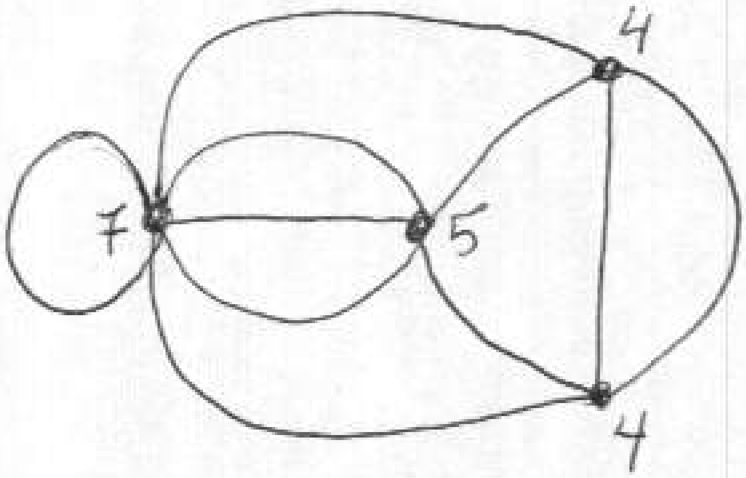
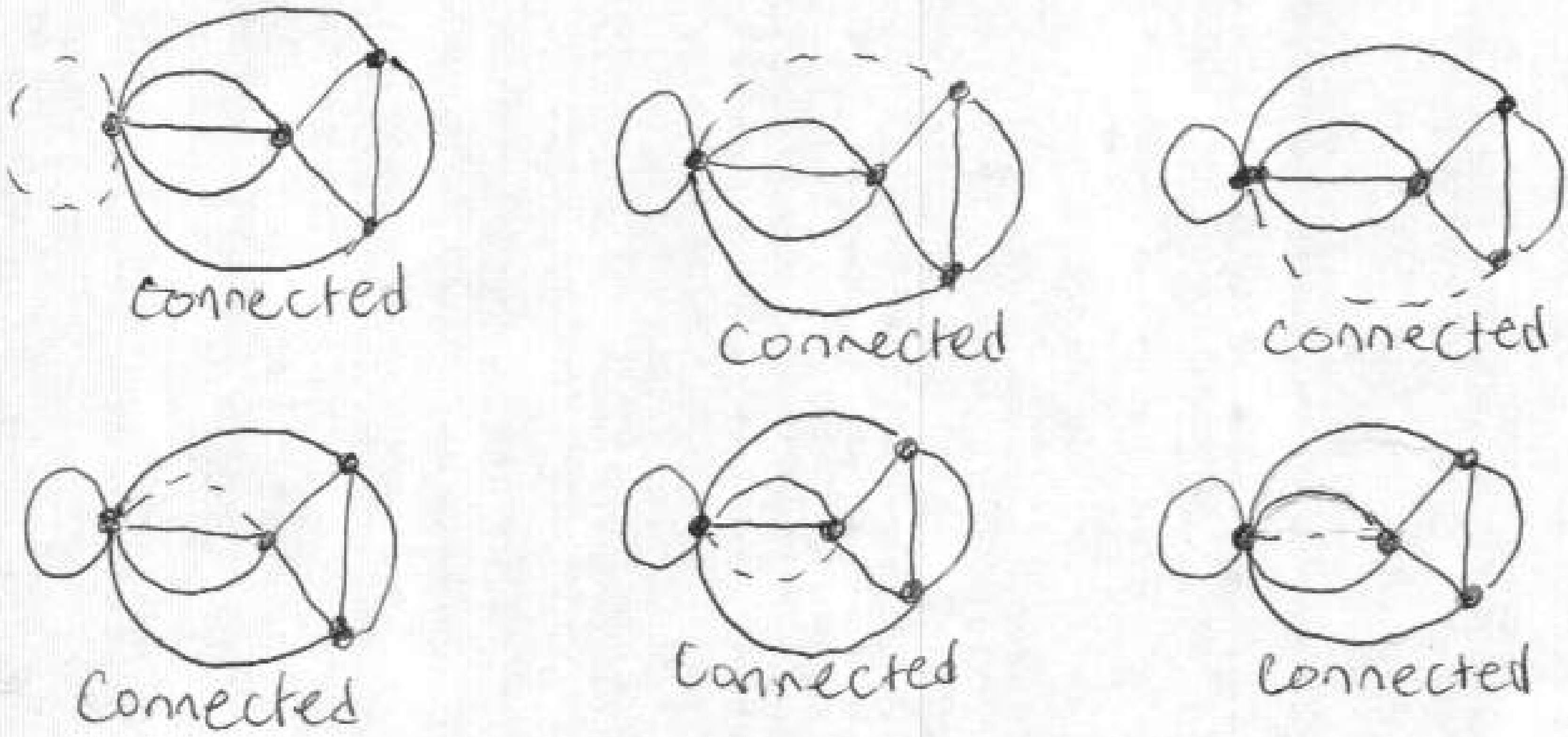
Fleury's Algorithm (Cont.) & Eulerizing graphs.



