Fleury's Algorithm for Finding an Euler Circuit (Path)

- **Preliminaries**. Make sure that the graph is connected and either (1) has no odd vertices (circuit), or (2) has two odd vertices (path).

- **Start**. Choose a starting vertex. [In case (1) this can be any vertex; in case (2) it must be one of the two odd vertices.]

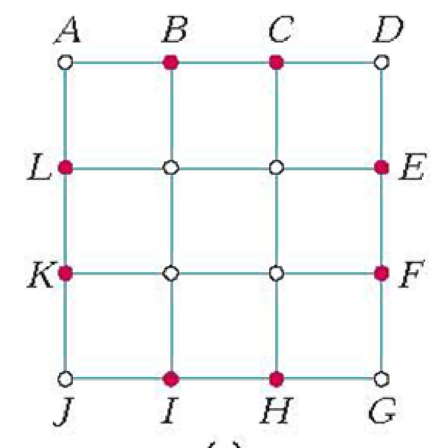
Intermediate steps. At each step, if you have a choice, don't choose a bridge of the yet-to-be-traveled part of the graph. However, if you have only one choice, take it.

- **End**. When you can't travel any more, the circuit (path) is complete. [In case (1) you will be back at the starting vertex; in case (2) you will end at the other odd vertex.]

Eulerizing Graphs

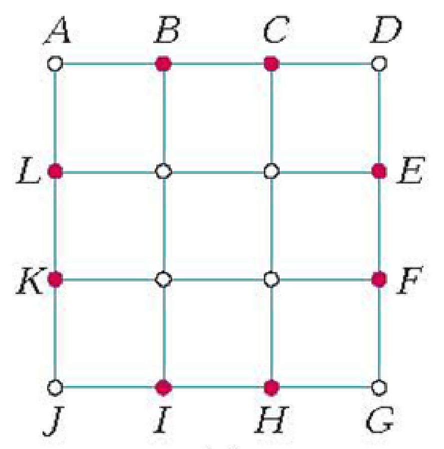
Suppose you wanted to plow the snow off the following streets. You only have to go over each road once (in either direction).

An Euler circuit would give you an optimal route. What do you do if you don't have an Euler circuit?



(a)

Our first step is to identify the odd vertices.
This graph has eight odd vertices
(B,C,E,F,H,I,K,and L), shown in red.



(a)

Add some extra (double) edges.
The edges that you would have to plow twice.
So that you never "get stuck" at an odd degree vertex.

How many such edges do you have to add?
What is the fewest?

- **Concept of a graph**

  This idea can be traced back to Euler some 270 years ago.

- **Concept of a graph model.**

  We used graphs and mathematical theory of graphs to solve certain types of routing problems.

- **Concept of an algorithm**

  A set of procedural rules that helps us find Euler circuits or Euler path in a graph

Attachments

- Web Pages as Graphs
- Euler Circuit
- TheHousesAndUtilitiesCrossingProblem.nbp