STAT 231: Problem Set 5B

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due by 10 PM on Friday, March 26

This homework assignment is designed to help you futher ingest, practice, and expand upon the material covered in class over the past week(s). You are encouraged to work with other students, but all code and text must be written by you, and you must indicate below who you discussed the assignment with (if anyone).

Steps to proceed:

1. In RStudio, go to File > Open Project, navigate to the folder with the course-content repo, select the course-content project (course-content.Rproj), and click "Open"
2. Pull the course-content repo (e.g. using the blue-ish down arrow in the Git tab in upper right window)
3. Copy ps5B.Rmd from the course repo to your repo (see page 6 of the GitHub Classroom Guide for Stat231 if needed)
4. Close the course-content repo project in RStudio
5. Open YOUR repo project in RStudio
6. In the ps5B.Rmd file in YOUR repo, replace "YOUR NAME HERE" with your name
7. Add in your responses, committing and pushing to YOUR repo in appropriate places along the way
8. Run "Knit PDF"
9. Upload the pdf to Gradescope. Don't forget to select which of your pages are associated with each problem. *You will not get credit for work on unassigned pages (e.g., if you only selected the first page but your solution spans two pages, you would lose points for any part on the second page that the grader can't see).*

If you discussed this assignment with any of your peers, please list who here:

ANSWER:

1. Justices of the Supreme Court of the United States

a. Confirm (using an R command) that the following Wikipdeia page allows automated scraping: https://en.wikipedia.org/wiki/List_of_justices_of_the_Supreme_Court_of_the_United_States

```
paths_allowed("https://en.wikipedia.org/wiki/List_of_justices_of_the_Supreme_Court_of_the_United_States
```

```
##  en.wikipedia.org
```

```
## [1] TRUE
```

b. Go to the List of Justices of the Supreme Court of the United States and scrape the table for the Justices. Write, test, and save your code in an R script called `scrape_justices.R`, and write the data frame out to a csv file called `justices.csv` using the `write_csv` function.

Be sure to push your .R and .csv files to your GitHub repo.

```
## Add your code that is in justices.R to this code chunk.
## KEEP the "eval=FALSE" option in this code chunk option, as you do NOT want to
## evaluate it (which would re-scrape the website every time you knit this file).
## (We do want the grader to be able to see the code, though, as you'll only
## submit this one knit PDF to Gradescope.)

url <- "https://en.wikipedia.org/wiki/List_of_justices_of_the_Supreme_Court_of_the_United_States"
tables <- url %>%
    read_html() %>%
    html_nodes("table")
  justice <- html_table(tables[[2]], fill = TRUE)
  justice
write_csv(justice, file = "justices.csv")
```

c. Load `justices.csv` into this file using the `read_csv` function. Then, run the code given below to create the variable `tenure_length` (a numeric variable containing each justice's tenure on the bench).

Create a visualization to show the distribution of tenure length of U.S. Supreme Court judges. Interpret the plot.

> ANSWER: There seems to be a significantly high concentration of U.S. Supreme Court Justices who have served on the court for a tenure of fewer than 20 years. This is when compared to Justices who have served for at least 25 years. This could be because you need to have a considerable amount of legal experience before assuming a seat, and as a result, most appointed justices are elderly. Therefore, despite having their seat "for life," many may reach a retirement age relatively early in their career serving on the Supreme Court. Moreover, in general, it is very difficult to retain a seat in the U.S. Supreme Court mostly due to dismissal issues, stress issues, and other negative factors. Therefore, it is not surprising as to why fewer individuals serve on the U.S. Supreme Court for longer periods of time.

```
justices <- read_csv("~/Spring 2021/Data Science - STAT 231/First-Repository/justices.csv")
```

