

Discrete Optimization

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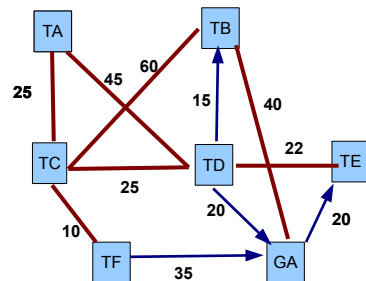
1 Assignment - 4

Due: Tuesday 13 Oct.

A garbage collection truck is contracted to collect garbage from the neighborhood described below. This means that the truck will have to traverse every street. He may traverse some streets more than once. Some streets are one way streets (marked by blue arrows). The numbers on each street are the number of minutes it takes to traverse the street.

The truck starts at the garage (GA) and needs to end there.

Please help the driver design the best way to collect the garbage. Your description should look as follows: $GA \rightarrow TE \rightarrow TD \rightarrow \dots \rightarrow GA$.



Create a weighted graph G with 18 vertices. Use a density 3.

1. If G is a weighted graph and all edges have different weights. Is the MCST unique?
2. Use Kruskal's algorithm to find a MCST in the graph G .
3. Use Prim's algorithm to find a MCST in the graph G . Did you get the same tree?
4. Use Dijkstra's algorithm to find the shortest distance from vertex 5 to all other vertices. Show the final spanning tree.
5. Prove that Prim's algorithm produces a MCST.