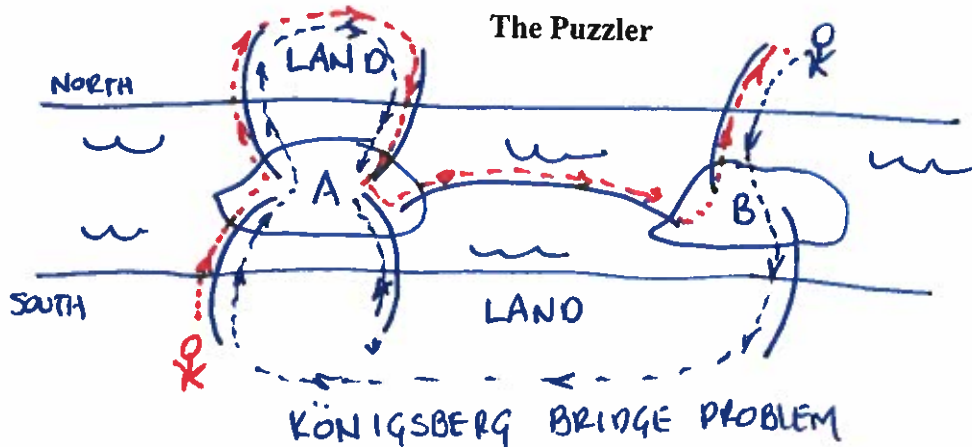


Math 142
Graph Theory (Chapter 7)
Spring 2021

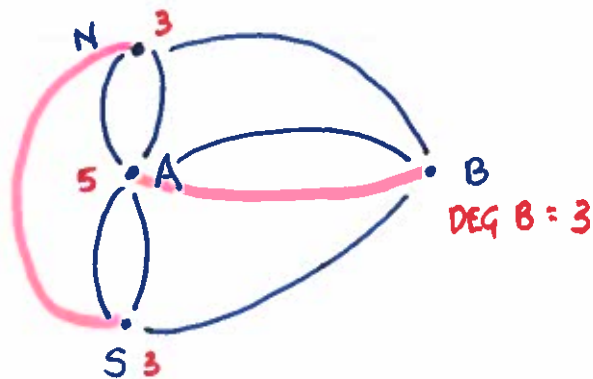
Part I (Section 7.1): Euler Circuits, Euler Paths, and Transverse Graphs

Graph theory is a math discipline credited to **Leonard Euler** based upon a "puzzler".



GRAPH THEORY TERMINOLOGY : LAND MASSES (NODES OR VERTICES)
BRIDGES (EDGES)
DEGREE (NUMBER OF EDGES IN & OUT
OF EACH NODE)

GRAPH THEORY OF THE KÖNIGSBERG BRIDGE PROBLEM



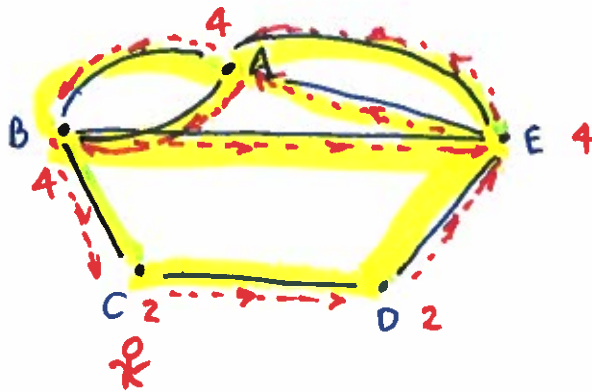
Part II: Euler Circuits versus Euler Paths

An Euler Circuit is a closed circuit that:

- ✓ 1. Starts and ends at the same node (vertex).
- ✓ 2. Crosses over each edge only once.
- ✓ 3. The graph is a transverse graph.
- ✓ 4. ALL DEGREES MUST BE EVEN!

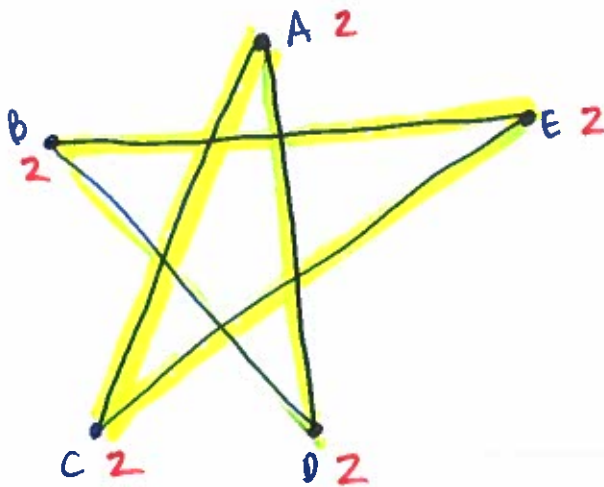
Examples:

①



EULER CIRCUIT: C-D-E-A-B-E-A-B-C

②

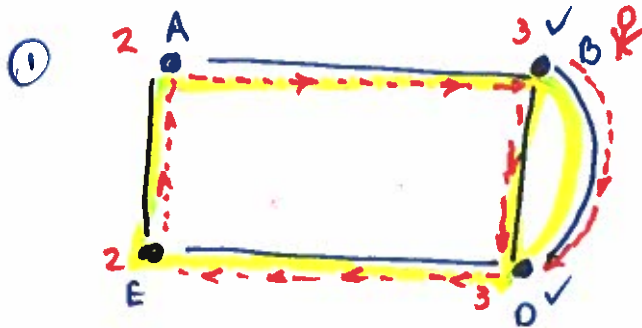


EULER CIRCUIT: A-D-B-E-C-A

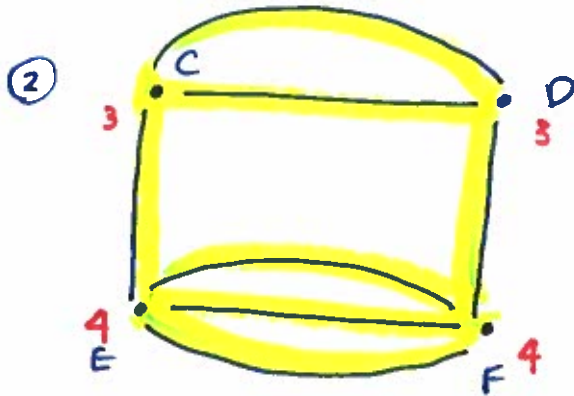
An Euler Path is a closed circuit that:

- ✓1. Starts at an odd degree node (vertex).
- ✓2. Ends at a different odd degree node (vertex).
- ✓2. Crosses over each edge only once.
- ✓3. The graph is a transverse graph.

Examples:



NO EULER CIRCUIT!
EULER PATH!
B - D - E - A - B - D



NO EULER CIRCUIT!
EULER PATH!
C - E - F - E - F - D - C - D