ECON 121 FA23 Problem Set 1

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Question 1

Verbal: list group members. Robert Tso - A13829791

Question 2

Code: Load packages and dataset, summarize the data.

Verbal: Interpret the summary statistics.

```
# The PDF will show the code you write here but not the output.
# Load packages and dataset here.

library(readr)

#tinytex::install_tinytex()

install.packages('tidyverse', repos = "http://cran.us.r-project.org")
```

```
## package 'tidyverse' successfully unpacked and MD5 sums checked
##
## The downloaded binary packages are in
##  C:\Users\hp\AppData\Local\Temp\RtmpSmaMhR\downloaded_packages
```

```
library(tidyverse)

install.packages('plyr', repos = "http://cran.us.r-project.org")
```

```
## package 'plyr' successfully unpacked and MD5 sums checked
##
## The downloaded binary packages are in
##  C:\Users\hp\AppData\Local\Temp\RtmpSmaMhR\downloaded_packages
```

```
library(dplyr)

#ssa_names <- read_csv("D:/Documents/Class/Econ 121/econ121/data/ssa_names.csv")
ssa_names <- read_csv("C:/Users/hp/Documents/GitHub/econ121/data/ssa_names.csv")
# View(ssa_names)
```

```
# The PDF will show the code AND output here.
# Summarize the data here.

summary(ssa_names)
```

```
##      name               sex              frequency            year
##  Length:1718855     Length:1718855     Min.   :    5.0   Min.   :1940
##  Class :character   Class :character   1st Qu.:    7.0   1st Qu.:1976
##  Mode  :character   Mode  :character   Median :   12.0   Median :1996
##                                        Mean   :  172.3   Mean   :1991
##                                        3rd Qu.:   31.0   3rd Qu.:2009
##                                        Max.   :99693.0   Max.   :2022
```

```
#There are 1,718,855 name entries, ranging from years of 1940 to 2022.
#A minimum of 5 occurrences for any name and maximum of 99,693 occurrences.
```

Question 3

Code: Find the all time most common boy and girl names.

Verbal: Interpret your results.

```
#aggregate by name
total_names <- ssa_names%>%
  group_by(sex,name) %>%
  summarize(total_frequency = sum(frequency))%>%
  ungroup()
```

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

```
total_names
```

```
## # A tibble: 108,325 x 3
##    sex   name      total_frequency
##    <chr> <chr>               <dbl>
##  1 F     Aabha                  56
##  2 F     Aabidah                 5
##  3 F     Aabriella              51
##  4 F     Aada                   13
##  5 F     Aadaya                  9
##  6 F     Aaden                   5
##  7 F     Aadhini                31
##  8 F     Aadhira               232
##  9 F     Aadhirai                5
## 10 F     Aadhvi                  5
## # i 108,315 more rows
```

```
#girls
total_girl_names <- total_names%>%
  filter(sex=="F") #filter by sex for female

#filter total girl names by the most frequent name
total_girl_names %>% filter(total_frequency==max(total_frequency))
```

```
## # A tibble: 1 x 3
##   sex   name  total_frequency
##   <chr> <chr>           <dbl>
## 1 F     Mary          1997025
```

```
#store the frequency for girls
most_common_girl <- max(total_girl_names$total_frequency)



#boys
total_boy_names <- total_names%>%
  #filter by sex for male
```

```
  filter(sex=="M")

#filter total boy names by the most frequent name
total_boy_names %>% filter(total_frequency==max(total_frequency))
```

```
## # A tibble: 1 x 3
##   sex   name    total_frequency
##   <chr> <chr>             <dbl>
## 1 M     Michael         4264145
```

```
#store the frequency for boy
most_common_boy <- max(total_boy_names$total_frequency)

#add the total frequencies
print(most_common_girl+most_common_boy)
```

```
## [1] 6261170
```