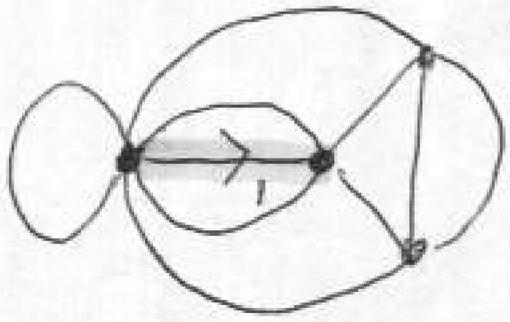
The degrees of the vertices are written in.
There are exactly two odd vertices, and the graph is connected, so it has an Euler path.
Let's use Fleury's Algorithm.

To start, we choose either of the odd vertices.
Let's choose the degree 7 one.

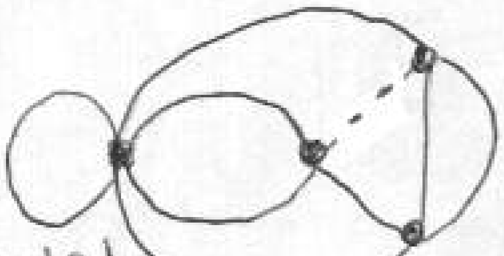
We have 7 choices (6 edges to choose from, and the loop can be traversed in 2 directions).
Check if any of the 6 edges are bridges:



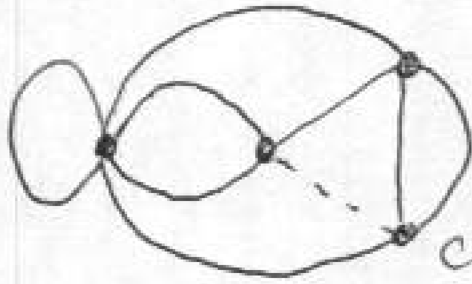
None are bridges, so we can choose any edge. We choose the middle one:



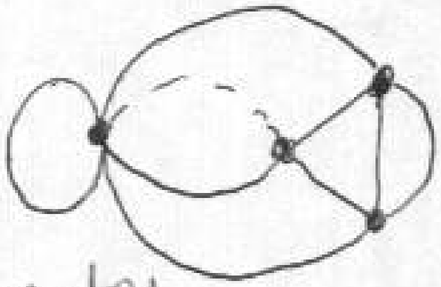
We now have 4 choices to proceed; we check if any of the 4 edges are bridges of the yet-to-be-travelled graph (the non-highlighted graph):



