Assignment 1: Data Exploration

Student Name

OVERVIEW

This exercise accompanies the lessons in Environmental Data Analytics (ENV872L) on data exploration.

Directions

1. Change "Student Name" on line 3 (above) with your name.
2. Use the lesson as a guide. It contains code that can be modified to complete the assignment.
3. Work through the steps, **creating code and output** that fulfill each instruction.
4. Be sure to **answer the questions** in this assignment document. Space for your answers is provided in this document and is indicated by the ">" character. If you need a second paragraph be sure to start the first line with ">". You should notice that the answer is highlighted in green by RStudio.
5. When you have completed the assignment, **Knit** the text and code into a single PDF file. You will need to have the correct software installed to do this (see Software Installation Guide) Press the `Knit` button in the RStudio scripting panel. This will save the PDF output in your Assignments folder.
6. After Knitting, please submit the completed exercise (PDF file) to the dropbox in Sakai. Please add your last name into the file name (e.g., "Salk_A02_DataExploration.pdf") prior to submission.

The completed exercise is due on Thursday, 31 January, 2019 before class begins.

1) Set up your R session

Check your working directory, load necessary packages (tidyverse), and upload the North Temperate Lakes long term monitoring dataset for the light, temperature, and oxygen data for three lakes (file name: NTL-LTER_Lake_ChemistryPhysics_Raw.csv). Type your code into the R chunk below.

2) Learn about your system

Read about your dataset in the NTL-LTER README file. What are three salient pieces of information you gained from reading this file?

ANSWER:

3) Obtain basic summaries of your data

Write R commands to display the following information:

1. dimensions of the dataset
2. class of the dataset
3. first 8 rows of the dataset
4. class of the variables lakename, sampledate, depth, and temperature
5. summary of lakename, depth, and temperature

```
# 1
```

```
# 2
```

```
# 3

# 4

# 5
```

Change sampledate to class = date. After doing this, write an R command to display that the class of sammpledate is indeed date. Write another R command to show the first 10 rows of the date column.

Question: Do you want to remove NAs from this dataset? Why or why not?

ANSWER:

4) Explore your data graphically

Write R commands to display graphs depicting:

1. Bar chart of temperature counts for each lake
2. Histogram of count distributions of temperature (all temp measurements together)
3. Change histogram from 2 to have a different number or width of bins
4. Frequency polygon of temperature for each lake. Choose different colors for each lake.
5. Boxplot of temperature for each lake
6. Boxplot of temperature based on depth, with depth divided into 0.25 m increments
7. Scatterplot of temperature by depth

```
# 1

# 2

# 3

# 4

# 5

# 6

# 7
```

5) Form questions for further data analysis

What did you find out about your data from the basic summaries and graphs you made? Describe in 4-6 sentences.

ANSWER:

What are 3 further questions you might ask as you move forward with analysis of this dataset?

ANSWER 1:

ANSWER 2:

ANSWER 3: