

GR5702

Exploratory Data Analysis and Visualization

Prof. Joyce Robbins

March 28, 2017

Community Contribution ideas

Columbia Statistics Club

Python Group Study Syllabus Spring 2017

Sundays, April 2, 9, 16, 23

2pm - 4pm, Mathematics Room 520

Python Data Science Handbook, by Jake VanderPlas

more info: [CSSPythonSyllabus.pdf](#)

contact: **Xuehan (Cathy) Liu: x12615**

Community Contribution ideas

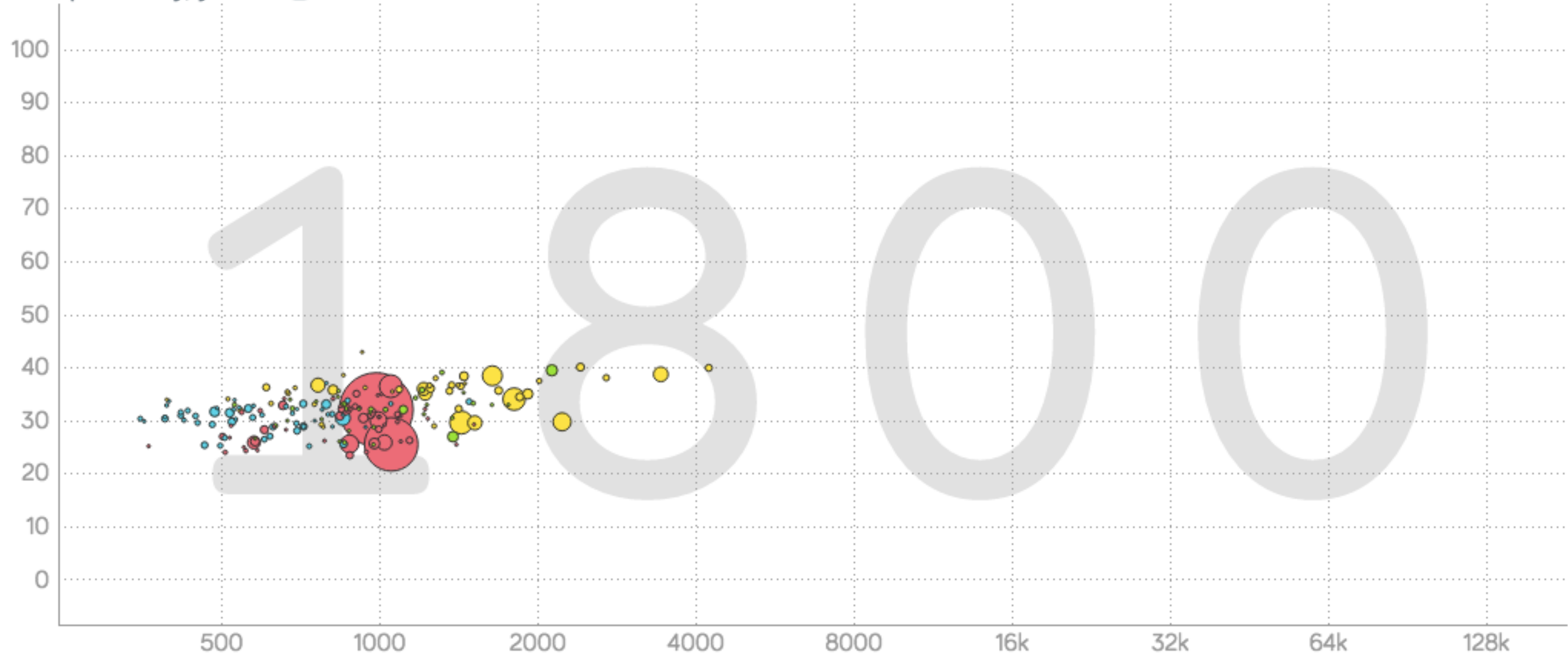
- * tutorial (written or in-class)
- * software evaluation
- * translate graph forms to Python (or ...)

Final Projects

- Groups
- Ask questions on Piazza

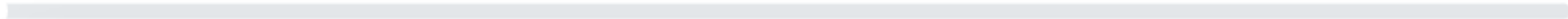
Animation

Life expectancy, years ?



Income per person, GDP/capita in \$/year adjusted for inflation & prices ?

▲ DATA DOUBTS

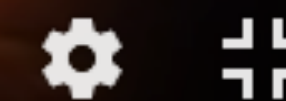


Hans Rosling's 200 Countries, 200 Years, 4 Minutes - The Joy of Stats - BBC Four



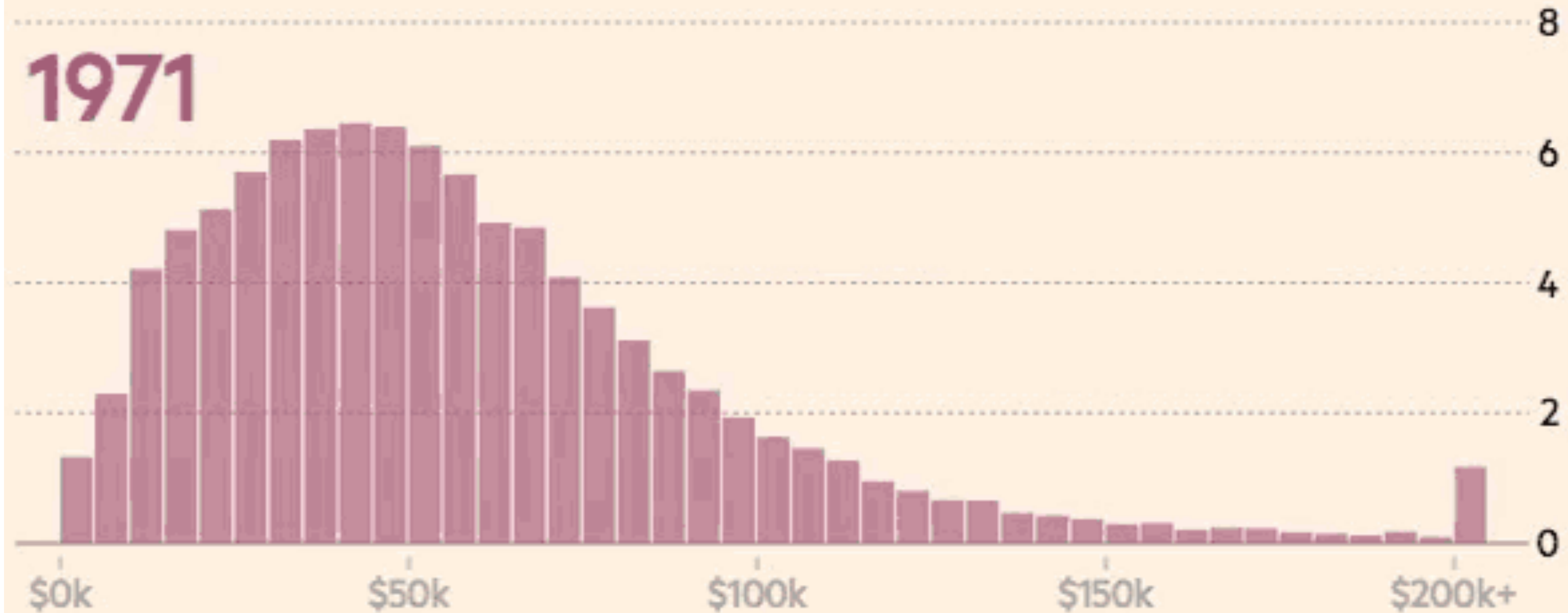
SUBSCRIBE

0:57 / 4:47



Household income in 2014 dollars (% of adults)

