Video 3.10

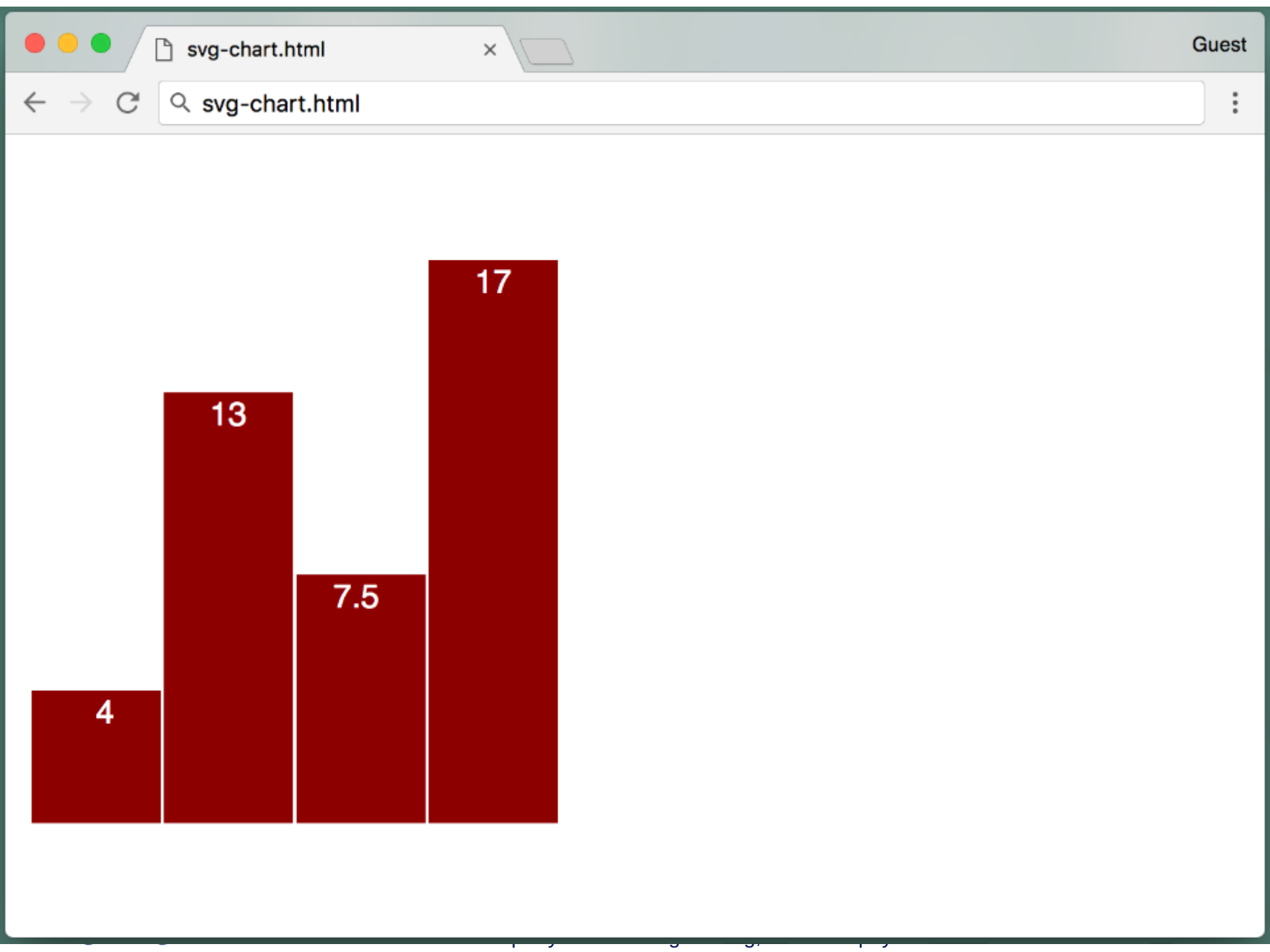
D3 Charts

Chris Murphy

Review

- D3.js allows us to programmatically generate HTML elements (including SVG) based on data

