D3.js An introduction

Agenda

▶ What's D3

▶ D3 Examples

▶ Build some visualizations

▶ Resources

What is D3

▶ Data Driven Documents

▶ An General purpose visualization Library written in JS

▶ Started at Stanford Visualization Group (Jeff Heer, Mike Bostock and many others)

▶ Open Source

What is D3

"D3.js is a JavaScript library for manipulating documents based on data. D3 helps you bring data to life using HTML, SVG, and CSS. D3's emphasis on web standards gives you the full capabilities of modern browsers without tying yourself to a proprietary framework, combining powerful visualization components and a data-driven approach to DOM manipulation" - Source d3js.org

What is D3

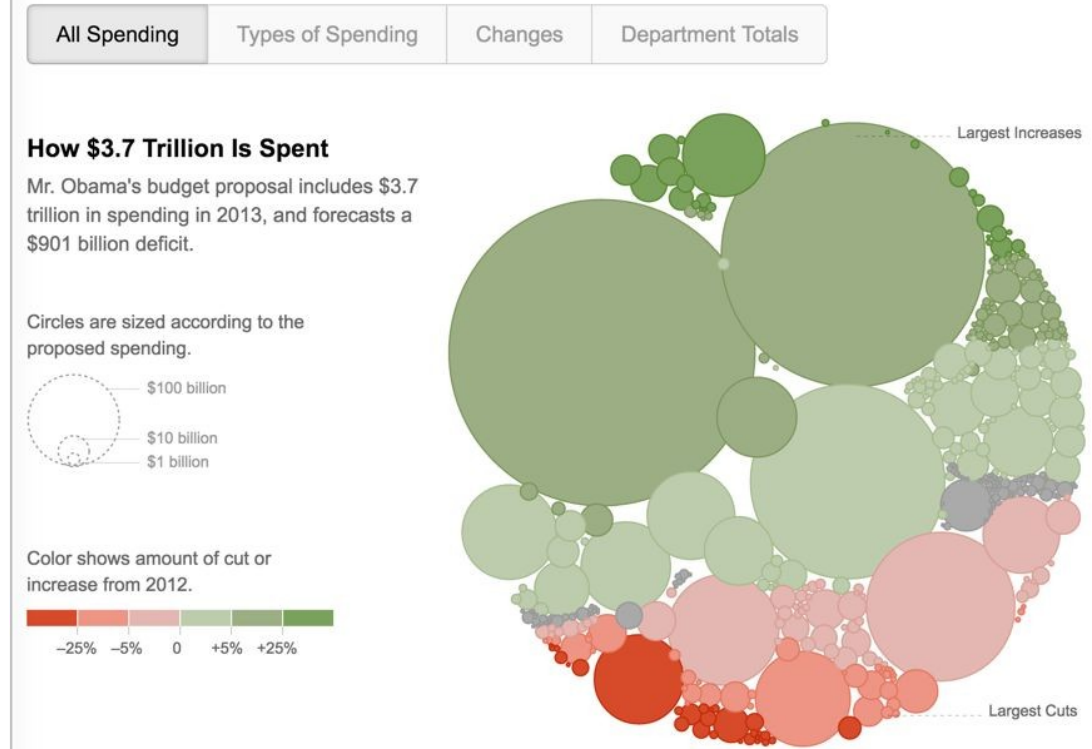A Labor of Love by Mike Bostock

Follow him: @mbostock
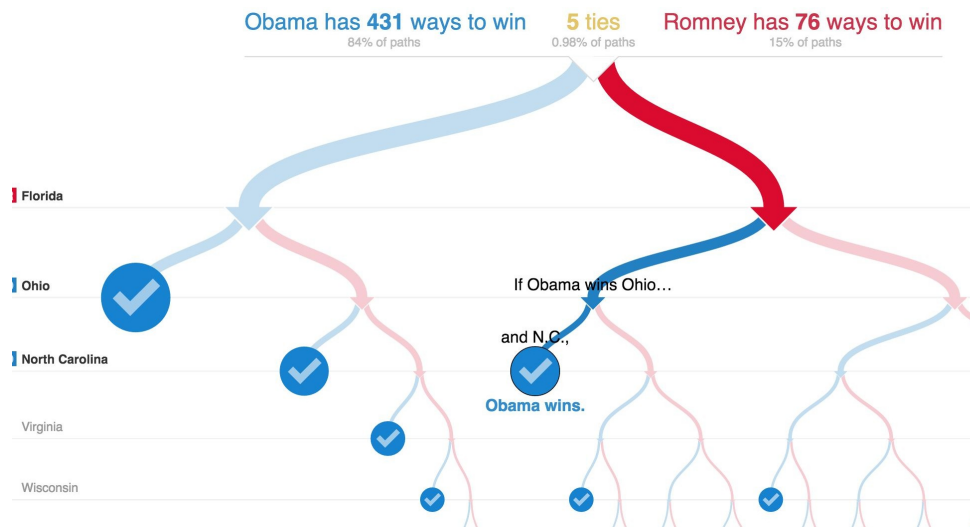
Examples

Four ways to slice Obama's Budget (2012)

http://www.nytimes.com/interactive/2012/02/13/us/politics/2013-budget-proposal-graphic.html

Elections 2012

http://elections.nytimes.com/2012/results/president

