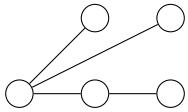
**CSE421: Design and Analysis of Algorithms** April 12, 2022

*Shayan Oveis Gharan* Problem Solving Session 2

P1) Let $G$ be a tree. Use induction to prove that the number of leaves of $G$ is at least the number of vertices of degree at least 3 in $G$. For example, the following tree has 3 leaves and 1 vertex of degree at least 3, and $3 \geq 1$.



P2) Given a connected undirected graph $G = (V, E)$ with $n$ vertices and $m = n + k$ edges. Design an $O(m + n)$ time algorithm that outputs $k$ edges $e_1, \ldots, e_k$ of $G$ such that if we delete all of these edges $G$ still remains connected. For example in the following graph if you delete both of the red edges the graph remains connected.