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 1st and 2nd classes to 3rd class.