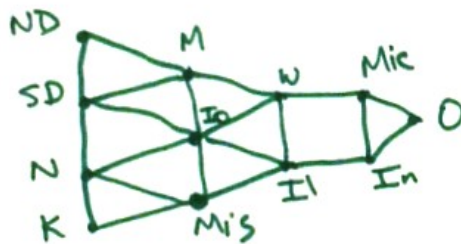


Two pages, 4 problems, 10 points. Show all work. No calculators.

Problem 1 (6 points). Here are the Midwestern states:



(a) Below, draw the adjacency graph for this map. That is, replace each state with a vertex, and connect the vertices if the corresponding states touch (note: Michigan and Illinois don't touch).



(b) Compute the valence for each of the following states.

(i) South Dakota: 4

(ii) Wisconsin: 4

(iii) Illinois: 4

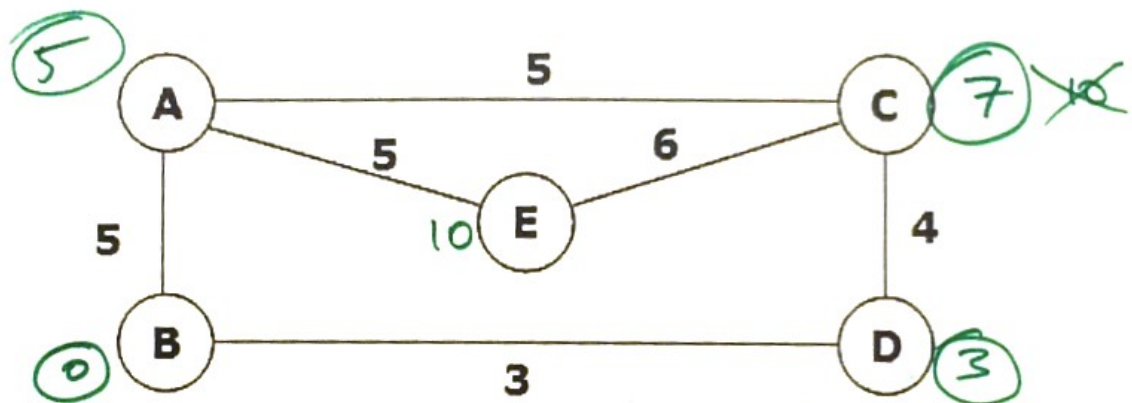
(c) What does "valence" mean here in terms of geography?

of neighboring states in the midwest

(d) Is it possible to start in some state, cross each border exactly once, and return home? If so, draw your path on the map. If not, convince me you're right.

No. Indiana has valence 3, so there is no Euler circle in the graph, so no solution to the problem.

Problem 2 (3 points). Use Dijkstra's algorithm to find the distance from B to C. Make sure to show all work and tell me the answer.



distance B to C is 7.

Problem 3 (1 point). Draw a complete graph with 5 vertices. How many edges does it have?



$$\frac{5 \times 4}{2} = 10 \text{ edges}$$

8.225 mean
9 median

