

# Lecture 11:

## Last Lecture: Putting Things Together

April 23, 2018

# Overview

Course Administration

Good, Bad and Ugly

Tying Things Together: Stories

Tying Things Together: Visualizations that Communicate

R Functions

# Course Administration

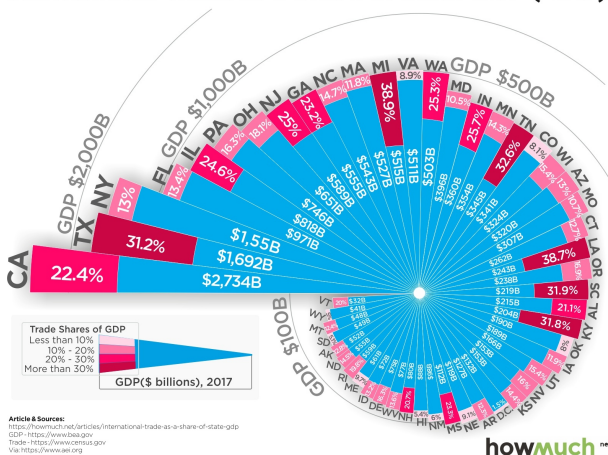
1. Presentations next week
2. Policy brief and presentation handout
3. Updated (?) grades online
4. Online evaluations open! Please give feedback
5. Missing anything from me?

# Today's Final Good Bad and Ugly

- Alex Sexton

# Alex's Chart

## International Trade as a Share of State GDP (2017)



From <https://howmuch.net/articles/international-trade-as-a-share-of-state-GDP>

# Knaflic: Graphics to Tell Stories

# Knaflc's 5 Case Studies

1. Color considerations with a dark background
2. Leveraging animation in the visuals you present
3. Establishing logic in order
4. Strategies for avoiding the spaghetti graph
5. Alternatives to pie charts

Wording is all Knaflc's.

# Knaflic's 5 Case Studies

1. Color considerations with a dark background
2. **Leveraging animation in the visuals you present**
3. **Establishing logic in order**
4. **Strategies for avoiding the spaghetti graph**
5. Alternatives to pie charts

Wording is all Knaflic's.

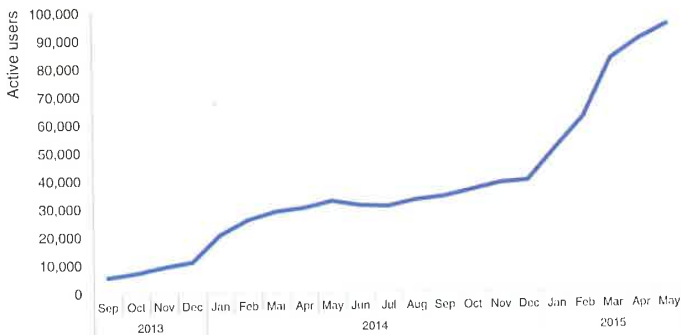


## 2. Animation

- Don't use animation – figures that move without your guidance
- Do use sequential reveal
- Great example of same figure in presentation and paper

# How Do You Get People to Pay Attention to the Important Parts?

Moonville: active users over time



Data source: ABC Report. For purpose of analysis "active user" is defined as the number of unique users in the past 30 days.

# Frame the Analysis

Moonville: active users over time



Data source: ABC Report. For purpose of analysis "active user" is defined as the number of unique users in the past 30 days.

# Start at the Beginning

Moonville: active users over time



Data source: ABC Report. For purpose of analysis "active user" is defined as the number of unique users in the past 30 days.

# Add Step by Step

Moonville: active users over time



Data source: ABC Report. For purpose of analysis "active user" is defined as the number of unique users in the past 30 days.

# Step by Step

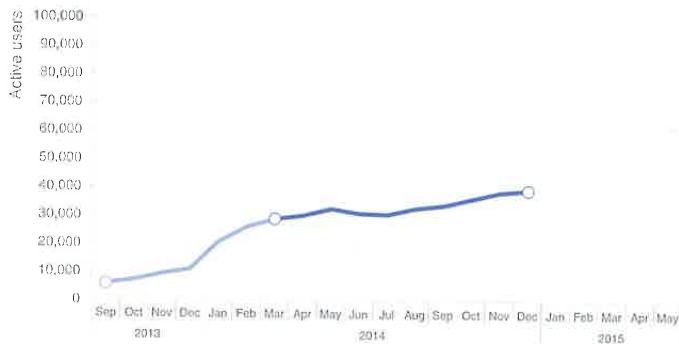
## Moonville: active users over time



Data source: ABC Report. For purpose of analysis "active user" is defined as the number of unique users in the past 30 days.

