STAC33 Assignment 2

Due Tuesday January 28 at 11:59pm

Hand in your answers to Questions 2 and 4. Questions 1 and 3 contain suggested problems from PASIAS to work through. They may contain hints for the questions to hand in.

The assignment is due on the date shown above. An assignment handed in after the deadline is late, and may or may not be accepted (see course outline). My solutions to the assignment questions will be available when everyone has handed in their assignment.

You are reminded that work handed in with your name on it must be *entirely your own work*.

Assignments are to be handed in on Quercus. See `https://www.utsc.utoronto.ca/~butler/c32/quercus1.nb.html` for instructions on handing in assignments in Quercus. Markers' comments and grades will be available there as well.

You will probably want to begin with this:

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library(tidyverse)
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1. Work through Chapter 6 of PASIAS.
2. Children in a psychology study were asked to solve some puzzles. The children were then given some feedback on their performance, and after that the children were asked to rate how lucky they had been at solving the puzzles, on a scale from 1 ("very lucky") to 10 ("very unlucky"). The scores for the 60 children in the study are in `http://www.utsc.utoronto.ca/~butler/assgt_data/feellucky.csv`, as a `.csv` file.
   (a) (2 marks) Read in and display (some of) the data. Does it look as if you have the right thing? Explain briefly.
   (b) (2 marks) Obtain a 99% confidence interval for the mean luck score.
   (c) (3 marks) The middle of the luck scale is 5.5 points (halfway between 1 and 10). Is there any evidence that all children, if they were to do this study, would rate themselves as luckier than average? What do you conclude, in the context of the data?
   (d) (3 marks) Make a suitable graph of the data. Explain briefly why you are doubtful about the test and confidence interval you just did.
3. Work through problems 7.1 through 7.4 in Chapter 7 of PASIAS.
4. What is the effect of sleep deprivation on food intake? To find out, a random sample of 30 men were randomly assigned to one of two groups. In the first group, the men were limited to only 4 hours of sleep on each of two nights; in the second group, the men were allowed to sleep for 8 hours for the same two nights. The day after their two nights of restricted sleep, each man had their food intake (in Kcal) measured.

   The data are in `https://www.utsc.utoronto.ca/~butler/assgt_data/sleep-dep.csv`.

(a) (3 marks) Read in and display (some of) the data. Do you have what you were expecting to see? Explain briefly.

(b) (4 marks) Make a suitable graph (noting that the subject numbers are an identification variable only and don't need to appear on the graph). Compare the centres and spreads of the two distributions, and note any interesting features.

(c) (3 marks) Carry out a suitable two-sample t-test. What do you conclude, in the context of the data? (Make sure you justify the particular two-sample test that you do.)