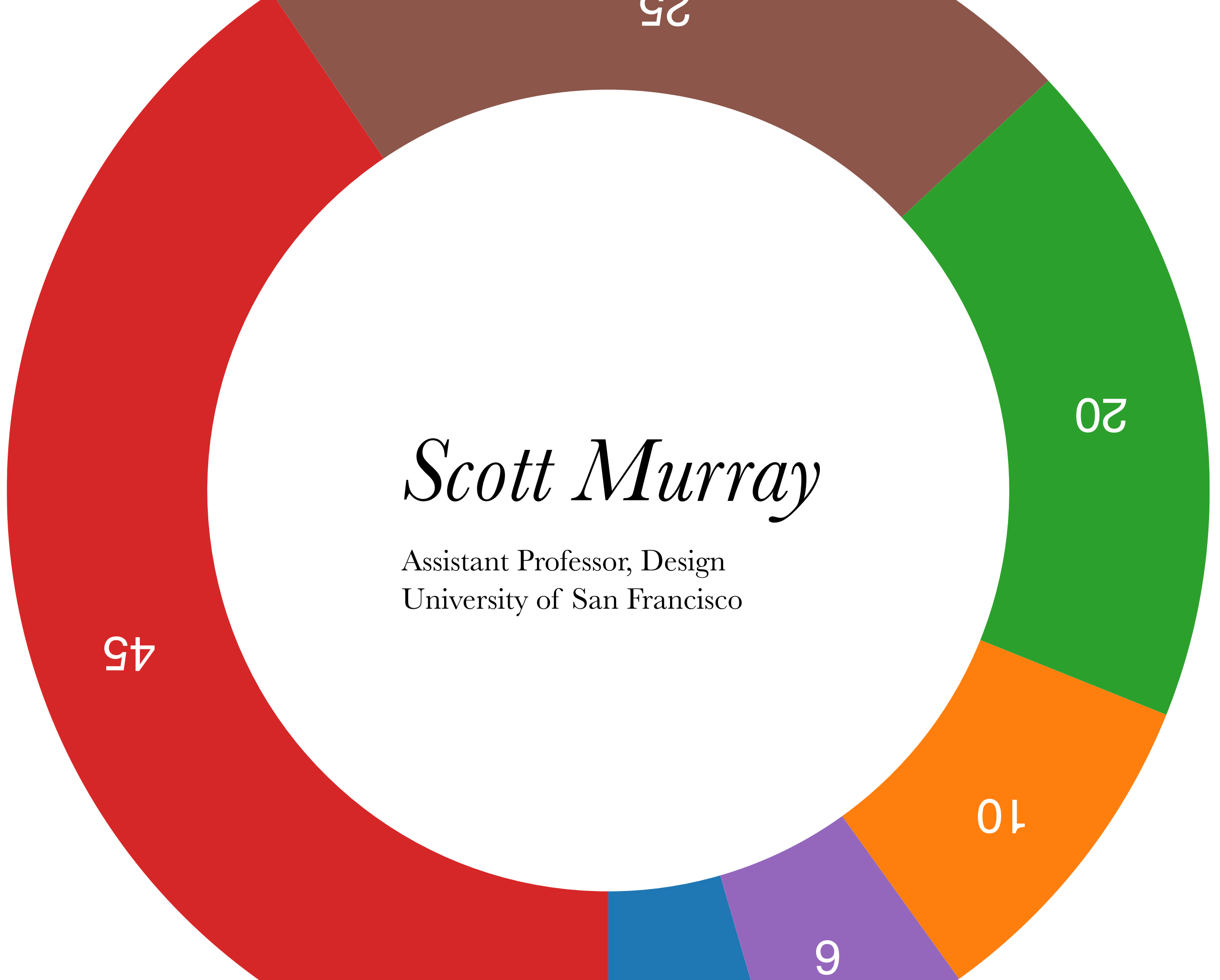


# *Learning D3*

*What is d3.js all about?  
And how do I get started?*

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*What is d3.js?*

```

d3 = function() {
  var  $\pi$  = Math.PI,  $\epsilon$  = 1e-6, d3 = {
    version: "3.0.6"
  }, d3_radians =  $\pi$  / 180, d3_degrees = 180 /  $\pi$ , d3_document = document, d3_window = window;
  function d3_target(d) {
    return d.target;
  }
  function d3_source(d) {
    return d.source;
  }
  var d3_format_decimalPoint = ".", d3_format_thousandsSeparator = ",", d3_format_grouping = [ 3, 3 ];
  if (!Date.now) Date.now = function() {
    return +new Date();
  };
  try {
    d3_document.createElement("div").style.setProperty("opacity", 0, "");
  } catch (error) {
    var d3_style_prototype = d3_window.CSSStyleDeclaration.prototype, d3_style_setProperty = d3_style_prototype.setProperty;
    d3_style_prototype.setProperty = function(name, value, priority) {
      d3_style_setProperty.call(this, name, value + "", priority);
    };
  }
  function d3_class(ctor, properties) {
    try {
      try {
        for (var key in properties) {
          Object.defineProperty(ctor.prototype, key, {
            value: properties[key],
            enumerable: false
          });
        }
      } catch (e) {
        ctor.prototype = properties;
      }
    }
  }
  var d3_array = d3_arraySlice;
  function d3_arrayCopy(pseudoarray) {
    var i = -1, n = pseudoarray.length, array = [];
    while (++i < n) array.push(pseudoarray[i]);
    return array;
  }
  function d3_arraySlice(pseudoarray) {
    return Array.prototype.slice.call(pseudoarray);
  }
  try {
    d3_array(d3_document.documentElement.childNodes)[0].nodeType;
  } catch (e) {
    d3_array = d3_arrayCopy;
  }
}