- The most common visual representation of data is in the form of a **chart**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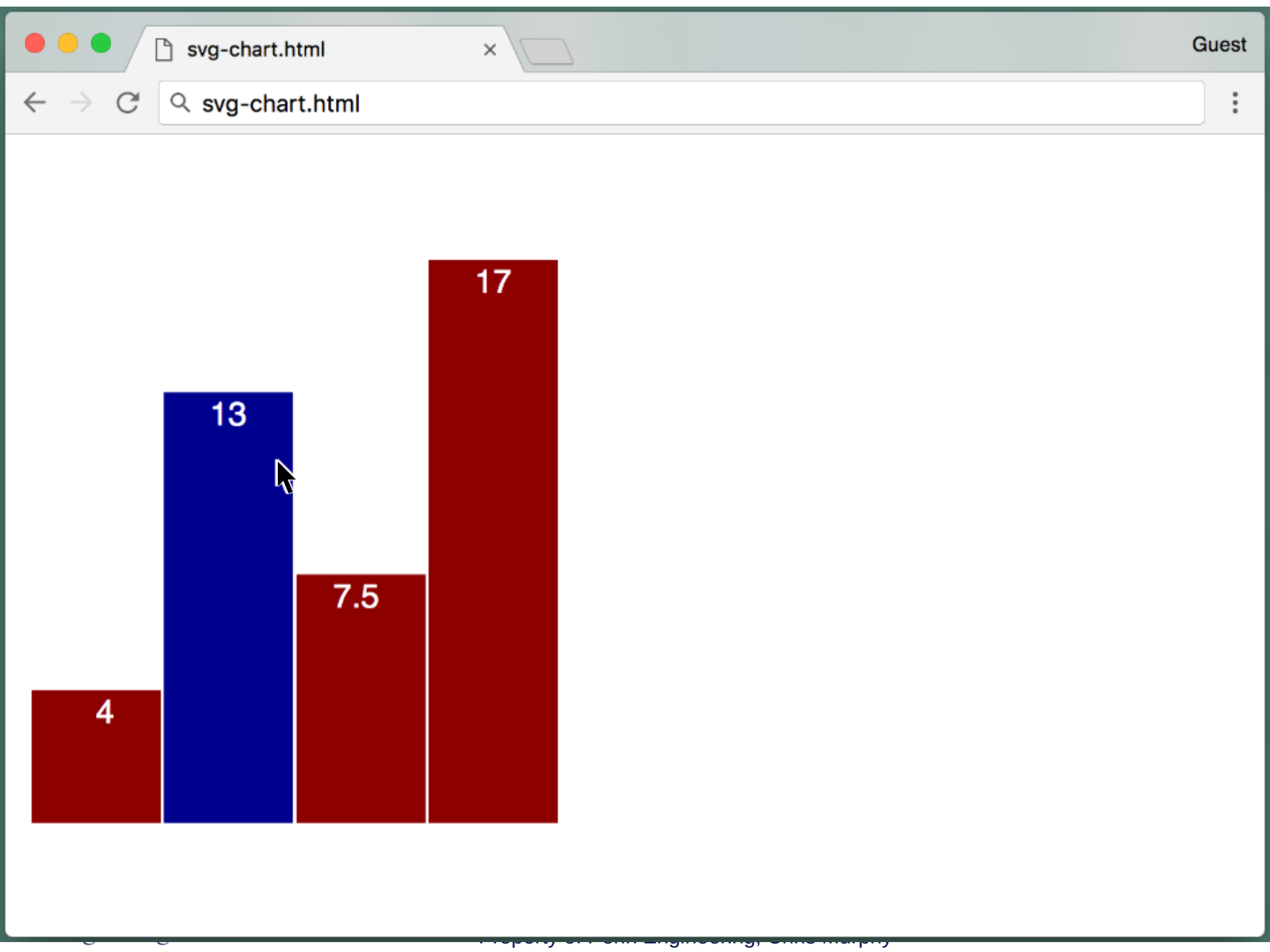
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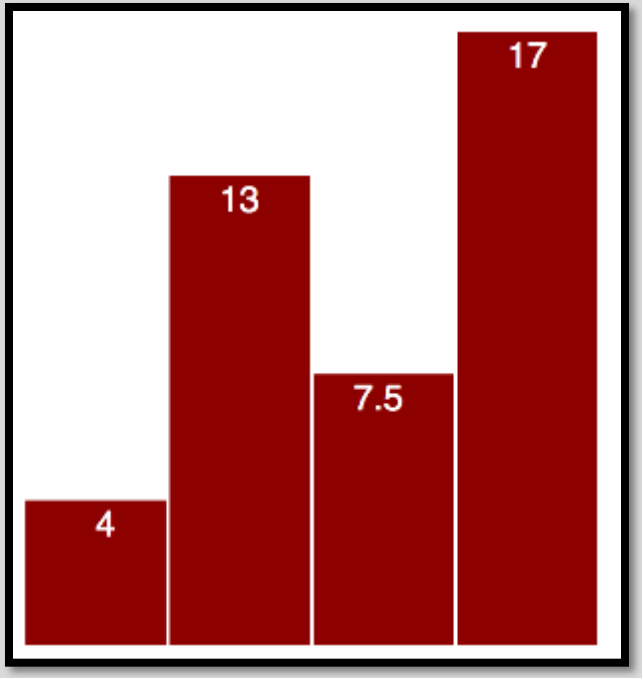

