Week 8 - Discussion

Problem 1. You wonder if undergraduate students go to Geisel library at least one time for a given quarter as much often as graduate students. After surveying a random sample of students, you get such a result for Fall 2021. Unfortunately, you lose some data and only know the total number of surveyed graduate students.

Go to Geisel library at least one time	Undergraduate	Graduate
Yes	170	x
No	30	
Total	200	200

- a. Based on your intuition, you think that graduate students will go to the library less often than undergraduate students. If you want to reject the null hypothesis that graduate and undergraduate students have the same tendency to go to Geisel library at least one time, what is the possible x value which can make you reject the null hypothesis. (Assume you use $\alpha = 0.05$) [Tech]
- b. Give one reason for your intuition in part (a).

Problem 2. Suppose a staff of Target in the UCSD campus claims that an equal number of customers come for shopping every 7:00-8:00 PM on weekdays. To test this hypothesis, he/she surveys the habit of 250 students. We assume that these student only come to Target once every week and the probabilities for them to come to target on each weekdays are all 1/5. On a given week, this staff observes the following data: Monday, 50; Tuesday, 60; Wednesday, 40; Thursday, 40; Friday, 60.

- a. Run a goodness-of-fit test using R based on this provided data. Will you reject this hypothesis with $\alpha = 0.01$. [PHOM of PHANTOM]
- b. You think this hypothesis may be broken during the final week. Most students will come to campus on Monday for preparing exams. Then, most students will not come to campus once they have finished their final exams. Thus, you guess the number of customers that come into the shop during the same time period on Monday and Friday of the final week will increase and decrease by x, respectively. Suppose we still do hypothesis test based on the same data provided in part (a). In other words, our new observed data should be Monday, 50+x; Tuesday, 60; Wednesday, 40; Thursday, 40; Friday, 60-x. find the smallest x that makes you reject the null hypothesis with $\alpha = 0.01$. [Table]
- c. Test your answer for part (b) by R.