http://www.nytimes.com/interactive/2012/11/02/us/politics/paths-to-the-white-house.html?_r=0

Facebook IPO

http://www.nytimes.com/interactive/2012/05/17/business/dealbook/how-the-facebook-offering-compares.html
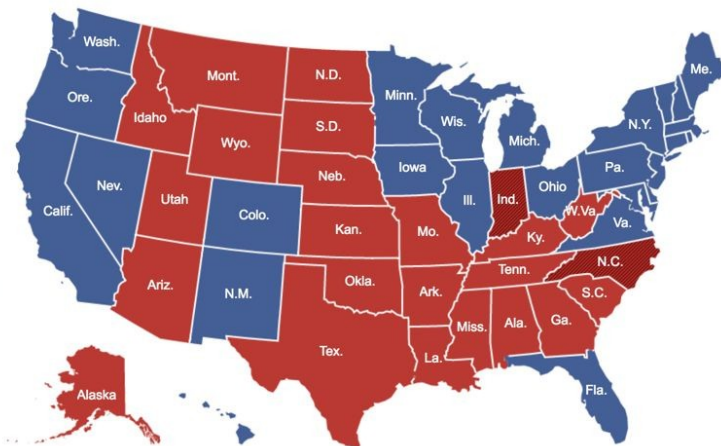
The Facebook Offering: How It Compares

< Prev   Next ➤   **1** 2 3 4 5   Find a company [   ]

Company value
In billions of today's dollars

The Tech I.P.O.'s
Since 1980, there have been about 2,400 technology, Internet and telecom initial public offerings. Until this week, the largest by market capitalization was Google, which was valued at $23 billion, or about $28 billion in today's dollars.

Google went public in 2004

25 —
20 —
15 —
10 —
5 —
0 —

Apple went public in 1980

Microsoft

Year of I.P.O.   1980   1985   1990   1995   2000   2005   2010

Explained Visually

http://setosa.io/ev/conditional-probability/

$$P(B|A) = \frac{P(A|B)P(B)}{P(A)}.$$

P(A) = 0.200 or 20.0%

P(B) = 0.200 or 20.0%

P(A n B) = 0.100 or 10.0%

P(B|A) = 0.500 or 50.0%

If we have a ball and we know it hit the red shelf, there's a 50.0% chance it also hit the blue shelf.

