

Math 140: Thursday Aug 22nd, Day 2 Notes

Agenda for Thursday, Aug 22nd, 2024

Continue Intro to Graph Theory notes	1
Section 1.2 Euler Paths and Circuits	1

Reminders

- ! Turn in Group activity 0
- First Canvas Homework will open today and be due by next Thursday
- Office Hour **today 1-2:15pm** in C162
- Culinary event - mini tostadas in B019 from 3-5pm today

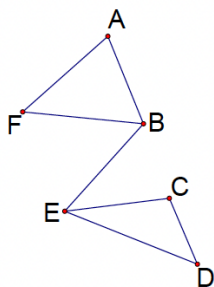
Intro to graph theory: continued

Recall: Graph, vertices, edges

Section 1.2 Euler Paths and Circuits

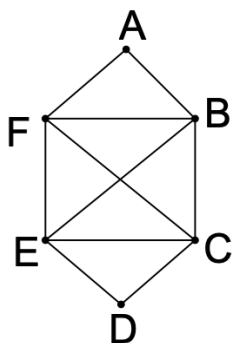
Euler Path

Example 1. Find an Euler path in the following graph.



Euler Circuit

Example 2. Find an Euler circuit in the following graph.



Euler's Circuit Theorem

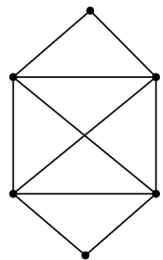
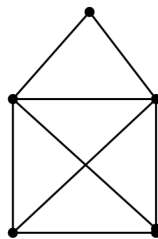
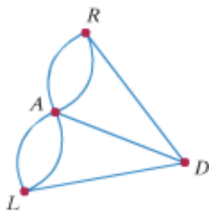
- If a graph is connected and every vertex has

- If a graph has any vertices

Euler's Path Theorem

- If a graph is connected and has exactly two vertices, then it has at least one Euler Path. The path must start at one of the vertices and end at the other.
- If a graph has more than two vertices, then it cannot have an Euler Path.

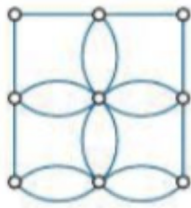
Example 3. Which of these graphs have an Euler's circuit or an Euler's Path?



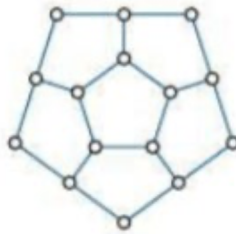
Example 4. For each of the three graphs below choose from one of the following answers and provide a short explanation for your answer.

1. The graph has an Euler circuit.
2. The graph has an Euler path.
3. The graph has neither an Euler circuit nor an Euler path.
4. The graph may or may not have an Euler circuit.
5. The graph may or may not have an Euler path.

(a)

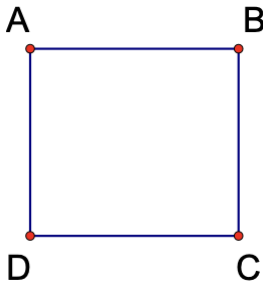


(b)



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

Example 5. Is it possible to add an edge so that you get just one odd vertex?

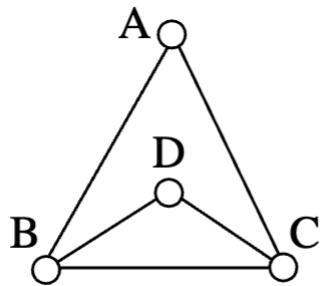


Group Practice 1:

Get in pairs 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

