Birla Institute of Technology & Science, Pilani
Data Structures & Algorithms (CS F211)
Lab Makeup Exam
(Closed Book)

DSA Lab Exam **Time: 3 Hours** **Total Marks: 40**

Exam Problem Specific Instructions:

- There are four problems to solve: P1, P2, and P3. The problems are arranged in increasing order of difficulty. Weightage of each problem is approximately proportional to its difficulty level (P1 = 10, P2 =10, and P3=20).
- Please complete your program for solving one problem, and then proceed to solve other problems. You will get marks only when your program gives correct output. You will not get any marks if your program is incomplete or it gives incorrect output.
- This is a closed book exam. You cannot use any notes or books (either softcopy or hard copy).Internet and network access will be disabled. You will not get any sheet for rough work. You can do rough work in text file on the computer.

Warnings (Possible Reasons for Cancellation of Lab Exam):

- Possession of any previously written code (irrespective of size, relevance, ownership, medium)
- Possession of any removable media or mobile.
- Attempt to access any machine other than allotted local machine and the Online Judge Server.

Problem 2

Solving the all pair shortest path problem.

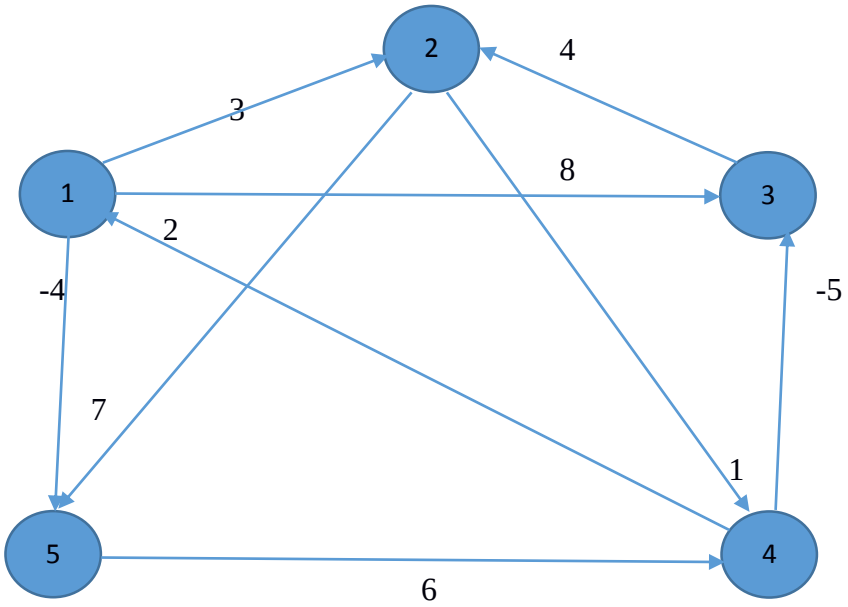
Input Format:

You will be given an adjacency list representation of a weighted directed graph which can have negative edge weights, but it will not have any negative weight cycle in the following format:

The first line of the input will specify the number of vertices in the graph. From second line onwards adjacency list representation of the weighted directed graph will be given in the sorted order of vertices together with edge weights in sorted order in the following format:

1 Number of adjacent Adjacent vertex1 weight if the edge from 1 to Adjacent vertex1…….

Vertex will be numbered in sequential order starting from 1,



Example weighted directed graph G2

Sample Input (For G2):

5
1 3 2 3 3 8 5 -4
2 2 4 1 5 7
3 1 2 4
4 2 1 2 3 -5
5 1 4 6

Output Format:
Output the distance matrix showing shortest distance between vertices one row of the matrix per line of output so that the matrix entries are separated by blank space. Take INFINITY as 10000. If there is no path between two vertices, then in the matrix, the corresponding entry will have INFINITY (=10000).

Sample Output (for G2):

0 1 -3 2 -4

3 0 -4 1 -1

7 4 0 5 3

2 -1 -5 0 -2

8 5 1 6 0