# ENGG2430A, Spring 2017, Homework 2

## Due at 5pm, Mar 8.

You can put your answer sheets to the Box 10B on the 10th floor of Ho Sin-hang Engineering Building (HSH).

1. (20 points) Fischer and Spassky play a chess match in which the first player to win a game wins the match. After 10 successive draws, the match is declared drawn. Each game is won by Fischer with probability 0.4, is won by Spassky with probability 0.3, and is a draw with probability 0.3, independent of previous games.
   a) What is the probability that Fischer wins the match?
   b) What is the PMF of the duration of the match?

2. (10 points) A family has 5 natural children and has adopted 2 girls. Each natural child has equal probability of being a girl or a boy, independent of the other children. Find the PMF of the number of girls out of the 7 children.

3. (10 points) You toss independently a fair coin and you count the number of tosses until the first tail appears. If this number is $n$, you receive $2^n$ dollars. What is the expected amount that you will receive?

4. (20 points) On a given day, your golf score takes values from the range 101 to 110. with probability 0.1, independent of other days. Determined to improve your score, you decide to play on three different days and declare as your score the minimum $X$ of the scores $X_1$, $X_2$, and $X_3$ on the different days.
   a) Calculate the PMF of $X$.
   b) By how much has your expected score improved as a result of playing on three days?

5. (10 points) Each morning, Hungry Harry eats some eggs. On any given morning, the number of eggs he eats is equally likely to be 1. 2, 3, 4, 5, or 6, independent of what he has done in the past. Let $X$ be the number of eggs that Harry eats in 10 days. Find the mean and variance of $X$.