1. (10) Let $G$ be a connected graph and $s$ be a vertex in $G$. Let $T_D$ be a DFS tree formed by doing DFS starting at $s$. Let $T_B$ be a BFS tree obtained by doing BFS starting at $s$. Is it always true that $\text{height}(T_D) \geq \text{height}(T_B)$? Does it matter whether the graph is directed or undirected? Give a clear argument or counterexample.

2. (5) How can a number of strongly connected components of the graph change if a new edge is added?

3. (20) An articulation point of $G$ is a vertex whose removal disconnects $G$. A bridge is an edge whose removal disconnects $G$.

   a) Show how to compute all articulation points in $O(E)$ time.
   b) Show how to compute all bridges in $O(E)$ time.

4. (10) 23.1.4. (old 24.1.4)

5. (10) 22.3.11 (old 23.3.9)

6. (10) 23.2.4 (old 24.2.4)

7. Practice problem: Draw a simple connected undirected, weighted graph with 8 vertices and 16 edges, with unique edge weights. Run Prim’s and Kruskal’s algorithm on the graph.