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Proj 3 Report
Nearest Neighbor and GreedyTSP

Num of Cities	Country	Nearest N Distance	Nearest N Time(ms)	GreedyTSP Distance	GreedyTSP Time(ms)	Best Known Distance	Solution time
194	Qatar	10982.6	43.5	15321.1	128.1	9352	2.09 secs
734	Ururguay	98358	2073	203001	5554.1	79114	3507secs
980	Luxembourg	14041	4034	16,342	14051	11344	1681.secs
1979	Oman	114932	35238.6	103,023	95600	86891	98029secs

So some of the biggest takeaways I had for this project was how efficient nearest neighbor is as well as how close it gets to the most optimal difference majority of the time. In a situation where you are in a time crunch, I believe nearest neighbor is a good outcome to pick. The only big issue I have seen is that it relies heavily on the starting node which is very essential to how optimal the tour will end up becoming. As well as it doesn't focus on global optimization. While what I noticed for greedyTSP is that it is overall efficient, but it is heavily reliant on the order that edges are considered resulting in its approximation in the way I implemented it to be not as close to the optimal solution as nearest neighbor was. As well as my time efficiency was much slower. The coolest thing I learned about the TSP was how people attempted to code it optimally. As well as how quickly the time required becomes exponential such as for China in which it required 5 full days to find the optimal solution. Which shows how quicky the computing can go from 1000 to 70000. It also illustrates issue of how we are limited in bigger data structures becomes when a problem become exponential to solve it becomes a NP problem. Overall I really enjoyed the project it help teached me a lot about graph algorithms.