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6CSE 3

MST FINDER (PRIM'S & KRUSKAL'S) - PROJECT DOCUMENTATION

This project implements a Graph GUI-based application that visualizes and allows the user to apply Prim's and Kruskal's algorithms for finding the Minimum Spanning Tree (MST) of a graph.

It is built using Python's tkinter, networkx, and matplotlib libraries.

The user can add edges between vertices, input the weights of edges,

and execute both Prim's and Kruskal's algorithms to find the MST.

The graph is dynamically displayed, and the results of the algorithms are shown in the output section.

Installation Instructions

1. Install Python 3.x on your system.
2. Install the required libraries using pip:

    pip install networkx matplotlib tkinter

3. Run the Python file that contains the above code.

Features of the Application

- The user can add edges with weights between vertices.
- Supports both Prim's and Kruskal's algorithms to find the MST.
- A graphical representation of the graph is shown using matplotlib and networkx.
- Displays results of the algorithms including the MST weight and edges.
- Option to clear the graph and input fields.

Graphical User Interface (GUI) Details

The GUI consists of several sections:

1. **Input Section**: Allows users to input edges and their weights.

2. **Algorithm Buttons**: Buttons for running Prim's and Kruskal's algorithms.

3. **Output Section**: Displays the results of the algorithms.

4. **Graph Visualization**: Shows a graphical representation of the graph.

5. **Clear Graph**: Clears all input fields and resets the graph.

The background color is set to Fuchsia (#D8125B), with dark grey (#2C2E39) for buttons and labels.

The text and UI elements are designed to be user-friendly and easy to interact with.

Conclusion

This project demonstrates the use of two well-known algorithms for finding the Minimum

Spanning Tree (MST)

in a graph: Prim's and Kruskal's algorithms. It provides a GUI where users can interact

with the graph

and observe the results in real-time. The application is designed for beginners to learn about graphs

and MST algorithms in an intuitive way.

