

ENEE324. Problem set 2

Date due February 17, 2016

1. An urn contains n balls of which one is red and the others white. Balls are taken out without replacement till the red one shows up. Identify the sample space of this experiment. Find the probability $P(A_m)$, where A_m is the event that the red ball is drawn in the m th try, $m = 1, \dots, n$.
2. Select 5 natural numbers from the set $\{10, 11, \dots, 29, 30\}$. What is the probability that the smallest of the chosen numbers is greater than 15?
3. A coin with $P(H) = 0.1, P(T) = 0.9$ is flipped an infinite number of time. What is the probability of (a) at least one H in the first n flips; (b) exactly k heads in the first n flips; (c) getting heads in all of the flips indefinitely (d) same as (c), but with $P(H) = 0.999$? For (a) and (b) identify the sample space, i.e., describe all the possible outcomes of the experiment.
4. In three sections of the 324 class there are 60 students, 20 students in each. A group of 3 students is chosen (a group is 3 students in any order).
(a) How many choices are possible? (b) How many choices if all 3 students are in the same section? (c) How many choices if 2 out of the three students are in the same section? (d) How many if all the three students are from different sections?
5. A round table has seats numbered 1 through 10. 5 men and 5 women are randomly assigned seats at the table. What is the probability that all the men sit together (i.e., next to each other without gaps)?
6. (a) There are 8 identical marbles which we are placing in 4 boxes. Each box can hold any number of marbles. How many different placements are possible?
(b) There are 8 marbles m_1, \dots, m_8 which we are placing in 4 boxes (the marbles are distinguishable, but the order of the marbles in the box doesn't matter). How many different placements are possible? How many different placements are possible if each box must contain two marbles out of m_1, \dots, m_8 ?