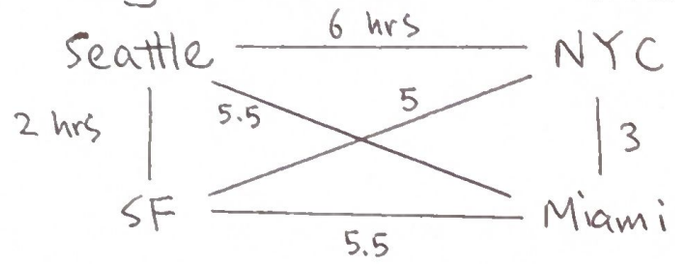
Traveling Salesman Problem (TSP)



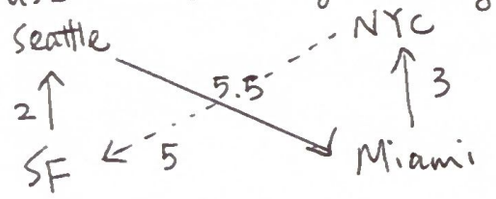
A <u>TSP tour</u> visits each city exactly once & returns home, with minimal total cost ($, distance, or time).

Exact solution is hard, so use approximate, heuristic solution.

<u>Nearest neighbor algorithm</u> Get approximate TSP tour by following cheapest adjacent edge to an unvisited city, then come home.

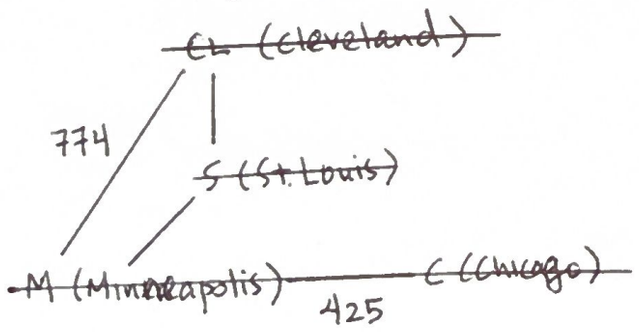
<u>Ex</u> Find appox. TSP tour of above graph starting at SF.

<u>A</u> Use nearest neighbor algo:



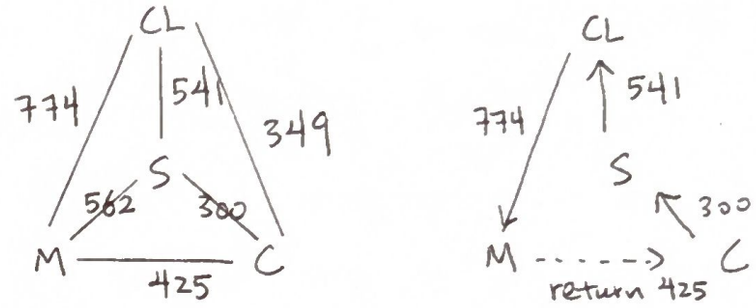
Here total cost is $2 + 5.5 + 3 + 5 = 15.5$ hrs of travel time.

~~<u>Ex</u> Use nearest neighbor algo. on the graph below, starting at Chicago.~~



<u>Ex</u>

Use the nearest neighbor algorithm to ~~obtain~~ find an approx. TSP tour from Chicago (C) to Minneapolis (M), Cleveland (CL), & St. Louis (S).



Total cost: 2040 miles

Notice C → CL → S → M → C has total cost is 1877, so nearest neighbor algo is not optimal in this case.