

## Introduction to R

### Session 7: Fitting models

1. Using the built-in `mtcars` dataset:
  - a. Implement a t-test of the null hypothesis that the average miles per gallon is equal in automatic and manual cars. (The `am` variable is 1 for manual, 0 for automatic) Check that your output is sensible by plotting a boxplot of the same data.
  - b. Implement analysis of variance, to assess whether the mean miles per gallon is equal in cars with different numbers of forward gears. Again, check your output using a boxplot, and be careful to use a factor representation of the `gear` variable.
2. Again using the `mtcars` dataset, implement linear regression of miles per gallon on weight. How does this compare to your “eyeball” estimate in Session 3? Obtain a p-value assessing the hypothesis that the linear trend in this dataset is flat – how does it compare to the permutation p-value from Session 5?
3. Obtain a 95% confidence interval for the linear trend between LSAT and GPA, in the `lawschool` dataset. Compare this with what you got in Session 6.
4. [For keen people!] The `titaniclong` dataset on the course site contains individual Titanic survival data – each row of the dataset represents one person. Implement logistic regression of survival (1/0) on class, and produce 95% confidence intervals for the odds ratios comparing survival in 1<sup>st</sup> and 2<sup>nd</sup> classes to 3<sup>rd</sup> class.