**Possible hypotheses based on modelling\_data.xlsx**

After analysing the data given in modelling\_data.xlsx, we can find some hypotheses which will be relevant to decision making for the sales of the items, which are the following:

* We can compare the difference between the average sales of two items and say which one of them is supposed to sale most determined by the sample data. We will do this by doing the one-tailed Student’s t-test, and the null hypothesis will be

H0: mean(a) >= mean(b)

Opposing to the alternate hypothesis,

H1: mean(a) < mean(b)

Where a,b are the two items we want to compare.

* We can compare the average sales of an item when it is promoted or it came in a feature display. We will use Student’s t-test for this again and the null hypothesis will be

H0: mean(0) >= mean(1)

And the alternative hypothesis will be

H1: mean(1) > mean(0)

Where mean(0) implies population mean of the item when it is not being promoted and mean(1) implies population mean of the item when it is being promoted.

* We can also test the relative variance of two items i.e. which one of the two items is supposed to have a higher fluctuation in sales under same condition. We can do this by doing an F-test of variance, while our null hypothesis and alternative hypothesis being

H0: var(a) >= var(b)

H1: var(b) > var(a)

Where var(a),var(b) are the population variance of items a and b respectively.

* We can also check whether sale of one item is affecting sale of another item or not. We can do this by having a Student’s t-test for correlation coefficient.
* Another thing we can check is that whether the correlation between the time and the sales of an item per week is positive i.e. increasing with time or negative i.e. decreasing with time. We can test this by same procedure as before.