1971

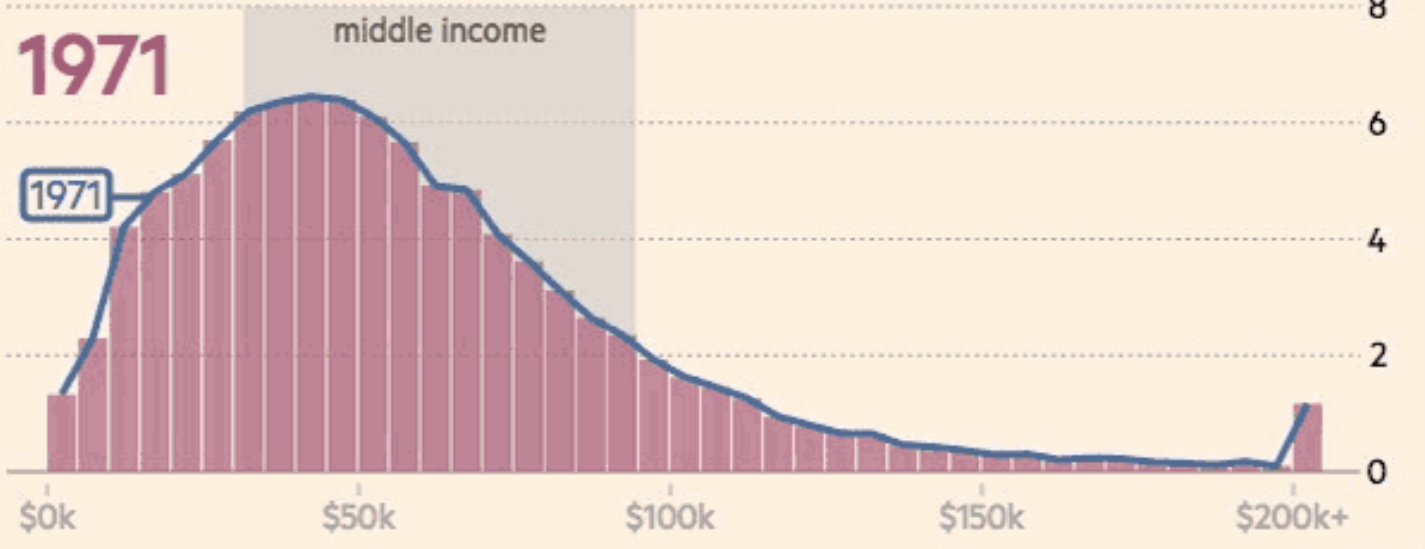


FT graphic Alan Smith, Source: Pew Research Center

FT

<http://www.latimes.com/business/hiltzik/la-fi-hiltzik-ft-graphic-20160320-snap-htmlstory.html>

