**DATA 557**

**Homework Assignment 7**

Submissions are due by **5:00pm, Wednesday February 27.**

This homework is an individual (not group) assignment. You may work together to help each other solve problems, but you should do all the work, create your own solutions, and hand in your own work without copying others’ work.

It is not necessary to include R code with your solutions for this assignment.

**Data set for Question 1: ‘cells.csv’**

Summary: a randomized clinical trial of immune cell stimulation in 40 patients

Variables:

id: subject id #

dose: drug dose (0, 10, or 100mg)

sex: sex (0=female, 1=male)

age: age (yrs)

count0: pre-treatment cell count

count1: post-treatment cell count (the response variable)

1. Use linear regression to estimate the effect of dose on post-treatment cell count, with adjustment for sex, age, and pre-treatment cell count. State the interpretation of the estimated dose effect. Using your model, conduct a test of the null hypothesis of no effect of dose after adjustment for sex, age, and pre-treatment cell count. Do you think this test is valid? Provide justification by assessing the model assumptions.

**Data set for Question 2: ‘Sales.csv’**

Variables:

LAST\_SALE\_PRICE: the sales price of the home

SQFT: area of the house (sq. ft.)

LOT\_SIZE: area of the lot (sq. ft.)

BEDS: number of bedrooms

BATHS: number of bathrooms

2. You are a real estate agent in Seattle who is often asked by potential clients the question “If I added a bathroom to my house, how much would it increase the house’s value.” House price depends on many factors in addition to the number of bathrooms, so use linear regression to adjust for some of these other confounding variables (use only the variables listed above for your analyses). Your answer should be one that you can use for any client (i.e., for the “average” house). However, in addition you would like to have answers specifically for owners of small houses and owners of large houses (as reflected by the area of the house). Provide two different estimates of the value of an additional bathroom: one for houses of below-average size, and one for houses of above-average size. (Note: Ignore the fact that the data set is a few years old and treat it as if it is current.)