Talis Biomedical Statistics Course - Homework 5

Due: 15 January 2020 9:00 AM

Name:	[your first and last name]
Collaborators:	[list all the people you worked with]
Date:	[date of submission]

By turning in this assignment, I agree by the **Stanford honor code** and declare that all of this is my own work.

The exercises can be found in the DeGroot & Schervish's textbook, available here.

Problem 1

(a) Section 3.9 Exercise 1.

(b) In Python, set up a simulation to see if the results match what you derived in Part (a). Specifically, do $1,000$ draws where you draw $X_1, X_2 \overset{iid}{\sim} U(0,1)$. Then, add them together to get $Y = X_1 + X_2$. Create a histogram on the resulting 1000 Y's. Comment on how it compares to the pdf you derived.

Problem 2

Section 3.9 Exercise 4.

Problem 3

(a) Section 4.1 Exercise 6.

(b) In Python, draw $1,000$ samples from the pdf given in Part (a). Transform the values by taking $1/X$ and calculate the mean. How does it compare to the expectation you derived?

Problem 4

(a) Section 4.1 Exercise 4.

(b) Section 4.3 Exercise 2.

(c) In Python, draw $1,000$ words (with replacement) from the sentence given in Part (a) and record the number of letters in the word. Compute the variance of the result. How does it compare to the variance you derived?

Problem 5

Section 4.6 Exercise 5

Problem 6

Section 4.6 Exercise 10

Problem 7

Section 4.7 Exercise 2

Problem 8

Section 4.7 Exercise 3