Please do not create sections in your report named exactly the same as these sections. Write the report as if it were a real report, either for a job or for a scholarly journal (depending on your background and interest). Include things like a title page (for a report) or Abstract/Conclusions (for a journal article).

1.   [Introduction] Give a short précis of your report (Abstract). Describe your data set, including available information on gathering technique (who? where? when? how?) and quality-related metrics (precision? missing points? imputation/gapfilling?). Be sure to accurately describe where you obtained the data, and cite it properly using a standard citation method (MLA, AMS, or IEEE). Include a short discussion of the physical reality the data is taken from, and any lurking factors that may complicate your analysis.

2.   [Data] Perform an 'Exploratory Data Analysis' where you examine your data set, estimate standard statistics like mean, variance, etc., and determine the data quality. If there are missing points or outliers, describe them and detail how you will work around them [1]. Include a time-series plot with carefully considered margins, axes, labels, and (if necessary) colours.

3.   [Analysis: I] Continue the data analysis by either fitting models to the data (time domain) or by estimating the power spectrum. Explore the accuracy of your fit, and discuss any choices you made. If you are working in the time domain, ensure you try at least two reasonable criteria for model fit, and discuss differences. Include interesting/instructive plots in this section.

4.   [Analysis: II] Interpret the results from the previous two sections in the context of your data's environment. Can you conclude anything from the analysis? Are there any implications for society/science?

5.   [Conclusion] Wrap everything up with a short conclusion, written in traditional paper/essay format.

6.   [Works Cited] You should have at least three citations here, at a minimum: the textbook, the source of your data, and the R/MATLAB package(s) you used. Feel free to find more, especially for the section on interpretation. I encourage you to research previous analyses of similar data sets to compare your results with theirs, so long as you have **some** unique material.

Marking Scheme

The project will be marked out of 60, providing a $2 : 1$ ratio of marks-on-project to final (term) points. The breakdown is as follows:

15 points General formatting, introduction, conclusion, Works Cited, spelling, grammar, general level-of-effort.

15 points Data description, all aspects from the *Introduction* and *Data* sections.

20 points Model fitting, accuracy, plots, statistical tests.

10 points Other aspects of analysis, interpretation, implications.

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[1] Feel free to discuss this particular part with the instructor to ensure you're making the right decision.

The report will be marked on a rubric-like scheme. I will read each report, making comments and corrections as I go. Once finished, I will go back over the report and evaluate each item above on a scale of 1-5, where 1 represents completely unacceptable work, and 5 represents exceptional work. These will be scaled by the appropriate scale to get to the points for the item (i.e. multiplied by $2, 3,$ or 4), and then modified within the bracket based on errors or flaws.

As an example, say John Doe has handed in a report. I read the report, and through the entire report there are no spelling or grammar errors. In addition, his introduction and conclusion are carefully written, his Works Cited is complete and accurate, and he has shown a clear level of effort. In the first item above, John clearly deserves a 5-level score. This scales to the $13 - 15$ bracket, and his final grade for the item will be selected in this bracket based on errors/flaws. It will be very difficult to receive a perfect score for an item, but entirely possible to get (say) $14/15$, which at 93% is well into the highest GPA at Queen's, a 4.3.

If you have questions or concerns about this project, please come talk to the instructor.