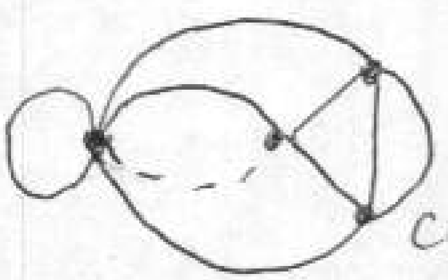
connected



connected

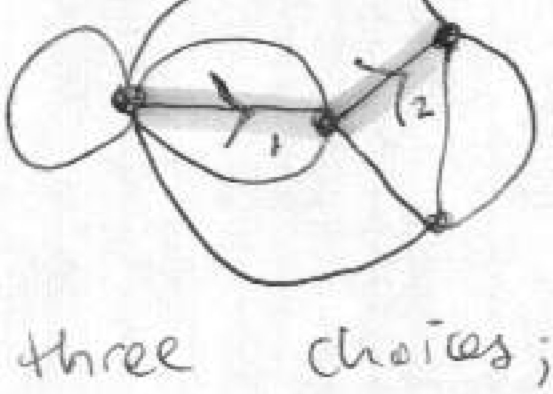


Connected

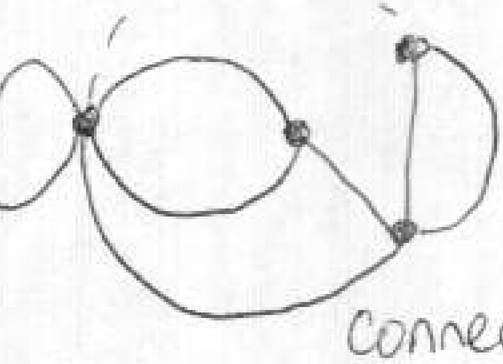


connected

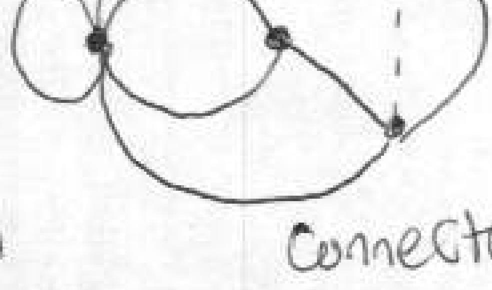
None are bridges, so all are valid choices; we choose the first one listed above:



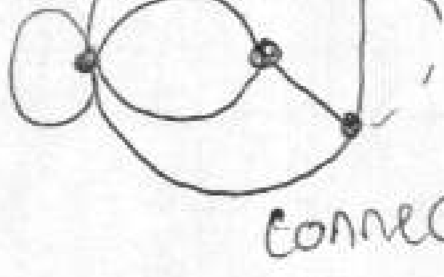
There are now three choices; we check if they're OK:



connected

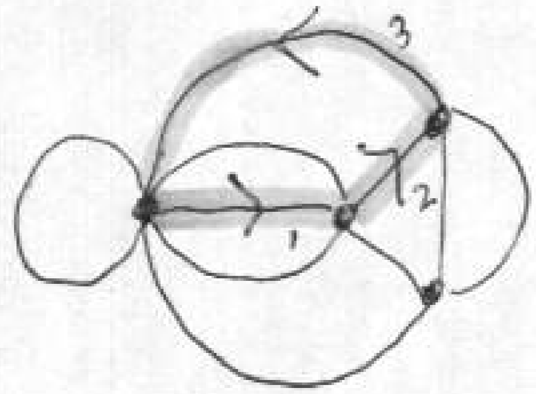


Connected

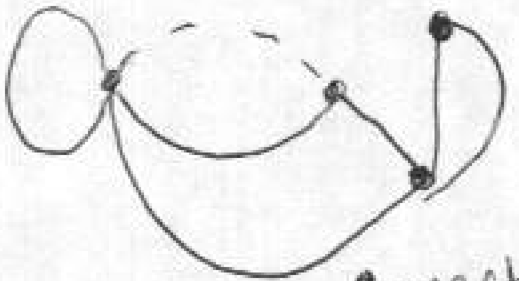


connected

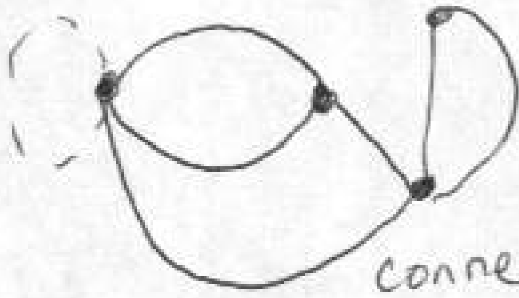
All are OK; we choose the 1st route:



