

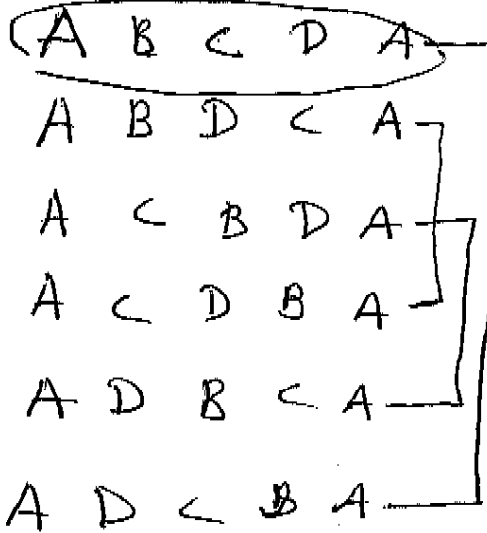
Math 107
Dusty Wilson

Ch. 6 Group Project

Names: KEY

Show any work required to answer each question. As much as is possible, do your work on this sheet.

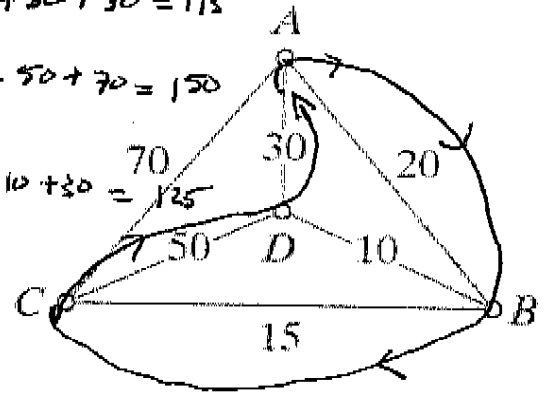
1. For the weighted graph given, find the optimal Hamilton circuit.



$20 + 15 + 50 + 30 = 115$

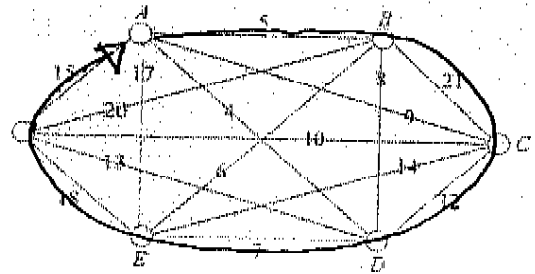
$20 + 10 + 50 + 70 = 150$

$70 + 15 + 10 + 30 = 125$



Optimal circuit A B C D A

2. Consider the given graph.



a.) Is this graph complete? Why or why not?

Yes - every vertex has a direct connection to every other vertex.

b.) How many Hamilton circuits must be checked to find the optimal circuit using brute force?

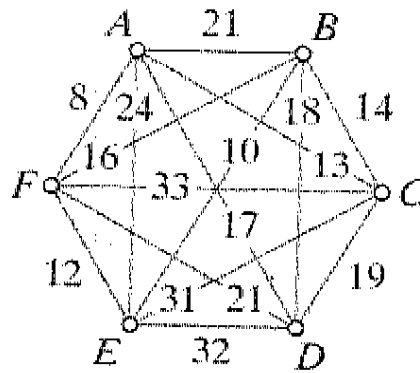
$(6-1)! = 5! = 120 \implies 60$ circuits
(half)

c.) Is there an Euler path or circuit for this graph?

No - all odd vertices.

d.) Clearly trace (with wiggly lines) a Hamiltonian circuit starting at vertex A.

3. Consider the weighted graph below and answer the following questions. Write the circuit assuming that the starting and ending point is B. For each part a, b, and c indicate both the route and its cost.



a) What is the shortest route using the nearest neighbor algorithm? What is the cost?

