

Announcement

Attendance to the lecture will be recorded. You will be asked to fill out a scantron in the last five minutes of every lecture.

- **First Hour Exam:**
Feb. 8, Friday in class.

Class website:
<http://kalman.math.siu.edu/~mxiao/math113.html>

Jan. 18, 2008

Help Sessions

Leader: Brenda Sanders.

Meeting time:

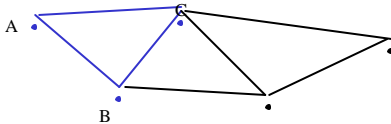
Wednesday 4:00-5:00PM

Location: **Lawson 221.**

8% bonus points will be given to those students who regularly attend this help sessions.

Quick Review

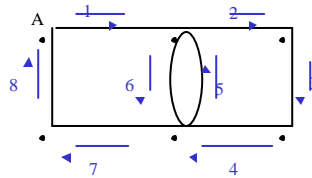
What is an Euler circuit?



A->B->C->A is a circuit, but is NOT an Euler circuit!

Circuits that cover every edge only once are called Euler circuits.

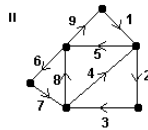
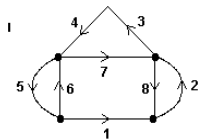
An Euler Circuit



Circuits that cover every edge only once are called Euler circuits.

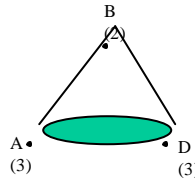
Old Exam Question

Consider the paths represented by the numbered sequence of edges on the graphs below. Which path represents an Euler circuit?



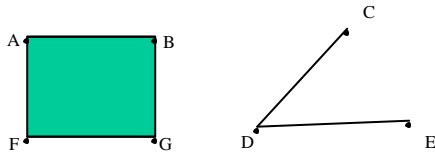
- A) I only
- B) II only
- C) I and II both
- D) Neither I or II

Valence of a Vertex



The valence of a vertex is the number of edges meeting at the vertex

A graph is said to be **connected** if for every pair of its vertices there is at least one path connecting the two vertices.

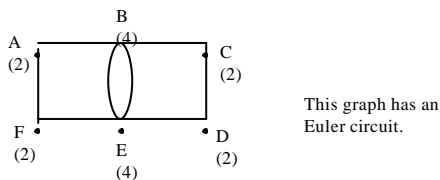
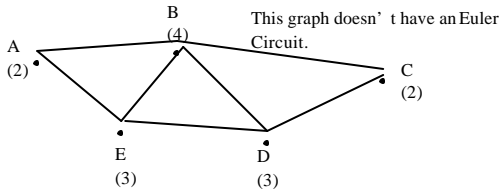


A nonconnected graph

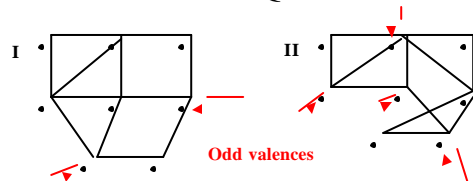
Euler's Theorem



1. If a graph G is **connected** and has all valences **even**, then G has an Euler circuit.
2. Conversely, if G has **Euler circuit**, then G must be **connected** and all its valences must be **even** numbers



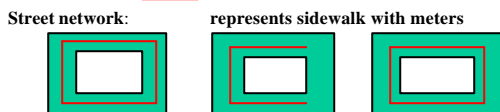
Old Exam Question



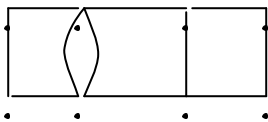
Which of these graphs have Euler circuits?

- A. I only
- B. II only
- C. I and II both
- D. Neither I nor II

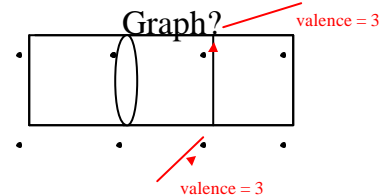
A Street Network with Three Blocks



A simplified graphic representation

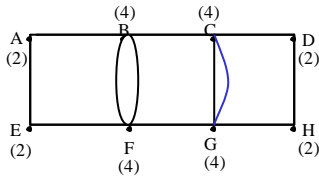


Is there an Euler Circuit in this Graph?



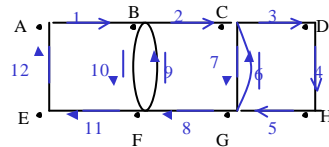
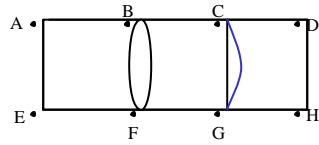
Answer: No, according to **Euler Theorem**
Thus in order to cover all edges in this graph, some edges must be reused!

Can it become an Euler Circuit?



Answer: Yes if we install a new blue edge!

Circuits with Reused Edges

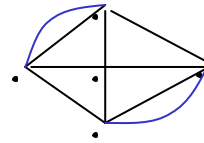


Eulerizing a Graph

- Adding edges to a graph to make all valences **even** is called **eulerizing** the graph.
- In this course, eulerizing a graph is limited in duplicates of some existing edges.
- Duplicates of some existing edges means to reuse some existing edges.

An Old Exam Problem

How many edges must be duplicated to produce an Eulerization of the following graph?



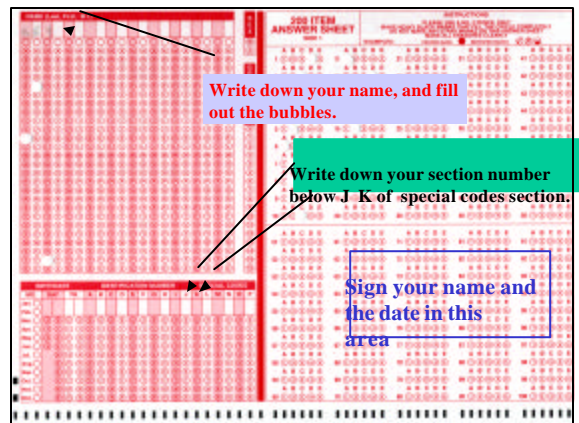
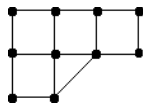
- A. 3
- B. 4
- C. 2
- D. 1

What is your answer?

Old Exam Question

In order to eulerize the graph below, give the fewest number of edges that need to be added or duplicated?

- A) 1
- B) 2
- C) 3
- D) 4



- Instructional class meets

Monday and Friday 8:00-8:50 PM.

- Recitation sessions meet:

- section 1 Tues 8:00AM, NKRS 156
- section 2 Wed 8:00AM, AG 153
- section 4 Tues 9:00AM, NKRS 156
- section 6 Tues 10:00AM, NKRS 156