STAT9006 Sample Assessment 03 Dr Seán Lacey

A physician is evaluating a new diet for her patients with a family history of heart disease. To test the effectiveness of this diet, 16 patients are placed on the diet for 6 months. Their weights are measured before, during and after the study, and the physician wants to know if subject's weights have changed. Test the hypothesis that there is no difference in subjects weight:

1. Over time;
2. With respect to gender;
3. Over time with respect to gender.

Open *Sample Assessment 03: Dataset* on Canvas. Report and interpret your findings using 0.05 level of significance.
Requirements: In your assessment, you are expected to use R to compile the appropriate tables/graphs/tests etc. You are expected to **explain all concepts and procedures** used in the analysis of the data - i.e., all the **descriptive statistics and statistical inference should be fully explained!**
Breakdown of marks (200 marks)

- 15 marks for a clear introduction to the assessment with reference to the approach been adopted for the assignment:
  - 10 marks for stating the type of data presented, **type of study**, **sample size**, **related** or **independent** samples and the main questions to be answered in the assessment;
  - 5 marks for summaries on the approach been undertaken to answer the questions posed - e.g., Section 2 of the assignment will summarise the data for each group into frequency tables etc.
- 30 marks (6 * 5 marks) for the correct use and explanation of **boxplots** and **means plots** describing the difference [**use grid.arrange()** to pair the appropriate plots]:
  - 3 marks for each graph presented;
  - 2 marks for a correct comment/observation on each graph.
- 30 marks to test the assumptions of **normality,** homogeneity of **variance** and **sphericity**. Clearly state the hypotheses when testing the three assumptions:

- 50 marks for the calculation and explanation of the **mean, standard deviation, min, max** and **confidence interval** for each group (note there are 10 groups):
  - 40 marks for correct calculations presented. Output needs to be presented in correct table format for full marks;
  - 10 marks for comments comparing **only** the **means** of the subgroups.
- 30 marks for the test of **differences** between the subgroups:
  - 10 marks for clearly stating the null and alternative hypotheses (note there are three null hypotheses);
  - 10 marks for the correct **conclusion**. The conclusion should state whether or not a difference exists.
  - 10 marks for **strength** of the difference found. Marks for **presentation**, full **description** of what effect size measures (in general) and comment on the actual **number**;
- 45 marks for **pairwise comparison** tests between the subgroups (using Tukey HSD):
  - 30 marks for **presentation** of the results;
  - 15 marks for the **correct conclusions**.