P(A|B) = 0.500 or 50.0%

If we have a ball and we know it hit the blue shelf, there's a 50.0% chance it also hit the red shelf.

drop frequency

perspective P(B|A) P(A|B) world
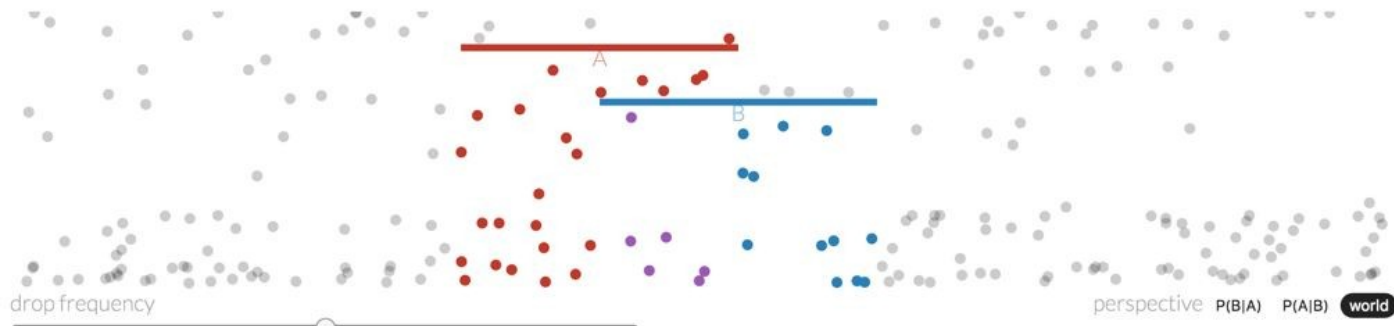
Visual Introduction to ML

http://www.r2d3.us/visual-intro-to-machine-learning-part-1/
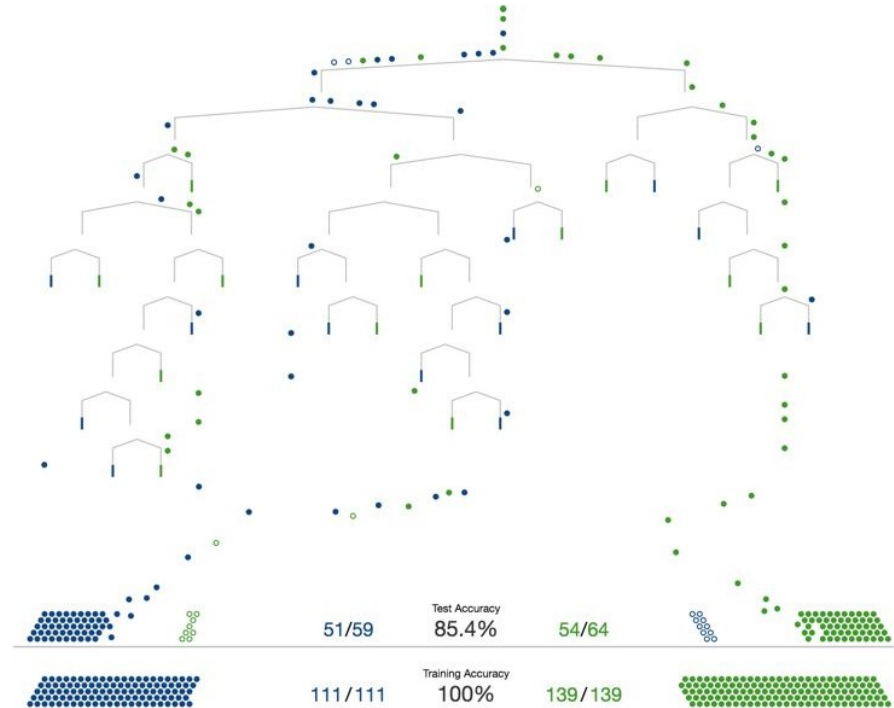
Income Changes by Profession