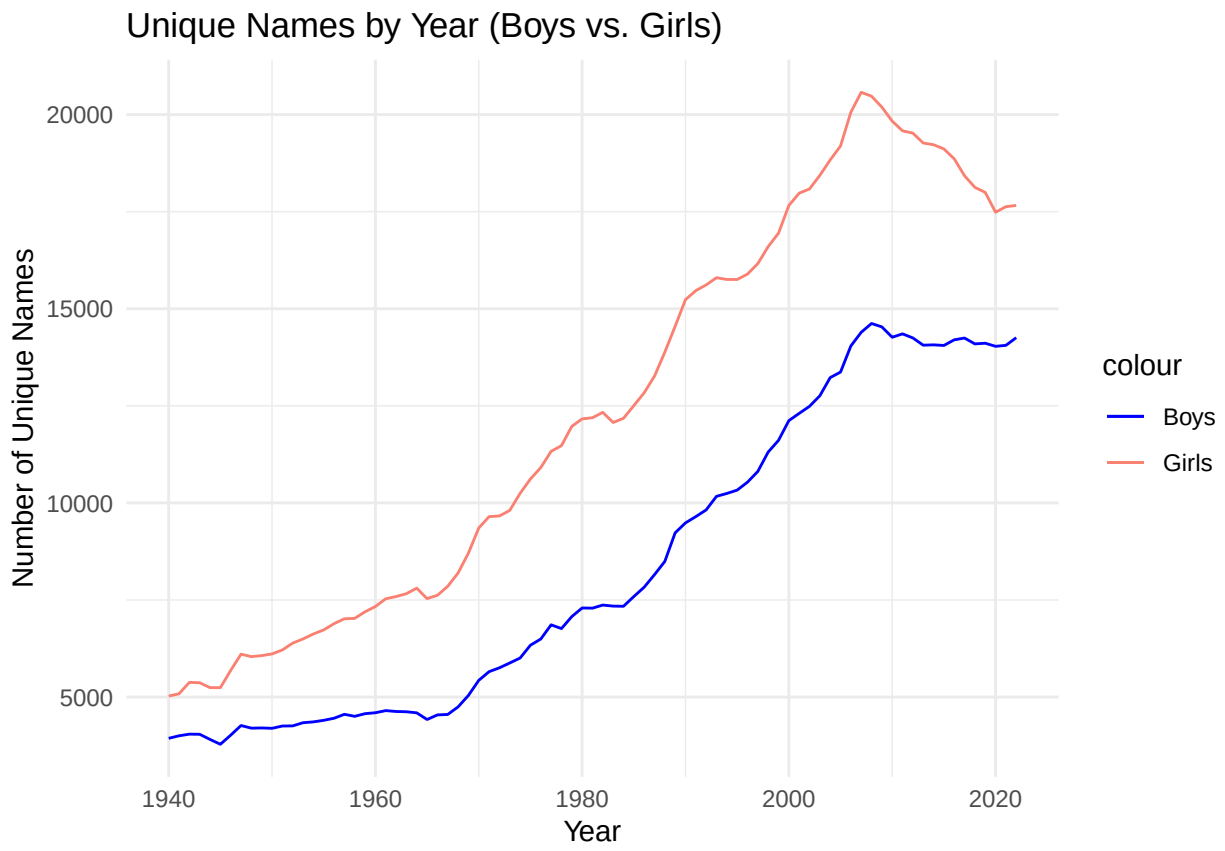
```
#Total of 6,261,170 babies of the 2 most popular names.

# Mary was the most popular name for girls at 1,997,025
# and Michael for boys at 4,264,145 A total of 6,261,170 babies
# since 1940 were born under these 2 popular names.
```

Question 4

Code: Plot time trends in the number of unique names by sex

Verbal: Interpret your results.

```
# All question 4 code here

unique_girls_by_year <- ssa_names %>%
  filter(sex=="F")%>%
  group_by(year) %>%
  #count the amount of distinct names each year for girls
  summarise(unique_name_count = n_distinct(name))

#unique_girls_by_year

unique_boys_by_year <- ssa_names %>%
  filter(sex=="M")%>%
  group_by(year) %>%
  #count the amount of distinct names each year for boys
  summarise(unique_name_count = n_distinct(name))

#unique_boys_by_year

unique_names_plot <- ggplot() +
  geom_line(data = unique_boys_by_year, aes(x = year, y = unique_name_count, color = "Boys")) +
  geom_line(data = unique_girls_by_year, aes(x = year, y = unique_name_count, color = "Girls")) +

  labs(x = "Year", y = "Number of Unique Names", title = "Unique Names by Year (Boys vs. Girls)") +
  scale_color_manual(values = c("Boys" = "blue", "Girls" = "salmon")) +
  theme_minimal()

unique_names_plot
```



