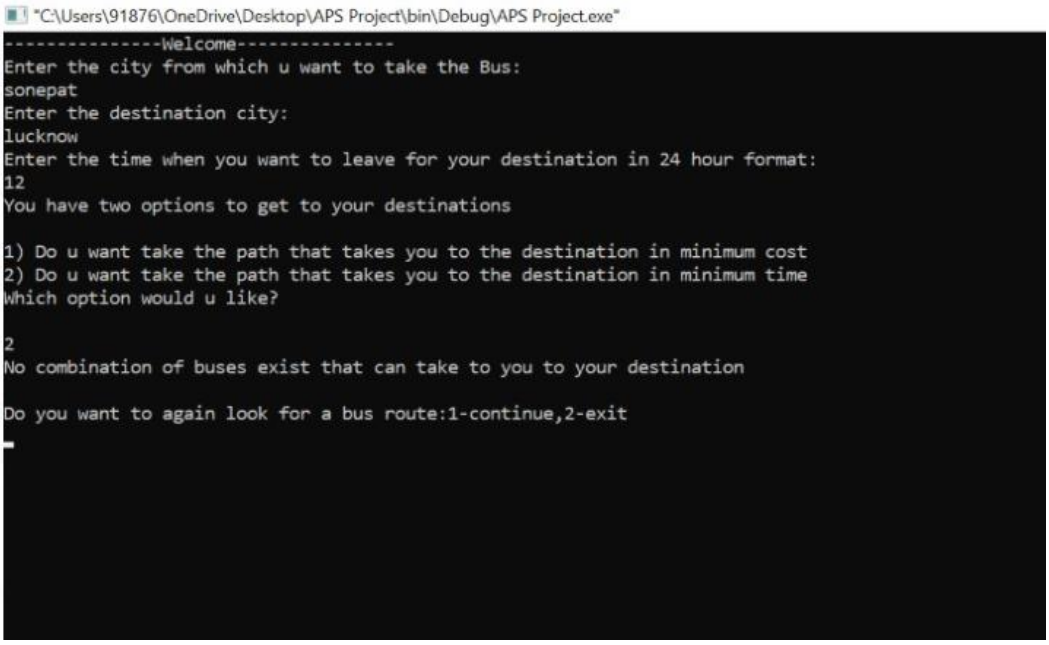
4.User wants to travel from Chandigarh to Lucknow and wants to reach in minimum time:



5.User wants to travel from Noida to Moradabad in minimum time:



6.User wants to travel from Sonepat to Lucknow but no buses available:



THANKYOU!

GROUP MEMBERS-

TANISHQ SHARMA (20103214)

KUNWAR UBAID ZAFAR KHAN (20103217)

LAKSHAYA ARORA (20103218)

YASH JAUHARI (20103219)