Teaswarm

https://bl.ocks.org/dhoboy/ccafe73e24cf9c36353f2641a4469314

Epicyclic Gearing

https://bl.ocks.org/mbostock/1353700

More Select Examples

- https://bost.ocks.org/mike/nations/

- https://bl.ocks.org/mbostock/346f4d967650b27c0511

- https://bl.ocks.org/kerryrodden/7090426
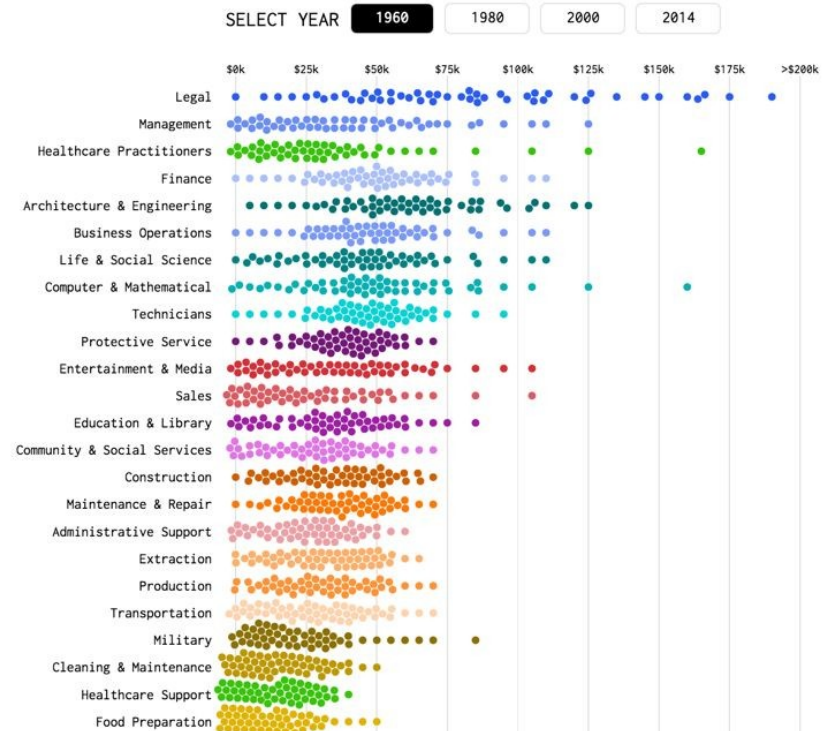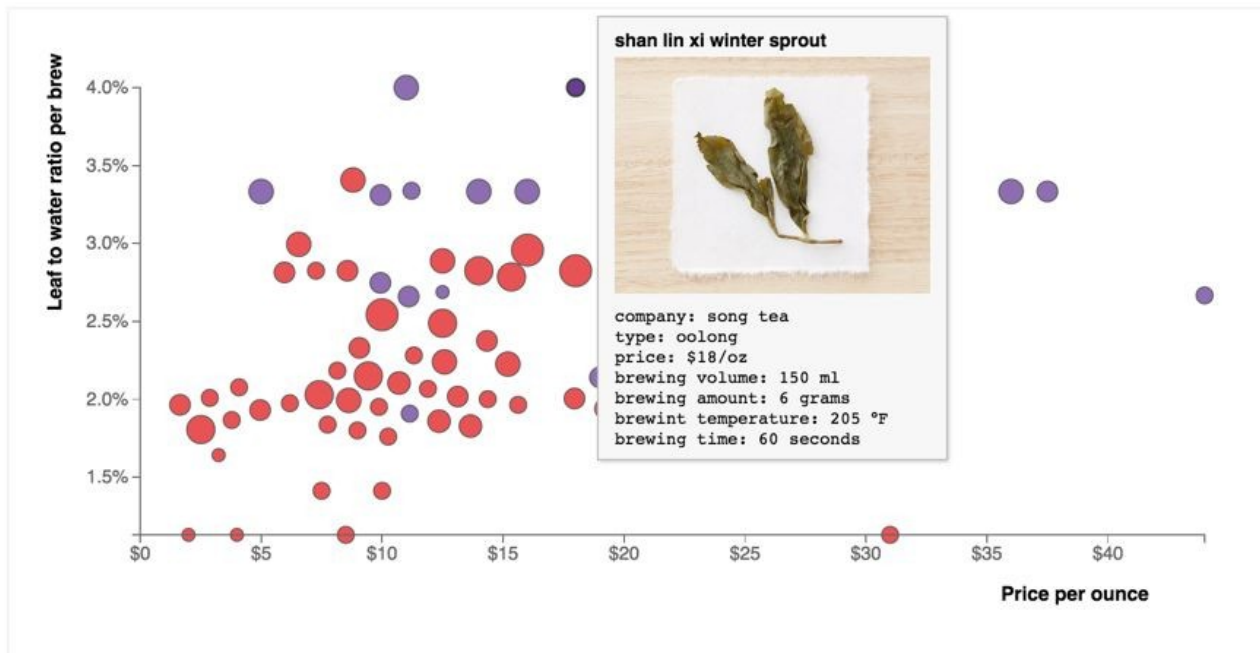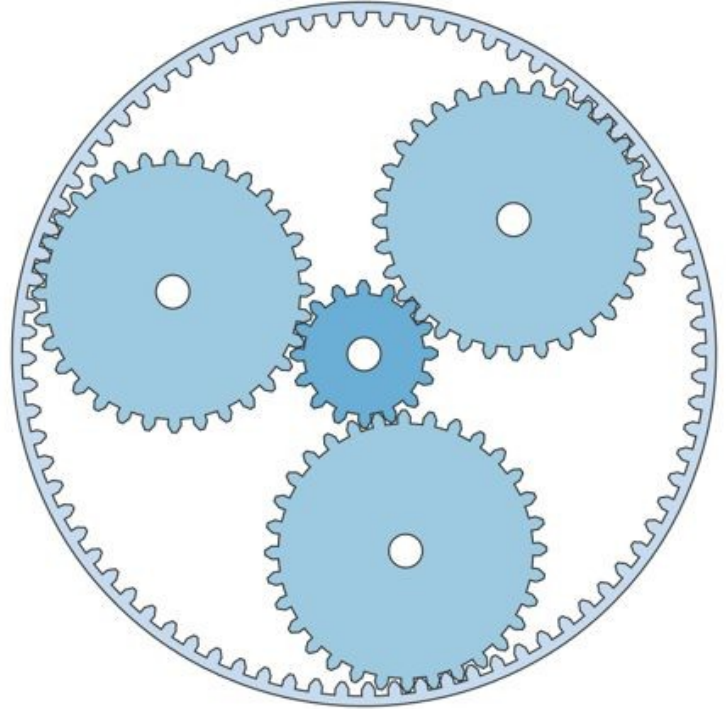
- Bostock Blocks - http://bl.ocks.org/mbostock

