Tutorial 1

1. Suppose that vehicles taking a particular highway exit can turn right (R), left (L), or go straight (S), with equal probabilities. Consider observing the direction of each of three successive vehicles.

   (a) How many outcomes are possible? Do not list them! List the outcomes in the event A that all vehicles go in the same direction. Compute $P(A)$.

   (b) List all the outcomes in the event B that all three vehicles take different directions. Compute $P(B)$.

   (c) List all the outcomes in the event C that exactly two vehicles turn right. Compute $P(C)$.

   (d) List all outcomes in the event D that exactly two vehicles go in the same direction. Compute $P(D)$.

   (e) List all the outcomes in C', $C \cup D$, $C \cap D$ and compute their probabilities.

2. Assume that 55% of adult population consumes coffee, 45% tea, and 70% at least one of the two drinks.

   (a) What is the probability that a randomly selected adult consumes both coffee and tea?

   (b) What is the probability that he or she consumes only one drink?

3. A production facility employs 20 workers on day shift (8am-4pm), 15 on swing shift (4pm-midnight), and 10 on graveyard shift (midnight-8am). A quality control consultant is using the database to randomly select 6 of these workers for in-depth interviews.

   (a) How many selections result in all the 6 workers coming from day shift?

   (b) What is the probability that all the 6 selected workers will be from the same shift?

   (c) What is the probability that at least one of the shifts will be unrepresented in the sample of the selected workers?