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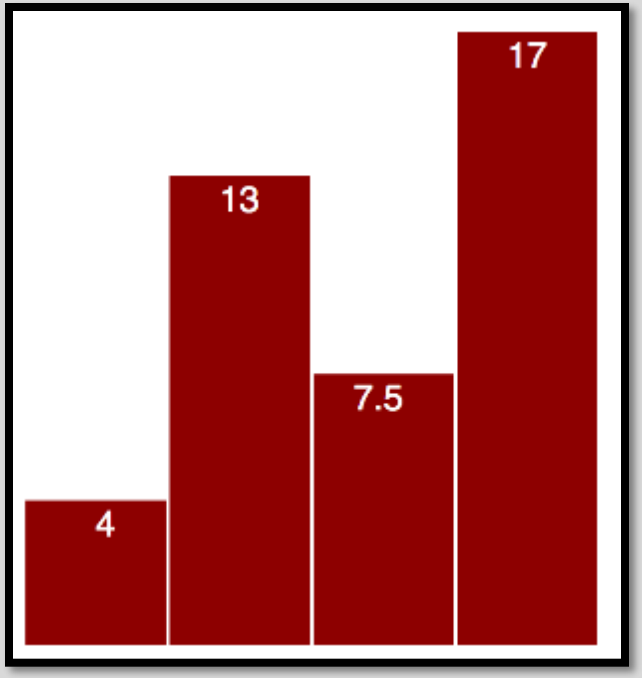

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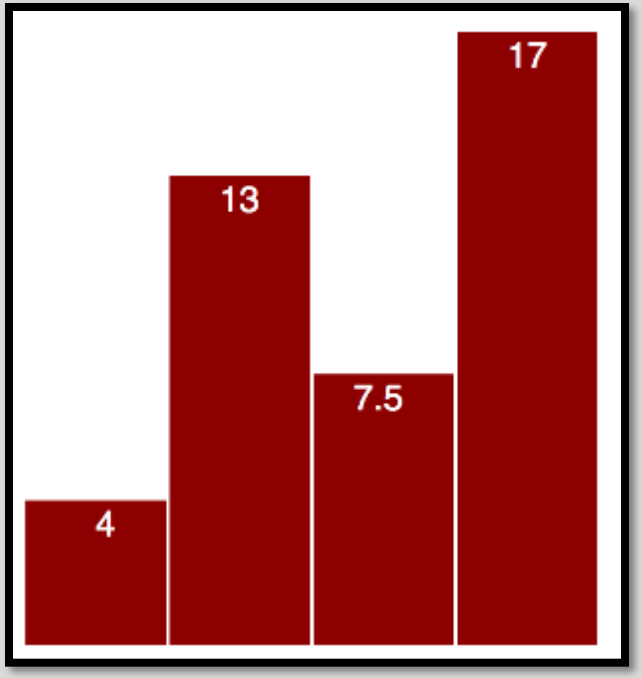

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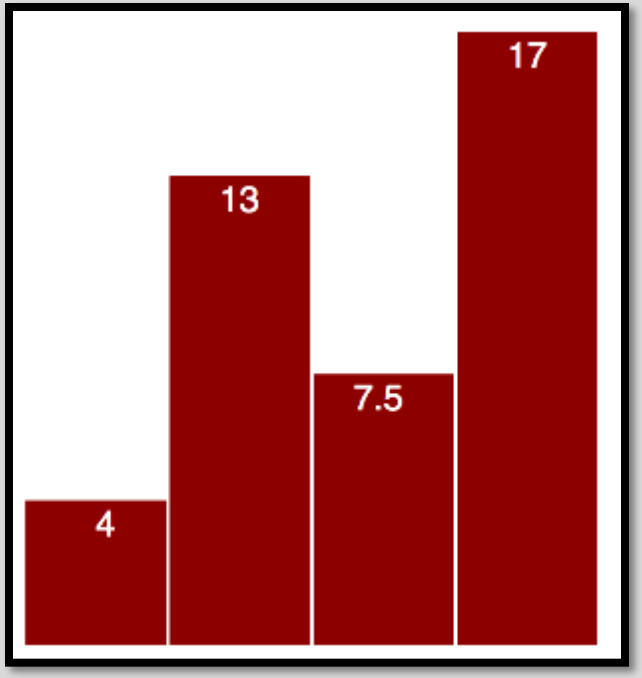

