S.Y. B. Tech. Academic Year 2022-23 Semester: IV

Advanced Data Structures

LABORATORY WRITE UP

Experiment Number: 05

TITLE: Minimum Cost Spanning Tree using Prim's Algorithm

PROBLEM STATEMENT:
A business house has several offices in different countries; they want to lease phone lines to connect them with each other and the phone company charges different rent to connect different pairs of cities. Business house wants to connect all its offices with a minimum total cost. Solve the problem using Prim's algorithm.

OBJECTIVE:

1. To study data structure Graph and its representation using Matrix
2. To study and implement algorithm for minimum cost spanning tree
3. To study and implement Prim's Algorithm for minimum cost spanning tree
4. To study how graph can be used to model real world problems

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THEORY: ***//To be Written by Students***

// Write theory by elaborating below points

Write in brief about

- What is Spanning tree. Explain with example.
- Example of weighted graph and its cost adjacency matrix (with diagrams)
- Explanation of Prim's algorithm using the above example graph

IMPLEMENTATION:

- **PLATFORM:**
    - 64-bit Open source Linux or its derivatives.
    - Open Source C++ Programming tool like g++/Eclipse Editor.

- **TEST CONDITIONS:-**

1. Input at least 5 nodes.
2. Display Minimum cost spanning tree and Minimum cost for the graph.

- **PSEUDO CODE:** ***//To be Written by Students***

  Write pseudo code for accept cost adjacency matrix ,display cost adjacency matrix and Prim's Algorithm .

- **TIME COMPLEXITY:** ***//To be Written by Students***

  Find out time complexity of Prim's Algorithm

- **CONCLUSION:**

  Thus, we have represented graph using cost adjacency matrix and implemented Prim's algorithm for MCST.

- **FAQs** ***//To be Written by Students***

  1. Explain two applications of minimum cost spanning tree.
  2. Explain the difference between Prim's and Kruskal's Algorithm for finding minimum cost spanning tree with a small example graph.
  3. Which algorithmic strategy is used in Prim's algorithm. Explain that algorithmic strategy in brief.

- **PRACTICE ASSIGNMENTS**

  1. Write a program to find Minimum cost spanning tree using Kruskal's algorithm.