

CIS 160

## Recitation Guide - Week 7

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**Topics Covered:** Graphs, Trees, Conditional Probability

**Problem 1:** Let  $T$  be a tree where the maximum degree is  $\Delta$ . Prove that  $T$  has at least  $\Delta$  leaves.

**Problem 2:**

You run into a town with 100 robots. You know that 99 of these robots tell the truth half the time and lie the other half. You also know that there is exactly 1 truthful robot in town, who always tells the truth. You take a robot at random and ask a question seven times, and the robot tells the truth every time. What is the probability that this is the truthful robot?

**Problem 3:**

Prove that  $G$  or the complement of  $G$  is connected. Note that the complement of a graph  $G = (V, E)$  is  $G^c = (V, E')$  and  $\forall u, v \in V, \{u, v\} \in E' \iff \{u, v\} \notin E$ .