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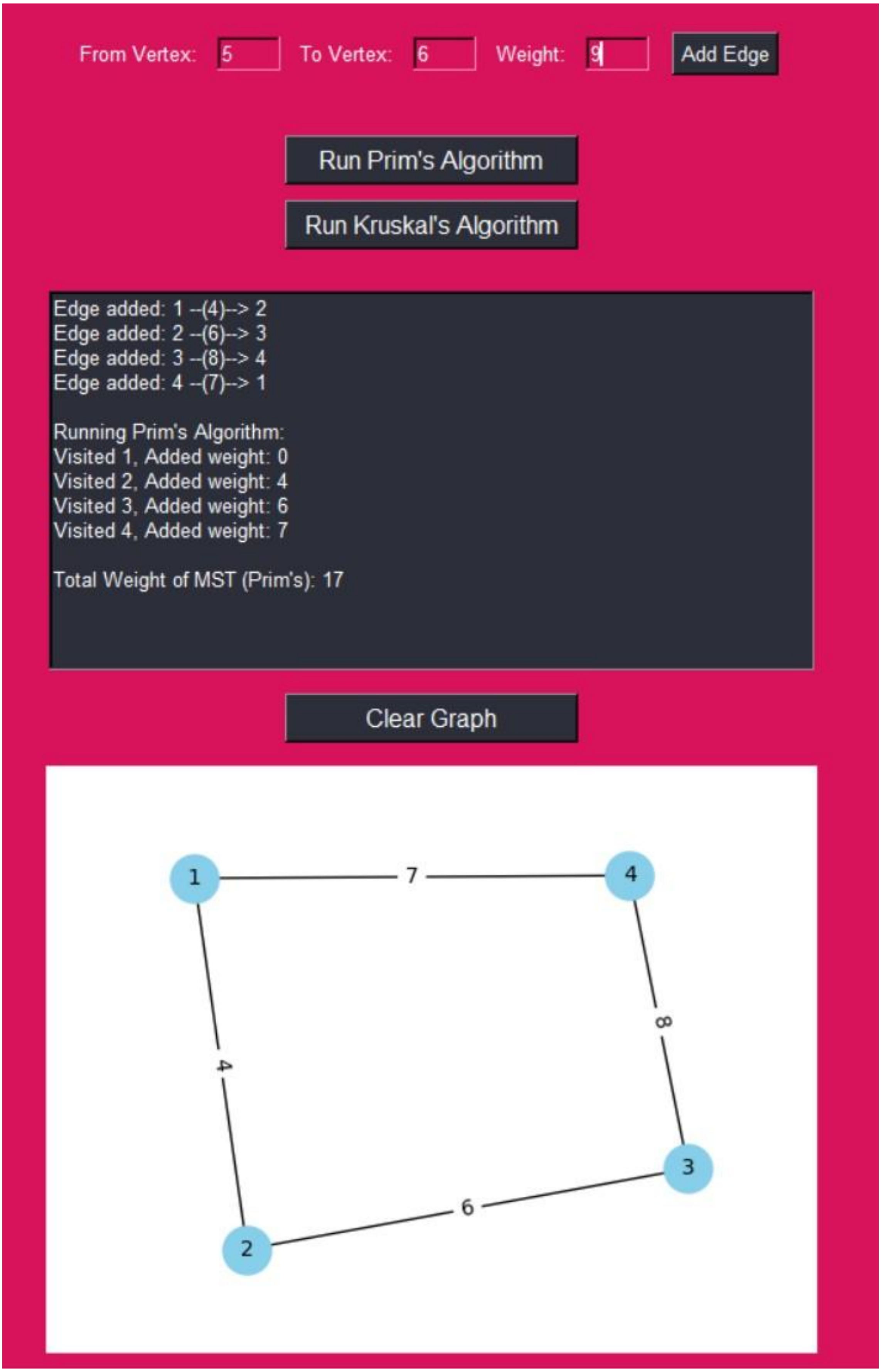

```
Edge added: 1 --(4)--> 2
Edge added: 2 --(6)--> 3
Edge added: 3 --(8)--> 4
Edge added: 4 --(7)--> 1

Running Prim's Algorithm:
Visited 1, Added weight: 0
Visited 2, Added weight: 4
Visited 3, Added weight: 6
Visited 4, Added weight: 7

Total Weight of MST (Prim's): 17
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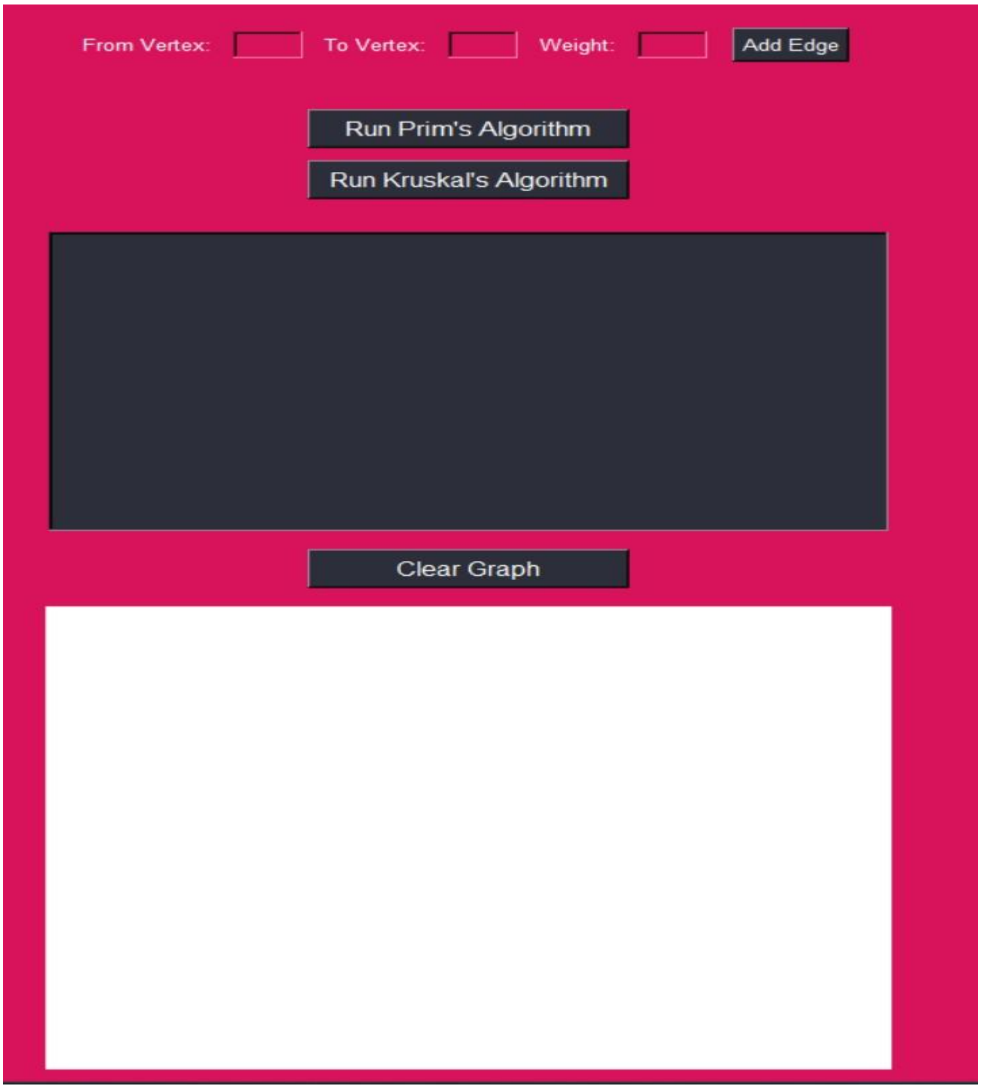

This are The screen shot from the project

- As you can see the implimentation , you are abele to add the node and vertex and also be able to see a visual representation of graph
- When u press clear graph you can delete everything and add next nodes
- You can edit nodesd from the black box given bellow
- And finally you can see the MST for the path provided by the user

Application Features and Design