

ENEE324-03. Problem set 2

Date due February 17, 2015

1. Player 1 rolls six 6-sided dice and wins if he gets at least one one. Player 2 rolls twelve 6-sided dice and wins if he gets at least two ones. Which of the two players has a higher probability to win?
2. An urn contains 90 red balls and 10 white balls. 10 balls are drawn at random. What is the probability that none of the drawn balls is white?
3. (a) Eight marbles are divided into four pairs. In how many ways can this be done?
(b) Six schoolchildren, three boys and three girls, line up randomly for a class picture. What is the probability that boys and girls alternate?
4. Five integer numbers are selected randomly and uniformly from the set $\{1, 2, \dots, 20\}$ without replacement. What is the probability that the smallest of the chosen numbers is greater than 5?
5. What is the probability that a randomly chosen number between 0 and 999 contains at least one 1? (Use inclusion-exclusion).
6. Given two urns, we place five blue balls and five red balls into them whatever way we like. Once this is done, we choose a random urn and draw a random ball out of it. How would you place the balls so that the probability to draw a blue ball is maximum?