**MSCI3001 research project planning**

**Choice: WEB APP: Temperature trends**

The idea I have in mind is a R shinyapp that will deal with BOM temperature data. Since you can no longer access the BOM’s data programmatically, the user will have to load in datasets themselves. For this app, a user must load in 2 datasets from the same station. One dataset must be of maximum daily temperature records, and another of minimum daily temperature records from the same station. After the user loads in the data they wish, the app should be able to do the following:

**App functionality basics:**

These are the basic features I plan on implementing in the app:

1. Timeseries of the raw data: both the maximum temperature and minimum temperature records for each day will be plotted out, allowing the user to see the full range of temperature records at that station.
2. Adding on a moving average: the user should be able to add on a moving average of the temperature for both maximum and minimum temperatures based on the number of days they wish to view. I have not decided whether this will be a discrete option (e.g., only choosing 7 days, 14 days, 28 days, etc.) or a continuous option where the number of days can be as long as the user wants.
3. Chart of mean monthly temperatures: the mean minimum and maximum temperature for each month in the dataset will be calculated and plotted in a bar chart.
4. Monthly temperature anomalies: the temperature anomaly for each month should also be plotted against time. A matrix of plots will also be made to show trends in monthly anomaly over time for each individua month.

In addition to the features above, the user should also be able to select what date range they wish to see the data for all of the plots. However, this is purely to zoom into a specific area they wish to look at, and the calculations will still be done with the entire dataset for consistency.

**Additional features**

I may decide to add more features when I get the basic features working without issues. The first additional feature which I aim to add will be to allow users to download the plots that they have created. Other features that I may consider for the app will be:

* Comparing mean monthly temperatures across different datasets
* Graph customisation: allowing users to change the colour of their plots
* Multiple datasets on the same plot.

It is unlikely that I will implement all of these additional features onto the app as I do not want to make this app too complicated.

**How do I plan on doing this?**

To make the app, I will tackle the process in several steps:

1. Make plots for the basic features. This will involve downloading BoM data for a single station and then working out efficient ways to make the plots I want to make.
2. Create shiny app. Using the existing code, I will ensure that these plots can be made as shinyapp outputs and a first version of the app will be developed that runs on only a single dataset.
3. Create user input options: With a basic shiny app, I will then code the input options available to the users, and test they work on the existing dataset, and other BoM datasets. This will be done for all basic features.
4. Additional features: When all of the basic features work, I will then start implementing additional features.

Currently, I am working on making the plots for the basic features, and I am very close to finishing that. I plan on actually making the shinyapp very soon.