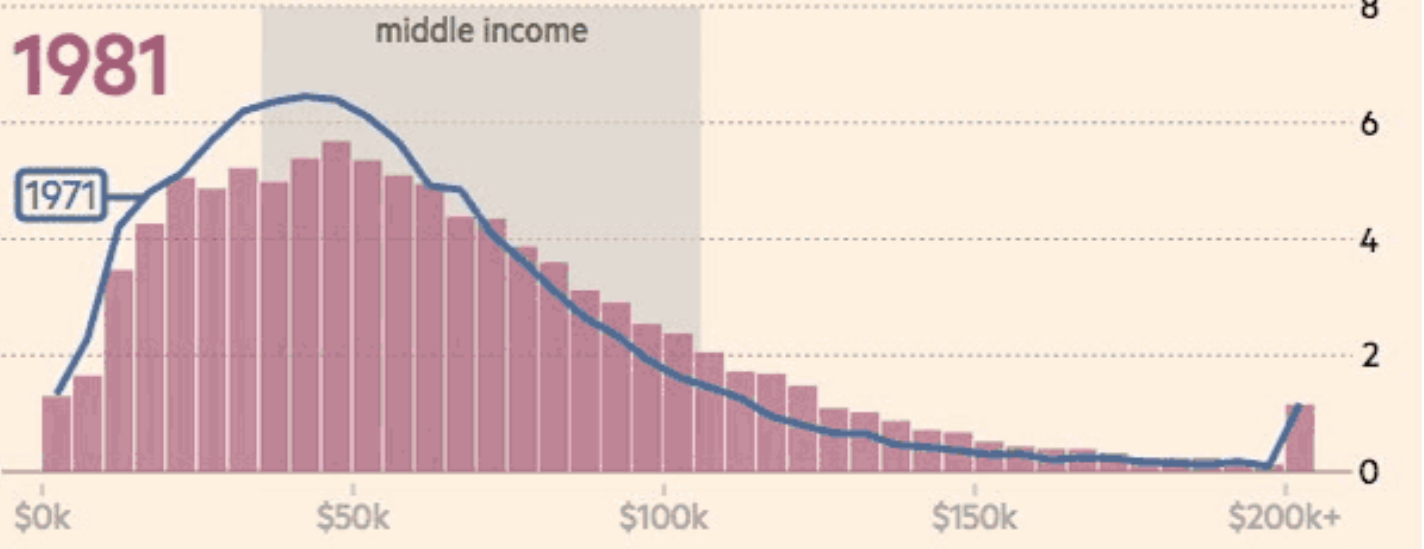
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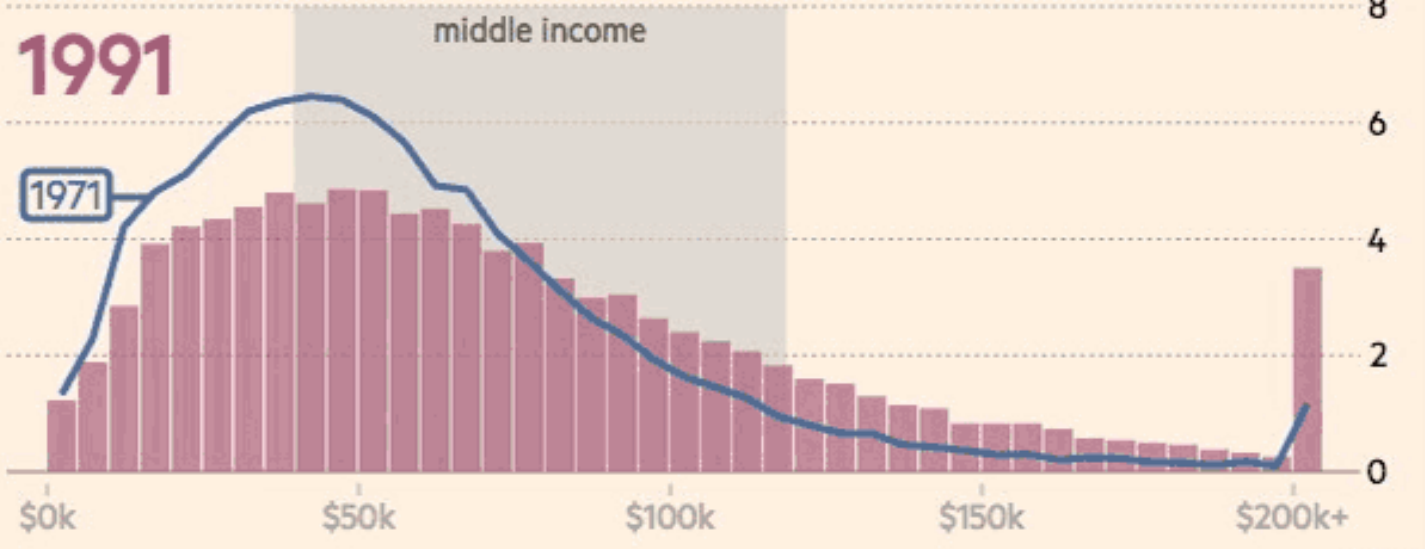
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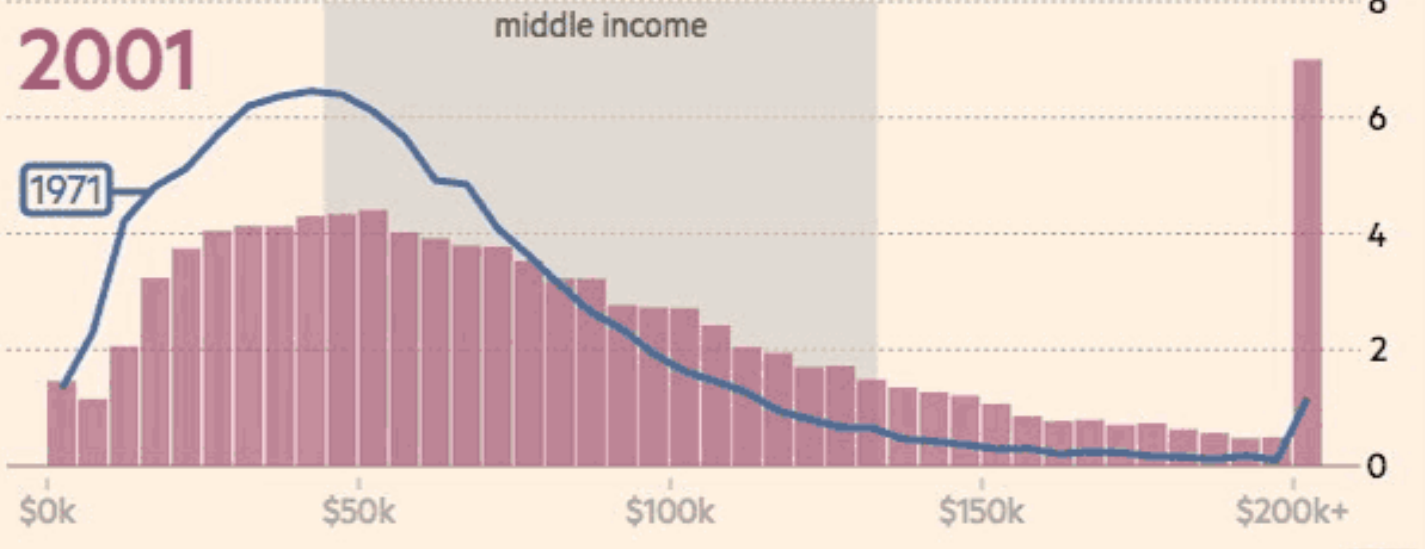
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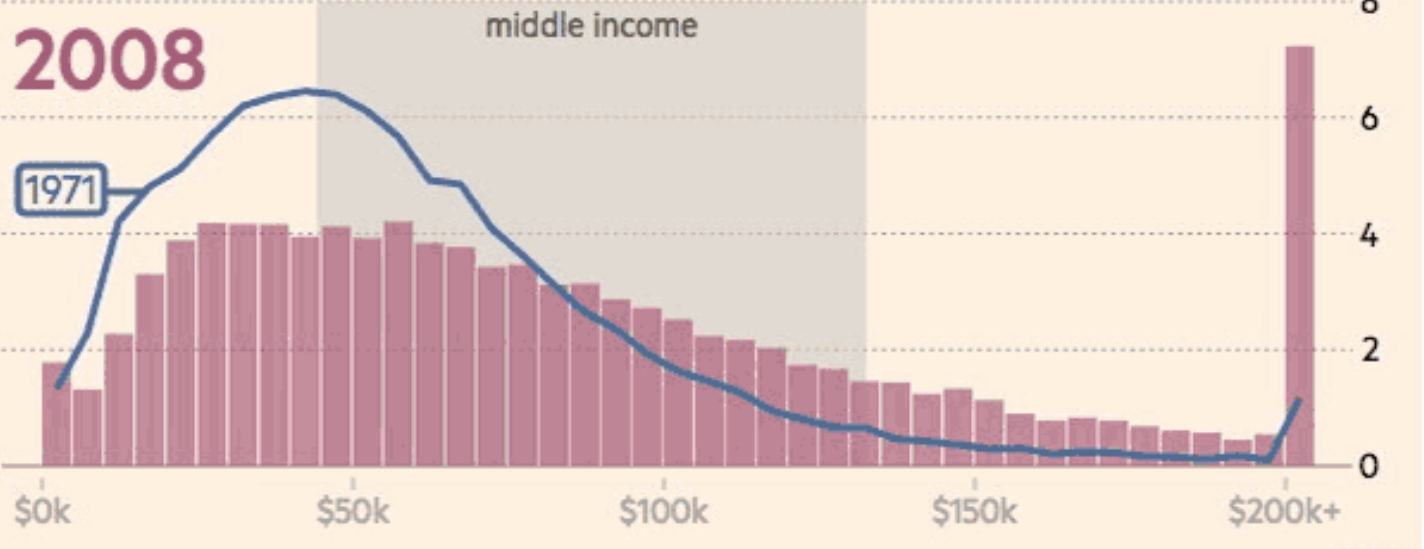
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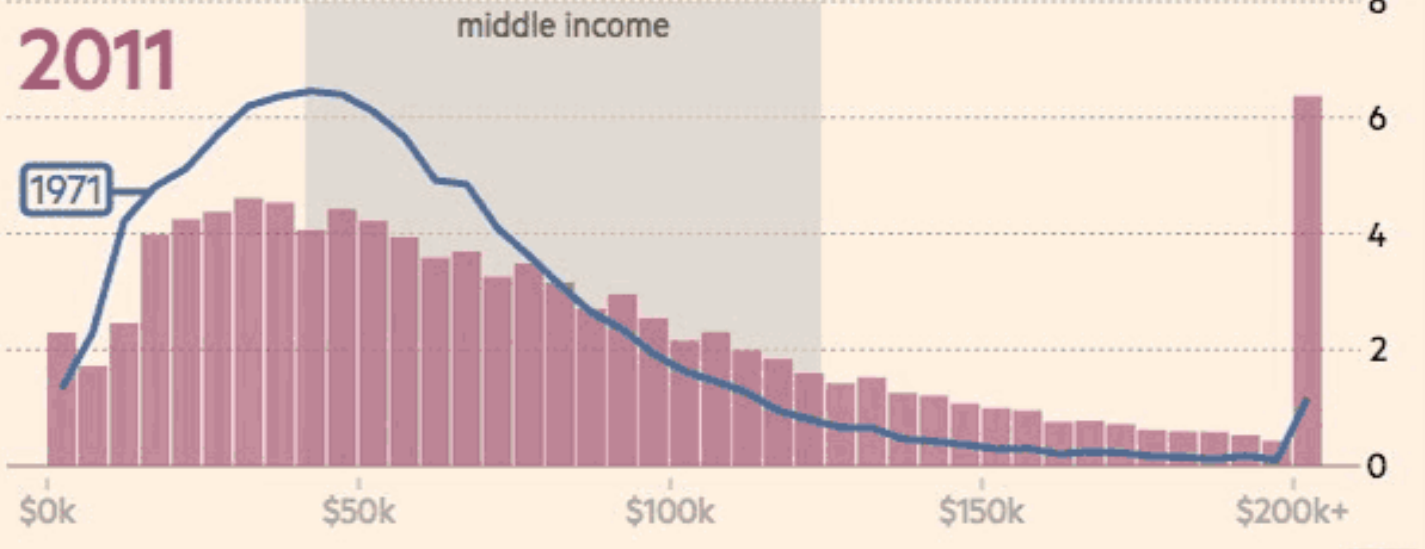
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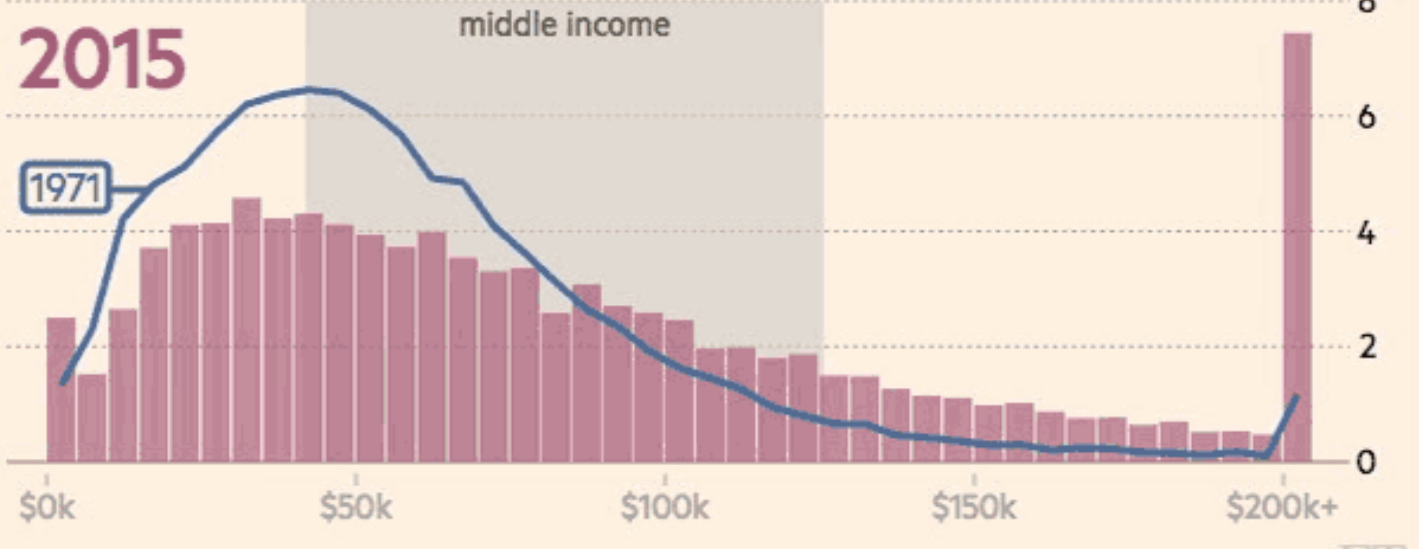
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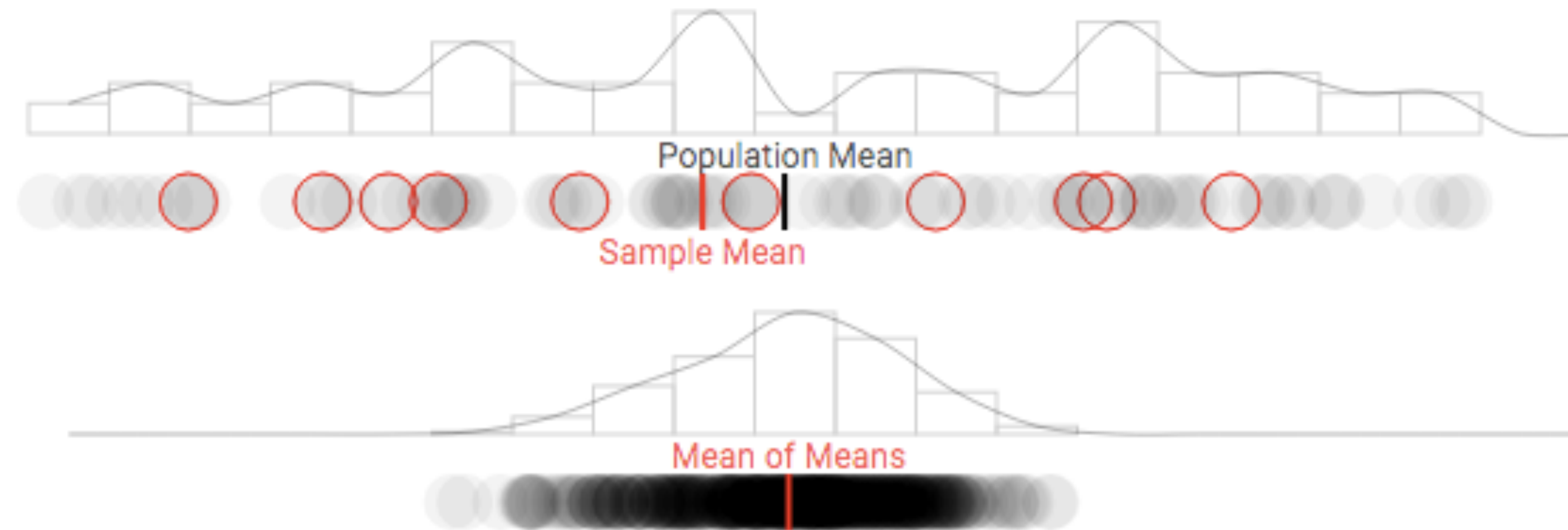


