

Recitation Guide - Week 11

Topics Covered: Bipartite Graphs, Variance, Tail Bounds

Problem 1:

A 10 digit number with no zeroes is chosen by independently and randomly selecting each digit (1 - 9). Let N be the number of digits missing from the 10 digit number. For example, if the number is 1231452832, then we are missing the digits 6, 7, 9 so $N = 3$.

- a) Find $\mathbf{E}[N]$ and $\text{Var}[N]$.
- b) Using Markov's Inequality, what is the lower bound of the probability that less than 6 digits are missing?
- c) How can you improve the bound you obtained above?

Problem 2:

Prove that a graph is bipartite if and only if it has no odd length cycles.