CSL 201 Data Structures
Lab 7 Due on Novermber 13, 11.55pm

Instructions

- You are to use Java as the programming language. Use Eclipse as the IDE.

- You can work in pairs for this lab.

- You are not allowed to share code with your classmates nor allowed to use code from the internet. You are encouraged engage in high level discussions with your classmates; however ensure to include their names in the report. If you refer to any source on the Internet, include the corresponding citation in the report. If we find that you have copied code from your classmate or from the Internet, you will get a straight F grade in the course.

- The submission must be a zip file with the following naming convention - rollnumber1-rollnumber2.zip. The Java files should be contained in a folder named after the question number. Only one person from the team needs to upload the file.

- Include appropriate comments to document the code. Include a `read me` file containing the instructions on for executing the code. The code should run on institute linux machines.

- Upload your submission to moodle by the due date and time. Do not email the submission to the instructor or the TA.

This lab will improve your understanding of data structures for representing graphs and operations on graphs..

1 Flight Trip Planner(25 points)

Given a set of flights between various cities, your goal is to build a simple trip planner. The input to the program is a set of flights between various cities. Each flight is associated with a unique flight number, departure city, arrival city, departure time and arrival time. All time information are specified in 24 hours format such as 1135, 0325, 2210 etc. There can be multiple flights between two cities (at different times). Given two cities A and B and times T1 and T2, your program must provide the shortest flight plan between the two cities such that the departure at city A is after time T1 and the arrival in city B is before time T2. Further the layover in an intermediate city should be at least 30 minutes. We will also make the assumption that the the entire trip is completed in a single day (between 0000 and 2359 hours).

Input Format
Your program must read a file name as command argument. The file lists the flight information between different cities and the queries to be solved by your program. The first line of the file will indicate the number of cities. This is followed by the number of flights between the different cities. The flight information is provided one per line in the following format
`flight_no dep_city arr_city dep_time arr_time` . For simplicity assume that the city names are represented as integers
This is followed by the number of queries that are provided one per line in the following format. -
`dep_city arr_city dep_time arr_time` .
For example
9
18
121 1 2 0200 0400

334 1 4 0100 0200
322 4 3 0300 0500
890 2 7 0500 0700
899 7 5 0800 1000
500 3 6 0700 0900
398 6 5 1000 1300
756 5 4 1400 1500
732 1 6 0700 0900
324 4 3 1600 1800
567 6 7 0915 1100
456 5 7 1400 1600
987 1 8 0300 0400
998 1 9 0400 0600
500 5 8 0200 0600
409 7 9 0300 0700
676 2 8 2000 2100
678 8 3 2145 2245
3
1 3 0000 0600
6 4 0930 1530
2 4 0200 1000

Output Format

The output should be the total travel time (including the layover time) for each query (one per line). If a flight plan is not available, the program should output -1. For example, for the queries provided as input the output should be

5
5
-1

Please stick to this format for input and output. Any deviation from this format could result in reduction of points.

2 Documentation of Code (5 points)

Documentation of code will fetch 5 points.