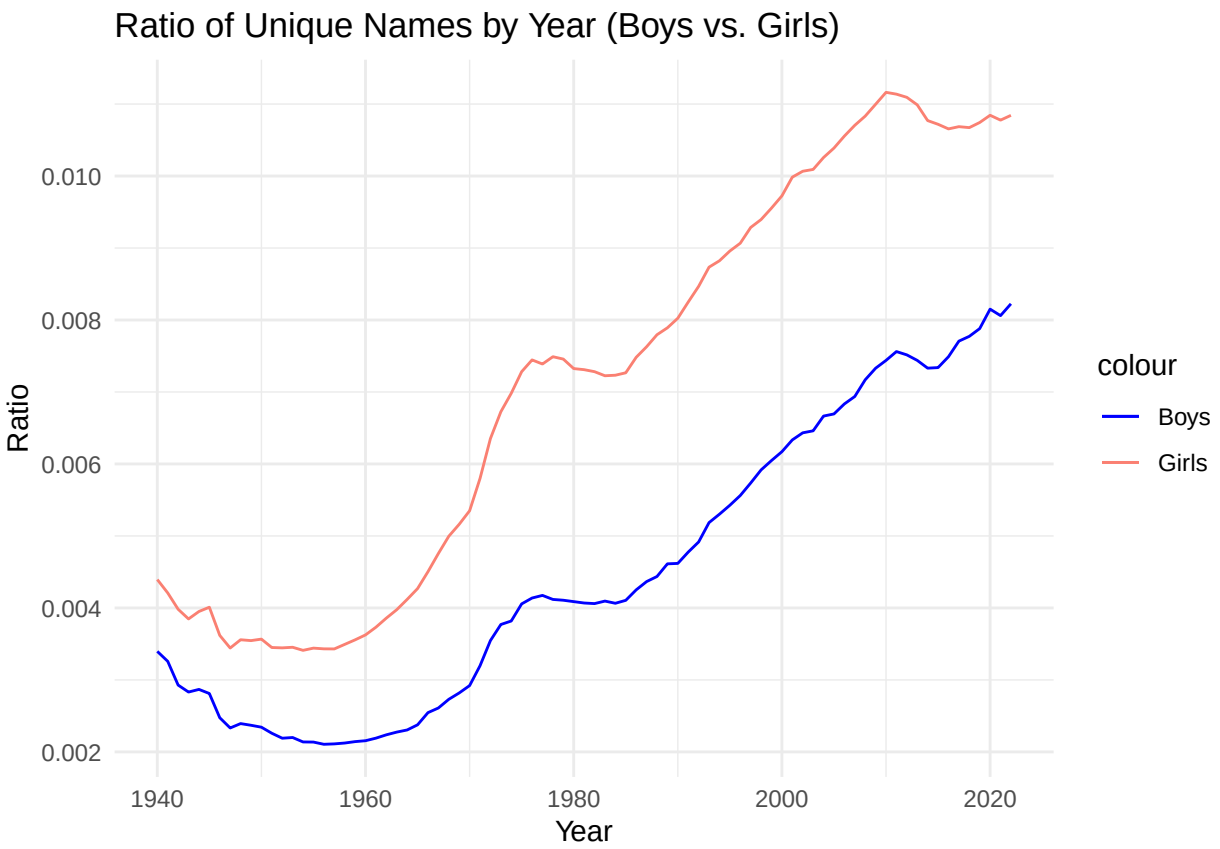

```
# Throughout the years, girls have had more unique names than boys,
# and they trend in similar ways. The number of unique names for both boys
# has remained relatively flat compared to girls until 1960-1970s.
# Both sexes peaked in uniqueness in 2008, where boys returned to a flat rate,
# while girls started declining.
```

Question 5

Code: Plot time trends in the number of unique names relative to the number of babies by sex.