# Step by Step

Moonville: active users over time



Data source: ABC Report. For purpose of analysis "active user" is defined as the number of unique users in the past 30 days.

# Till the End

Moonville: active users over time



Data source: ABC Report. For purpose of analysis "active user" is defined as the number of unique users in the past 30 days.



# And For Print

## Moonville: active users over time



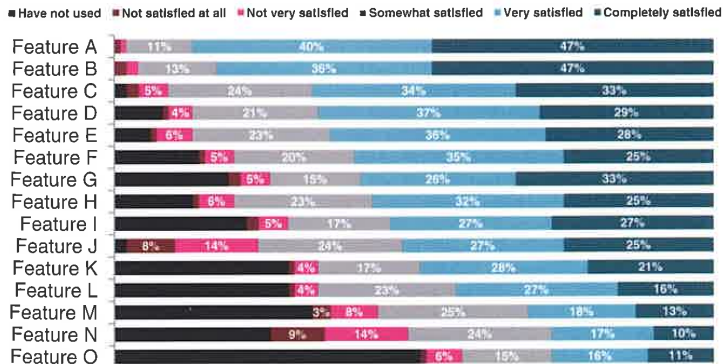
Data source: ABC Report. For purpose of analysis "active user" is defined as the number of unique users in the past 30 days.

### 3. Logic in order

- Highlight what you want people to focus on
- With order
- With color
- With text

# What's Important Here?

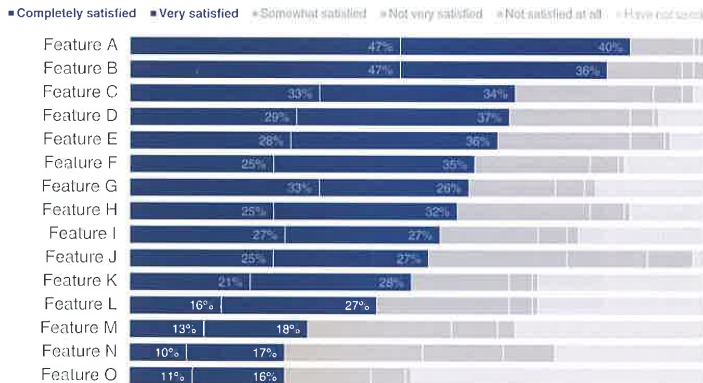
How satisfied have you been with each of these features?



# Suppose We Care Most About User Satisfaction

## Features A & B top user satisfaction

### Product X User Satisfaction: Features



Responses based on survey question: "How satisfied have you been with each of these features?"

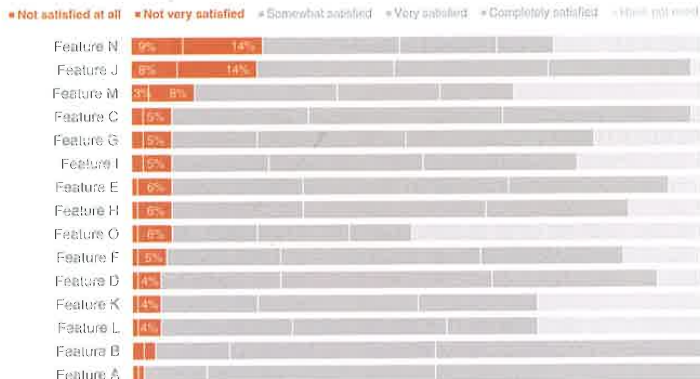
Need more details here to help put this data into context: How many people completed survey? What proportion of users does this represent?

Do those who completed survey look like the overall population, demographic-wise? When was the survey conducted?

# Suppose We Care Most About User Dissatisfaction

## Users least satisfied with Features N & J

Product X User Satisfaction: Features



Responses based on survey question "How satisfied have you been with each of these features?"