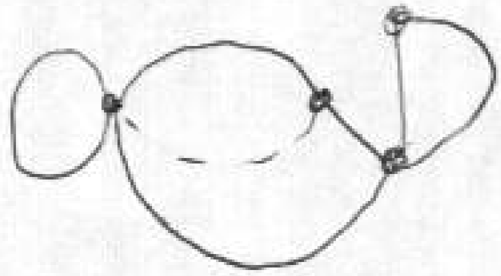
We have now 4 edges to choose from, and we check again if any are bridges of the yet-to-be-travelled graph:



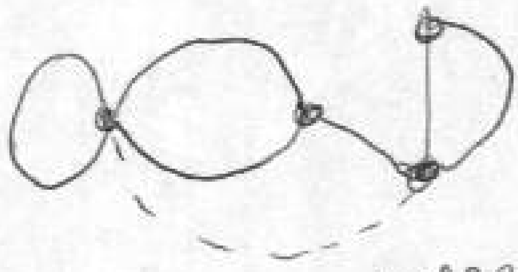
Connected



connected

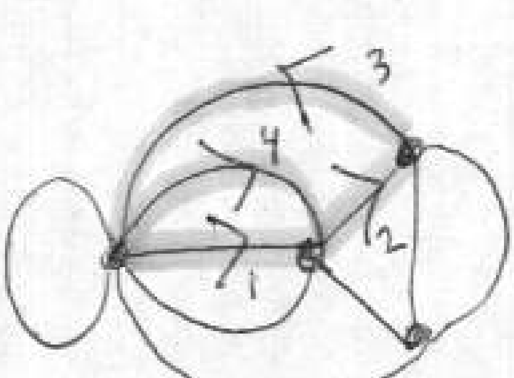


Connected

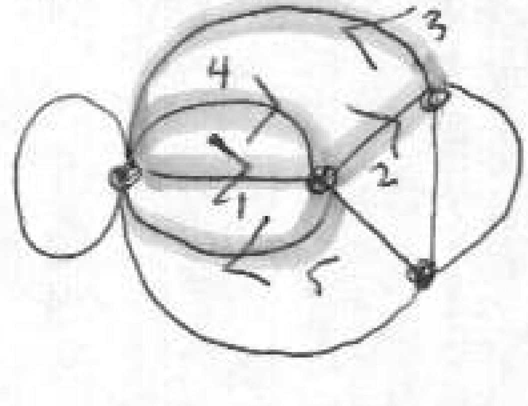


connected

They're all OK; we choose the 1st route:

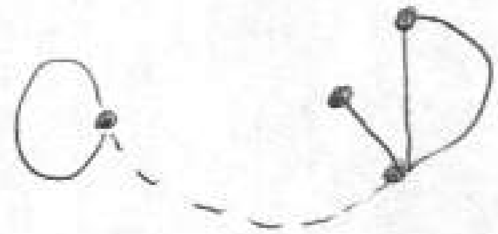


We now have two choices. We can as we've been doing check that both are OK, and we choose one:



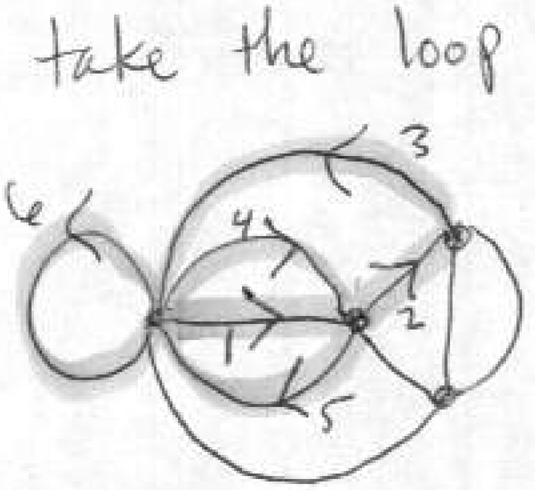
We now have two choices, but they are not both OK:

connected
(OK)

