

# **Math Camp: Lesson 2.5**

## **Introduction to R**

**UW—Madison Political Science**

**August 18, 2020**

**What is R?**

**R is...**

# R is...

- a programming language and software environment for statistical computing and graphics
- open source (free!)
- based on the popular C programming language

# R in the wild

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- R graphics are often featured in research in the top political science journals
- If you know R, you will be able to create cool graphics too!
- Check out Kastellec and Leoni's 2007 *Perspectives on Politics* article, [Using Graphs Instead of Tables in Political Science](#)
-

# Getting Started

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- Download R (engine)
- Download RStudio (car)
- Open RStudio
- Create New Folder called `sample-folder`
- Go to File -> New File -> R Script
- File -> Save As -> save in `sample-folder`



# Tips

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- Google is your friend!
- That's it

# Set Working Directory

- Copy folder path

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- In MacOS

```
setwd("/Users/marcyshieh/Desktop/sample-folder")
```

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- In MacOS

```
setwd("/Users/marcyshieh/Desktop/sample-folder")
```

- In Windows

```
setwd("C:/Users/marcyshieh/Desktop/sample-folder")
```

# Use R as a Calculator

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- `1+3`
- `5-3`
- `2*2`
- `9/9`
- `2^2`
- `sqrt(4)`

# Creating Objects in R

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- Here, you are taking out the word "hi" from the "hello" object and replacing it with "hi, nice to meet you"

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hello <- "hi, nice to meet you"
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approve <- c(50, 30, 15)
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- Create a column called "approve"

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```

- Create a column named "disapprove"

```
disapprove <- c(50, 70, 85)
```

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streaming <- c("Netflix", "Hulu", "Amazon Prime")
```

- Create a column called "approve"

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- Create a column named "disapprove"

```
disapprove <- c(50, 70, 85)
```

- Put all the columns together to create one table

```
streaming_dataframe <- data.frame(streaming, approve, disapprove)
```

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- Create a column called "approve"

```
approve <- c(50, 30, 15)
```

- Create a column named "disapprove"

```
disapprove <- c(50, 70, 85)
```

- Put all the columns together to create one table

```
streaming_dataframe <- data.frame(streaming, approve, disapprove)
```

- Then you can take a look at the table that you created!

```
streaming_dataframe
```

# Summarize the Data Frame

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- Calculate the mean for the "approve" column

```
mean(streaming_dataframe$approve)
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mean(streaming_dataframe$approve)
```

- Calculate the mean for the "disapprove" column

```
mean(streaming_dataframe$disapprove)
```

- Subtract the means in the approve and disapprove columns

```
mean(streaming_dataframe$approve) - mean(streaming_dataframe$disapprove)
```

# Summarize the Data Frame (cont)

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- Find the absolute value from subtracting the approve and disapprove columns

```
abs(mean(streaming_dataframe$approve) - mean(streaming_dataframe$disapprove))
```

# Summarize the Data Frame (cont)

- Find the absolute value from subtracting the approve and disapprove columns

```
abs(mean(streaming_dataframe$approve) - mean(streaming_dataframe$disapprove))
```

- Find the median of the approve column

```
median(streaming_dataframe$approve)
```

# Summarize the Data Frame (cont)

- Find the absolute value from subtracting the approve and disapprove columns

```
abs(mean(streaming_dataframe$approve) - mean(streaming_dataframe$disapprove))
```

- Find the median of the approve column

```
median(streaming_dataframe$approve)
```

- Look at the summary statistics for the entire table

```
summary(streaming_dataframe)
```

# Count rows and columns

- Count the number of rows

```
nrow(streaming_dataframe)
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nrow(streaming_dataframe)
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- Count the number of variables

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ncol(streaming_dataframe)
```

- Count rows and columns

```
dim(streaming_dataframe)
```



***Any questions?***

# Write & Read CSV Files

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- Write csv file into folder

```
write.csv(streaming_dataframe, "streaming_dataframe.csv")
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```
write.csv(streaming_dataframe, "streaming_dataframe.csv")
```

- Open up your streaming\_dataframe.csv file and rename the "approve" cell into "approve2"

```
streaming_dataframe_v2 <- read.csv("streaming_dataframe.csv")
```

# Write & Read CSV Files

- Write csv file into folder

```
write.csv(streaming_dataframe, "streaming_dataframe.csv")
```

- Open up your streaming\_dataframe.csv file and rename the "approve" cell into "approve2"

```
streaming_dataframe_v2 <- read.csv("streaming_dataframe.csv")
```

- Find the mean for each column one by one

```
mean(streaming_dataframe_v2$approve2) mean(streaming_dataframe_v2$disapprove)
```

# Write & Read CSV Files

- Write csv file into folder

```
write.csv(streaming_dataframe, "streaming_dataframe.csv")
```

- Open up your streaming\_dataframe.csv file and rename the "approve" cell into "approve2"

```
streaming_dataframe_v2 <- read.csv("streaming_dataframe.csv")
```

- Find the mean for each column one by one

```
mean(streaming_dataframe_v2$approve2) mean(streaming_dataframe_v2$disapprove)
```

- Or find "summary" statistics info for all the columns

```
summary(streaming_dataframe_v2)
```

# Graphs

- Create a graph for approval

```
barplot(streaming_dataframe_v2$approve, xlab="Streaming", ylab="Approval  
Rating", names.arg=c("Netflix", "Hulu", "Amazon Prime"))
```

- Create a graph for disapproval

```
barplot(streaming_dataframe_v2$disapprove, xlab="Streaming",  
ylab="Disapproval Rating", names.arg=c("Netflix", "Hulu", "Amazon Prime"))
```

# Install Packages

- Install the package once

```
install.packages("ggplot2")
```

- Access the package in your current environment

```
library("ggplot2")
```



# Create graph in ggplot2

- Create graph

```
streaming_graph<-ggplot(data=streaming_dataframe_v2, aes(x=streaming,  
y=approve)) + geom_bar(stat="identity")
```

- Load graph

```
streaming_graph
```

- Add color to the graph

```
streaming_graph_blue<-ggplot(data=streaming_dataframe_v2, aes(x=streaming,  
y=approve)) + geom_bar(stat="identity", fill="steelblue")
```

- Load graph with color

```
streaming_graph_blue
```

# Final Takeaways

# Final Takeaways

- Coding is all about building confidence
- Don't be discouraged
- Don't be afraid to ask for help
- Rely on Google! Use it like it's a friend!
- [swirl](#) is a good resource for learning R

# Let's call it a day

Homework is online

<https://github.com/shirikov/math-camp-2020>