

**Statistics 3080**  
**Homework 3**  
**Due: Friday, October 6**

Complete the following problems in a commented R file. Include any output requested as a comment following your code. Save any produced plots in a single PDF file.

**Problem 1 (30 points):** The data file *sleep.txt* contains the reaction times for 18 subjects after the associated number of days of sleep deprivation.

- (a) Plot these data distinguishing each subject by line type.
- (b) Plot these data distinguishing each subject by line color.
- (c) Add points to the graphic created in part (b)
- (d) Modify the point type in the graphic created in part (c) to vary by subject.
- (e) Add the following plot title to the graphic created in part (c): “Reaction times after days of sleep deprivation”.
- (f) Modify the graphic created in part (e) so that the x-axis markers are the integers from 0 to 9.

**Problem 2 (45 points):** The data file *tv.txt* contains the number of minutes that subjects spent sitting at home in the evening (x) and the number of minutes that subjects spent watching tv at home in the evening (y). The variable z represents whether the subject regularly exercises (2) or not (1).

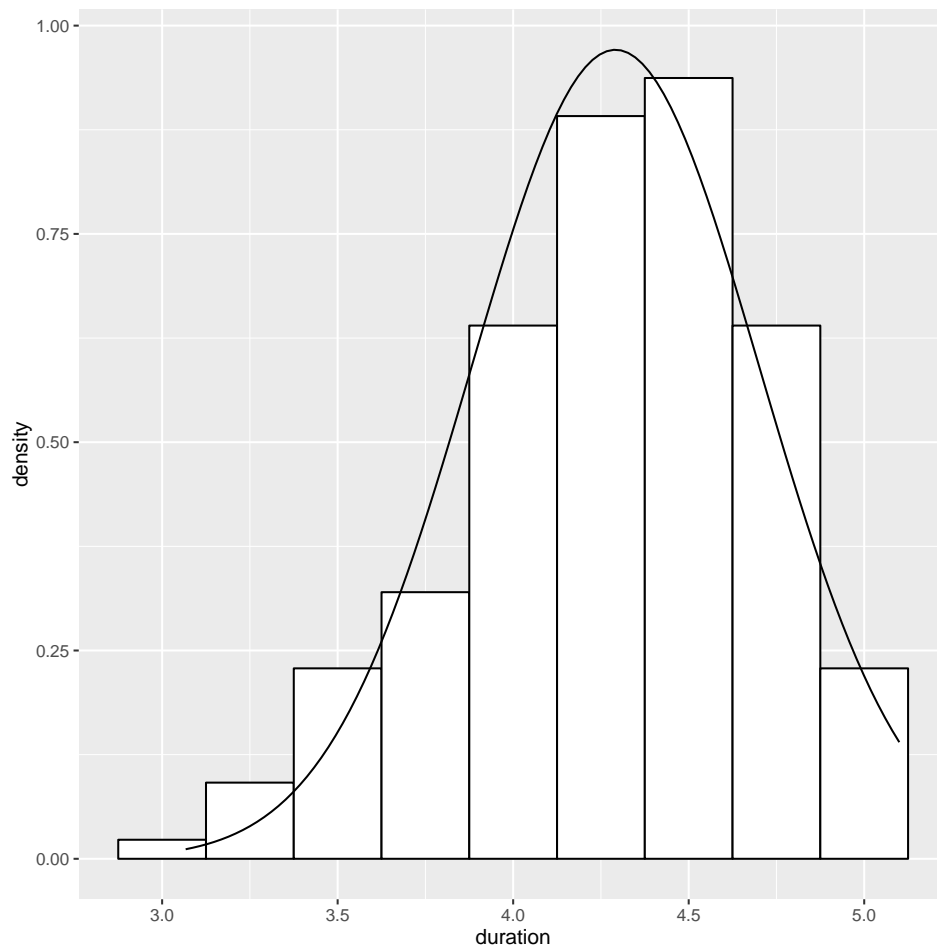
- (a) Plot these data using a point that has only an outline.
- (b) Modify the graphic created in part (a) to have the title “Evening time at home”, the x-axis “Sitting (minutes)”, and the y-axis “Watch TV (minutes)”.
- (c) Modify the graphic created in part (b) to use rectangles of varying colors to identify the data instead of individual points.
- (d) Modify the graphic created in part (b) to distinguish those who exercise regularly by color using blue and orange.
- (e) Modify the graphic created in part(d) to make the points transparent enough that all of them can be seen.
- (f) Modify the legend of the graphic created in part (e) to be titled “Exercise” with labels “Yes” and “No”.
- (g) Add just a regression line for each group of subjects to the graphic created in part (f) (no confidence bands).

- (h) Add the confidence bands to the graphic created in part (g) that are shaded the same color as the line and mostly transparent.
- (i) Create a plot similar to the graphic created in part (g) with just one regression line for all of the subjects.

**Problem 3 (15 points):** The data file *compexp.txt* contains results from an experiment on plant competition. The experiment compared the plant yield at maturity for one control and four treatment groups.

- (a) Create a bar graph for the median yield of each group with bars that are white with a black outline.
- (b) Add error bars to the graphic created in part (a) that represent the interquartile range (Q1 to Q3) and reduce their width to 20% of the width of the bars.
- (c) Modify the graphic created in part (b) to have the title “Yield of mature plants”, the x-axis “Treatment”, and the y-axis “Median yield”.

**Problem 4 (10 points):** The data file *erupt.txt* contains a subset of the Old Faithful geyser eruption duration data. Recreate the graphic shown below.



Hint: The density curve is centered at the sample mean and uses the sample standard deviation.