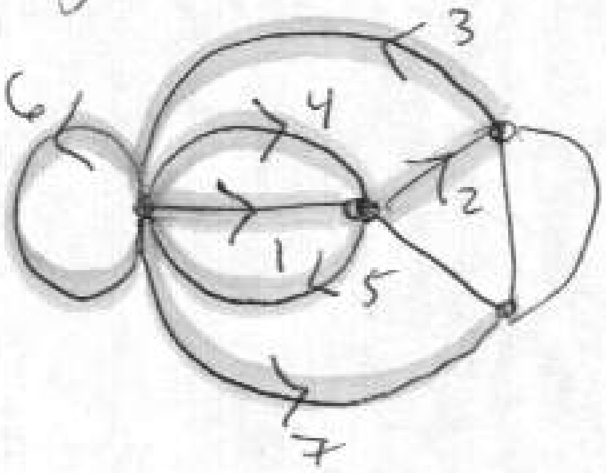


disconnected
(not OK)

So we must take the loop next:

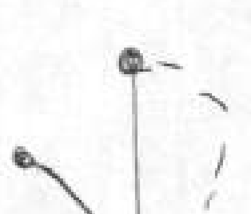


We then only have one choice and take it:

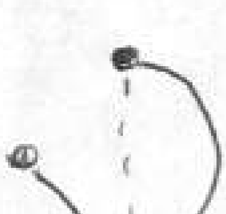


Now we have 3 choices and check if they're OK:

disconnected
(not OK)

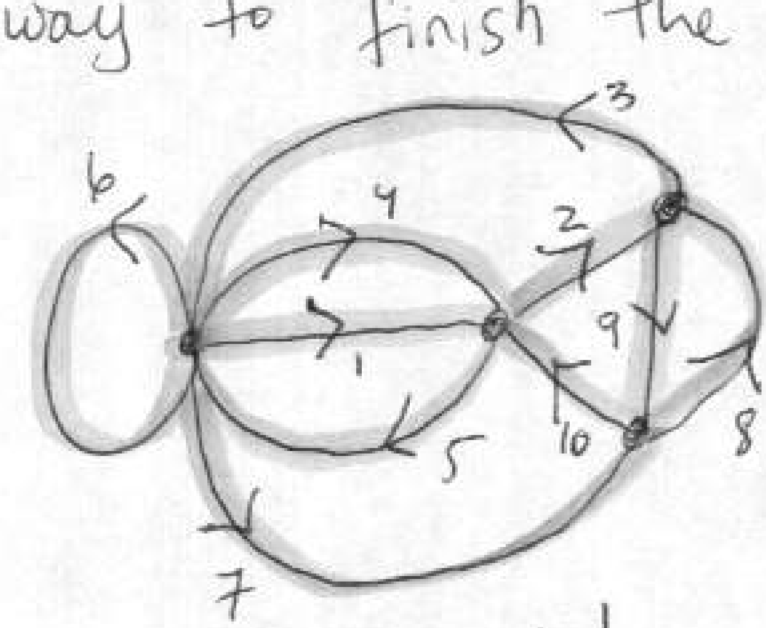


connected
(OK)



connected
(OK)

We take the 2nd route. After that there is only one way to finish the path:



That completes our Euler path!

Eulerizing & Semi-Eulerizing Graphs

When a graph modelling a street-routing problem has no Euler circuits or Euler paths, recall that we were still interested in finding an optimal route, i.e. one with the fewest edges overlapped. We show how to solve this.

Definition: An Eulerization of a graph is a graph obtained by adding duplicate edges to the original graph in a way such that the result has only even vertices.