Strong Digraphs

- Read section 7.1, pages 161-168

- What is a **digraph**, **arc**, **oriented graph**?

- When do we say that a vertex u is **adjacent to** a vertex v? When do we say that it is **adjacent from** v?

- What are the **indegree** and **outdegree** of a vertex?

- What does the **first theorem of digraph theory** say?

- What is a **directed walk/trail/path/circuit**?

- When do we say that a directed graph is **weakly connected**?

- When do we say that a directed graph is **strongly connected**?

- Show examples of graphs that are weakly, but not strongly, connected.

- What is the **directed distance** from u to v? Is it a symmetric function?

- Why is it the case that if a digraph is strongly connected then each vertex has positive out- and in-degrees?

- Theorem 7.3: A digraph is strong if and only if it contains a closed spanning (directed) walk.

- What is an **Eulerian Circuit**? What is an **Eulerian Graph**?

- Theorem 7.4: A nontrivial connected digraph is Eulerian if and only if on each vertex the outdegree equals the indegree.

- What is an **orientation** for a nontrivial connected graph?

- Theorem 7.5: A nontrivial connected graph G has a strong orientation if and only if it contains no bridges.

- Practice problems: 7.2, 7.3, 7.4