Verbal: Interpret your results.

```
# All question 5 code here

ratio_girl_babies <- ssa_names %>%
  filter(sex=="F")%>%
  group_by(year) %>%
  summarise(ratio = n_distinct(name)/sum(frequency))
#ratio_girl_babies

ratio_boy_babies <- ssa_names %>%
  filter(sex=="M")%>%
  group_by(year) %>%
  summarise(ratio = n_distinct(name)/sum(frequency))
#ratio_boy_babies


ratio_names_plot <- ggplot() +
  geom_line(data = ratio_boy_babies, aes(x = year, y = ratio, color = "Boys")) +
  geom_line(data = ratio_girl_babies, aes(x = year, y = ratio, color = "Girls")) +

  labs(x = "Year", y = "Ratio", title = "Ratio of Unique Names by Year (Boys vs. Girls)") +
  scale_color_manual(values = c("Boys" = "blue", "Girls" = "salmon")) +
  theme_minimal()

ratio_names_plot
```




```
#The ratio of unique names increases over time, with slight declines
# during certain time periods, such as the mid-1970s to mid-1980s, and after
#2010, for girls a steady decline while for boys only a short decline.
# The patterns display a decreasing of conformity among babies.
```

Question 6

Verbal: Which names and why?

Apple because it was the first word I could think of that starts with "A". Sam because this is a gender neutral name, short for Samuel or Samantha.