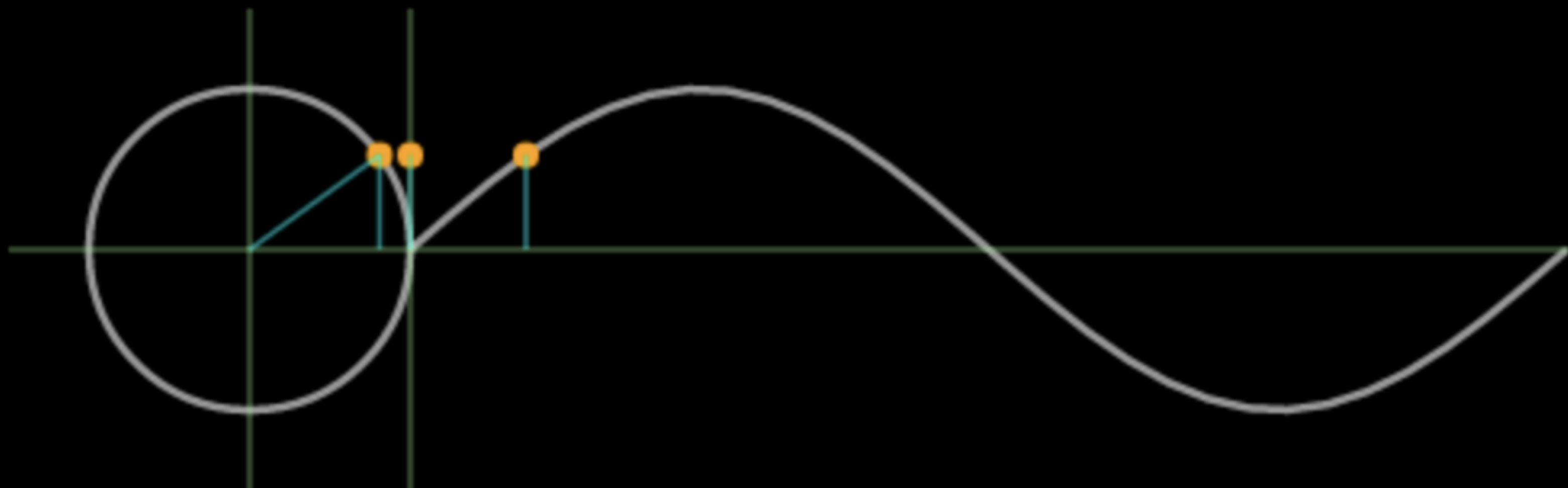
FT graphic Alan Smith, Source: Pew Research Center

FT

This is a bit tedious, so let's speed the process up a bit:

