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Introduction to Algorithms

CS430

Fall 2017

Project:

Introduction:

- Using two algorithms to find the Minimum Spanning Tree:
  - **Kruskal's using Union Find**
  - **Prim's using Heaps**

Execution:

- Go to "cmd" and go to the directory where the .jar file is placed.
- Run the command: **java -jar AnimeshMST.jar**
- Then it would ask for the "File Path:"
- Enter the path where "graph.in" or the input file is placed and then enter.
- The output will be displayed on Command Prompt as well as the .out files.

Methodology Used:

Kruskal's Algorithm:

- Graph G should be Connected and weighted otherwise an error will be thrown.
- Implemented it using the Union Find Data Structure
- Used Bubble Sort Algorithm to sort instead of the comparators function.
- Even implemented Merge Sort but then finally went on to do it with Bubble Sort Algorithm
- Please read the comments in the source code for better understanding.
- The output of the code would be displayed on both Command Prompt and Kruskal's.Out
- Time Complexity of Kruskal's is: O(E log V)

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Prim's Algorithm:

- Graph G should be connected and weighted otherwise an error will be thrown.
- The order of output in Prim's and Kruskal's might be different.
- The time complexity of the Prim's Algorithm is: O(E log V).
- Please read the comments in the source code for better understanding.
- The code also checks whether the graph is connected it not.

➢ If the Graph is dense with more then you should go for Prim's Algorithm else choose Kruskal's which perform better for sparse graphs.