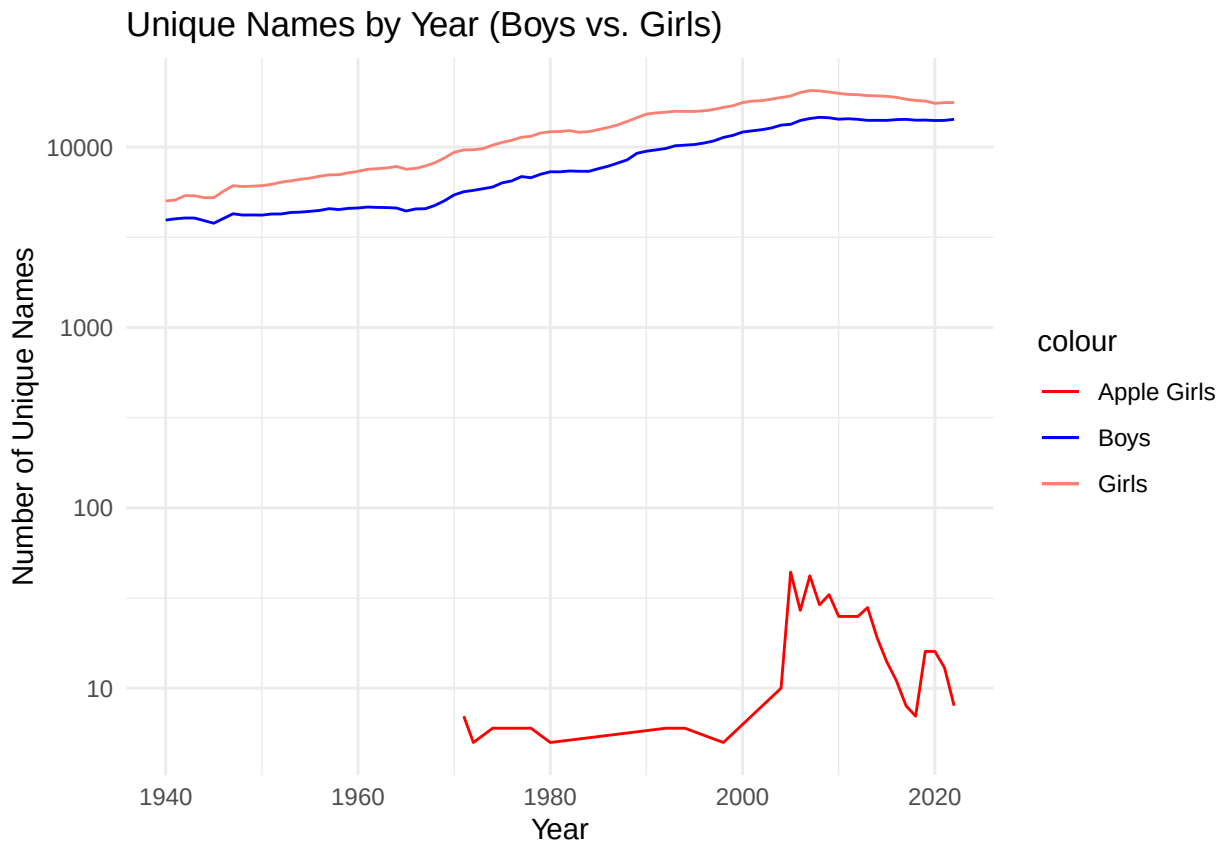
Question 7

Code: Find all-time frequency of your names and compare with all-time most popular names.

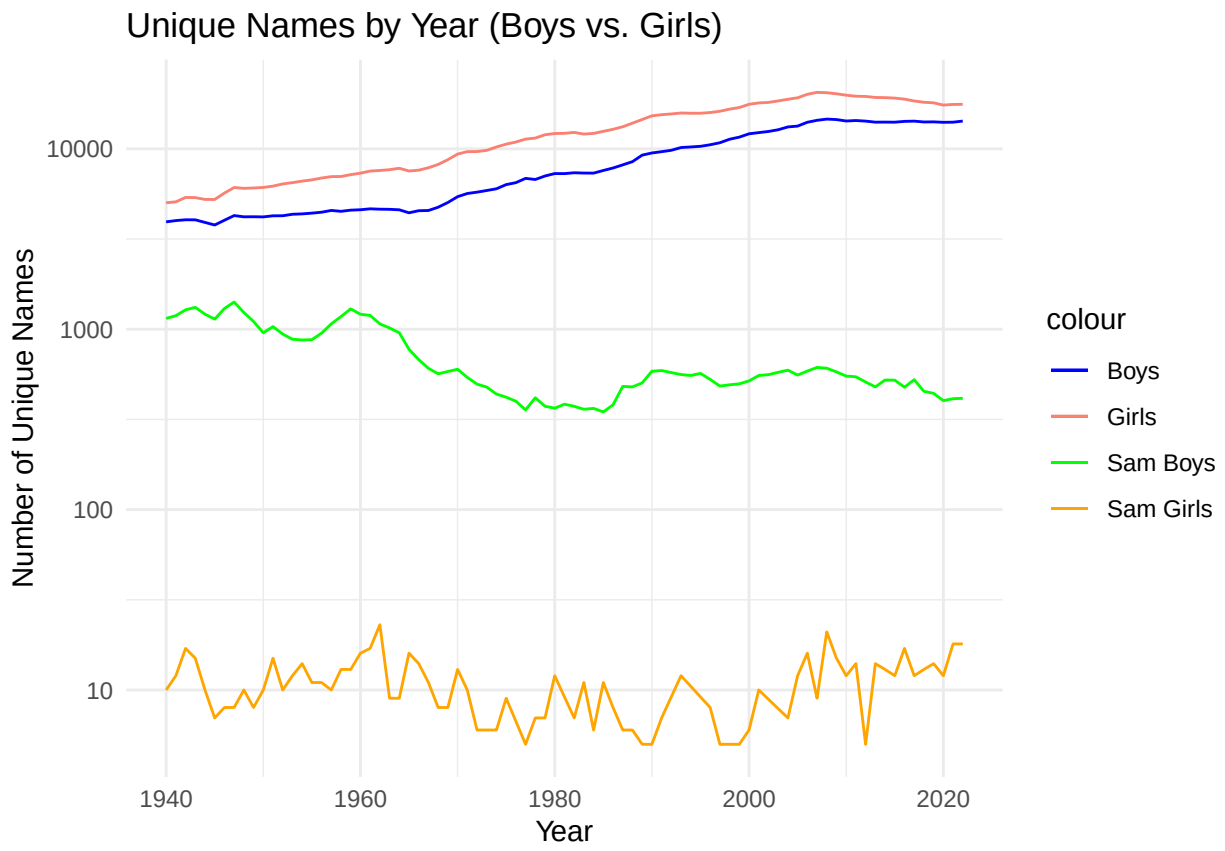
Verbal: Interpret your results.

```
# All question 7 code here

#apple
Apple_names <- ssa_names%>%
  filter(name=="Apple")
Apple_names_girls <- Apple_names%>%
  filter(sex=="F")
Apple_names_boys <- Apple_names%>%
  filter(sex=="M")

#Apple_names_girls
#Apple_names_boys


Sam_names <- ssa_names %>%
  filter(name=="Sam")

Apple_names_plot_log <- ggplot() +
  geom_line(data = unique_boys_by_year, aes(x = year, y = unique_name_count, color = "Boys")) +
  geom_line(data = unique_girls_by_year, aes(x = year, y = unique_name_count, color = "Girls")) +
  geom_line(data = Apple_names_boys, aes(x = year, y = frequency, color = "Apple Boys")) +
  geom_line(data = Apple_names_girls, aes(x = year, y = frequency, color = "Apple Girls"))+

  scale_y_continuous(trans='log10')+           #Scaled the graph into Log
  labs(x = "Year", y = "Number of Unique Names", title = "Unique Names by Year (Boys vs. Girls)") +
  scale_color_manual(values = c("Boys" = "blue", "Girls" = "salmon","Apple Boys"="purple","Apple Girls"=
  theme_minimal()

#sam
Sam_names <- ssa_names%>%
  filter(name=="Sam")
Sam_names_girls <- Sam_names%>%
  filter(sex=="F")
Sam_names_boys <- Sam_names%>%
  filter(sex=="M")

#Sam_names_girls
#Sam_names_boys



Sam_names_plot_log <- ggplot() +
  geom_line(data = unique_boys_by_year, aes(x = year, y = unique_name_count, color = "Boys")) +
  geom_line(data = unique_girls_by_year, aes(x = year, y = unique_name_count, color = "Girls")) +
  geom_line(data = Sam_names_boys, aes(x = year, y = frequency, color = "Sam Boys")) +
  geom_line(data = Sam_names_girls, aes(x = year, y = frequency, color = "Sam Girls"))+

  scale_y_continuous(trans='log10')+           #Scaled the graph into Log
  labs(x = "Year", y = "Number of Unique Names", title = "Unique Names by Year (Boys vs. Girls)") +
```

