


ENVIRONMENTAL DATA ANALYTICS: WEEK 4 – DATA EXPLORATION

Spring 2023

Nicholas School of the Environment - Duke University

Part 1.1

Q&A on Data Exploration

Q&A: Importing datasets

- Include `stringAsFactors = True` when importing files

Line 100…

```
USGS.flow.data <- read.csv("../Data/Raw/USGS_Site02085000_Flow_Raw.csv",stringsAsFactors = TRUE)
```

```
Data
USGS.flow.data                33690 obs
  $ agency_cd                 : chr
  $ site_no                   : int
  $ datetime                  : chr
  $ X165986_00060_00001       : num
  $ X165986_00060_00001_cd    : chr
  $ X165987_00060_00002       : num
  $ X165987_00060_00002_cd    : chr
  $ X84936_00060_00003        : num
  $ X84936_00060_00003_cd     : chr
  $ X84937_00065_00001        : num
  $ X84937_00065_00001_cd     : chr
  $ X84938_00065_00002        : num
  $ X84938_00065_00002_cd     : chr
```

```
Data
USGS.flow.data                33690 obs. o
  $ agency_cd                 : Factor w
  $ site_no                   : int  208
  $ datetime                  : Factor w
  $ X165986_00060_00001       : num  NA
  $ X165986_00060_00001_cd    : Factor w
  $ X165987_00060_00002       : num  NA
  $ X165987_00060_00002_cd    : Factor w
  $ X84936_00060_00003        : num  39
  $ X84936_00060_00003_cd     : Factor w
  $ X84937_00065_00001        : num  NA
  $ X84937_00065_00001_cd     : Factor w
  $ X84938_00065_00002        : num  NA
  $ X84938_00065_00002_cd     : Factor w
```

