

1. What is the worst case algorithmic asymptotic complexity, i.e.,  $O(?)$  of each of the operations that you have implemented? Assume, Graph  $G = (V, E)$ ,  $|V| = n$ ,  $|E| = m$ .

- a. Finding a minimum spanning tree using Kruskal's algorithm.

This has complexity  $O(m \log(n))$ .

- b. Finding a minimum spanning tree using Prim's algorithm.

This also has complexity  $O(m \log(n))$ .

2. Can you find a simple graph example where Kruskal's algorithm and Prim's algorithm both fail? What is the output of your implemented method for such a case? Does it fail to generate the correct MST?

Neither algorithm should ever fail for fully connected graphs. In the case of unconnected graphs, both algorithms will throw an exception that prints "No Solution."