**Assignment 1 (5% CA):**

**Due at the start of 10am class on the 8th of October**

**Provide all the code and results from R and report the answers in a document along with your interpretation.**

1. **Vectors in R: [25 marks]**

Regression The following are a sample of observations on incoming solar radiation at a greenhouse.

11.1 10.6 6.3 8.8 10.7 11.2 8.9 12.2

1. Assign the object to a vector called *solar.radiation*
2. Find the mean, median and variance.
3. Add 10 to each observation and assign the resulting vector to *sr10*. Find the mean, median and variance of *sr10*. Which statistics change and by how much?
4. Multiple each observation by -2 and assign the resulting vector to *sr2*. Find the mean, median and variance of *sr2*. Which statistics change and by how much?
5. Plot a histogram of each of *solar.radiation*, *sr10* and *sr2*.
6. **Simple Linear Regression: Blood Pressure vs Height: [40 marks]**

Carry out a regression analysis of **Blood Pressure** and **Height** from the Data.txt file**.** Undertake this analysis as you would any analysis whilst also providing the code and graph illustration in a report by doing the following:

* Construct a hypothesis, explaining which is the dependent variable and which is the independent variable.
* Create appropriates plots to investigate your hypothesis.
* Carry out the simple linear regression analysis.
* Check the appropriate assumptions are satisfied
* If the assumptions are met, interpret your results, including details such as regression equation; interpretation of the slope and if it is significant; and any measures that comment on how well the model fits. Relate your results back to your hypothesis and make a conclusion.

1. **Simple Linear Regression: Old faithful data: [35 marks]**

Load in the data “faithful” from the datasets that are available in R (hint use data() command and help). Carry out a regression analysis of **Eruptions times** and  **Waiting times** from this dataset to see if the volcano “Old faithful” waiting times has a linear relationship with the eruptions times. Undertake this analysis as you would any analysis providing the code and graph illustration in a report by doing the following:

* Construct a hypothesis, explaining which is the dependent variable and which is the independent variable.
* Create appropriates plots to investigate your hypothesis.
* Carry out the simple linear regression analysis.
* Check the appropriate assumptions are satisfied
* If the assumptions are met, interpret your results, including details such as regression equation; interpretation of the slope and if it is significant; and any measures that comment on how well the model fits. Relate your results back to your hypothesis and make a conclusion.