Predicting Design Ground Snow Loads in Utah

(Your name here)

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1 Introduction

- Introduce the design ground snow load problem and why it is important. You may choose to cite a few sources regarding the importance of proper design ground snow loads such as the reference provided in the assignment description (Arcement, 2017). Some other references you may wish to include are:
  - A reference that found mention in the media of 1,029 snow induced building failures in the United States from 1989-2009 (Geis, Strobel, & Liel, 2011).
  - A reference to the national snow load standards document, which illustrates that snow is important enough to prompt engineers to require that buildings be constructed to appropriately withstand loads (ASCE, 2017).
  - A reference to the report that includes the data-set being used in this project (Bean, Maguire, & Sun, 2018).

2 Data

- Briefly describe the variables of interest, including their units of measure.
- Provide one or two exploratory plots that show the distribution of the data as well as the relationship between ground snow and elevation.
- Identify any outliers that are present in the data. If you do identify outliers, be sure to describe how you handled them in the following section.

3 Modeling Assumptions

- Determine whether the original regression model provided in the starter code satisfies the necessary modeling assumptions.
- If assumptions are violated, describe the remedial measures you took to eliminate the violations.
- Demonstrate that your remedial measures were successful.

4 Model Inference and Validation

- Determine whether or not the linear relationship between ground snow and elevation is significant.
- Provide an interpretation for the coefficient associated with elevation in the model.
- Provide simultaneous prediction intervals for Park City (elevation: 2134 meters) and Logan (elevation: 1382 meters) and comment on the appropriateness of these intervals.
- Provide a confidence interval for your prediction at Kings Peak, Utah (elevation 4122 meters) and comment on the appropriateness of this interval.
- On a scale of 1-5 (1 being terrible, 5 being excellent) rate the quality of your linear model and justify your choice using two graphical and two numerical outputs.

5 Conclusions

- Describe the implications of your analysis: what do we learn about the relationship between ground snow and elevation based on your work?
- Identify at least two future directions for research. What additional questions would be worth exploring based on your analysis?
- Be sure to write the introduction and conclusion in ways that an everyday reader would understand. These sections should not be overly technical.

References

Arcement, K. (2017, January). *'a lot of scared people': Relentless snow collapses hundreds of Idaho roofs, devastates rural county.* WP Company LLC. Retrieved from `https://www.washingtonpost.com/news/morning-mix` (Accessed: 05-15-2018)

ASCE. (2017). *Minimum design loads and associated criteria for buildings and other structures* (ASCE/SEI 7-16 ed.). American Society of Civil Engineers. Retrieved from `http://ascelibrary.org/doi/abs/10.1061/9780784414248` doi: 10.1061/9780784414248

Bean, B., Maguire, M., & Sun, Y. (2018). *The Utah snow load study* (Tech. Rep.). Utah State University, Department of Civil and Environmental Engineering. Retrieved from `https://digitalcommons.usu.edu/cee_facpub/3589`

Geis, J., Strobel, K., & Liel, A. (2011). Snow-induced building failures. *Journal of Performance of Constructed Facilities*, *26*(4), 377–388.

A Appendix

Place relevant SAS code here:

```
/* This first line of code will need to be changed */
FILENAME REFFILE '/home/u41171697/data/project1/snowloads.csv';
```

```
/* Read in the csv file using proc import. Note that you will need
   to upload the snowloads.csv file to SAS Studio prior to use */
PROC IMPORT DATAFILE=REFFILE replace
DBMS=CSV
OUT=WORK.snow;
GETNAMES=YES;
RUN;

/* Initital regression model */
proc reg data = snow;
model snowload = elevation;
run;
```