Coding_Challenge_5

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Question 1: Read dataset

```r
# Clear memory
rm(list=ls(all = TRUE))

# Loading tidyverse library
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
## v dplyr     1.1.4     v readr     2.1.5
## v forcats   1.0.0     v stringr   1.5.0
## v ggplot2   3.5.1     v tibble    3.2.1
## v lubridate 1.9.3     v tidyr     1.3.1
## v purrr     1.0.2
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become error
```

```r
diversity <- read.csv("DiversityData.csv" , na.strings = "na")
meta <- read.csv("Metadata.csv", na.strings = "na")
```

Question 2: Joining datasets by column Code

```r
alpha <- (left_join(meta, diversity, by = "Code")) # adding the richness data to the metadata based on
```

Question 3: Calculate Pielou's evenness index:

```r
# We are creating a new column that will be the result of shannon divided by log of richness
alpha_even <- mutate(alpha, logRich = shannon/log(richness))
```

Question 4: Using the summarise() function to calculate the mean and standard error evenness grouped by crop over time.

```
alpha_average <- alpha_even %>% # We start with this dataset
  select(Code, Crop, Time_Point, Replicate, Water_Imbibed, shannon, invsimpson, simpson, richness) %>%
  group_by(Crop, Time_Point) %>% # grouping by Crop and Tmepoint to later calculate summary stats by gr
  mutate(logRich = shannon/log(richness)) %>% # creating a new column of the log richness
  summarise(Mean.even = mean(logRich), # calculating the mean evennes, stdeviation, and standard error
            n = n(), # output of the sample size per group
            sd.dev = sd(logRich)) %>% # calculating the standard deviation of logRich
  mutate(std.err = sd.dev/sqrt(n)) # calculating the standard error which will be stored in the column
```

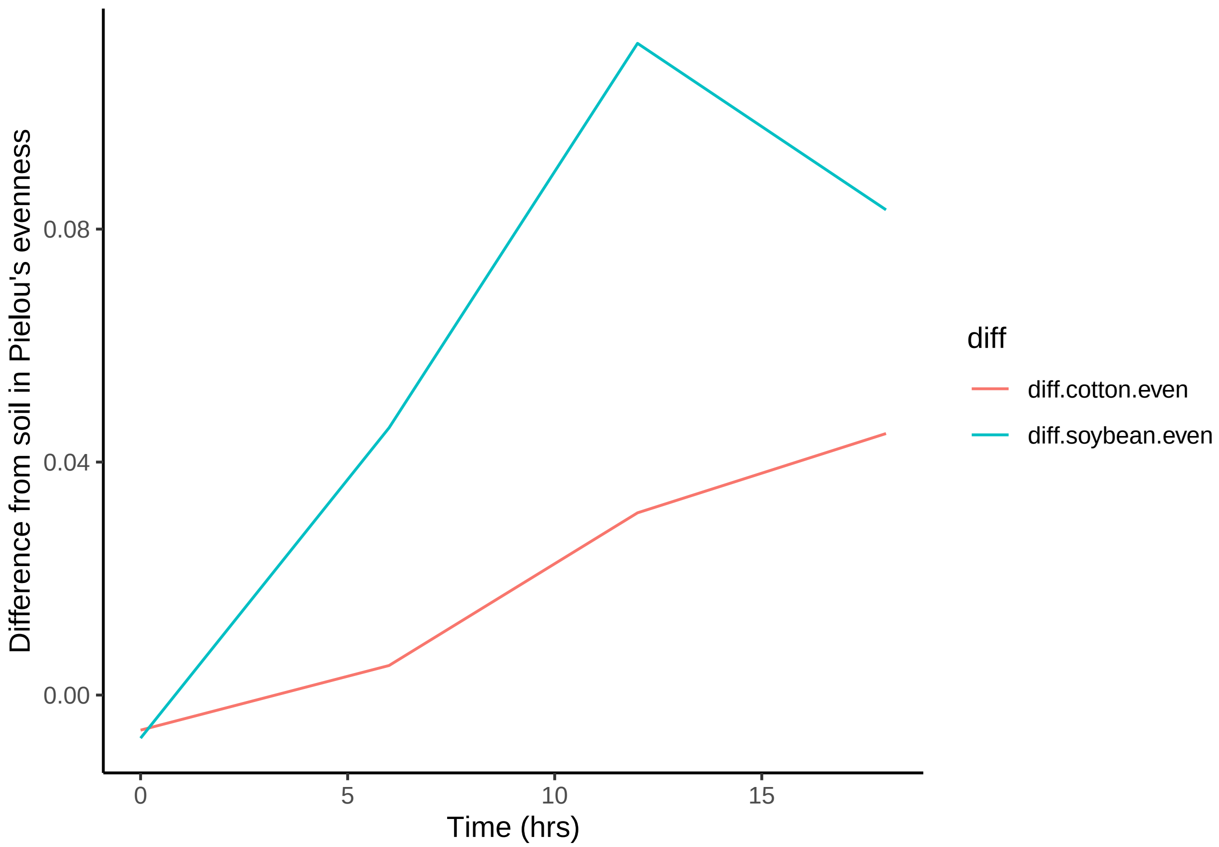
```
## `summarise()` has grouped output by 'Crop'. You can override using the
## `.groups` argument.
```

Question 5: Calculate the difference between the soybean column, the soil column, and the difference between the cotton column and the soil column

```
alpha_average2 <- alpha_average %>% # We start with this dataset
  select(Time_Point, Crop, Mean.even) %>%
  pivot_wider(names_from = Crop, values_from = Mean.even) %>% # pivot to wide format by taking the name
  mutate(diff.cotton.even = Soil - Cotton) %>% # calculate the difference between Soil and Cotton
  mutate(diff.soybean.even = Soil - Soybean)  # calculate the difference between Soil and Soybean
```

Questio 6: Connecting it to plots

```
alpha_average2 %>%
  select(Time_Point, diff.cotton.even, diff.soybean.even) %>%
  pivot_longer(c(diff.cotton.even, diff.soybean.even), names_to = "diff") %>%
  ggplot(aes(x = Time_Point, y = value, color = diff)) + # Plot it
  geom_line() +
  theme_classic() +
  xlab("Time (hrs)") +
  ylab("Difference from soil in Pielou's evenness")
```



Link to GitHub