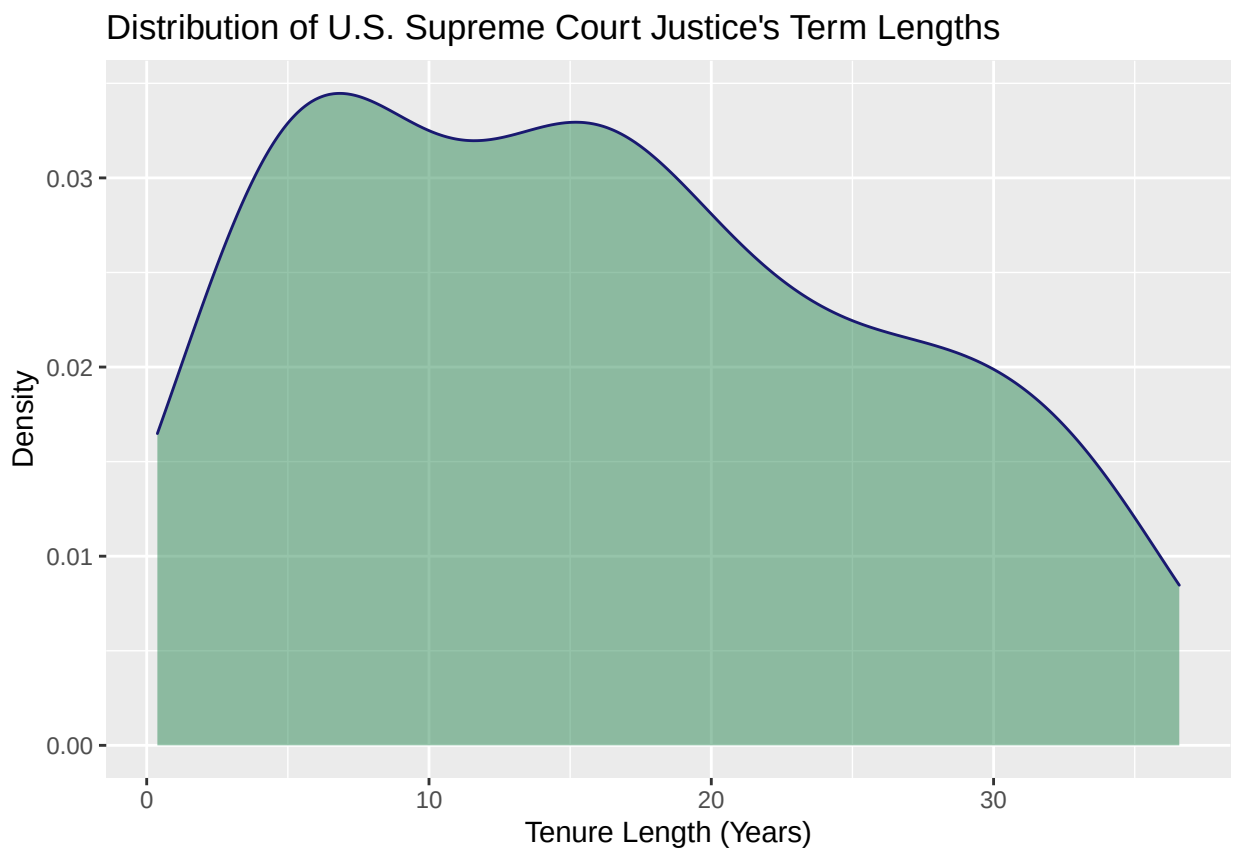
```
## Warning: Duplicated column names deduplicated: 'Justice' => 'Justice_1' [2],
## 'Justice' => 'Justice_2' [3]
```

```
##
## -- Column specification --------------------------------------------------------
## cols(
##   Justice = col_character(),
##   Justice_1 = col_character(),
##   Justice_2 = col_character(),
##   `State[c]` = col_character(),
##   Position = col_character(),
##   Succeeded = col_character(),
##   `Date confirmed(Vote)` = col_character(),
##   Tenure = col_character(),
##   `Tenure length[d]` = col_character(),
##   `Nominated by` = col_character()
## )
```

```
justices2 <- justices %>%
  clean_names() %>%
  # remove extra line that comes in at end of table
  filter(justice != "Justice") %>%
  # some justices served less than 1 year, adjust their length so can
  # separate correctly
  mutate(tenure_length_temp = case_when(str_detect(tenure_length_d, "year") ~
                                          tenure_length_d
                                        , TRUE ~
                                          paste0("0 years, ", tenure_length_d))) %>%
  separate(tenure_length_temp, into = c("years_char", "days_char")
           , sep = ","
           , remove = FALSE) %>%
  mutate(tenure_length = parse_number(years_char) + (parse_number(days_char)/365)) %>%
  # create date confirmed as date variable
  separate(date_confirmed_vote, into = c("date_confirmed_vote", "extra")
```

```
          , sep = "\\(") %>%
  mutate(date_confirmed = lubridate::mdy(date_confirmed_vote))

ggplot(data = justices2, aes(x = tenure_length)) +
  geom_density(fill = "seagreen", alpha = 0.5, color = "midnightblue") +
  labs(title = "Distribution of U.S. Supreme Court Justice's Term Lengths", x = "Tenure Length (Years)"
       y = "Density")
```



2. Brainy Quotes

a. Confirm (using an R command) that automated scraping of the Brainy Quote webpage (https://www.brainyquote.com/) is allowed.

```
paths_allowed("https://www.brainyquote.com/")
```

```
##  www.brainyquote.com
```

```
## [1] TRUE
```

b. Life can get frustrating at times. Like when we're trying to Zoom and our internet cuts out. Or when we can't figure out why R's throwing an error when we try to clone a GitHub repo in RStudio. Or, when COVID-19 upends life as we knew it. In these times, it can't hurt to be reminded of the power of persistence, resilience and optimism.

