Trees

- Read 4.2, pages 87-92
  - When is a graph G called **acyclic**? What's another name for such graphs?
  - When is a graph G called a **tree**?
  - Draw all trees of orders 3 and 4.
  - How can we define a tree alternatively using bridges instead of cycles?
  - What trees do we call **stars**, **double-stars**, **caterpillars**?
  - How does a **rooted tree** differ from a tree?
  - Prove theorem 4.2: A graph is a tree if and only if every two vertices are connected by a unique path.
  - Prove theorem 4.3: Every nontrivial tree has at least two end-vertices (leaves).
    - How does this theorem help us prove facts about trees?
  - Prove theorem 4.4: Every tree of order n has size $n-1$.
  - Study example 4.5
  - Prove corollary 4.6: Every forest of order n with k components has size $n-k$.
  - Practice problems: 4.7, 4.8, 4.13, 4.14
  - Prove theorem 4.7: Every connected graph of order n has size at least $n-1$.
  - Prove theorem 4.8: If G is a graph of order n and size m, then any two of the following imply that the graph is a tree (and hence also imply the third):
    a. G is connected
    b. G is acyclic
    c. $m = n - 1$
  - Prove theorem 4.9: If T is a tree of order k, then T is isomorphic to a subgraph of any graph G with $\delta(G) \geq k-1$.
  - Practice problems: 4.20, 4.22