- Tons more at https://bost.ocks.org/<github_handle>

Design Process

- http://chartsnthings.tumblr.com

- http://kpq.github.io/chartsnthings/

What's D3

JS library for manipulating documents based on data. D3 helps you bring data to life using HTML, SVG and CSS.

Data to Visual Elements on the HTML Document

Before we can get started with D3…

WEB Standards

- HTML - Content, CSS - Style

- JS - Dynamic Scripting

- Data Visualization

  - Canvas - Paint shapes

  - SVG - DOM Shape elements

  - Web GL - 3D (Not going to talk about it)

- ▶ Let's learn some JS
- ▶ http://jsbin.com/

Getting Started with D3

Creating SVG

```
svg = d3.select("#chart").append("svg")
```

Creating SVG

```
svg = d3.select("#chart").append("svg")
```

Selecting Elements

▶ .selectAll(selector)

▶ .select(selector)

▶ Selects Elements on HTML Document

Append Elements

▶ .append(element)

▶ Appends an Child element on the page

Setting Attributes

▶ .attr(properties)

▶ Set Properties for the selected element

Setting Style

.style(properties**)**

Set Style properties (CSS) for the selected element

Chaining

```
var chart = d3.select("#chart")

    .append("svg")

    .attr("width", 450)

    .attr("height", 300);
```

