ST204 Nonparametric Statistics
2021-22 Semester 2
Assignment Sheet 3

Due at 16:00 on Friday 1st April 2022.

Only one randomly chosen question will be marked. Submit answers to questions not already covered in tutorials only. Your submission file should be in the form of a merged .pdf and your code must be provided for any questions involving R. Otherwise, you are free to mix typed/handwritten solutions as you see fit.

1. A health administrator wanted to compare the unoccupied bed space for three hospitals located in the same city. She randomly selected 10 days from the records of each hospital and noted the number of unoccupied beds. The data set is given in the following table.

Hospital 1	Hospital 2	Hospital 3
6	34	13
48	28	35
3	42	19
17	13	4
11	40	29
30	31	0
15	59	7
16	32	48
25	39	18
5	28	24

   (a) Explain in the context of the problem and using any appropriate graphics why a parametric F-test might not be appropriate here.

   (b) Is there evidence of a difference in unoccupied beds across the hospitals? Answer this by hand (without the use of R). You may need to consult Table 8 in the book of statistical tables.

2. Following on from question 1,

   (a) Use R to verify your calculations in question 1 (b).

   (b) Using R, perform appropriate comparisons across the hospitals to identify any differences.

3. The dataset `CA3_Flu.csv` records data from a study examining recovery time from three strains of influenza (denoted A, B and C). Thirty human subjects were selected at random from a group of volunteers and divided into three groups of ten. Each group was randomly assigned a strain of the virus and influenza was induced. The subjects were then cared for under identical conditions and recovery time (in days) was recorded.

   (a) Summarise the raw data using summary statistics *and* graphs as appropriate.

   (b) Use a parametric test to compare the groups. State your conclusion. Find confidence intervals for the pairwise differences using Tukey's method. Assess the model fit via residual diagnostics.

   (c) Use nonparametric tests to compare the groups. Look for both overall and pairwise differences. State all appropriate hypotheses and conclusions.

   (d) Which approach is more appropriate here?

   You may use R to answer this question.