Worksheet 13 (Graph Theory 5): Eulerization

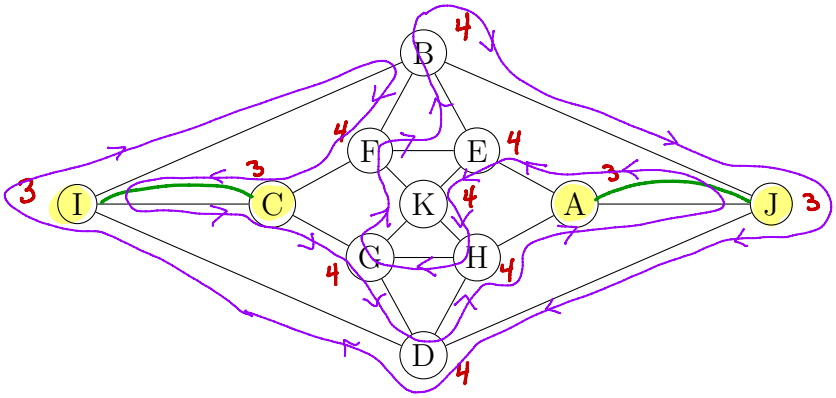
Group Names: _____

1. Consider the following graph.

   (a) How many vertices of odd degree does this graph have? 4

   (b) Eulerize this graph: find the smallest number of edges you can add so that you can construct an **Euler circuit**.

   (c) Draw the circuit on the graph.

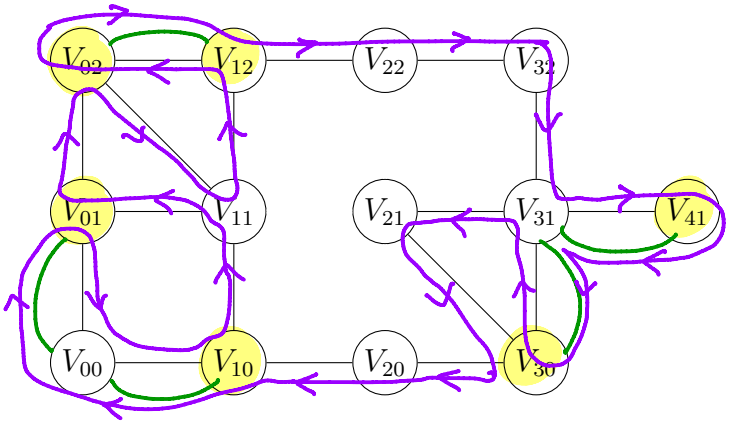


2. Consider the following graph.

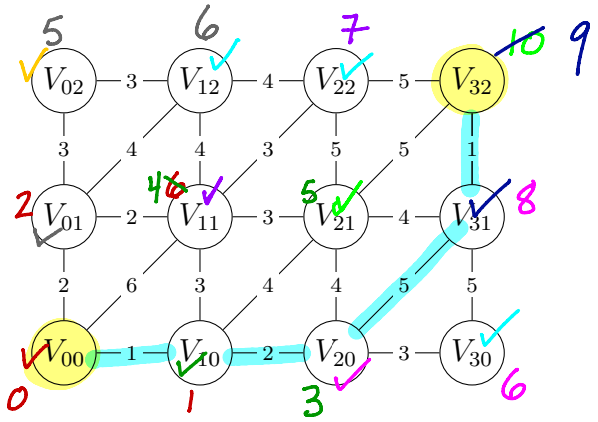
   (a) Which are the vertices of odd degree? V_{02} V_{12} V_{01} V_{10} V_{30} V_{41}

   (b) Eulerize this graph: find the smallest number of edges you can add so that you can construct an **Euler circuit**, and add them to the graph.

   (c) Draw the circuit on the graph.



3. Consider the following weighted graph.



(a) There are two vertices of odd degree in this graph, V_{00} and V_{32}. Use Dijkstra's algorithm to find a path of minimum distance between the two vertices. Break ties by using the vertex whose subscript is smaller (for example, V_{01} is smaller than V_{23} because $01 = 1 < 23$.)

vertex	V_{00}	V_{01}	V_{02}	V_{10}	V_{11}	V_{12}	V_{20}	V_{21}	V_{22}	V_{30}	V_{31}	V_{32}
explored?	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
tentative weight	0	2	5	1	~~6~~ 4	6	3	5	7	6	8	~~10~~ 9

(b) Duplicate your minimum distance path (including the weights) to eulerize the graph.

(c) Then find an Euler circuit in the graph. of minimum weight.