

## Homework 11

Do the problems on Webwork and upload the following problems to Gradescope before 8 am on April 17th. When you upload your assignment, mark the page on which your solution to each problem starts, or upload each problem individually.

Homework should be written neatly and clearly explained. If it requires more than one sheet, the sheets must be stapled. Include your name and id number in the top right corner of your homework.

**Problem 1.** You flip a biased coin 15 times, independently. The coin has probability  $p$  of being a heads. Let  $X$  be the number of heads in the first 10 coin flips and  $Y$  be the total number of heads in the last 10 coin flips.

Compute  $\text{Cov}(X, Y)$  and their correlation  $\rho$ .

**Problem 2.** In a football tournament you play each of the other ten teams once. In every match you get 3 points if you win, 1 point for a draw and 0 points if you lose. For each match the probability you win is 0.6, the probability you draw is 0.1 and the probability you lose is 0.3, independently of the results of all other matches.

Let  $W$  be the number of games you win and  $L$  be the number of games you lose.

What is the covariance and correlation between  $W$  and  $L$ ?