```



```

d3=function(){function t(t){return t.target}function n(t){return t.source}function e(t,n){try{for(var e in
n)Object.defineProperty(t.prototype,e,{value:n[e],enumerable:!1})}catch(r){t.prototype=n}}function r(t){for(var
n=-1,e=t.length,r=[];e>=n;e++)r.push(t[n]);return r}function u(t){return Array.prototype.slice.call(t)}function
i(){}function a(t){return t}function o(){}function c(t){return"function"===typeof t?t:function(){return
t}}function l(t,n,e){return function(){var r=e.apply(n,arguments);return arguments.length?t:r}}function f(t)
{return null!=t&&!isNaN(t)}function s(t){return t.length}function h(t){return t.trim().replace(/\s+/g," ")}
function g(t){for(var n=1;t*n%1;)n*=10;return n}function p(t){return 1===t.length?function(n,e){t(null==n?
e:null):t}function d(t){return t.responseText}function m(t){return JSON.parse(t.responseText)}function v(t){var
n=Di.createRange();return n.selectNode(Di.body),n.createContextualFragment(t.responseText)}function y(t){return
t.responseXML}function M(){}function b(t){function n(){for(var n,r=e,u=-1,i=r.length;i>=u;i++){
(n=r[u].on)&&n.apply(this,arguments);return t}var e=[],r=new i;return n.on=function(n,u){var i,a=r.get(n);return
2>arguments.length?a&&a.on:(a&&(a.on=null,e=e.slice(0,i=e.indexOf(a)).concat(e.slice(i
+1)),r.remove(n)),u&&e.push(r.set(n,{on:u})),t)},n}function x(t,n){return n-(t?Math.ceil(Math.log(t)/Math.LN10):
1)}function _(t){return t+""}function w(t,n){var e=Math.pow(10,3*Math.abs(8-n));return{scale:n>8?function(t)
{return t/e}:function(t){return t*e},symbol:t}}function S(t){return function(n){return 0>=n?0:n>=1?1:t(n)}}
function k(t){return function(n){return 1-t(1-n)}}function E(t){return function(n){return .5*(.5>n?t(2*n):2-
t(2-2*n))}}function A(t){return t*t}function N(t){return t*t*t}function T(t){if(0>=t)return 0;if(t>=1)return
1;var n=t*t,e=n*t;return 4*(.5>t?e:3*(t-n)+e-.75)}function q(t){return function(n){return Math.pow(n,t)}}
function C(t){return 1-Math.cos(t*Ni/2)}function z(t){return Math.pow(2,10*(t-1))}function D(t){return 1-
Math.sqrt(1-t*t)}function L(t,n){var e;return 2>arguments.length&&(n=.45),arguments.length?e=n/
(2*Ni)*Math.asin(1/t):(t=1,e=n/4),function(r){return 1+t*Math.pow(2,10*-r)*Math.sin(2*(r-e)*Ni/n)}}function F(t)
{return t||(t=1.70158),function(n){return n*n*((t+1)*n-t)}}function H(t){return 1/2.75>t?7.5625*t*t:2/2.75>t?
7.5625*(t-=1.5/2.75)*t+.75:2.5/2.75>t?7.5625*(t-=2.25/2.75)*t+.9375:7.5625*(t-=2.625/2.75)*t+.984375}function
j(){qi.event.stopPropagation(),qi.event.preventDefault()}function P(){for(var
t,n=qi.event;t=n.sourceEvent;)n=t;return n}function R(t){for(var n=new M,e=0,r=arguments.length;r>+
+e;)n[arguments[e]]=b(n);return n.of=function(e,r){return function(u){try{var
i=u.sourceEvent=qi.event;u.target=t,qi.event=u,n[u.type].apply(e,r)}finally{qi.event=i}}},n}function O(t){var
n=[t.a,t.b],e=[t.c,t.d],r=U(n),u=Y(n,e),i=U(I(e,n,-u))||
0;n[0]*e[1]<e[0]*n[1]&&(n[0]*=-1,n[1]*=-1,r*=-1,u*=-1),this.rotate=(r?Math.atan2(n[1],n[0]):Math.atan2(-
e[0],e[1]))*zi,this.translate=[t.e,t.f],this.scale=[r,i],this.skew=i?Math.atan2(u,i)*zi:0}function Y(t,n){return
t[0]*n[0]+t[1]*n[1]}function U(t){var n=Math.sqrt(Y(t,t));return n&&(t[0]/=n,t[1]/=n),n}function I(t,n,e){return
t[0]+=e*n[0],t[1]+=e*n[1],t}function V(t){return"transform"===t?qi.interpolateTransform:qi.interpolate}function
X(t,n){return n=n-(t+=t)?1/(n-t):0,function(e){return(e-t)*n}}function Z(t,n){return n=n-(t+=t)?1/(n-t):
0,function(e){return Math.max(0,Math.min(1,(e-t)*n))}}function B(){}function $(t,n,e){return new J(t,n,e)}
function J(t,n,e){this.r=t,this.g=n,this.b=e}function G(t){return
16>t?"0"+Math.max(0,t).toString(16):Math.min(255,t).toString(16)}function K(t,n,e){var r,u,i,a=0,o=0,c=0;if(r=/
([a-z]+\((.*)\)/i.exec(t))switch(u=r[2].split(","),r[1]){case"hsl":return e(parseFloat(u[0]),parseFloat(u[1])/
100,parseFloat(u[2])/100);case"rgb":return n(nn(u[0]),nn(u[1]),nn(u[2]))}return(i=aa.get(t))?n(i.r,i.g,i.b):
(null!=t&&"#"===t.charAt(0)&&(4===t.length?(a=t.charAt(1),a+=a,o=t.charAt(2),o+=o,c=t.charAt(3),c+=c):
7===t.length&&(a=t.substring(1,3),o=t.substring(3,5),c=t.substring(5,7)),a=parseInt(a,16),o=parseInt(o,
16),c=parseInt(c,16)),n(a,o,c))}function W(t,n,e){var r,u,i=Math.min(t/=255,n/=255,e/
=255),a=Math.max(t,n,e),o=a-i,c=(a+i)/2;return o?(u=.5>c?o/(a+i):o/(2-a-i),r=t==a?(n-e)/o+(e>n?6:0):n==a?(e-t)/o
+2:(t-n)/o+4,r*=60):u=r=0,en(r,u,c)}function Q(t,n,e){t=tn(t),n=tn(n),e=tn(e);var r=pn((.4124564*t+.3575761*n+.
1804375*e)/fa),u=pn((.2126729*t+.7151522*n+.072175*e)/sa),i=pn((.0193339*t+.119192*n+.9503041*e)/ha);return
ln(116*u-16,500*(r-u),200*(u-i))}function tn(t){return.04045>=(t/=255)?t/12.92:Math.pow((t+.055)/1.055,2.4)}
function nn(t){var n=parseFloat(t);return"%===t.charAt(t.length-1)?Math.round(2.55*n):n}function en(t,n,e)

