Assignment 5

Due Tuesday February 25 at 11:59pm on Blackboard

As before, the questions without solutions are an assignment: you need to do these questions yourself and hand them in (instructions below).

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.

Start with this. You will be using something from `smmr` here, so load that as well. Install it first (see the lecture notes if you need help).

```
library(tidyverse)
library(smmr)
```

Hand in question 2.

1. Work through Chapter 10 of PASIAS (on matched pairs and the matched pairs sign test).
2. Some people believe that the full moon can cause changes in behaviour. In one study, aggressive behaviour in dementia patients (in a hospital) was observed. The experimenters suspected that there might be more aggressive behaviour on days close to a full moon. The number of incidents of aggressive behaviour for each patient on each day was recorded. After that, each day was classified as a "moon day" (within 3 days of a full moon) or an "other day" (not close to a full moon), and, for each patient, the mean number of aggressive incidents on moon days and other days was recorded. These data are in `http://ritsokiguess.site/STAC33/moon.csv` as a `.csv` file. (Note: we only have averages for moon days and other days for each patient. If we had numbers of aggressive incidents for each day and each patient, we would be dealing with repeated measures, multiple observations per individual under different conditions. But we don't; just analyzing the means is simpler.)
   (a) (2 marks) Read in and display (some of) the data.
   (b) (2 marks) Explain briefly, in the context of this data set, why this is a matched pairs experiment.
   (c) (3 marks) What is the principal assumption behind the matched pairs t-test? Obtain a graph that would enable you to assess this assumption. (You don't need to interpret the graph until later.)
   (d) (3 marks) Carry out a suitable matched-pairs t-test and interpret the results. (Do this even if you think some other test is better. The critical analysis comes later.)
   (e) (3 marks) Carry out a suitable matched-pairs sign test on these data, and interpret the results. (Do this even if you think some other test is better.)
   (f) (2 marks) Which of the two tests you did is better? Explain briefly.