Part 1.2

Q&A on Visual Data Exploration

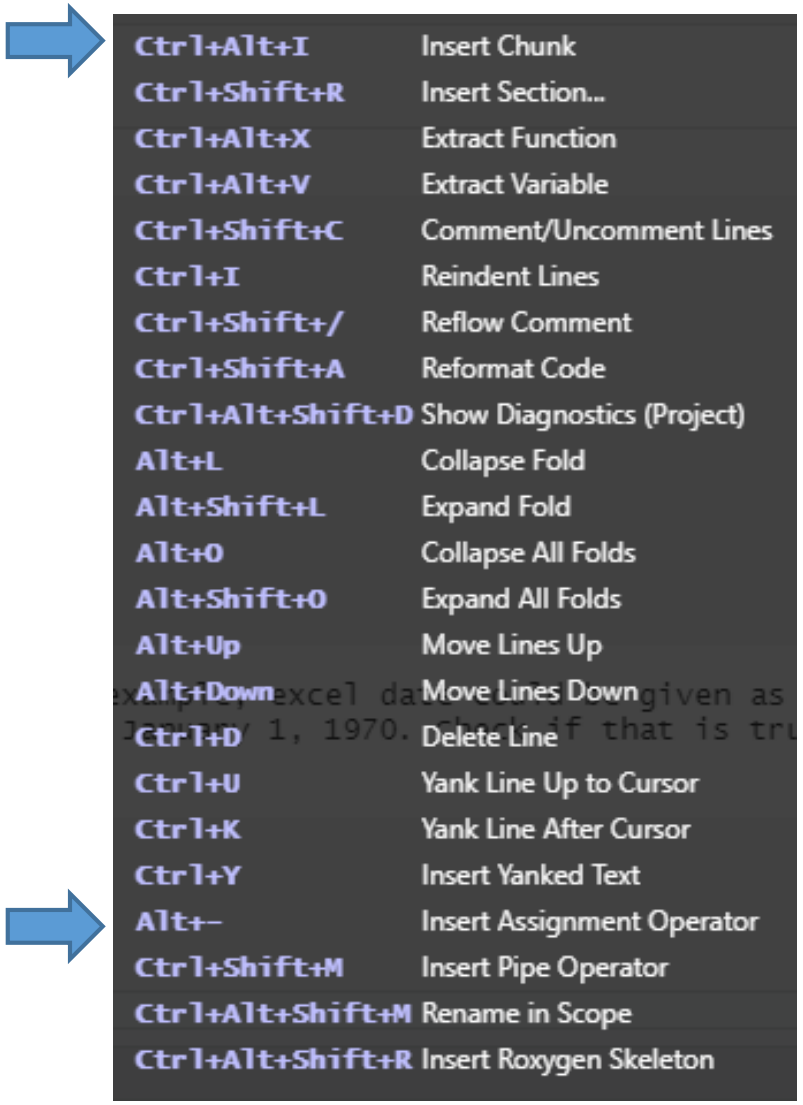
Part 2

Review – Data Structures

Coding Challenges!

Tips for the day – Rmd shortcuts

- Naming code chunks…
- Keyboard shortcuts:



Data Structures

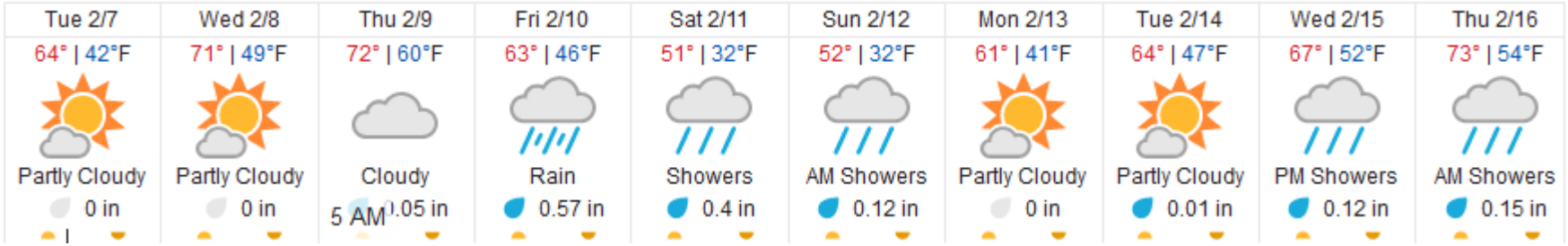
- Vector
- Matrix
- Array
- List
- Data Frame

- What they can hold
- How to construct
- Number of dimensions
- How to extract elements

Coding Challenge #1

- Find a ten-day forecast of temperatures (Fahrenheit) for Durham, North Carolina. **Create two vectors,** one representing the high temperature on each of the ten days and one representing the low

https://www.wunderground.com/forecast/us/nc/durham



Coding Challenge #2 & 3

- Now, create two additional vectors that include the ten-day forecast for the high and low temperatures in Celsius. *Use a function to create the two new vectors from your existing ones in Fahrenheit.*

$$(°\mathbf{F} - 32) \times 5/9 = °\mathbf{C}$$

- *Combine your four vectors into a data frame with informative column names*

Coding Challenge #4

- Use the common functions `summary` and `sd` to obtain basic data summaries of the ten-day forecast. How would you call these functions differently for the entire data frame vs. a single column?

Coding Challenge #5

- Date formats:

%d day as number (0-31)
%m month (00-12, can be e.g., 01 or 1)
%y 2-digit year
%Y 4-digit year
%a abbreviated weekday
%A unabbreviated weekday
%b abbreviated month
%B unabbreviated month

```
```{r}
# Adjust date formatting for today
# Write code for three different date formats
# An example is provided to get you started.
# (code must be un-commented)
today <- Sys.Date()
format(today, format = "%B")
#format(today, format = "")
#format(today, format = "")
#format(today, format = "")

```
```

The “lubridate” package

- More powerful than `as.date()`
- `ymd()... ydm()... mdy()...`
- `fast_strptime()` & `parse_dateTime2()`
  - parses character dates into date obj
  - Has a “`cutoff_2000`” feature (to help with Y2K issue)

The “here” package

here() facilitates relative paths in your script

http://jenrichmond.rbind.io/post/where-is-here/

- **here() –**
  - points to the project’s “root” folder, i.e. the one containing the `.Rproj` file.
  - Is not affected by setwd()
- **here('data', 'raw', 'my_file.csv')**
  - Creates a path to `…/data/raw/my_file.csv`