STOP SAMPLING



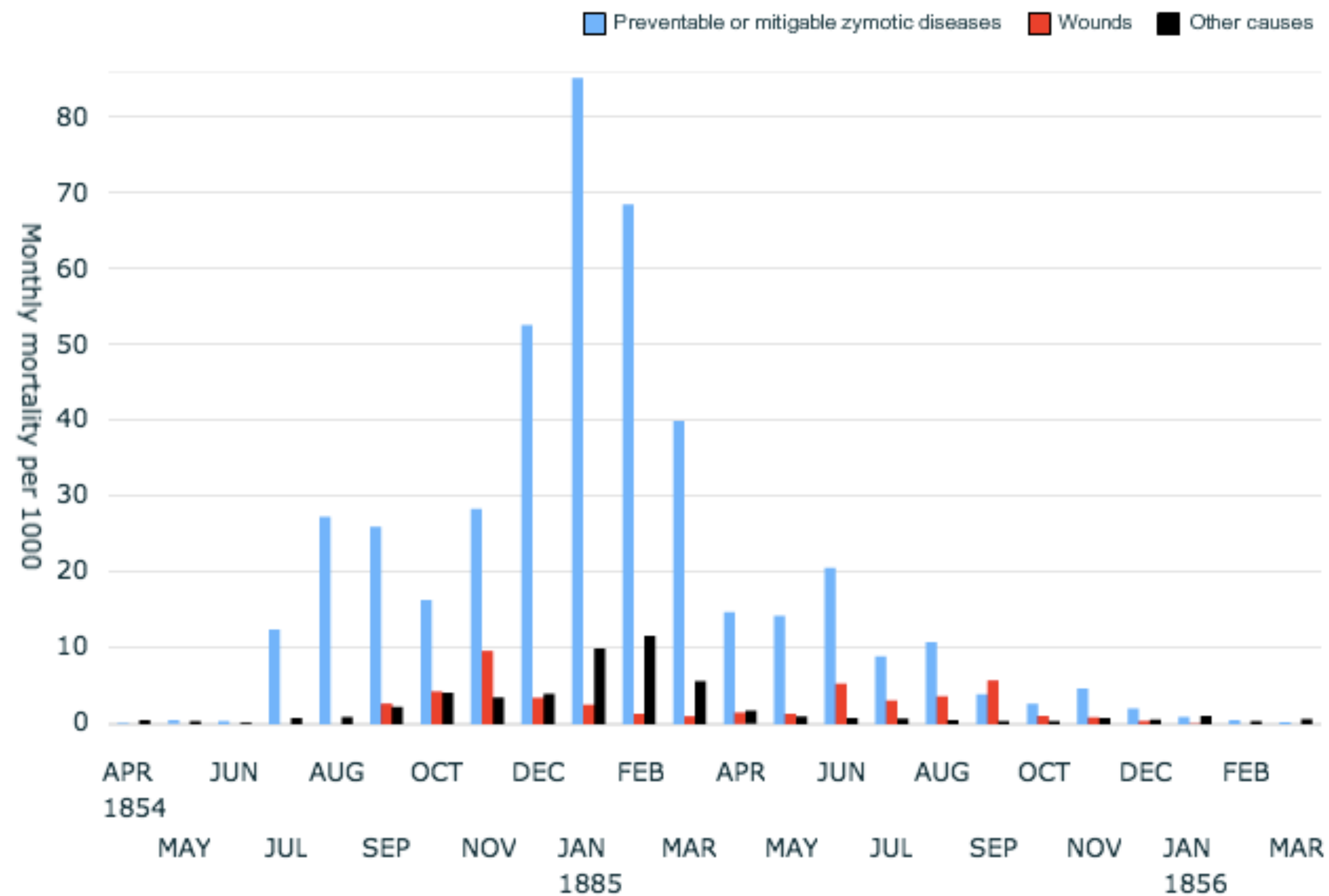


Rotating circle generates sine wave
written in Javascript using HTML5 Canvas drawing

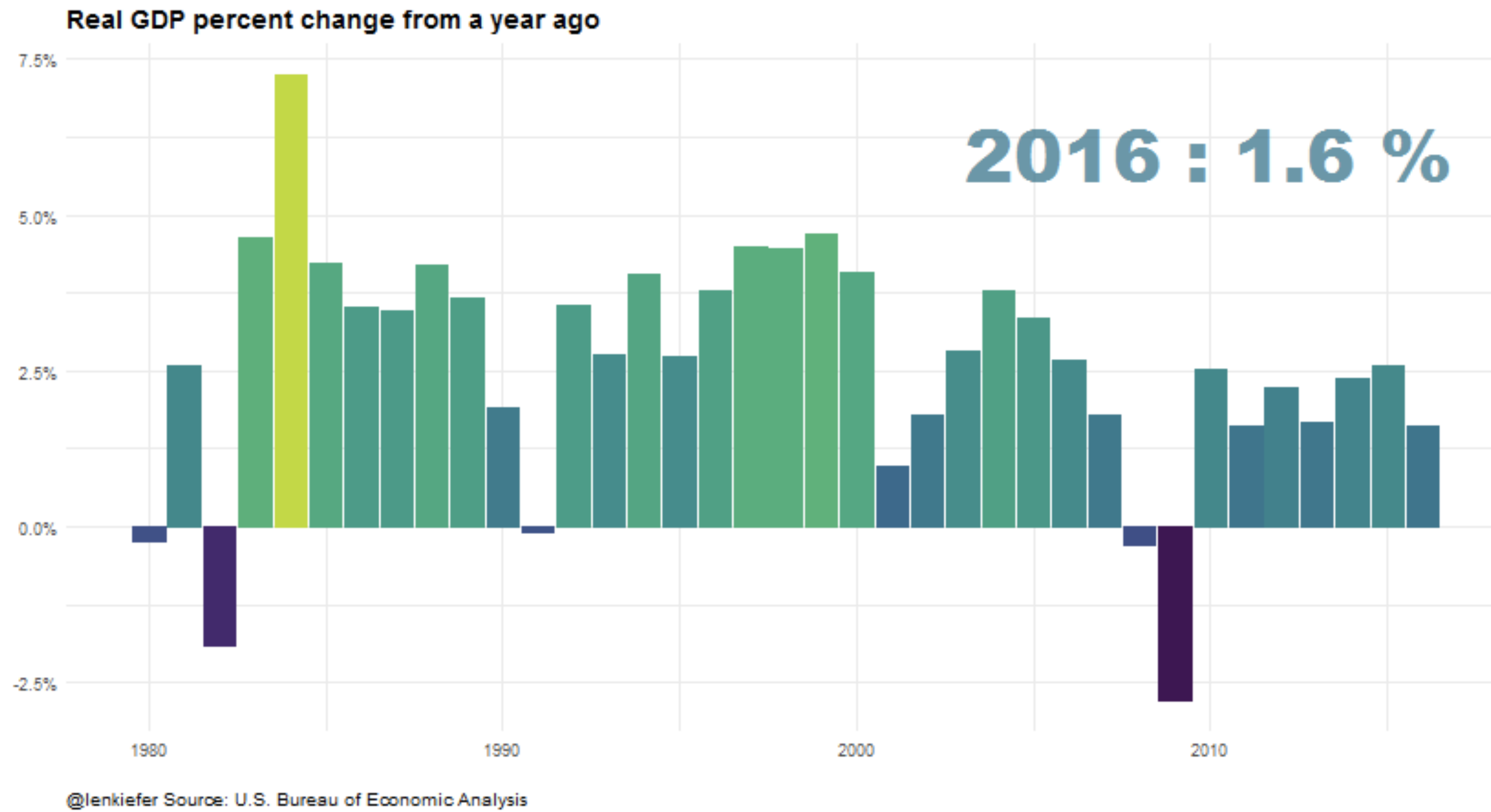
quantblog.wordpress.com



Nightingale's Coxcombs

[About](#)[Embed](#)[Print](#)[Full Screen](#)[Original](#)[Superimposed](#)[Bar Chart](#)[Icons](#)

