1   Description

We will model Prim's and Kruskal's algorithms for producing a minimum spanning tree of a graph, Dijstra's shortest path algorithm, and show that Dijkstra's breaks with negative edge weights.

2   Reason for choosing

Both of us want to have a more thorough understanding of graph algorithms. We are relatively comfortable with graphs, but we think that modeling the algorithms in a detailed fashion will give us a much more in-depth understanding.

3   Goals

1. **Foundation goal:** Model Prim's and Kruskal's algorithms and show that they always produce a minimum spanning tree. Model Dijktra's and show that it always finds the shortest path.

2. **Target goal:** Answer the question of whether or not Prim's and Kruskal's always produce the *same* minimum spanning tree. Show that Dijstra's breaks with negative edge weights. To achieve this goal, we will use the same reason-instance implication setup that is common in the labs.

3. **Stretch goal:** Model Bellman-Ford algorithm and show that it fixes the issues with Dijkstra's.