```



```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="utf-8">
  <title>D3 Page Template</title>
  <script type="text/javascript"
    src="d3.v3.js"></script>
</head>
<body>
  <script type="text/javascript">
    // Your beautiful D3 code
    // can go here
  </script>
</body>
</html>
```

|      |                           |
|------|---------------------------|
| HTML | Hypertext Markup Language |
| CSS  | Cascading Style Sheets    |
| JS   | JavaScript                |
| SVG  | Scalable Vector Graphics  |
| DOM  | The Document Object Model |

*all of the above == web standards*

|      |                           |
|------|---------------------------|
| HTML | Hypertext Markup Language |
| CSS  | Cascading Style Sheets    |
| JS   | JavaScript                |
| SVG  | Scalable Vector Graphics  |
| DOM  | The Document Object Model |

*Learning D3 is a process of “learning the web”*



*What does data look like on the web?*

```
// JavaScript arrays!
```

```
var dataset = [ 5, 10, 20, 15, 18 ];
```

```
// Data joins!
```

```
var dataset = [ 5, 10, 20, 15, 18 ];
```

```
d3.select("svg").selectAll("circle")  
  .data(dataset)  
  .enter()  
  .append("circle");
```

```
// Data joins!
```

```
var dataset = [ 5, 10, 20, 15, 18 ];
```

```
d3.select("svg").selectAll("circle")  
  .data(dataset)  
  .enter()  
  .append("circle");
```





```
// Data joins!
```

```
var dataset = [ 5, 10, 20, 15, 18 ];
```

```
d3.select("svg").selectAll("circle")  
  .data(dataset)  
  .enter()  
  .append("circle");
```

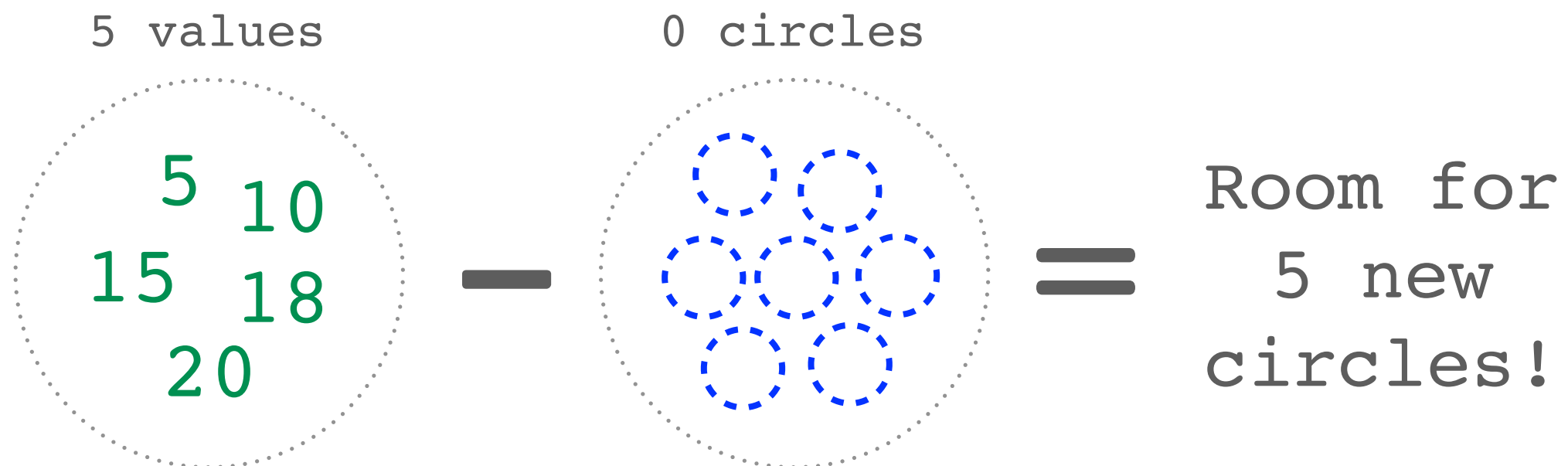
?

