Lab 10 Activity

Today we will look at salaries of university professors in 2008:

Variable	Description
rank	Assistant, Associate, or Full Professor
discipline	A = theoretical department, B = applied department
yrs.since.phd	Years since PhD
yrs.service	Years of Service
sex	Sex (Male or Female)
salary	nine-moth salary in dollars

Run the following code to name the data you will be using as `dat`:

```
library(carData)

dat <- Salaries
```

1. We want to test whether there is a difference in salaries (`salary`) between professor ranks (`rank`). It is good practice to check what type of class the variables you are dealing with are. Use the `class()` function to check what type of variable `rank` is. Does it need to be turned into a `factor` variable?

- What will be the reference group (i.e., intercept value) once you run a regression with `rank` predicting `salary`? You should be able to find out before running the regression.

2. Run a regression with `rank` predicting `salary`. What are the meaning of the intercept and the two regression coefficients? What hypotheses do the two regression coefficients test?

- based on these results, can we test whether the mean salary of associate professors is significantly different from that of full professors?

3. Recode the contrast matrix such that you regression coefficients test whether salary of associate professors is significantly different from the salary of full professors and assistant professors. Check that you receded the contrast matrix correctly by printing it again.

4. Run the same regression as before. Report the regression coefficient that tests whether the mean salary of associate professors is significantly different from the salary of full professors. Is there a significant difference?