Test 2

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```
library(ggplot2)
library(babynames)
library(tidyverse)
library(plyr)
```

Question 1

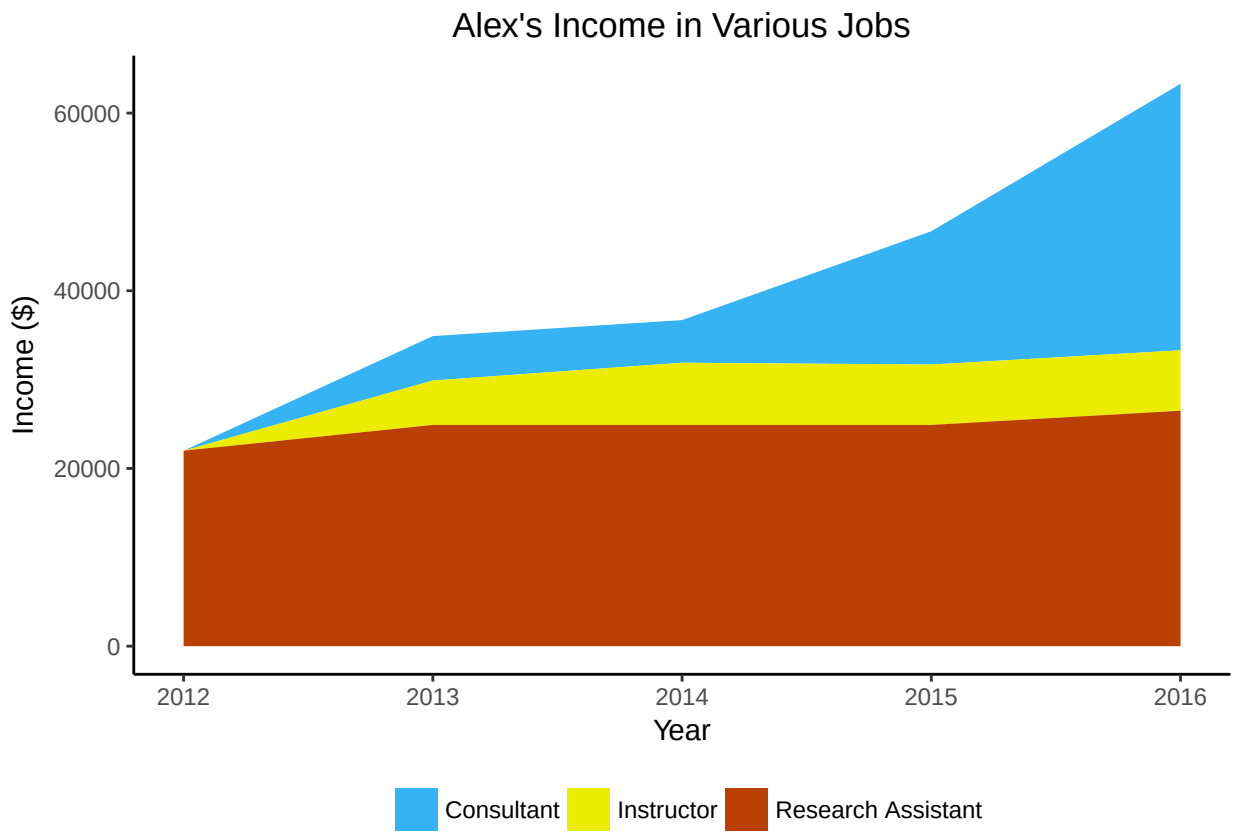
Set up the dataset.

```
years <- rep(c(2012, 2013, 2014, 2015, 2016), 3)
positions <- c(rep("Research Assistant", 5), rep("Instructor", 5), rep("Consultant", 5))
incomes <- c(22000, 24900, 24900, 24900, 26500, 0, 5000, 7000, 6800, 6800, 0, 5000, 4800, 15000, 30000)

df <- data.frame(years, positions, incomes)
df$years <- as.numeric(as.character(df$years))
```

Plot.

```
ggplot(df, aes(x = years, y = incomes, fill = positions)) +
  geom_area() +
  ggtitle("Alex's Income in Various Jobs") +
  xlab("Year") +
  ylab("Income ($)") +
  theme_bw() +
  theme(legend.position = "bottom", legend.title = element_blank()) +
  theme(panel.grid.major = element_blank(), panel.grid.minor = element_blank(), panel.border = element_
  scale_fill_manual(values=c("#36B3F2", "#ECEC00", "#BA3F02")) +
  theme(plot.title = element_text(hjust = 0.5))
```



Question 2

Find the 2 names to use.

