Introduction to R
Session 6: More loops, control structures, and bootstrapping

Download the `lawschool` dataset, from the course website, and read it into your R session. This dataset is a random sample of 15 law schools, taken from a collection of 82 participating law schools in a large study of admission practices. Two measurements were made on the entering classes of each school: LSAT, the average score for the class on a national law test, and GPA, the average undergraduate grade-point average for the class.

We will estimate the correlation of `LSAT` and `GPA`, and obtain a 95% confidence interval for this correlation.

1. Illustrate the relationship of `LSAT` and `GPA` using a plot (or plots) of your choice.

2. Calculate the correlation of `LSAT` and `GPA` with the `cor()` function.

3. Bootstrap the correlation of `LSAT` and `GPA` using a `repeat()or while()` loop. Start with 50 bootstrap replicates, and then try using 200, 800, and 3200 bootstrap replicates. Keep the output from all four versions.

4. In one graphical window, plot histograms of the bootstrap correlation values for the four bootstrap replicate sizes considered in the previous question (50, 200, 800, and 3,200 replicates). Also calculate the standard deviation of the correlation of `LSAT` and `GPA` for each of the bootstrap replicate sizes.

5. Calculate a 95% confidence interval for the correlation of `LSAT` and `GPA` using the bootstrap quantiles with 3,200 bootstrap replicates.