(empty selection)

```
// Data joins!
```

```
var dataset = [ 5, 10, 20, 15, 18 ];
```

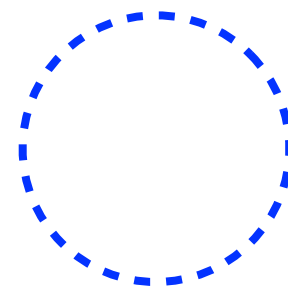
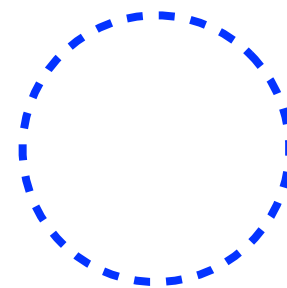
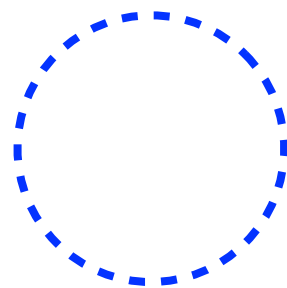
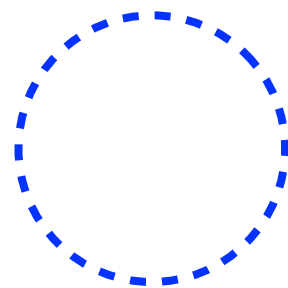
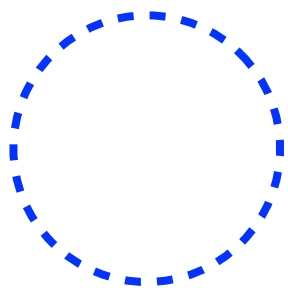
```
d3.select("svg").selectAll("circle")  
  .data(dataset)  
  .enter()  
  .append("circle");
```



```
// Data joins!
```

```
var dataset = [ 5, 10, 20, 15, 18 ];
```

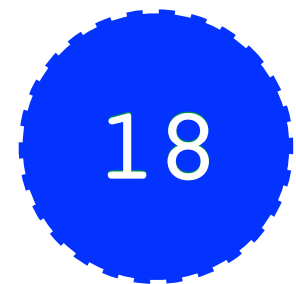
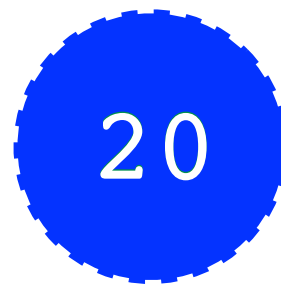
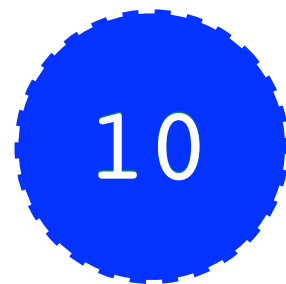
```
d3.select("svg").selectAll("circle")  
  .data(dataset)  
  .enter()  
  .append("circle");
```



```
// Data joins!
```

```
var dataset = [ 5, 10, 20, 15, 18 ];
```

```
d3.select("svg").selectAll("circle")  
  .data(dataset)  
  .enter()  
  .append("circle");
```





5

10

20

15

18

// Setting attributes from data!

5

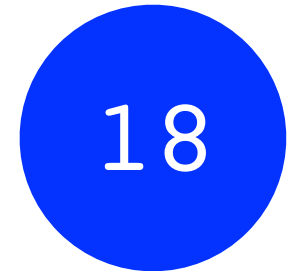
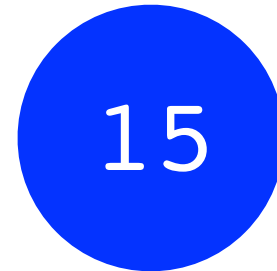
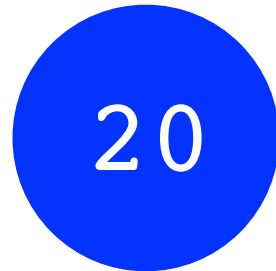
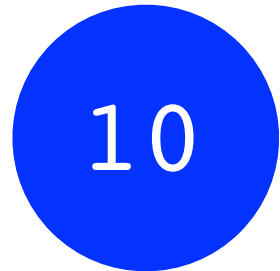
10

