

Nearest Neighbor algorithm

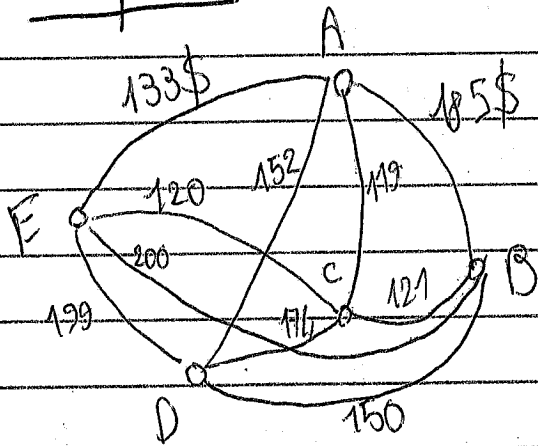
Last time we saw the straightforward method to find optimal Hamilton paths.

	Straightforward alg	Nearest Neighbor algorithm	Optimal path
BAD	<ul style="list-style-type: none"> • Time consuming • Memory consuming 	<ul style="list-style-type: none"> • Quick • Small memory 	x
<u>GOOD</u>	<ul style="list-style-type: none"> • Outcome = optimal path 	<ul style="list-style-type: none"> • Non optimal solution !! 	x
	<ul style="list-style-type: none"> • Impossible to implement on large scale problems 		

How to implement this.

Marka. Go to the nearest neighbor ^{among} the remaining vertices part of the graph which were not visited previously.

Example A



Starting from B

$$B \xrightarrow{121} C \xrightarrow{119} A \xrightarrow{133} E \xrightarrow{199} D$$

$$\text{Total cost: } 121 + 119 + 133 + 199 = 572.$$

Starting from C

$$C \xrightarrow{119} A \xrightarrow{133} E \xrightarrow{199} D \xrightarrow{150} B = 591$$

Starting from D

$$D \xrightarrow{150} B \xrightarrow{121} C \xrightarrow{119} A \xrightarrow{133} E$$

$$\text{Cost} = 529$$

Starting from E

$$E \xrightarrow{120} C \xrightarrow{119} A \xrightarrow{152} D \xrightarrow{150} B$$

$$\text{Cost} = 541$$

Example B More computer friendly.

	A	C	K	M	P	T
A	X	533	798	1068	1361	772
C	533	X	656	713	1071	802
K	798	656	X	447	592	248
M	1068	713	447	X	394	695
P	1361	1071	592	394	X	760
T	772	802	248	695	760	X

Atlanta Columbus Kansas City Minneapolis Pierre Tulsa

Starting from A

A 533 → C 656, K 278, T 695, M 394, P

Repetitive Nearest neighbor algorithm

Do the nearest neighbor alg starting from each vertex.

Cheapest link algorithm

Idea Highlight the cheapest edge

• Avoid circuit and