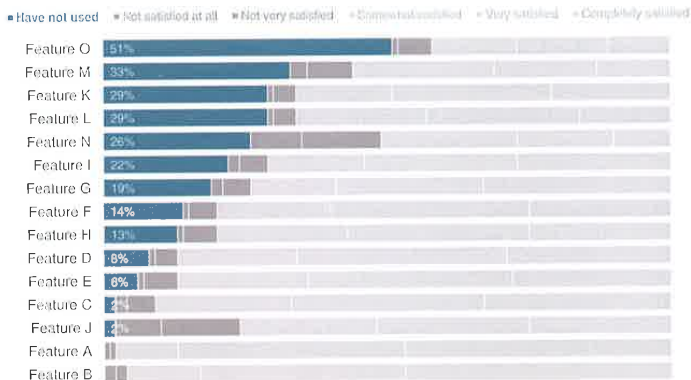
Need more details here to help put this data into context. How many people completed survey? What proportion of users does this represent?

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# Or About Which Feature is Least Used

## Feature O is least used

### Product X User Satisfaction: Features



Responses based on survey question: "How satisfied have you been with each of these features?"

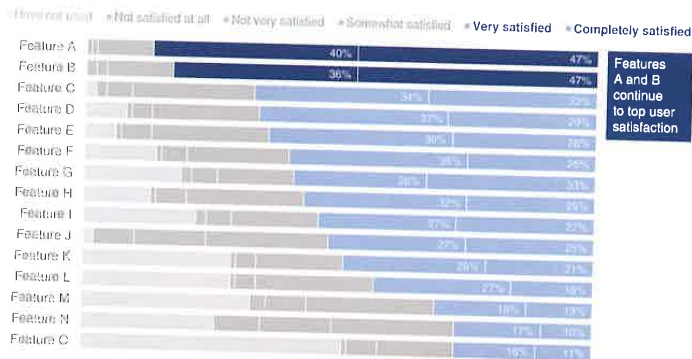
Need more details here to help put this data into context: How many people completed survey? What proportion of users does this represent? Do these who completed survey look like the overall population, demographic-wise? When was the survey conducted?

# What if You Want to Highlight All Three?

# What if You Want to Highlight All Three?

## User satisfaction varies greatly by feature

Product X User Satisfaction: Features



Responses based on survey question "How satisfied have you been with each of these features?"

Need more details here to help put this data into context: How many people completed survey? What proportion of users does this represent? Do these who completed survey look like the overall population, demographic-wise? When was the survey conducted?



# Highlighting All Three, Part 2

## User satisfaction varies greatly by feature

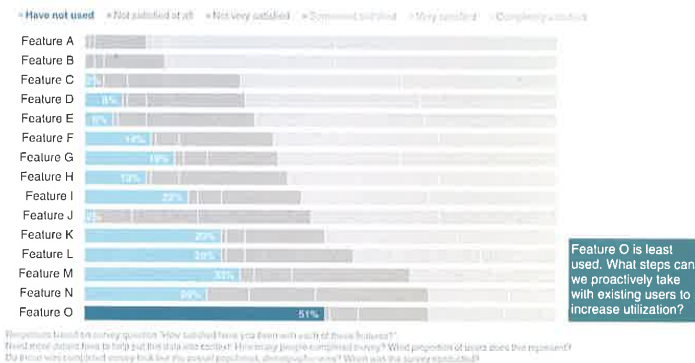
### Product X User Satisfaction: Features



# Highlighting All Three, Part 3

## User satisfaction varies greatly by feature

### Product X User Satisfaction: **Features**

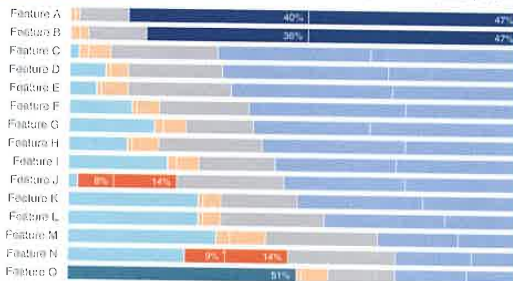


# Putting It All Together: Best for Print

## User satisfaction varies greatly by feature

### Product X User Satisfaction: Features

Have not used Not satisfied at all Not very satisfied Somewhat satisfied Very satisfied Completely satisfied



Features A and B continue to top user satisfaction

Users are least satisfied with Features J and N; what improvements can we make here for a better user experience?

