

Applied Statistical Programming - Spring 2022

Problem Set 3

Due Wednesday, March 16, 10:00 AM (Before Class)

Instructions

1. The following questions should each be answered within an Rmarkdown file. Be sure to provide many comments in your code blocks to facilitate grading. Undocumented code will not be graded.
2. Work on git. Continue to work in the repository you forked from <https://github.com/johnsontr/AppliedStatisticalProgramming2022> and add your code for Problem Set 4. Commit and push frequently. Use meaningful commit messages because these will affect your grade.
3. You may work in teams, but each student should develop their own Rmarkdown file. To be clear, there should be no copy and paste. Each keystroke in the assignment should be your own.
4. For students new to programming, this may take a while. Get started.

tidyverse

Your task in this problem set is to combine two datasets in order to observe how many endorsements each candidate received using only `dplyr` functions. Use the same Presidential primary polls that were used for the in class worksheets on February 28 and March 2.

First, create two new objects `polls` and `Endorsements`. Then complete the following.

- Change the `Endorsements` variable name `endorsee` to `candidate_name`.
- Change the `Endorsements` dataframe into a `tibble` object.
- Filter the `poll` variable to only include the following 6 candidates: Amy Klobuchar, Bernard Sanders, Elizabeth Warren, Joseph R. Biden Jr., Michael Bloomberg, Pete Buttigieg **and** subset the dataset to the following five variables: `candidate_name`, `sample_size`, `start_date`, `party`, `pct`
- Compare the candidate names in the two datasets and find instances where the a candidates name is spelled differently i.e. Bernard vs. Bernie. Using only `dplyr` functions, make these the same across datasets.
- Now combine the two datasets by candidate name using `dplyr` (there will only be five candidates after joining).
- Create a variable which indicates the number of endorsements for each of the five candidates using `dplyr`.
- Plot the number of endorsement each of the 5 candidates have using `ggplot()`. Save your plot as an object `p`.

- Rerun the previous line as follows: `p + theme_dark()`. Notice how you can still customize your plot without rerunning the plot with new options.
- Now, using the knowledge from the last step change the label of the X and Y axes to be more informative, add a title. Save the plot in your forked repository.

```
Endorsements <- Endorsements %>% #Using dplyr to rename the endorsee column
  rename(candidate_name = endorsee)

#This line will transform our dataframe into a tibble
Endorsements <- as_tibble(Endorsements)

#Next we're going to use the "filter()" function to get 6 candidates and then
#use the "select()"# function to chose our 5 variables. We can do both with the
#piping function
polls <- polls %>%
  filter(candidate_name == "Amy Klobuchar" | candidate_name == "Bernard Sanders" |
    candidate_name == "Elizabeth Warren" | candidate_name == "Joseph R. Biden Jr." |
    candidate_name == "Michael Bloomberg" | candidate_name == "Pete Buttigieg") %>%
  select(candidate_name, sample_size, start_date, party, pct)

#Here I'm going to check for the unique candidate names in each dataset
unique(polls$candidate_name)
```

```
## [1] "Bernard Sanders"      "Pete Buttigieg"      "Joseph R. Biden Jr."
## [4] "Amy Klobuchar"       "Elizabeth Warren"    "Michael Bloomberg"
```

```
unique(Endorsements$candidate_name)
```

```
## [1] "John Delaney"      "Joe Biden"          "Julian Castro"
## [4] "Kamala Harris"     "Bernie Sanders"     "Cory Booker"
## [7] "Amy Klobuchar"     "Elizabeth Warren"   "Jay Inslee"
## [10] "John Hickenlooper" "Beto O'Rourke"      "Kirsten Gillibrand"
## [13] "Pete Buttigieg"    "Eric Swalwell"      "Steve Bullock"
## [16] NA
```

```
#I'll need to change Bernie and Joe's name in the Endorements dataset to make
#sure they match
```