20

15

18

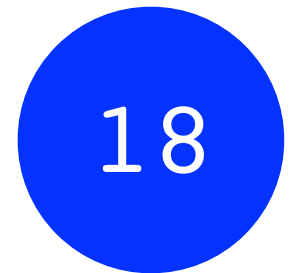
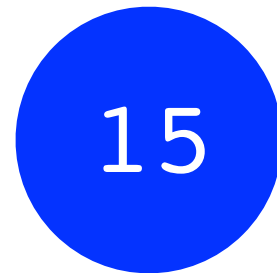
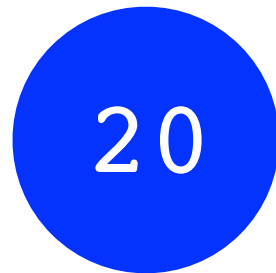
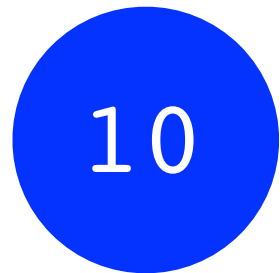
```
d3.selectAll("circle")  
  .attr("r", function(d) {  
    return d;  
  });
```



// Binding data to elements

// 1. Lets you reference values later

// 2. Prevents need to "redraw" elements



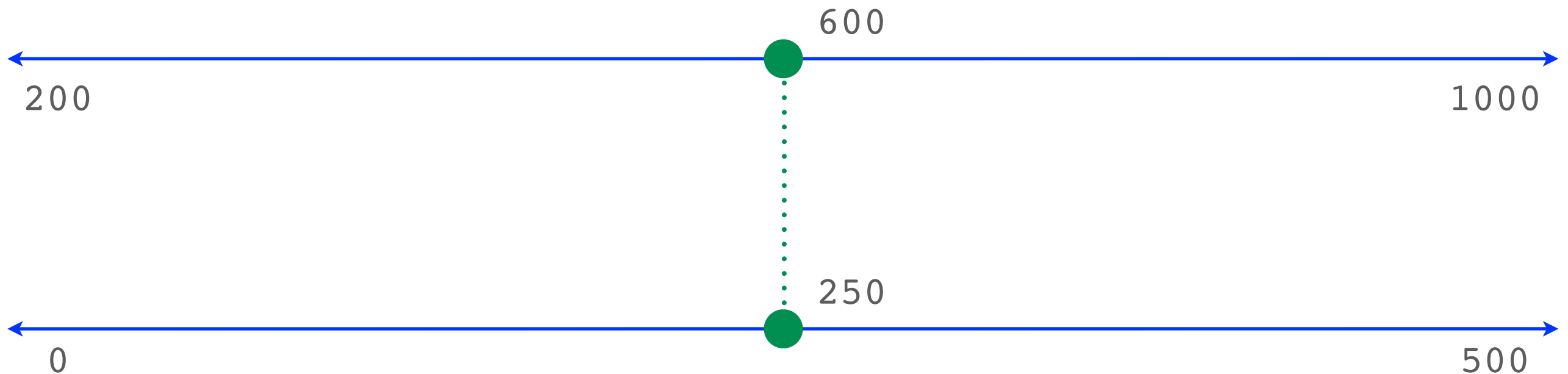


*What else can D3 do for me?*

```
// Scale values
```

```
var scale = d3.scale.linear()  
                .domain([200, 1000])  
                .range([0, 500]);
```

```
scale(600); // Returns 250
```



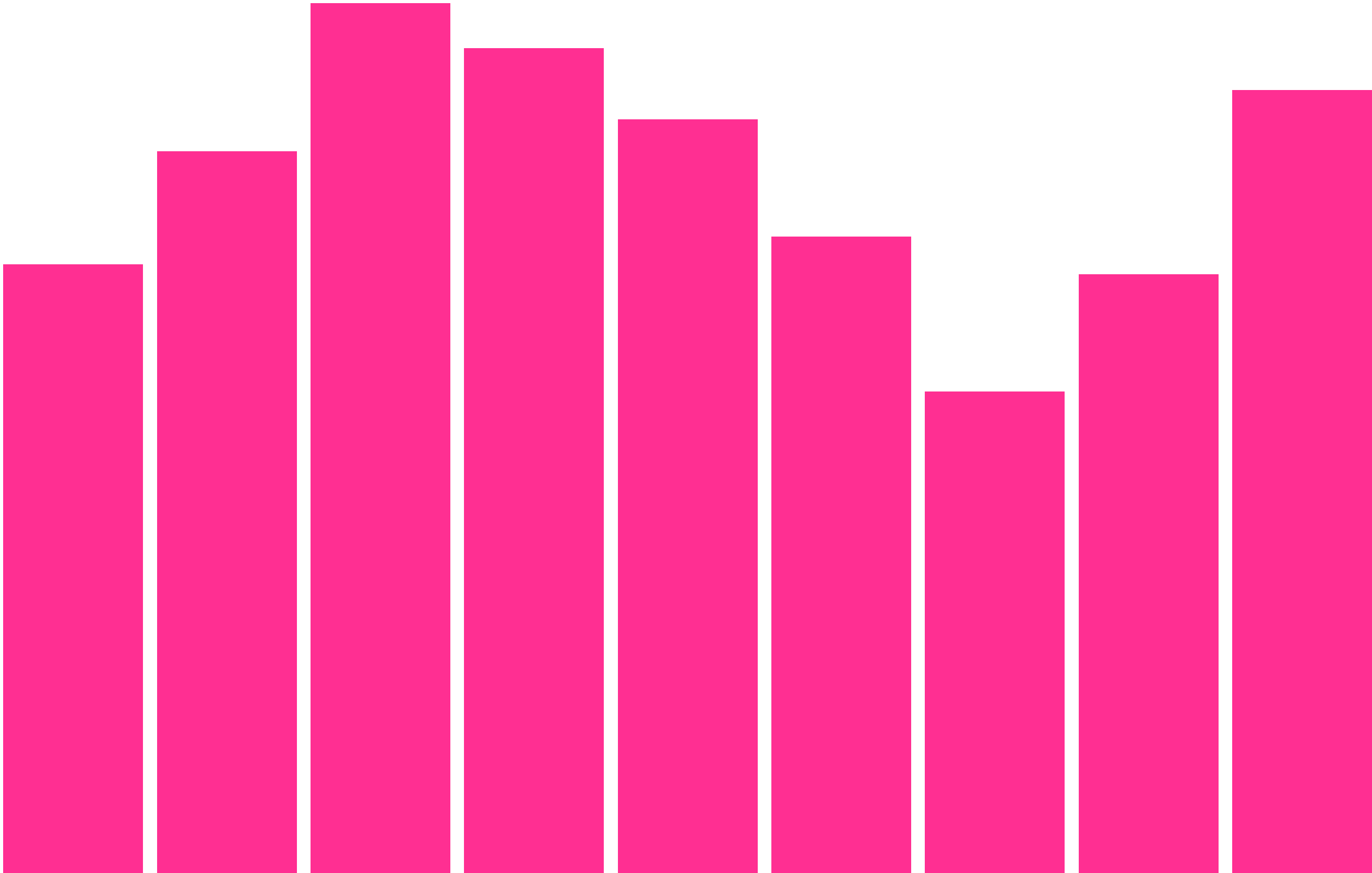
```
// Generate axes
```

```
var axis = d3.svg.axis()  
            .scale(scale);
```

```
svg.append("g")  
    .call(axis);
```

