

Data Visualization

Fall 2016

What D3 is?

- JavaScript library for manipulating documents based on data
- Data-Driven Documents (D3)
- Visualizing Data with common Web standards:
 - HTML, CSS, SVG
- Constructing the DOM from Data
- Each data point has a corresponding element

What D3 is not?

- Not a chart library; it is a visualization library
- Not a compatibility layer
- Not only about SVG, HTML, or Canvas

Selection

- Modifying documents using W3C DOM API is tedious:
- ```
var paragraphs = document.getElementsByTagName("p");
for (var i = 0; i < paragraphs.length; i++)
{
 var paragraph = paragraphs.item(i);
 paragraph.style.setProperty("color", "white",
 null);
}
```

# Selection

- D3 employs a declarative approach:
- Operating on arbitrary sets of nodes:
  - `d3.selectAll("p").style("color", "white");`
- Manipulating individual nodes:
  - `d3.select("body").style("background-color", "black");`

# Selection

- D3 uses CSS Selectors

- Single selector

- `#foo` // `<any id="foo"> </any>`
- `foo` // `<foo> </foo>`
- `.foo` // `<any class="foo"> </any>`
- `[foo=bar]` // `<any foo="bar"> </any>`
- `foo bar` // `<foo><bar> </bar></foo>`

- Multiple selectors:

- `foo.bar` // `<foo class="bar"> </foo>`
- `foo#bar` // `<foo id="bar"> </foo>`

# Select and Modify Element Properties

- `var svg = d3.select("svg");`
- `var rect = svg.select("rect");`  
`rect.attr("width", 100);`  
`rect.attr("height", 100);`  
`rect.style("fill", "steelblue");`
- `svg.select("rect")`  
`.attr("width", 100)`  
`.attr("height", 100)`  
`.style("fill", "steelblue");`
- `d3.select("svg").select("rect")`  
`.attr({`  
`"width": 100,`  
`"height": 100`  
`})`  
`.style({`  
`"fill": "steelblue"`  
`});`

# Transitions

- ```
var svg = d3.select("svg");  
  
svg.selectAll("rect")  
  .data([127, 61, 256])  
  .transition()  
  .duration(1500) // 1.5 second  
  .attr("x", 0)  
  .attr("y", function(d,i) { return i*90+50; })  
  .attr("width", function(d,i) { return d; })  
  .attr("height", 20)  
  .style("fill", "steelblue");
```


D3 Setup

- Create a new folder for your project
- Within that folder create a subfolder called d3
- Download the latest version of D3 into that subfolder and decompress the ZIP file
- (notice both the minified and standard version)
- Or, download entire repository:

<https://github.com/mbostock/d3>

- Or, to link directly to the latest release, copy this snippet:
`<script src="//d3js.org/d3.v3.min.js" charset="utf-8"></script>`

D3 Setup

- Create a simple HTML page within project folder named index.html:

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN">
<html lang="en">
  <head>
    <meta http-equiv="content-type" content="text/html>
    <meta charset="utf-8">
    <title>D3 Page Template</title>
    <script type="text/javascript" src="d3/d3.js" charset="utf-8"></script>
  </head>
  <body>
    <script type="text/javascript">
      // TODO
    </script>
  </body>
</html>
```

D3 Setup

- Running a Python mini web server:

Python 2.x:

```
python -m SimpleHTTPServer 8080
```

Python 3.x:

```
python -m http.server 8080
```

You should get:

```
127.0.0.1 - - [02/Dec/2015 22:58:35] "GET / HTTP/1.1" 200 -  
127.0.0.1 - - [02/Dec/2015 22:58:35] "GET /d3/d3.js HTTP/1.1" 200 -
```