March 1856



gganimate

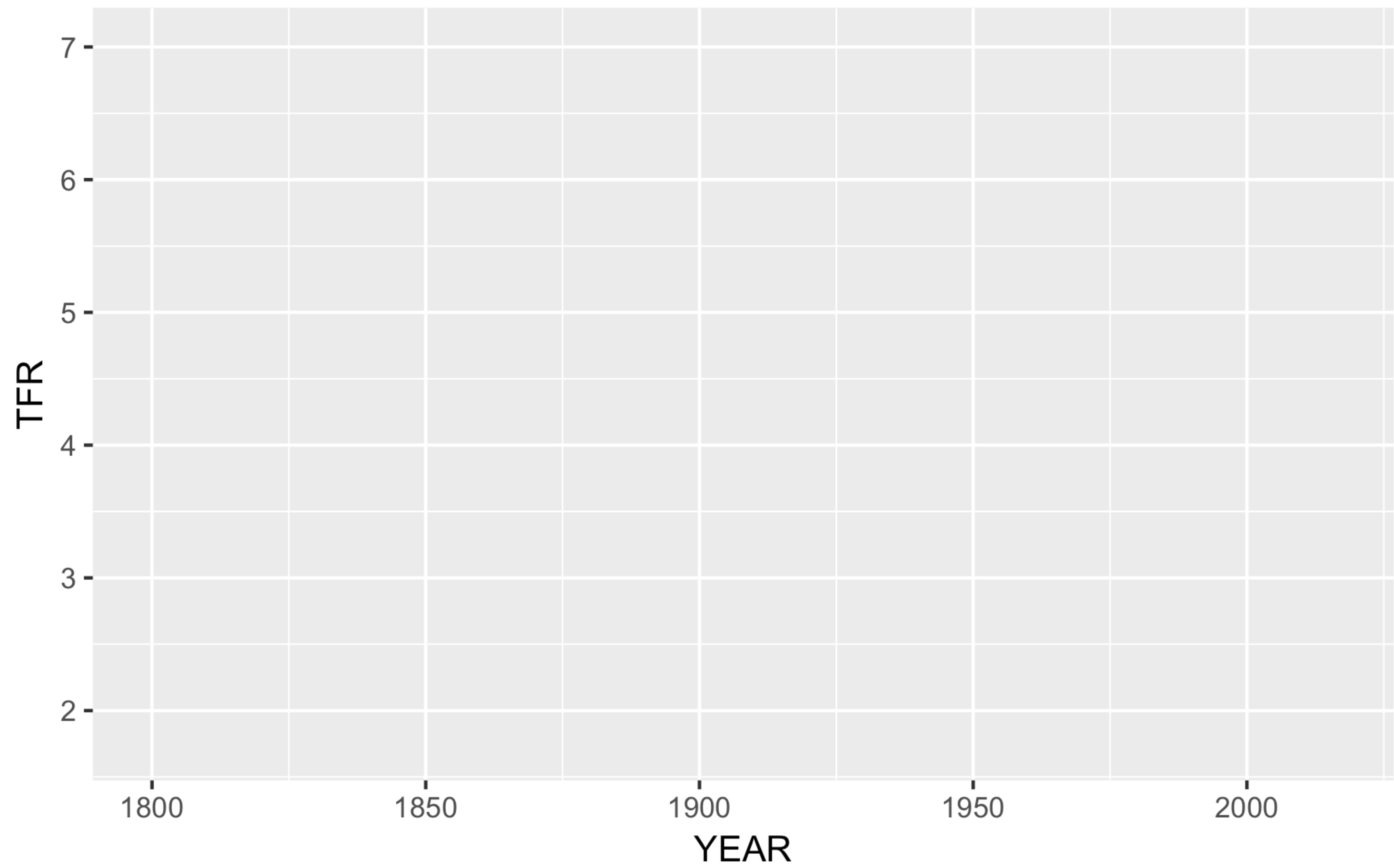
1. usual method of creating an animation: bundle a series of images (plots)
2. gganimate method: add frame as an ggplot aesthetic
 - more efficient
 - automatically keeps scales consistent

gganimate examples

<https://github.com/dgrtwo/gganimate>

<http://lenkieferr.com/2017/02/20/house-price-tour>

<http://lenkieferr.com/2016/05/29/improving-R-animated-gifs-with-tweenr>



Web Technologies

HTML, CSS,
JavaScript

Data
Science Tools

Data +
Graphics

```
Call:
lm(formula = ROLL ~ UNEM, data = datavar)
```

```
Residuals:
    Min       1Q   Median       3Q      Max
-7640.0 -1046.5   602.8  1934.3  4187.2
```

```
Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   3957.0     4000.1   0.989   0.3313
UNEM          1133.8       513.1   2.210   0.0358 *
```

```
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Residual standard error: 3049 on 27 degrees of freedom
Multiple R-squared:  0.1531, Adjusted R-squared:  0.1218
F-statistic: 4.883 on 1 and 27 DF,  p-value: 0.03579
```

Graphic Design

Photoshop
Illustrator



A rotating globe in GIF format.

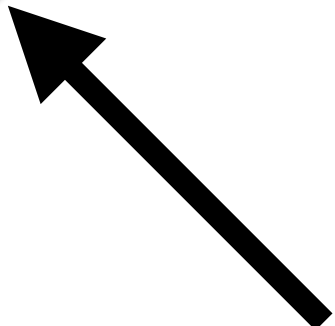
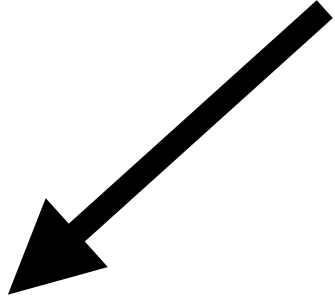
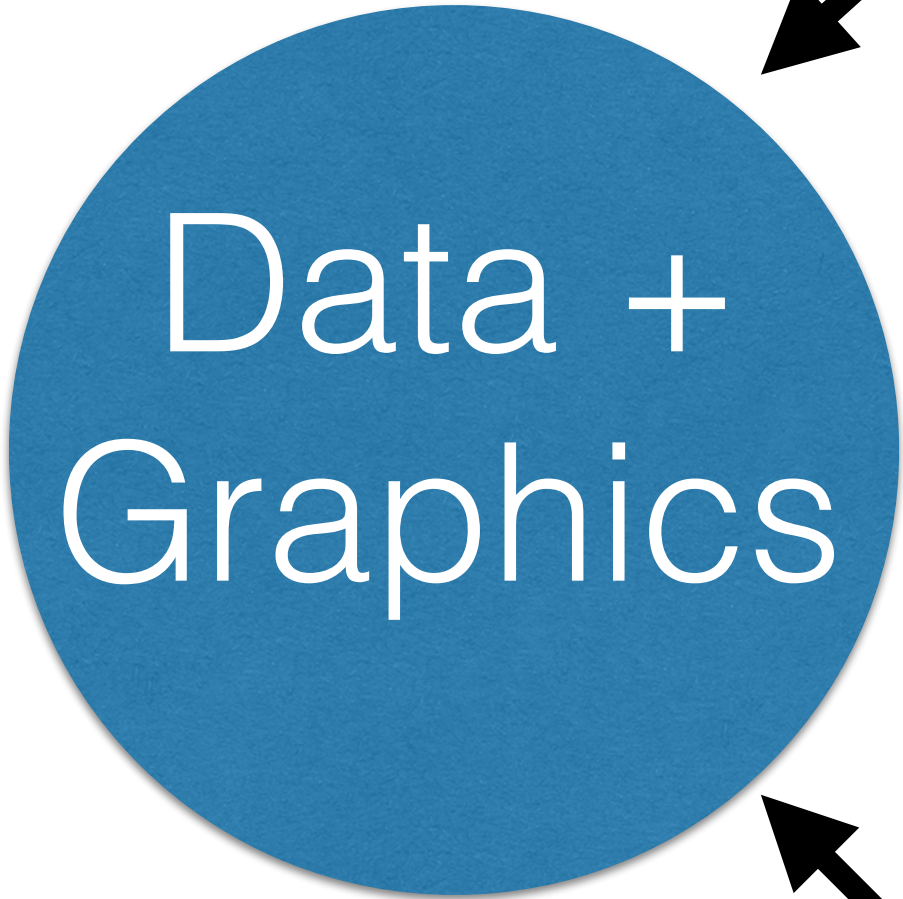
Filename extension	.gif
Internet media type	image/gif
Type code	GIFf
Uniform Type Identifier (UTI)	com.compuserve.gif
Magic number	GIF87a / GIF89a
Developed by	CompuServe
Initial release	1987; 30 years ago ^[1]
Latest release	89a (1989; 28 years ago ^[2])
Type of format	lossless bitmap image format
Website	www.w3.org/Graphics/GIF/spec-gif89a.txt