```
df <- babynames

year.range <- range(df$year)

initial.prop <- df %>%
  filter(year == year.range[1]) %>%
  select(sex, name, prop)

colnames(initial.prop)[3] <- "initial.prop"

final.prop <- df %>%
  filter(year == year.range[2])  %>%
  select(sex, name, prop)

colnames(final.prop)[3] <- "final.prop"

joined <- join(initial.prop, final.prop, by = c("sex", "name"), type = "inner") %>%
  mutate(change.in.prop = abs(initial.prop - final.prop)) %>%
  arrange(desc(change.in.prop))

girl <- joined %>%
```

```
  filter(sex == "F") %>%
  mutate(rank.column.name = rank(-change.in.prop)) %>%
  filter(rank.column.name <=1) %>%
  select(name)

boy <- joined %>%
  filter(sex == "M") %>%
  mutate(rank.column.name = rank(-change.in.prop)) %>%
  filter(rank.column.name <=1) %>%
  select(name)
```

Set up the dataset with the two names.

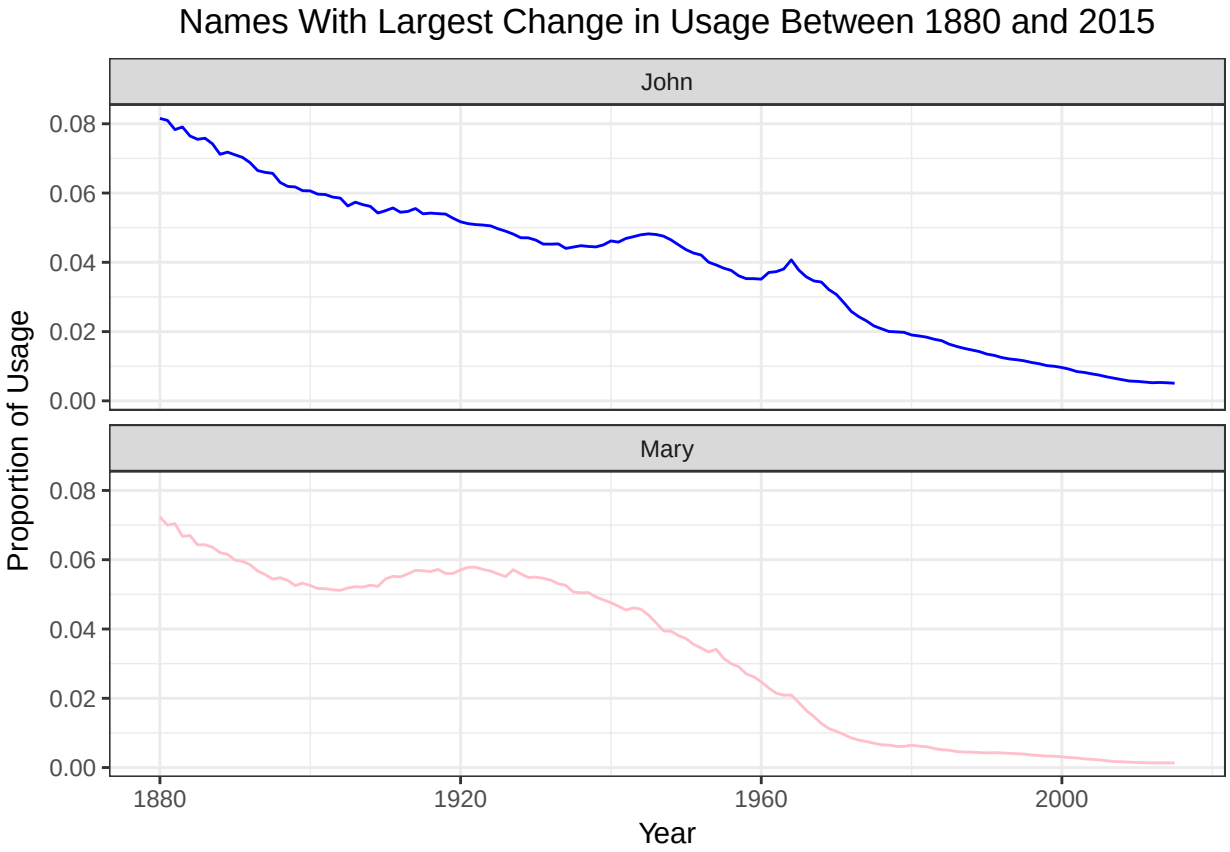
```
girl.data <- df %>%
  filter(name == girl[[1]], sex == "F")

boy.data <- df %>%
  filter(name == boy[[1]], sex == "M")

data <- rbind(girl.data, boy.data)
```

Plot.

```
ggplot(data, aes(x=year, y = prop, color = name)) +
  geom_line() +
  scale_color_manual(values = c("blue", "pink")) +
  ggtitle("Names With Largest Change in Usage Between 1880 and 2015") +
  xlab("Year") +
  ylab("Proportion of Usage") +
  theme_bw() +
  theme(legend.position = "none") +
  theme(plot.title = element_text(hjust = 0.5)) +
  facet_wrap(~name, ncol = 1)
```



I have neither given nor received unauthorized aid on this exam. Jennifer Johnson