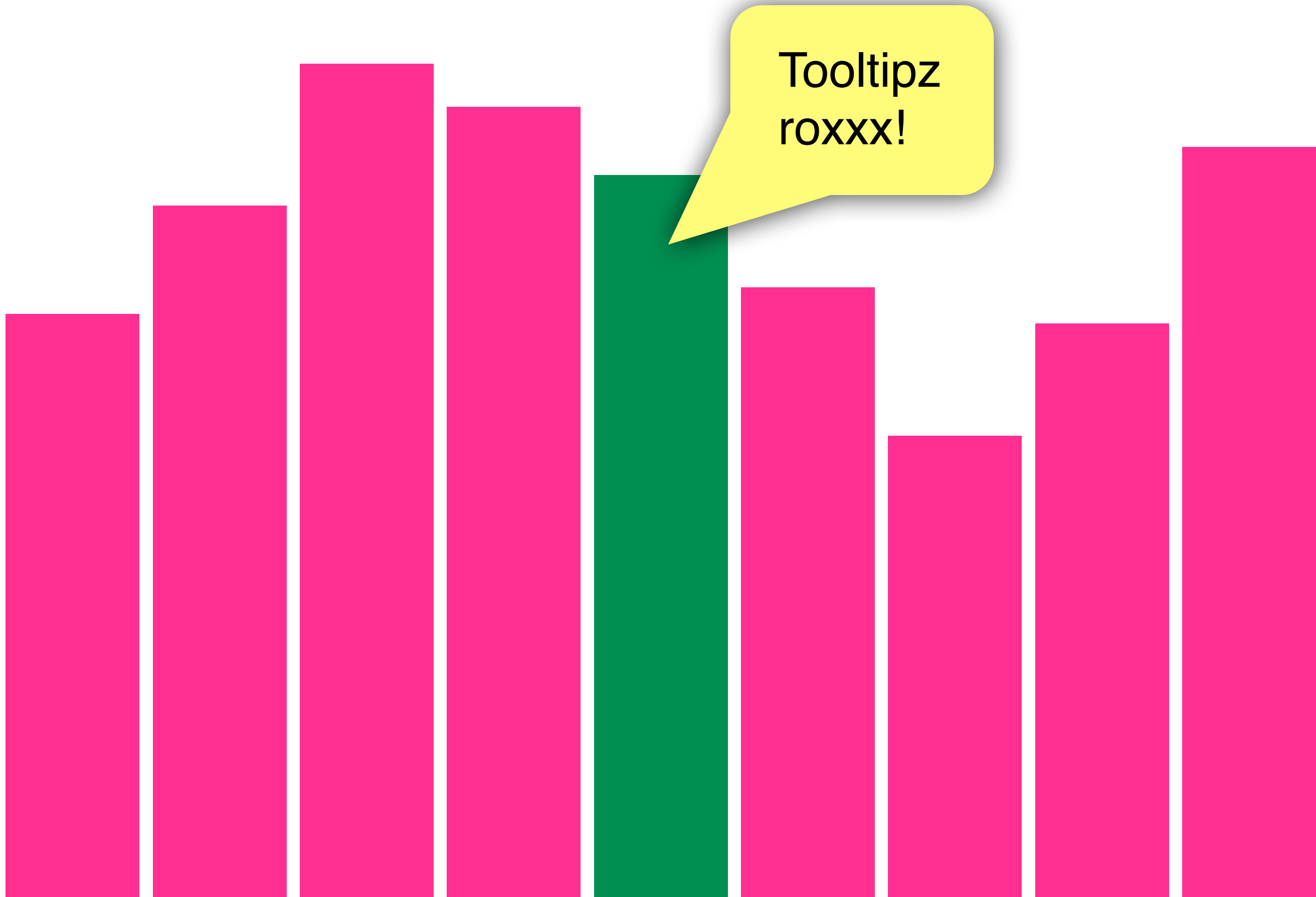


// Transitions and motion