D3 Data Join
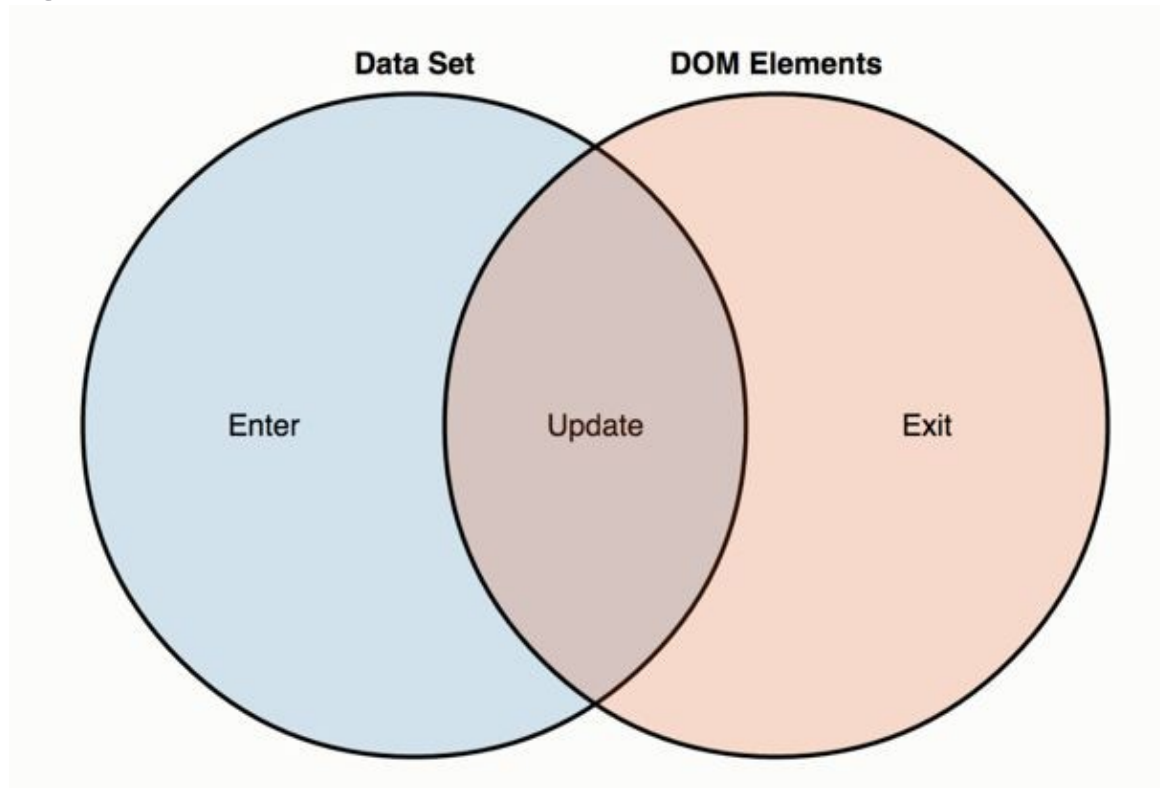
D3 Data Join

▶ .data()

▶ Binds Data to DOM Elements

.enter()

- ▶ .enter()

- ▶ Add new Elements to DOM

.exit()

▶ .exit()

▶ Removes existing elements from DOM

D3 Selections & General Update Pattern

- Three little circles
- How selections work
- Thinking with joins
- General Update Pattern
- General Update Pattern II
- General Update Pattern III
- Transitions

There's Lot more to D3

- Scale
- Axis
- Layouts
- Maps
- Canvas Rendering
- And many more…

D3 Examples Gallery

- https://d3js.org

- https://github.com/d3/d3/wiki/Gallery

- http://bl.ocks.org/

D3 Community

- http://blockbuilder.org/ (Blocks Editor)

- http://kpq.github.io/ (NY [Times)](http://kpq.github.io/)

- http://christopheviau.com/d3list/ (Alternative D3 Gallary)

- https://www.jasondavies.com/ (Maps)

- http://www.meetup.com/Bay-Area-d3-User-Group/

  (Bay Area D3 Meetup)

Alternatives

- plot.ly
- Bokeh Plotting Library
- plottablejs.org
- Tableau
- Many more

But nothing beats the amazing library of examples in D3.

Will you love D3?

- Maybe?
- Some people love d3, others find it too cumbersome
- Find Examples posted by Mike or others
- Ask questions, it's a supportive community

Just the Beginning ....

of your Data Visualization Journey