Feature O is least used. What steps can we proactively take with existing users to increase utilization?

Response time (in survey question) (This question has not been asked yet, so these features?)  
 How (from 1 to 5, where 5 is the best) did this survey help you? (How many people completed survey?) What percentage of users does this represent?  
 Do these who completed survey look like the overall population? (percentage) (How many people completed survey?)

## 4. No Spaghetti

- Instead of the book's example, another from her website
- Transforming hard-to-read bars to easier-to-read formats
- Many similar ideas apply

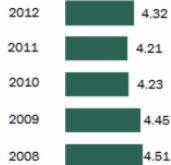
# Pew Charts on Number of Newly Married Adults

What's Wrong and How to Fix?

ORIGINAL

## Number of Newly Married Adults

*In millions*



Note: "Newly married" refers to adult respondents who reported marrying within the past twelve months of the interview.

Source: Pew Research Center tabulations of the 2008-2012 American Community Survey (ACS) data

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# Show Change Over Time

## ORIGINAL

### Number of Newly Married Adults

*In millions*



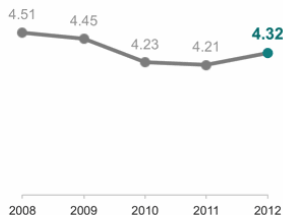
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## COLE's MAKEOVER

### Number of Newly Married Adults In Millions



"Newly married" refers to adult respondents who reported marrying within the past twelve months of the interview.

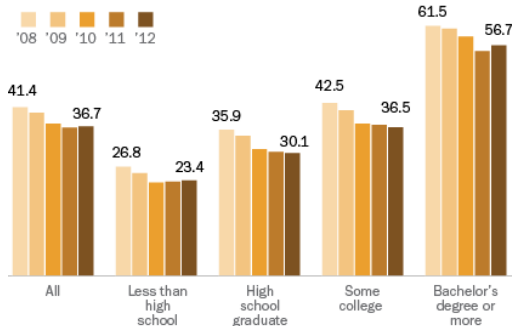
Source: Pew Research Center tabulations of the 2008-2012 American Community Survey (ACS) data.

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# Can You Pick Out the Point Here?

## New Marriage Rate by Education

*Number of newly married adults per 1,000 marriage eligible adults*



Note: Marriage eligible includes the newly married plus those widowed, divorced or never married at interview.

Source: US Census

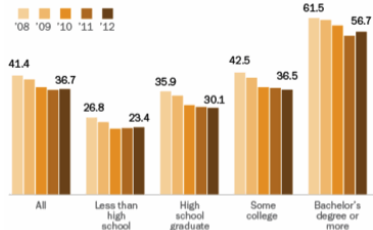
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# Highlighting the Increase for You Guys

## ORIGINAL

### New Marriage Rate by Education

Number of newly married adults per 1,000 marriage eligible adults



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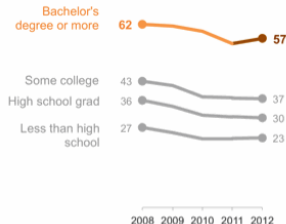
Source: US Census

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## COLE's MAKEOVER

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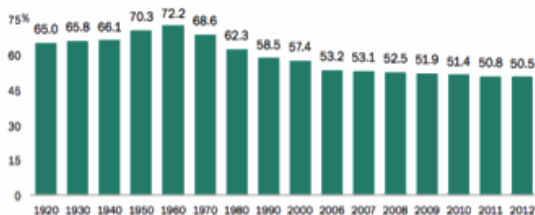
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# What Would You Want to Pull Out?

## ORIGINAL

### Adults Currently Married



Notes: Based on adults age 18 and older. Currently married includes respondents reporting "married, spouse absent." Those reporting "separated" are not included in "currently married."

Source: Pew Research Center tabulations of the 1920-2000 Decennial Census data and 2006-12 American Community Survey (ACS) Integrated Public Use Micro Samples.