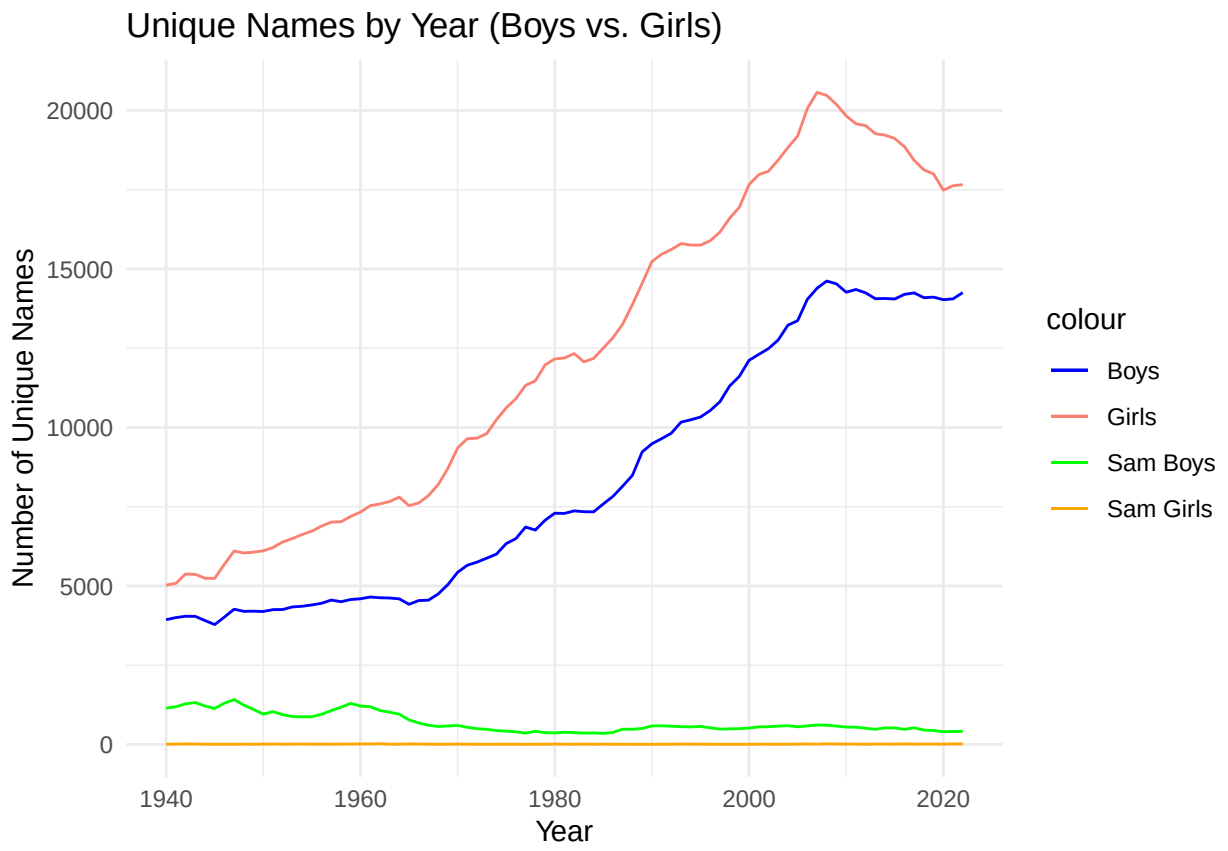
```
  scale_color_manual(values = c("Boys" = "blue", "Girls" = "salmon","Sam Boys"="green","Sam Girls"="ora
  theme_minimal()

Sam_names_plot <- ggplot() +
  geom_line(data = unique_boys_by_year, aes(x = year, y = unique_name_count, color = "Boys")) +
  geom_line(data = unique_girls_by_year, aes(x = year, y = unique_name_count, color = "Girls")) +
  geom_line(data = Sam_names_boys, aes(x = year, y = frequency, color = "Sam Boys")) +
  geom_line(data = Sam_names_girls, aes(x = year, y = frequency, color = "Sam Girls"))+

  labs(x = "Year", y = "Number of Unique Names", title = "Unique Names by Year (Boys vs. Girls)") +
  scale_color_manual(values = c("Boys" = "blue", "Girls" = "salmon","Sam Boys"="green","Sam Girls"="ora
  theme_minimal()

Apple_names_plot_log
```




```
#I had not checked beforehand how many boys were named Apple,
#so I was surprised to see no line representing boys named Apple

Sam_names_plot_log
```




```
#I was surprised to see how erratic, but constant Sam's name was for girls,
#meanwhile for boys, Sam was a slow decline.

Sam_names_plot
```