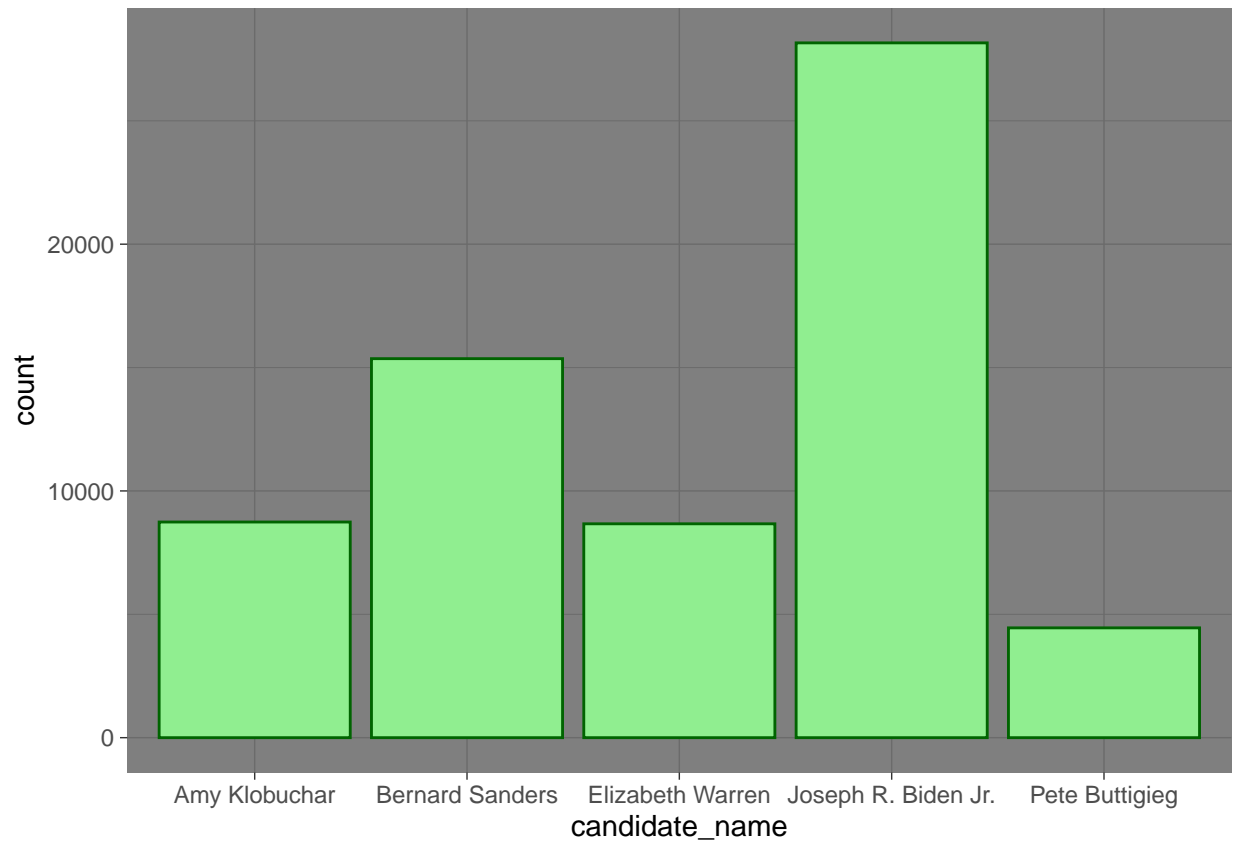
```
Endorsements <- Endorsements %>%
  mutate(candidate_name = replace(candidate_name, candidate_name ==
    "Bernie Sanders", "Bernard Sanders"),
    candidate_name = replace(candidate_name, candidate_name ==
    "Joe Biden", "Joseph R. Biden Jr.))
```

```
#We're going to join the two datasets on candidate_name
new_data <- inner_join(polls, Endorsements, by = "candidate_name")
```

