Name: **EID:**

Exam #1 Review: DFS/BFS (Recitation)

Problem 1: Finding bridges

Give an $O(m * (n + m))$ time algorithm to find all bridge edges in a connected graph. Recall that a bridge of a connected graph is an edge whose removal disconnects the graph. Briefly justify the running time of your algorithm.

Problem 2: Bridges again

Suppose G is a connected undirected graph. An edge whose removal disconnects the graph is called a *bridge*. Either prove the following statement or provide a counter-example: every bridge e must be an edge in any depth-first search tree of G and any breath first search tree of G.

Problem 3: Good vs. evil

Suppose there are only two types of professional wrestlers: good guys and bad guys. Between any pair of professional wrestlers, there may or may not be a rivalry. Suppose we have n professional wrestlers and we have a list of r pairs of wrestlers for which there are rivalries. Give an $O(n + r)$ algorithm that determines whether it is possible to designate some of the wrestlers as good guys and the remainder as bad guys such that each rivalry is between a good guy and a bad guy. If it is possible to perform such a designation, your algorithm should produce it.