EECS 70 Discrete Mathematics and Probability Theory
Spring 2014 Anant Sahai

Discussion 9B

1. Probability and Counting Practice

1. A message source M of a digital communication system outputs a word of length 8 characters, with the characters drawn from the ternary alphabet $\{0,1,2\}$, and all such words are equally probable. What is the probability that M produces a word that looks like a byte (*i.e.*, no appearance of '2')?
2. If five numbers are selected at random from the set $\{1,2,3,\ldots,20\}$, what is the probability that their minimum is larger than 5?

2. Counting

1. How many ways are there to arrange n ones ("1") and k zeros ("0") into a sequence?
2. How many solutions does

$$x_0 + x_1 + \ldots + x_k = n$$

   have, if all xs must be non-negative integers?
3. How many solutions does

$$x_0 + x_1 = n$$

   have, if all xs must be *strictly positive* integers?
4. How many solutions does

$$x_0 + x_1 + \ldots + x_k = n$$

   have, if all xs must be *strictly positive* integers?