EECS 126: Probability and Random Processes

Discussion 2

Note: Please work on the problems before the discussion session.

Problem 15. A coin is tossed twice. Alicia claims that the event of two heads is at least as likely if we know that the first toss is a head than if we know that at least one of the tosses is a head. Is she right? Does it make a difference if the coin is fair or unfair? How can we generalize Alicia's reasoning?

Problem 17. A hiker starts by taking one of n available trails, denoted $1, 2, \ldots, n$. An hour into the hike, trail i subdivides into $1 + i$ subtrails, only one of which leads to the hiker's destination. The hiker has no map and makes random choices of trail and subtrail. What is the probability of reaching the destination?

Problem 33. A candy factory has an endless supply of red, orange, yellow, green, blue, and violet jelly beans. The factory packages the jelly beans into jars of 100 jelly beans each. One possible color distribution, for example, is a jar of 58 red, 22 yellow, and 20 green jelly beans. As a marketing gimmick, the factory guarantees that no two jars have the same color distribution. What is the maximum number of jars the factory can produce?

Problem 36. Consider a backgammon match with 25 games, each of which can have one of two outcomes: win (1 point), or loss (0 points). Find the number of all possible distinct score sequences under the following alternative assumptions.

(a) All 25 games are played.

(b) The match is stopped when one player reaches 13 points.