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# Highlighting Peak and Trough

## ORIGINAL

### Adults Currently Married



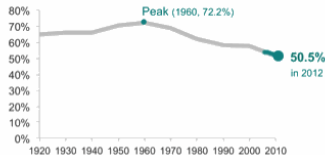
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## COLE's MAKEOVER

### Adults Currently Married



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# Mulbrandon's Graphics

# Visualizing Economics

- Mulbrandon has a BA in economics, and a postgraduate degree in design
- Experience in finance industry
- Now runs a data visualization firm
- To make this book she used Excel, OmniGraphSketcher (no longer available), Illustrator, R and InDesign (publishing)

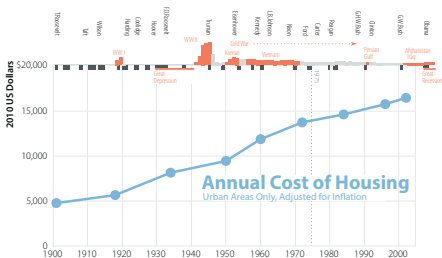
# Which Techniques is She Using?

- What's the story she's trying to convey?
- Look at each graph and think about the underlying techniques
- Two static and two building



1901–2002

# Cost of Housing in the 20th Century



Hot and cold piped water,  
a bathtub or shower,  
and a flush toilet



55%

**More homes had a full bathroom.**



99%



34 million

**More housing built for more people**



112 million



3.7

**with fewer people living together**



2.6

Median square feet of floor area  
in new single-family houses



~1,000

**while the size of houses increased.**



2,135

1940

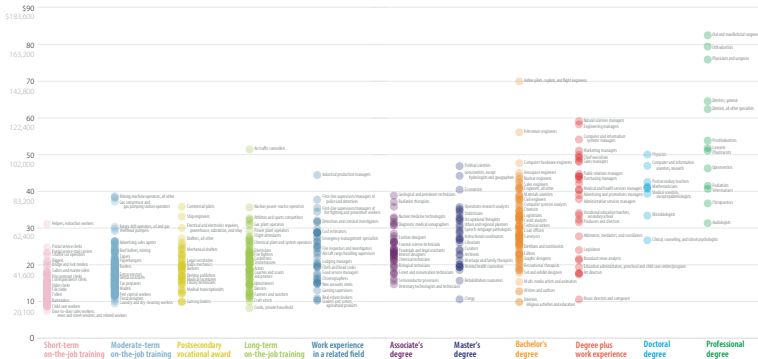
2000

VisualizingEconomics.com

152 Sources: US Bureau of Labor Statistics, "100 Years of US Consumer Spending: Data for the Nation, New York City, and Boston," Report no. 991 • US Census Bureau

# Wages of All Occupations by Education

Median Hourly Wage  
(2011 US Dollars)  
Estimated  
Annual Salary



VisualizingEconomics.com

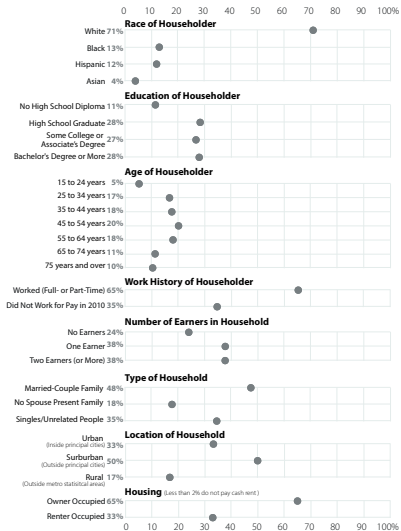
100 Source: EMSI EconomicModeling.com (Compiled from data collected by BLS, BEA and US Census Bureau)