^{10 12 8 13 19 18}
 B E F A C D B - 80

b) What is the shortest route using the repetitive nearest neighbor algorithm? Show each different route using each vertex (A, B, C, and D) and then write the shortest but start it at D. ~~B D~~ ok

same

^{12 10 14 19 12}
 A F E B C D A - 80

B — see (a.) —

^{13 8 12 10 18 19}
 C A F E B D C - 80

^{17 8 12 14 19 19}
 D A F E B C D - 80

^{10 14 13 12 21 32}
 E B C A F D E - 80

^{8 13 14 10 32 21}
 F A C B E D F - 80

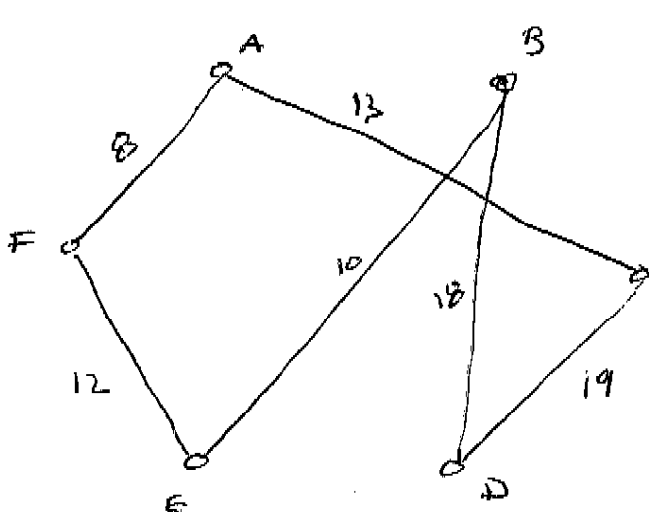
D B E F A C D

OR

D A F E B C D

(or mirror images)

c) What is the shortest route using the cheapest link algorithm? Show the edges as you pick them and then write the route starting at vertex D.



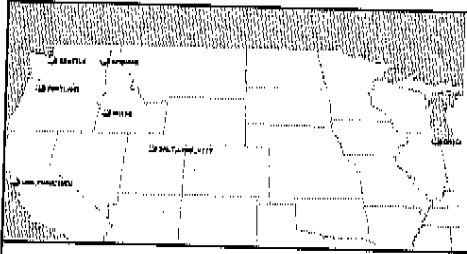
D B E F A C D

OR

D C A F E B D

80

4. You are the manager for a local band here in Seattle. Your band is going on a tour around the northwestern United States to the following 6 cities (besides Seattle): Spokane, WA; Portland, OR; San Francisco, CA; Reno, NV; Salt Lake City, UT; and Boise, ID. You will be driving in one big bus, so you need to keep the mileage down as much as possible.



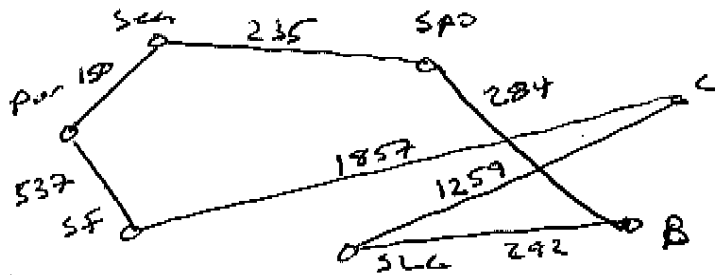
	SEATTLE, WA	SPOKANE, WA	PORTLAND, OR	SAN FRANCISCO, CA	CHICAGO, IL	SALT LAKE CITY, UT	BOISE, ID
Seattle, WA	*	235	150	687	1737	702	411
Spokane, WA	235	*	288	731	1503	543	284
Portland, OR	150	288	*	537	1750	626	341
San Francisco, CA	687	731	537	*	1857	600	522
Chicago, IL	1737	1503	1750	1857	*	1259	1447
Salt Lake City, UT	702	543	626	600	1259	*	292
Boise, ID	411	284	341	522	1447	292	*

a.) Find the nearest-neighbor circuit for your band to travel. What is the total mileage?

150 200 284 292 600 1857 1737
 Sea Port. Spd B SLG SF C Sea

5208 miles.

b.) Find the cheapest-link circuit for your band to travel. What is the total mileage?



Sea Port SF C SLG B
 Spd Sea

4614 mi

c.) Tell your band which route you should take, and justify to them why it is okay to just stick with this solution.

repetitive nearest neighbor is best starting w/ Boise (4512 mi)

I would stick to that as the brute force solution (4498 mi) seems like a pain to find.