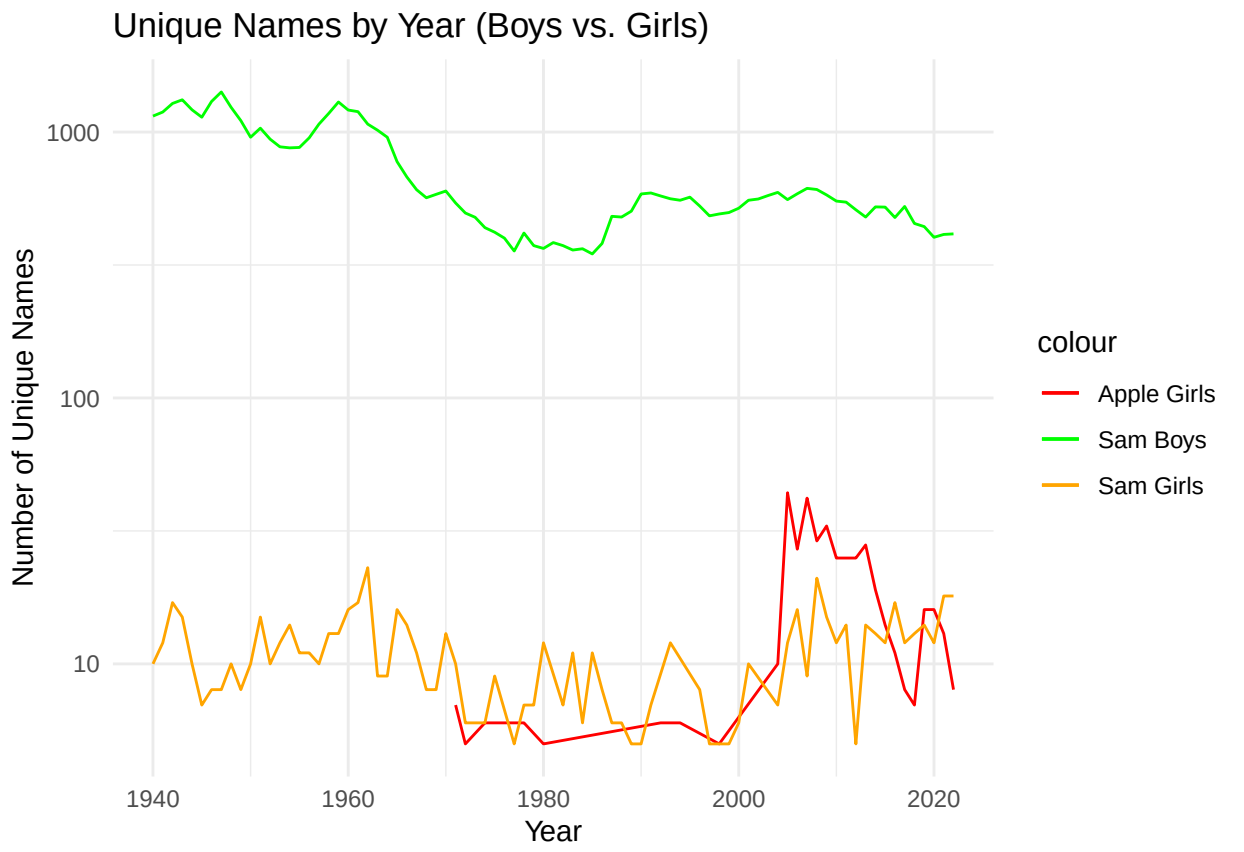

```
#I checked again without the Log, and see that Sam is near non-existent
#among girls, while Sam was still relatively popular before the 1960s for boys.
```