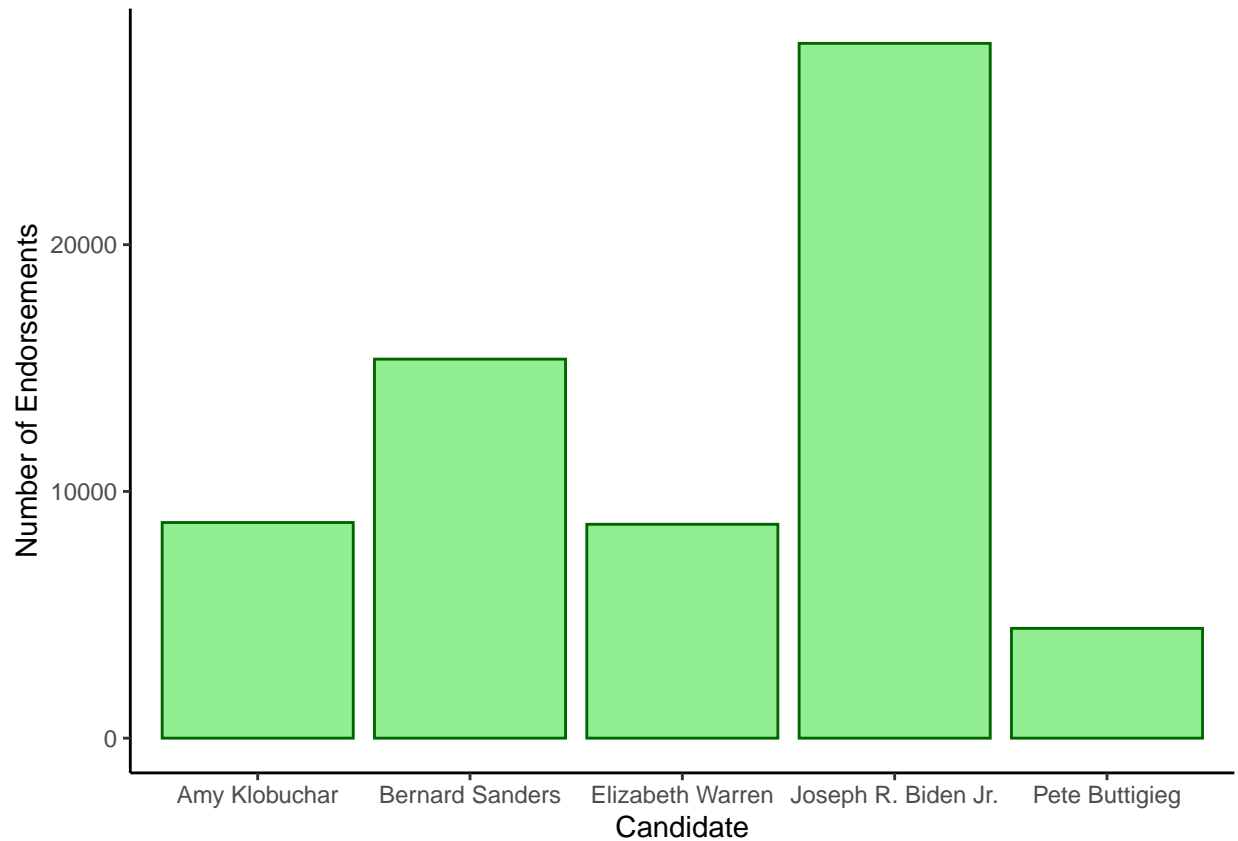
```
#Here I'm counting the number of endorsements for each candidate
candidate_endorsements <- new_data %>%
  group_by(candidate_name) %>%
  summarise(count = n())
```

```
#Below is the plot I created  
p <- ggplot(data = new_data, aes(x = candidate_name)) +  
  geom_bar(fill = "light green", color = "dark green")
```

```
#And I'm returning the plot with the dark theme  
p + theme_dark()
```



```
#Lastly I'm changing the axis name  
p + theme_classic() + xlab("Candidate") + ylab("Number of Endorsements")
```