101



2010

# Demographics of All Incomes





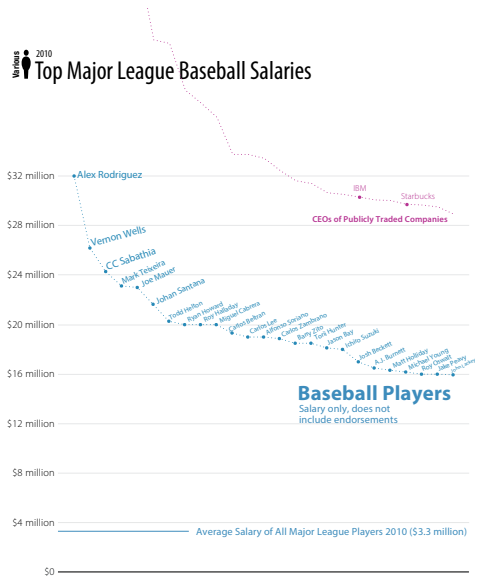


2010

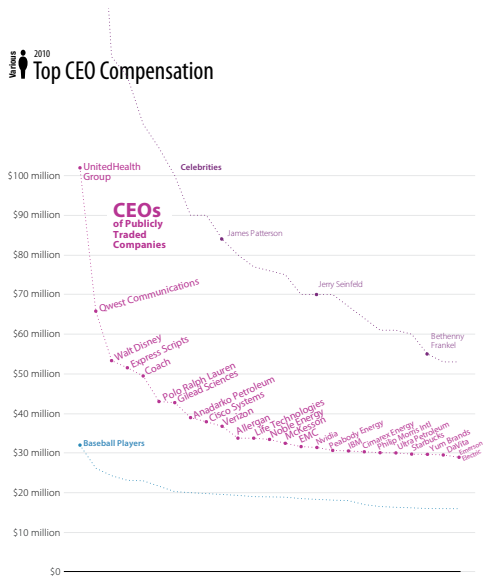
# Demographics of Incomes below \$30,000



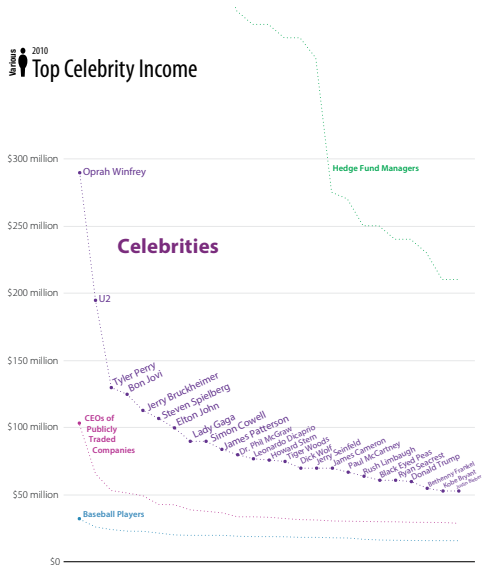
# Top Major League Baseball Salaries



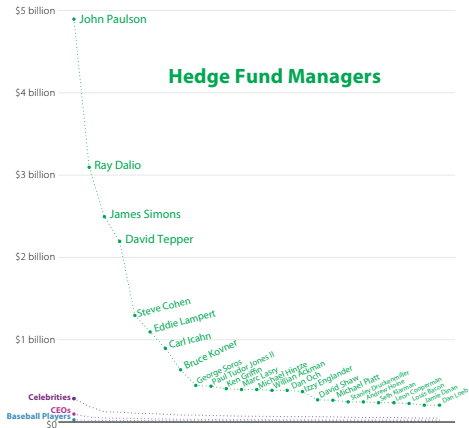
# Various 2010 Top CEO Compensation



# Top Celebrity Income



# Top Hedge Fund Manager Income



# Tying Things Together: Functions in R

# From Animate to Automate

- Today's R tutorial: functions
- How to automate repetitive tasks
- Usually slower in the short run
- Faster in the long run
- Less error prone

# Functions Plan

- Introduce a simple function in class
- Tutorial takes to you automating graph production



## Defining a Function

```
function.name <- function(arg1, arg2){  
  # stuff your function does  
}
```

- ▶ `function.name`: what you call the function
- ▶ `function`: needed to tell R this is a function
- ▶ `arg1`: first argument of the function
- ▶ inside the curly braces: what you want the function to do

## Simple Function Example

```
summer <- function(x,y){  
  x^y  
}
```

- ▶ function name?
- ▶ arguments?
- ▶ body of the function?

## Calling a Function

```
summer <- function(x,y){  
  x^y  
}
```

```
summer(x=2,y=3)
```

## Calling a Function

```
summer <- function(x,y){  
  x^y  
}
```

```
summer(x=2,y=3)
```

```
## [1] 8
```

## Calling a Function

```
summer <- function(x,y){  
  x^y  
}
```

```
summer(x=2,y=3)
```

```
## [1] 8
```

```
summer(3,2)
```

## Calling a Function

```
summer <- function(x,y){  
  x^y  
}
```

```
summer(x=2,y=3)
```

```
## [1] 8
```

```
summer(3,2)
```

```
## [1] 9
```

# To the Tutorial!

- Good luck
- Do the evaluation
- Presentations next week