Question 8

Code: Graph the annual frequencies of your chosen name(s) over time.

Verbal: Interpret your results.

```
# All question 8 code here

picked_names_plot <- ggplot() +
  geom_line(data = Apple_names_boys, aes(x = year, y = frequency, color = "Apple Boys")) +
  geom_line(data = Apple_names_girls, aes(x = year, y = frequency, color = "Apple Girls"))+
  geom_line(data = Sam_names_boys, aes(x = year, y = frequency, color = "Sam Boys")) +
  geom_line(data = Sam_names_girls, aes(x = year, y = frequency, color = "Sam Girls"))+

  scale_y_continuous(trans='log10')+           #Scaled the graph into Log
  labs(x = "Year", y = "Number of Unique Names", title = "Unique Names by Year (Boys vs. Girls)") +
  scale_color_manual(values = c("Apple Boys"="purple","Apple Girls"="red","Sam Boys"="green","Sam Girls
  theme_minimal()

picked_names_plot
```




```
#Sam and Apple are similar in popularity among girls, as they are very
# unconventional names, and Apple only started appearing after the 1970s,
# predictably more popular among  hippie/non-conformist parents. Sam as a name
# for boys sees a steady decline after 1960, which is the same time as the near
```

```
# exponential increase of non-conformity among all baby names mentioned in
# question 5.
```