IEOR151 Lab 1

1. Bill and George go target shooting together. Both shoot at a target at the same time. Suppose Bill hits the target with probability 0.7, whereas George, independently, hits the target with probability 0.4.
    a. Given that exactly one shot hit the target, what is the probability that it was George's shot?
    b. Given that the target is hit, what is the probability that George hit it?

2. Suppose that two teams are playing a series of game, each of which is independently won by team *A* with probability *p* and by team *B* with probability 1-*p*. The winner of the series is the first team to win four games. Find the expected number of games that are played, and evaluate this quantity when $p=1/2$.

3. Let *X* denote the number of white balls selected when *k* balls are chosen at random from an urn containing *n* white and *m* black balls.

    a. Compute *P{X=i}.*
    b. Let, for *i=1,2,…,k; j=1,2,…,n,*

$$X_i = \begin{cases} 1, & if\ the\ ith\ ball\ selected\ is\ white \\ 0, & otherwise \end{cases}$$

$$Y_j = \begin{cases} 1, & if\ the\ white\ ball\ j\ is\ selected \\ 0, & otherwise \end{cases}$$

    Compute *E[X]* in two ways by expressing *X* first as a function of the X_is and then of the Y_js.