EDA vs. Presentation

Web Technologies HTML, CSS, JavaScript

Data Science Tools



Graphic Design Photoshop Illustrator



A rotating globe in GIF format.

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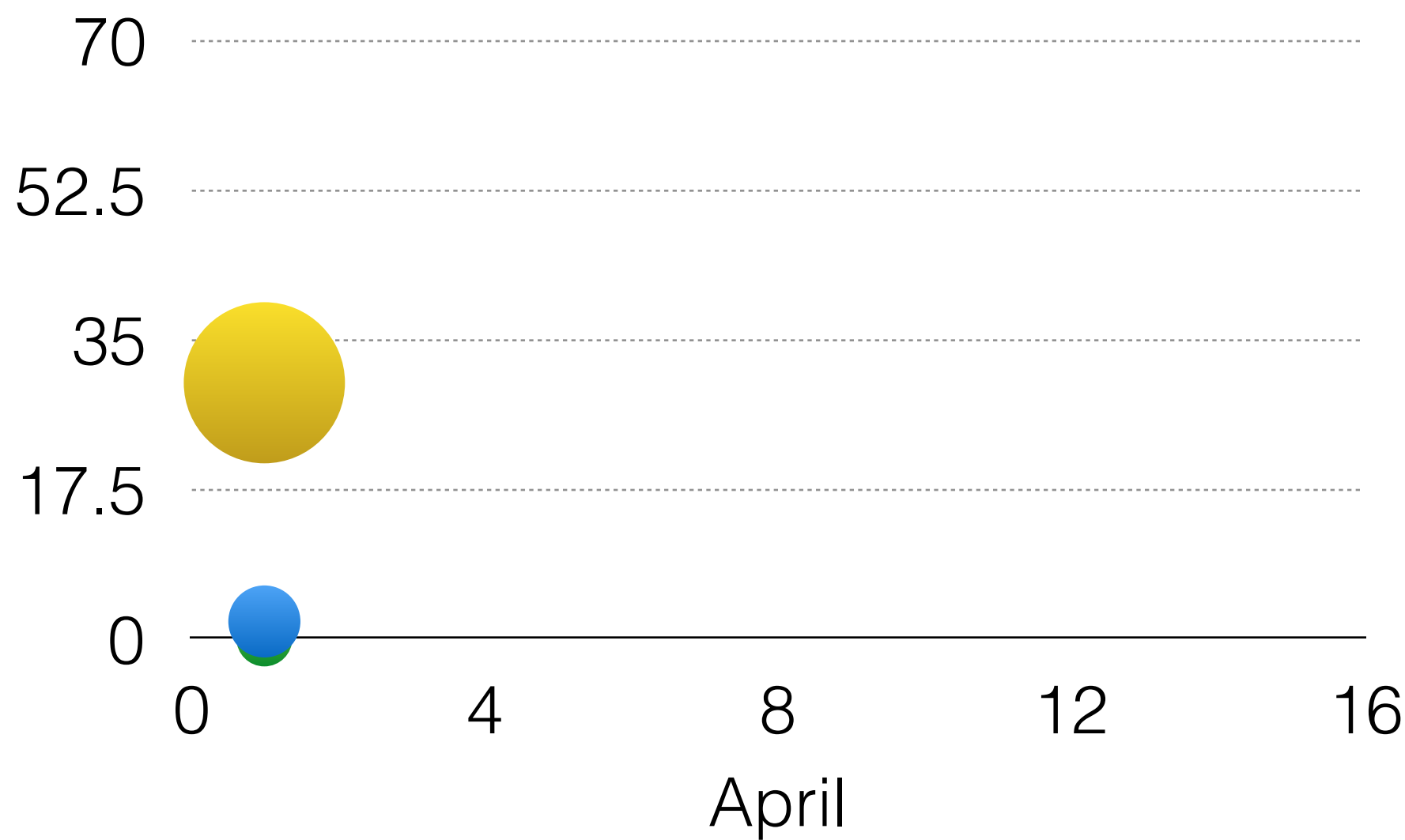
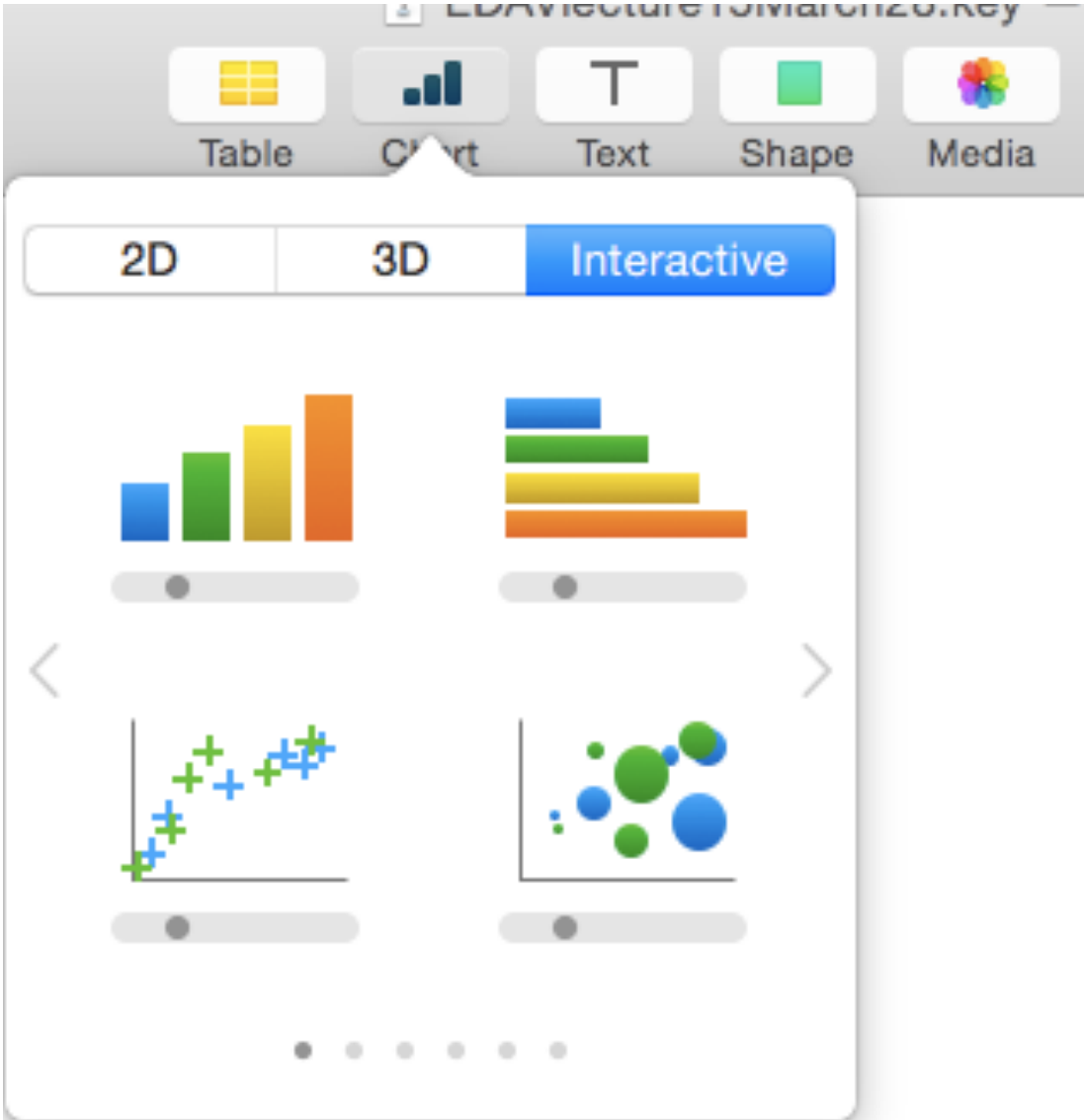