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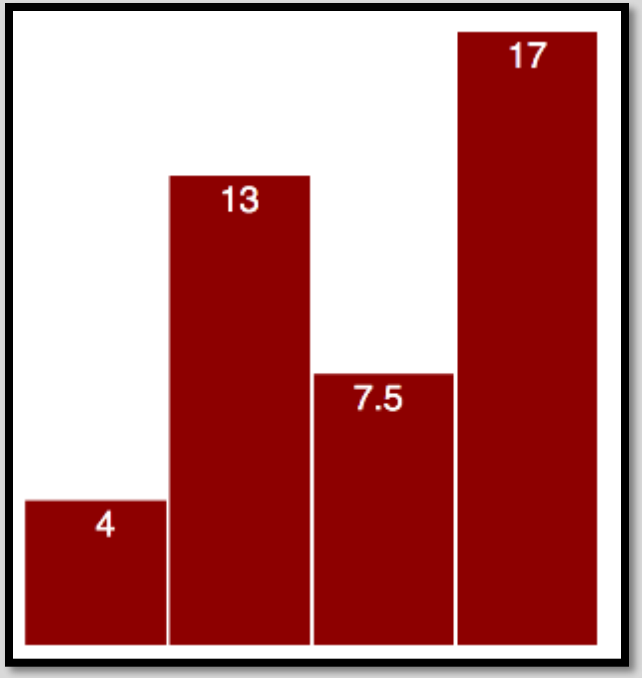

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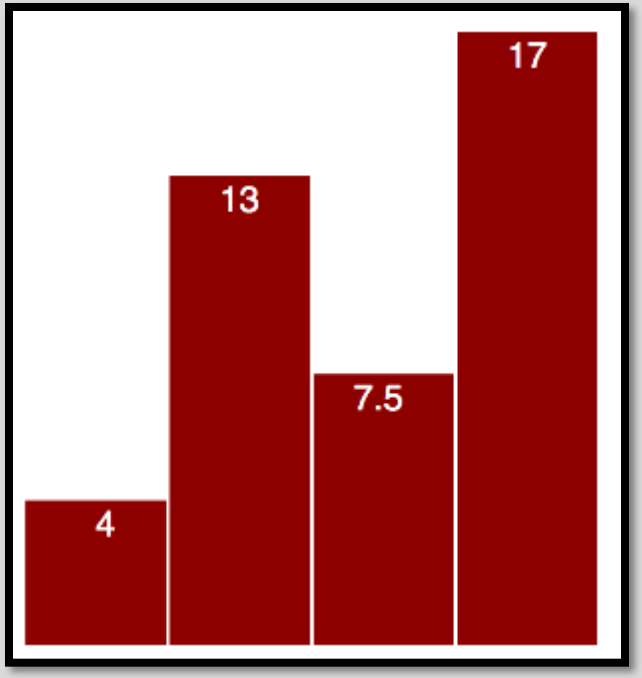

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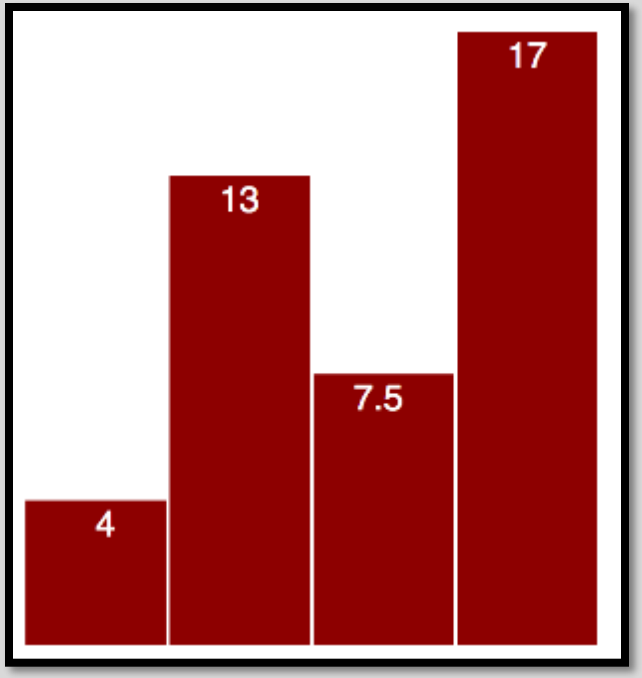