The code in the first R code chunk below scrapes the first 40 quotes returned from a search for "resilience" on BrainyQuote.com. (Do NOT remove the "eval = FALSE" option from that code chunk; you do not want it to evaluate it, i.e. scrape the site, every time you knit this file.)

The code in the second R code chunk below randomly selects a quote and prints it. When you're feeling frustrated, run that code chunk to randomly generate a quote to lift you up (or just make you laugh at the uselessness of the quote; some of them are pretty pathetic . . .).

Note that CSS selector gadget was used to identify the key words to specify in the `html_nodes` function (i.e. ".oncl_q" and ".oncl_a"). These key words will vary depending on what webpage and what particular objects from that webpage you're trying to scrape.

```
quotes_html <- read_html("https://www.brainyquote.com/topics/resilience-quotes")

quotes <- quotes_html %>%
  html_nodes(".oncl_q") %>%
  html_text()

person <- quotes_html %>%
  html_nodes(".oncl_a") %>%
  html_text()

# put in data frame with two variables (person and quote)
quotes_dat <- data.frame(quote = quotes, stringsAsFactors = FALSE) %>%
  filter(quote != "\n") %>%
  mutate(person = person
         , together = paste('"', as.character(quote), '" --'
                            , as.character(person), sep=""))
```

```
quotes_dat <- read_csv("http://kcorreia.people.amherst.edu/S2021/resilience_quotes.csv")
```

```
##
## -- Column specification --------------------------------------------------------
## cols(
##   person = col_character(),
##   quote = col_character(),
##   together = col_character()
## )
```

```
quote_for_the_day <- quotes_dat[sample(1:nrow(quotes_dat), size = 1),]

cat(quote_for_the_day$together)
```

```
## "As my kids grow up, I think a lot about the lessons and
values I want to impart to them. More than any particular
skill or even financial support, I believe perseverance and
resilience will serve them best, regardless of what
curveball life inevitably throws them." --Sal Khan
```

Go to BrainyQuote.com and search a different topic (or search an Author) that interests you. Scrape the webpage returned from your search following the same code given above. Save your code in an R script called `scrape_quotes.R`, and write the data frame out to a csv file called `quotes.csv` using the `write_csv` function.

Be sure to push your .R and .csv files to your GitHub repo.

```
## Add your code that is in justices.R to this code chunk.
## KEEP the "eval=FALSE" option in this code chunk option, as you do NOT want to
## evaluate it (which would re-scrape the website every time you knit this file).
## (We do want the grader to be able to see the code, though, as you'll only
## submit this one knit PDF to Gradescope.)
quotes_html <- read_html("https://www.brainyquote.com/topics/friendship-quotes")

quotes <- quotes_html %>%
  html_nodes(".oncl_q") %>%
  html_text()

person <- quotes_html %>%
  html_nodes(".oncl_a") %>%
  html_text()

# put in data frame with two variables (person and quote)
quotes_dat <- data.frame(quote = quotes, stringsAsFactors = FALSE) %>%
  filter(quote != "\n") %>%
  mutate(person = person
         , together = paste('"', as.character(quote), '" --'
                            , as.character(person), sep=""))
write_csv(quotes_dat, file = "quotes.csv")
```

c. Load `quotes.csv` into this file using the `read_csv` function. Write code to select *three* of the quotes at random and print them (i.e., set `size = 3` in the `sample` function).

```
quotes_dat1 <- read_csv("~/Spring 2021/Data Science - STAT 231/First-Repository/quotes.csv")
```

```
##
## -- Column specification --------------------------------------------------------
## cols(
##   quote = col_character(),
##   person = col_character(),
##   together = col_character()
## )
```

```
quote_for_the_day1 <- quotes_dat1[sample(1:nrow(quotes_dat1), size = 3),]

cat(quote_for_the_day1$together)
```

```
## "The best time to make friends is before you need them."
--Ethel Barrymore "True friendship multiplies the good in
life and divides its evils. Strive to have friends, for
life without friends is like life on a desert island... to
find one real friend in a lifetime is good fortune; to keep
him is a blessing." --Baltasar Gracian "Friends show their
love in times of trouble, not in happiness." --Euripides
```