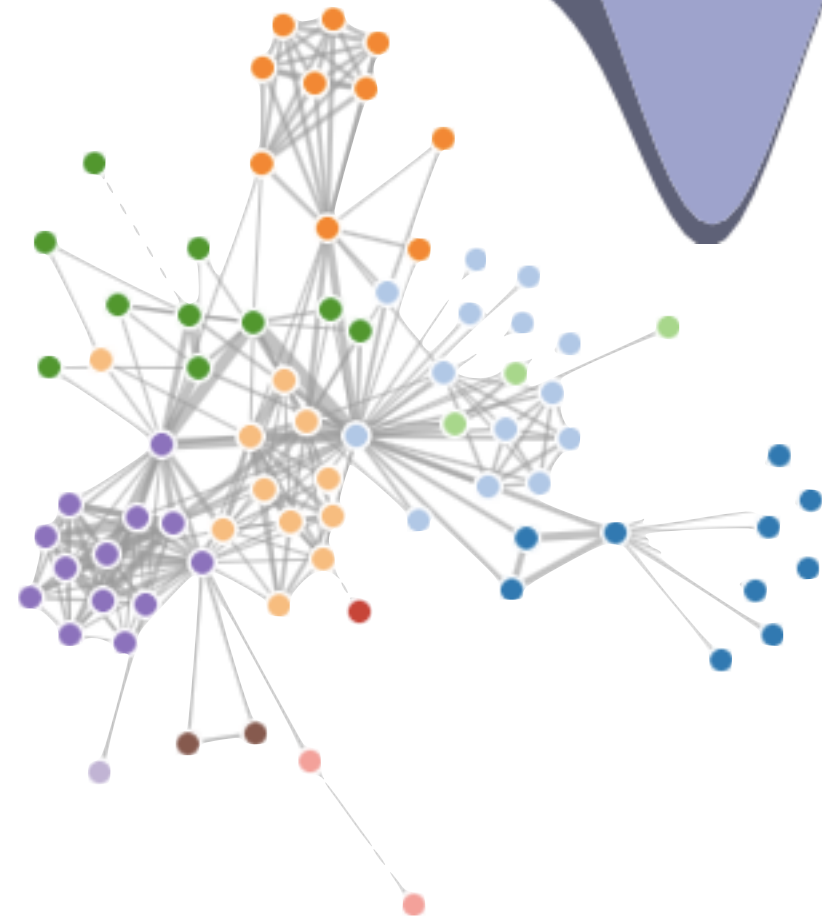
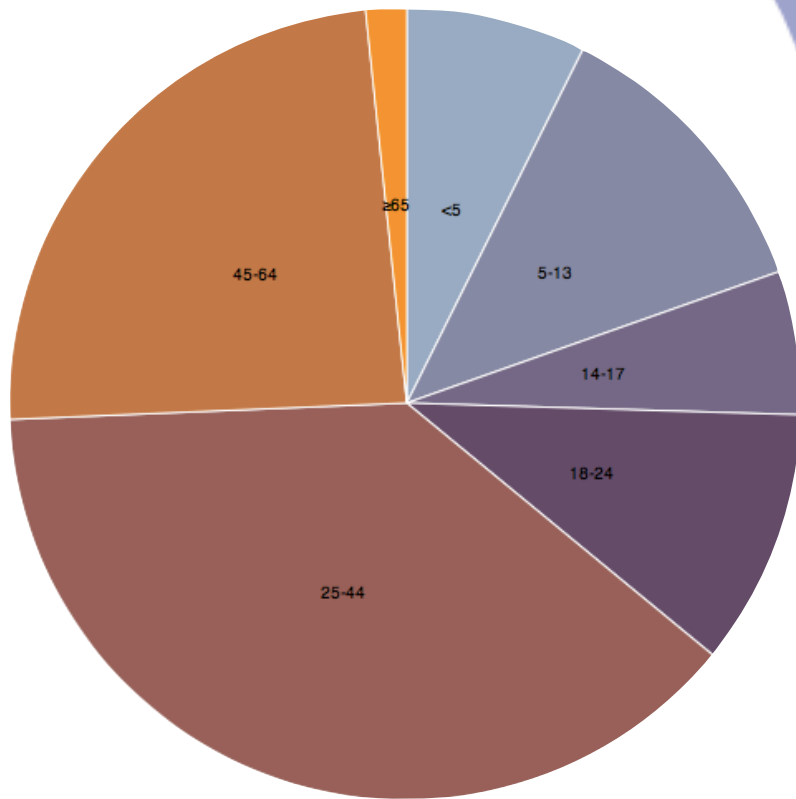




