

## Problem Set 2

- How many different linear arrangements are there of the letters A, B, C, D, E, F for which
  - A and B are next to each other?
  - A is before B?
  - A is before B and B is before C?
  - A and B are next to each other and C and D are also next to each other?
  - E is not last in line?
- How many 5-digit numbers can be formed from the integers 1, 2, ..., 9 if no digit can appear more than twice?
- Suppose there is a  $1/5$  probability that your dining hall serves broccoli at dinner (and assume the decision is made independently each evening).
  - What is the probability you will be able to eat broccoli at 20 consecutive dinners?
  - What is the probability that out of 20 consecutive evenings you will be able to eat broccoli at least once?
- One ball will be drawn from a jar containing white, blue, yellow, and green balls. The probability that the ball drawn will be green is 0.25, and the probability that the ball drawn will be yellow is 0.14. What is the probability that the ball drawn will be white or blue?
- Consider the joint event of flipping two coins. For the first toss, the probability of a head is 0.50, and the probability of a tail is 0.50. The same probabilities apply for the second toss, 0.50 for a head and 0.50 for a tail. However, the two coin flips are not independent. The probability of getting two heads on the two tosses is 0.20. List all possible outcomes in the probability space, and find their associated probabilities.
- In a city with two newspapers, 65 percent of families subscribe to the morning paper, 50 percent subscribe to the afternoon paper, and 80 percent subscribe to at least one of the two papers. What proportion of the families subscribe to both papers?
- Consider two events A and B such that  $\Pr(A) = 1/2$  and  $\Pr(B) = 1/3$ . Find  $\Pr(B \cap \text{not } A)$  for each of the following cases.
  - A and B are disjoint.
  - $B \subset A$ .
  - $\Pr(A \cap B) = 1/7$ .