6G7Z1020
Assignment 6

Refer to the work you have done in the lab practical, the relevant examples and the exercises given in the lecture notes. For each answer, include your results in a formatted PDF document that contains your graph, one small paragraph with your comments and a separate section that includes your `SAS` code.

Chapter 4 Questions

1. Diet

The file diet.csv contains measurements from a restricted caloric diet trial on mice. Scientists wanted to investigate if a restricted (in terms of calories) diet affects longevity. They considered the six different diets and randomly allocated experimental subjects to each group:

NP mice ate as much as they wished of a standard diet.

N/N85 mice were fed normally before and after weaning. After weaning, their caloric intake was 85 kcal per week, which is the normal average level.

N/R50 mice were fed normally before weaning; and after weaning, their caloric intake was restricted to 50 kcal per week.

R/R50 mice were fed 50 kcal per week before and after weaning.

lopro mice were fed normally before weaning, a restricted diet of 50 kcal per week after weaning, and the dietary protein content decreased as they got older.

N/R40 mice were fed normally before weaning and were given 40 kcal per week after weaning.

Using the information above reply to the following questions:

1. Using the appropriate numerical and visual summaries comment on your data. [10]
2. Conduct a test for the overall equality of the means. State your hypothesis, conduct the test and comment on the results. [20]
3. Using the appropriate comparisons method, use the **NP** group as your reference point (control) and check if compared to NP:
   a) Reducing the diet to 85 kcal has an effect. [5]
   b) Reducing the diet to 40 kcal has an effect. [5]
4. Select the appropriate groups (hint: do not use NP) to check if:
   a) Pre-weaning dietary restrictions have an effect. [5]
   b) Restricting the protein intake has an effect. [5]

Chapter 5 Questions

The following two questions were taken from [1] and assume that the normality assumption **does not hold**.

2. Golf

On the day of the third round of the Open Golf Championship in 1987 before play started a television commentator said that conditions were such that the average scores of players were likely to be at least three points higher than those for the second round. For a random sample of 10 of the 77 players participating in both rounds the scores were:

Player	A	B	C	D	E	F	G	H	I	J
Round 2	73	73	74	66	71	73	68	72	73	72
Round 3	72	79	79	77	83	78	70	78	78	77

Do these data support the commentator's claim? Consider carefully whether a one– or two–tail test is appropriate. [20]

3. Birthdays

Cohen [2] gives data for numbers of births in Israel for each day in 1975. We give below data for numbers of births on each day in the 10th, 20th, 30th and 40th weeks of the year.

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Week							
10	108	106	100	85	85	92	96
20	82	99	89	125	74	85	100
30	96	101	108	103	108	96	110
40	124	106	111	115	99	96	111

Perform the appropriate analyses to determine whether the data indicate:

1. a difference in birth rate between days of the week that shows consistency over the four selected weeks [15]
2. any differences between rates in the 10th, 20th, 30th and 40th weeks. [15]

References

[1] Peter Sprent and Nigel C. Smeeton *Applied Nonparametric Statistical Methods*, (Chapman & Hall, CRC Texts in Statistical Science) 3rd edition, 2001.

[2] Cohen, Ayala. *Seasonal daily effect on the number of births in Israel.* Applied Statistics (1983): 228-235.