

### Nearest Neighbor

Countries	# of cities	Time (ms)	Tour Distance	Optimal Time (sec)	Optimal Tour Distance
Argentina	9,152	81 ms	1.03496e+06	24,301 sec	837,479
Egypt	7,146	50 ms	222,335	36,249 sec	172,386
Greece	9,882	97 ms	391,416	415,948 sec	300,899
Japan	9,847	97 ms	625,032	118,232 sec	491,924

The main goal of the TSP is to find the most efficient and optimal route that visits a set of given cities (or locations) exactly once and returns to the starting city. We are provided the data of the optimal tour length, time, point set for each city for each participating country from the University of Waterloo: <https://www.math.uwaterloo.ca/tsp/world/countries.html>.

The data output from our Nearest Neighbor algorithm has some slight variations compared to the optimal time and tour distance from the University of Waterloo. The tour distance is slightly higher compared to the optimal tour distance. However, the time it takes for the Nearest Neighbor algorithm to complete is substantially lower compared to the optimal time. It takes less than a second to complete while optimal time is on average (from our data table) 148682.5 seconds.

Overall, the data from the Nearest Neighbor algorithm vs the algorithm used in the link above shows how Nearest Neighbor is extremely efficient with the downside that it's a little less accurate while the opposing algorithm can potentially take hours to complete. Furthermore, the Nearest Neighbor algorithm seems to be more efficient if given a smaller dataset. There's a strong correlation between the increasing number of cities and the wider gap from the optimal distance, indicating that the algorithm is less accurate when provided larger datasets.