CSE 312: Foundations of Computing II

Section 5: Variance, Important Discrete Distributions

0. The Enemy of my Enemy is my Friend

Suppose we have n people with amnesia in a prison. The prison guard tells each pair of two people whether or not they are enemies randomly, with probability 0.8 of telling them they are. These people, having amnesia, are especially suggestive and believe the prison guard.

(a) What is the expected number of pairs of enemies?

(b) What is the variance of number of pairs of enemies?

(c) If A and B are both enemies to C, then A and B become friends. A and B can become friends even if they are enemies (they will be "frenemies"). What is the expected number of friendships that are created as a result?

(d) What is the expected number of pairs of "frenemies"? We say a pair of people are frenemies if and only if they are enemies and friends.

(e) What is the expected number of pairs of "true" enemies? We say a pair of people are true enemies if and only if they are enemies, but not friends.