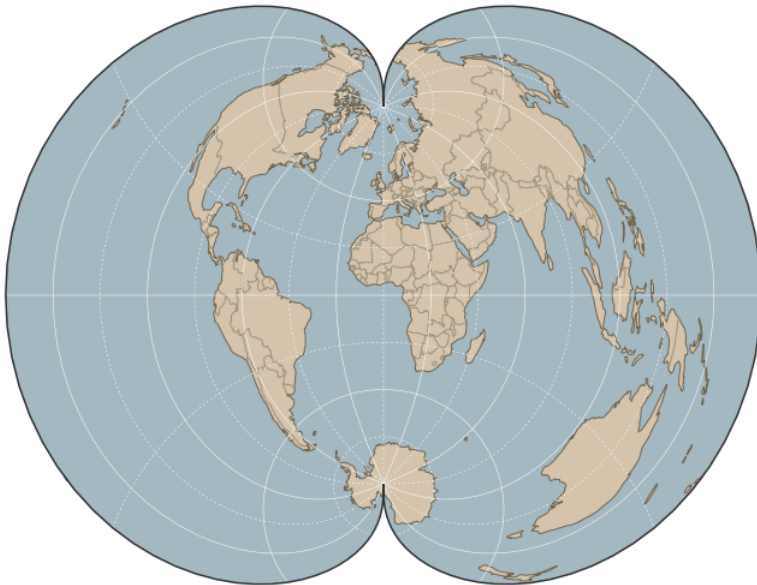
// Interactivity



# // Layouts

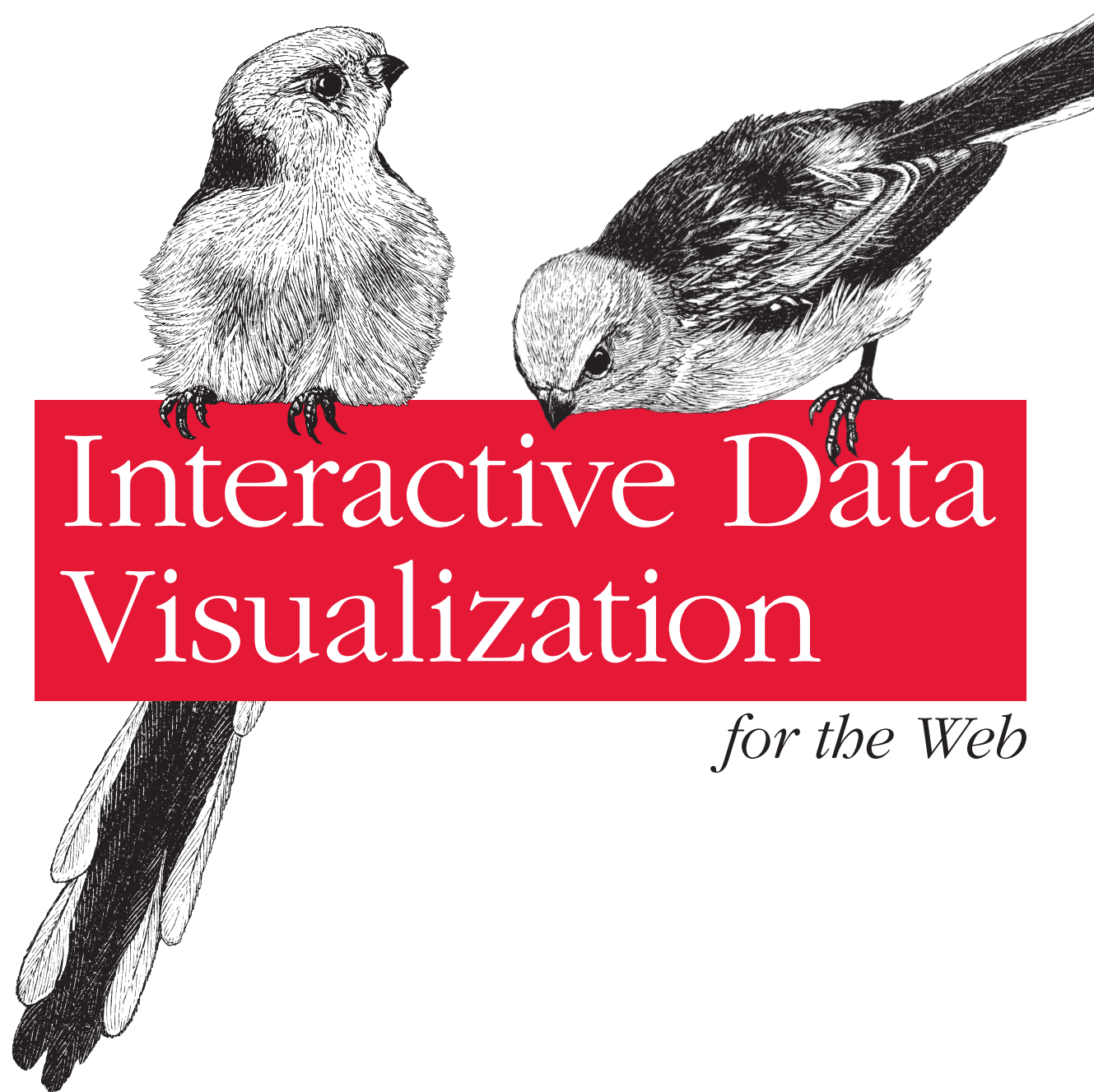


# // Geomapping and projections



*One step at a time*

*An Introduction to Designing With D3*



*@alignedleft*  
*alignedleft.com*

*Thanks!*  
*Questions?*

**O'REILLY®**

*Scott Murray*