Text-as-Data with tidyverse

For this question you will be analyzing Tweets from President Trump for various characteristics. Load in the following packages and data:

- First separate the `created_at` variable into two new variables where the date and the time are in separate columns. After you do that, then report the range of dates that is in this dataset.
- Using `dplyr` subset the data to only include original tweets (remove retweets) and show the text of the President's **top 5** most popular and most retweeted tweets. (Hint: The `match` function can help you find the index once you identify the largest values.)
- Create a *corpus* of the tweet content and put this into the object `Corpus` using the `tm` (text mining) package. (Hint: Do the assigned readings.)
- Remove extraneous whitespace, remove numbers and punctuation, convert everything to lower case and remove 'stop words' that have little substantive meaning (the, a, it).
- Now create a *wordcloud* to visualize the top 50 words the President uses in his tweets. Use only words that occur at least three times. Display the plot with words in random order and use 50 random colors. Save the plot into your forked repository.
- Create a *document term matrix* called `DTM` that includes the argument `control = list(weighting = weightTfIdf)`
- Finally, report the 50 words with the the highest tf.idf scores using a lower frequency bound of .8.

```
trump_tweets_url <- 'https://politicaldatascience.com/PDS/Datasets/trump_tweets.csv'
tweets <- read_csv(trump_tweets_url)
```

```
## Rows: 32974 Columns: 6
## -- Column specification -----
## Delimiter: ","
## chr (3): source, text, created_at
## dbl (2): retweet_count, favorite_count
## lgl (1): is_retweet
##
## i Use 'spec()' to retrieve the full column specification for this data.
## i Specify the column types or set 'show_col_types = FALSE' to quiet this message.
```

```
so_i_dont_have_to_redownload_when_i_mess_up <- tweets
#Here I'm separating the created variable into date and time
tweets$date <- dmy_hm(tweets$created_at)
```

```
## Warning: 19447 failed to parse.
```

```
#I use DPLYR to remove the tweets that are categorized as "retweets"
most_rt <- tweets %>%
  filter(is_retweet == "FALSE") %>% #filtering our retweets
  mutate(popular = retweet_count + favorite_count) %>% #here I create a
#"popular" variable
  slice_max(retweet_count, n = 5) %>% #I'm grabbing the 5 most re tweeted
  pull(text) #I extracted just the tweet text
most_rt #and printed it to the console
```

```
## [1] "#FraudNewsCNN #FNN https://t.co/WYUnHjjUjg"
## [2] "TODAY WE MAKE AMERICA GREAT AGAIN!"
## [3] "Why would Kim Jong-un insult me by calling me \"old\" when I would NEVER call him \"short and f"
## [4] "A$AP Rocky released from prison and on his way home to the United States from Sweden. It was a l"
## [5] "Such a beautiful and important evening! The forgotten man and woman will never be forgotten aga
```

```
#I'm doing the same thing below but with most popular
most_pop <- tweets %>%
  filter(is_retweet == "FALSE") %>%
  mutate(popular = retweet_count + favorite_count) %>%
  slice_max(popular, n = 5) %>%
  pull(text)

most_pop #and printing to the console again
```

```
## [1] "A$AP Rocky released from prison and on his way home to the United States from Sweden. It was a l"
## [2] "https://t.co/VXeKiVzpTf"
## [3] "#FraudNewsCNN #FNN https://t.co/WYUnHjjUjg"
## [4] "Just spoke to @KanyeWest about his friend A$AP Rocky's incarceration. I will be calling the ver"
## [5] "All is well! Missiles launched from Iran at two military bases located in Iraq. Assessment of c
```

