Due: Wednesday, October 4th (9:30 a.m. PT.)

Notes

There will be no class on Mondays October 2nd and 9th, as they are a holidays. However there will be class on Tuesday, October 10th in lieu of a Monday class. There will not be a tutorial that day.

The first midterm is on Wednesday, October 11th in class, and will cover material covered through the end of class on October 6th.

Reading

For Friday, September 22nd, Section 2.9 of *Probability Models*.

For Monday, September 25th, Section 2.10 of *Simulation*, and Sections 3.1 through 3.3 of *Probability Models*.

For Wednesday, September 27th, Section 3.4 of *Probability Models*.

For Friday, September 29th, Section 3.5 of *Probability Models*.

For Wednesday, October 4th, Sections 3.6 of *Probability Models*.

Assignment exercises to hand in

1. For the last 3 days of class in September (September 25th, 27th and 29th) record the (earliest) time you **departed** your residence and the (earliest) time you **arrived** at campus on those days.[1]
2. Your departure and arrival times on future days can be modelled as a random process. Let X represent your departure time, and Y represent your arrival time. One way to do this would be to take the three times you found for each value and use a discrete random variable that returns one of those three variables with equal probability. Describe the joint probability mass function $p(x, y)$ you would get if:
   (a) You take both the departure time and arrival time at random from the 3 available choices.
   (b) You choose a day at random, and take both the departure and arrival time from that day.
3. Does (a) or (b) more sense for this model? Why?
4. For both (a) and (b), compute $E[Y|X = e]$ where e was your earliest observed departure time.
5. Compute $Cov(X, Y)$ for both (a) and (b), and deduce whether X and Y are independent.
6. A better model for your departure and arrival times might use a continuous random variables. Using the distributions mentioned in Section 2.3 of *Probability Models*, explain what you believe would be a good model for your departure time X and why. Include numerical values for any parameters in the model.
7. What does the random variable $Y - X$ represent? Do you expect that $Y - X$ is independent of X? Why or why not?

8. *Simulation*, Chapter 2, Exercise 13.
9. *Simulation*, Chapter 2, Exercise 14.
10. *Simulation*, Chapter 2, Exercise 36.

[1] If you live on campus, use the time you departed residence, and the time you arrived at class.

11. *Simulation*, Chapter 2, Exercise 37.

12. *Probability Models*, Chapter 2, Exercise 68.

13. *Probability Models*, Chapter 2, Exercise 73, parts (a) through (d).

14. How well would you expect the assumptions in the previous question apply to whether two people in this class have the same birthday?

15. *Probability Models*, Chapter 2, Exercise 77.

[Held over from assignment 1:] Due to a mistaken reference to "part (a)" in Homework 1, many people did not submit an answer to question 2(b), estimating the probability distribution of the events in problem 1(b). If you didn't get full marks for 2(b) in Homework 1, then please submit an answer to it when you submit Homework 2 (as question 16). Curiously, since the release of Homework 1, Drake announced a two week postponement of his next album. Thus we are in essentially the same position with respect to question 2(b) as we were when the course started.