Math 140: Tuesday Aug 27, Day 3 Notes

Agenda for Tuesday, Aug 27,2024

Reminders

- ! Turn in Written HW 1 by Thursday (upload in Canvas or bring to class)
- Office Hour **today 1-2:15pm** in C162
- **First Group Quiz** on Thursday, August 29th in class (you can use your handwritten notes)
- **Student Resource Fair** Thursday, August 29 from 11:30 a.m.-1:30 p.m. & 4:30-6 p.m. Student Commons/Student Street

Section 1.2 Euler Path and Circuits

Recall: Euler's Circuit Theorem:

Euler's Path Theorem:

Example 1. For each of the three graphs below choose from one of the following answers and provide a short explanation for your answer.

A) The graph has an Euler circuit.

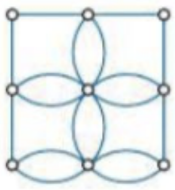
B) The graph has an Euler path.

C) The graph has neither an Euler circuit nor an Euler path.

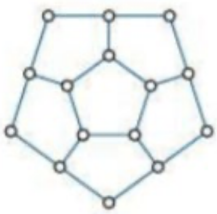
D) The graph may or may not have an Euler circuit.

E) The graph may or may not have an Euler path.

(a)

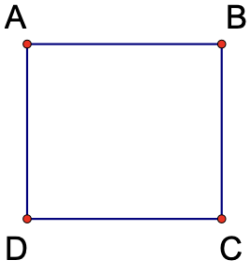


(b)



(c) A graph with eight vertices: six vertices of degree 2 and two vertices of degree 3.

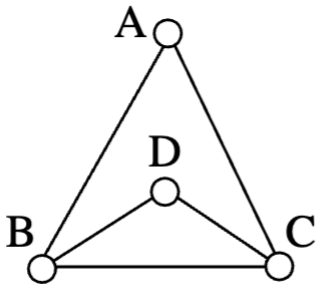
Example 2. Is it possible to add an edge so that you get just one odd vertex?



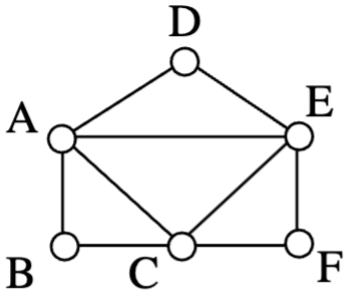
In class Activity

Get in pairs and and work on the following problem.
Do the following graphs have an Euler path or an Euler circuit?
If, yes, find at least one of each.

1. Graph 1:



2. Graph 2



Euler's Sum of Degrees Theorem

- The sum of the degrees of all the vertices of a graph equals

- A graph has always an

Fleury's algorithm for finding an Euler Circuit or Path

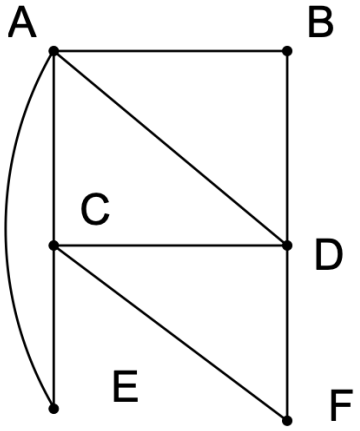
1. Determine the number of odd vertices in the graph. (If the graph is not connected, there is no Euler Circuit or Euler Path.)

2. Select a starting vertex.

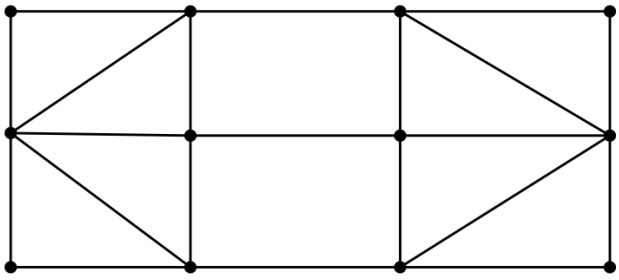
3. At each step, if you have a choice, don't choose a bridge of the yet-to-be-traveled part of the graph.

4. End.

Example 3. Find an Euler Circuit in the following graph using Fleury's Algorithm.

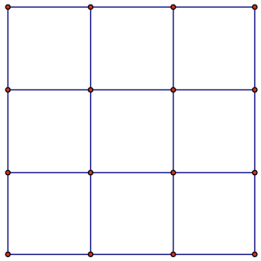


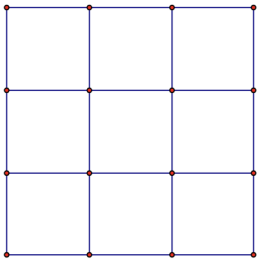
Example 4. Find an Euler path in the following graph using Fleury's Algorithm.



What do you do if a graph doesn't have an Euler Circuit or an Euler Path but you still need to travel all the edges?

Eulerization





Semi-Eulerization