May 10, 1869:

**The two
companies
met at
Promontory
Summit in
Utah.**



Keynote



Edit Chart Data

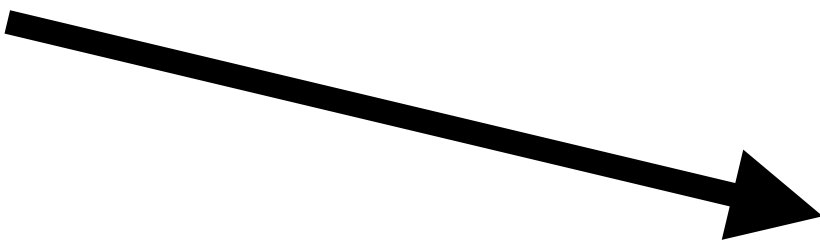
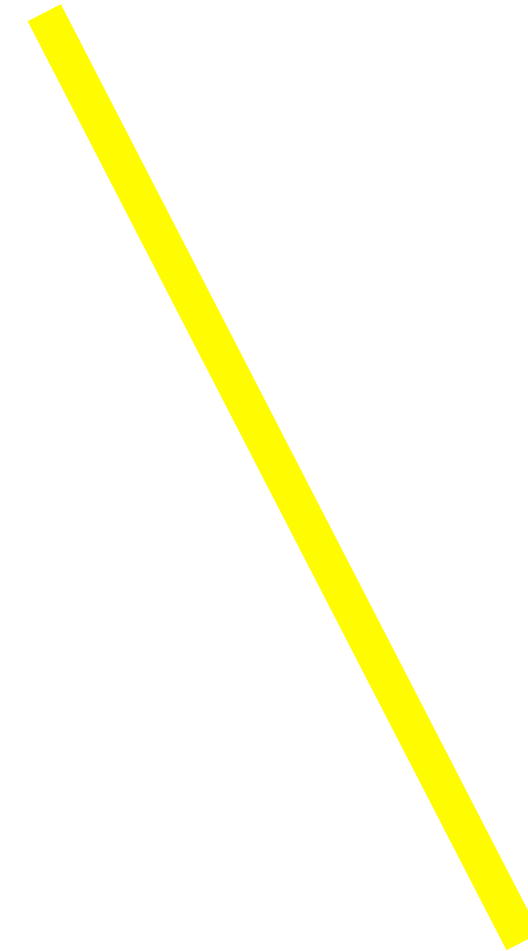
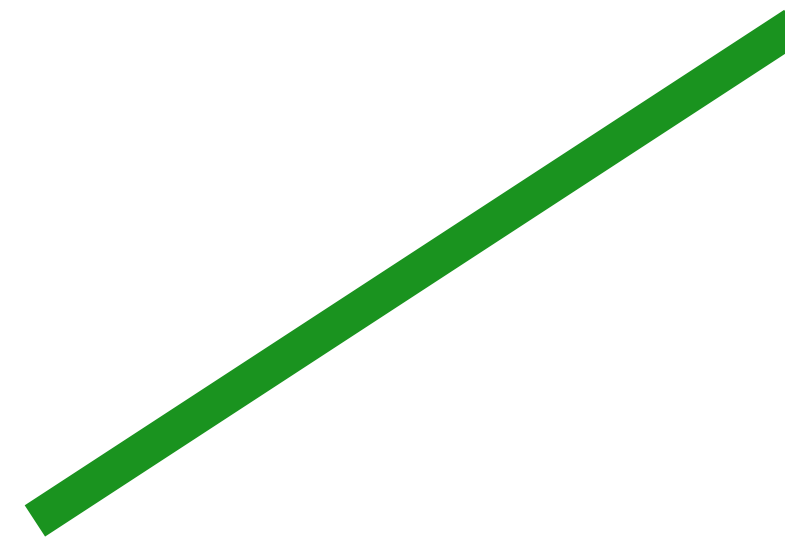
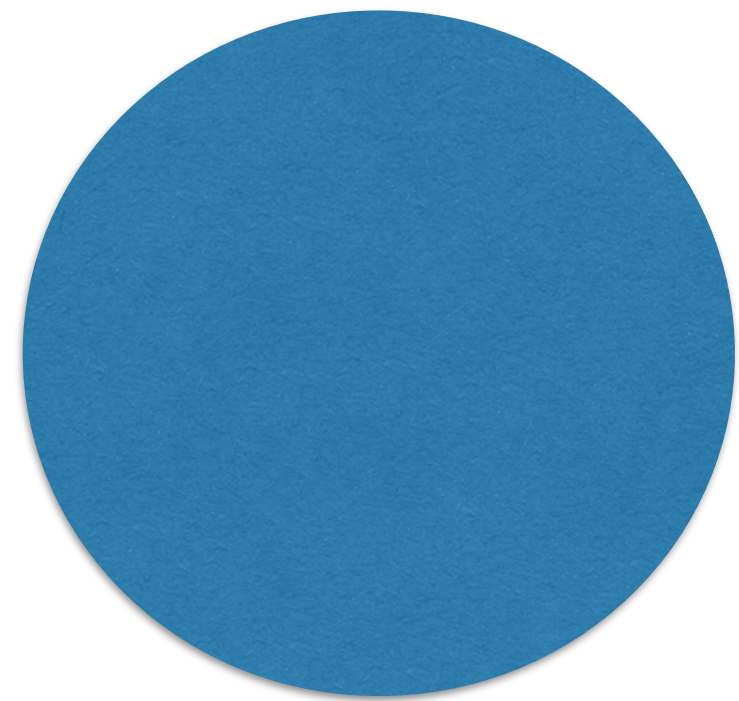


Chart Data				
Region 1				
	X	Y	Size	Y
April	1	2	20	0
May	3	4	34	11
June	5	5	12	19
July	6	8	50	26
August	8	13	70	33

D3



D3

Curran Kelleher

<https://github.com/curran/screencasts/tree/gh-pages/introToD3>

```
<!DOCTYPE html>
```

```
<html lang="en">
```

```
  <head>
```

```
    <meta charset="utf-8">
```

```
    <title></title>
```

```
    <script src="d3.js"></script>
```

```
    <style></style>
```

```
  </head>
```

```
  <body>
```

```
    <svg width = 500 height = 400></svg>
```

```
    <script></script>
```

```
  </body>
```

```
</html>
```

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```

```
</html>
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<!DOCTYPE html>
<html lang="en">
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    <title>This is a title.</title>
  </head>
  <body>
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  </body>
</html>
```