CS-263: Design and Analysis of Algorithms Laboratory
CS-661: Advanced Algorithms Laboratory

LAB Assignment IV

Course Instructor: Dr. Dibyendu Roy Due: Dec 18, 2023, 11:59 pm

Instructions: Code must be written in C language and it must be well commented. Write name and roll number on the top of your code. Submission of code in any other file extension (.pdf, .docx etc) will not be accepted. The file name of your code will be YOUR ROLL-NO.c

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Write a C code for solving the following problem.

1. Your code will take a positive integer n as input which is the number of vertices of a connected graph G.
2. Your code will ask for adjacent vertices of every vertex one by one. Here vertex indices are from 0 to $n-1$.
3. Based on your adjacency list it will take the weight of every edge as input in a matrix of size $n \times n$. If a_{ij} is the element of the matrix then it corresponds to the directed edge (i, j).
4. If there is no edge between any two vertices then weight will be character 'N'.
5. Based on these inputs the code will ask for a source vertex S as input (it will be an integer from 0 to $n-1$).
6. Your code will display distances from source vertex S to every other vertices.
7. Your code will display shortest path from S to other vertices. If there is an edge between a to b it will print '$a \rightarrow b$'.
8. For finding the shortest path, you need to use the Dijkstra's algorithm.
9. Finally find the Minimum spanning tree of G using Prim's algorithm. If there is an edge between a to b it will print '$a \rightarrow b$'.