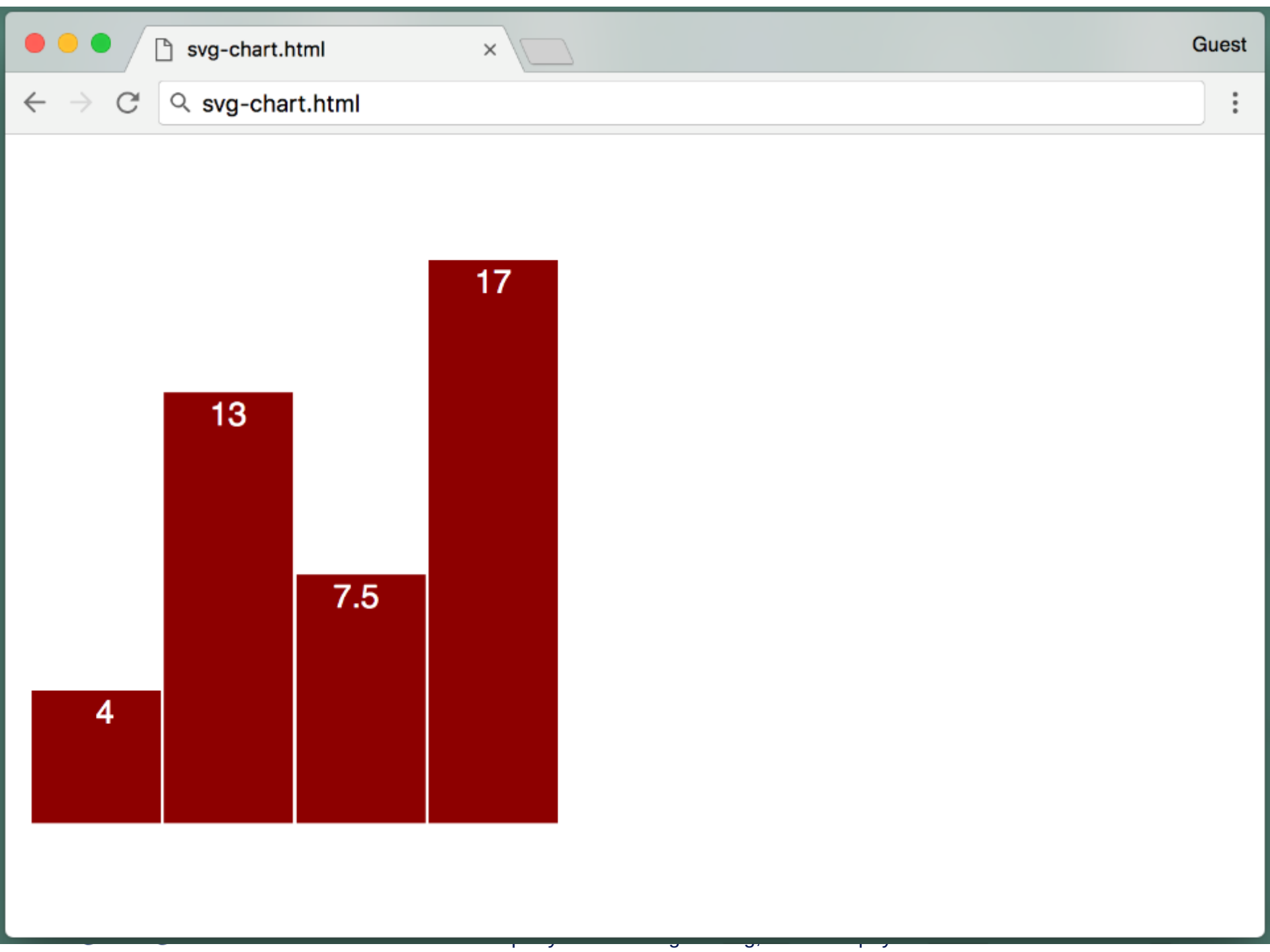
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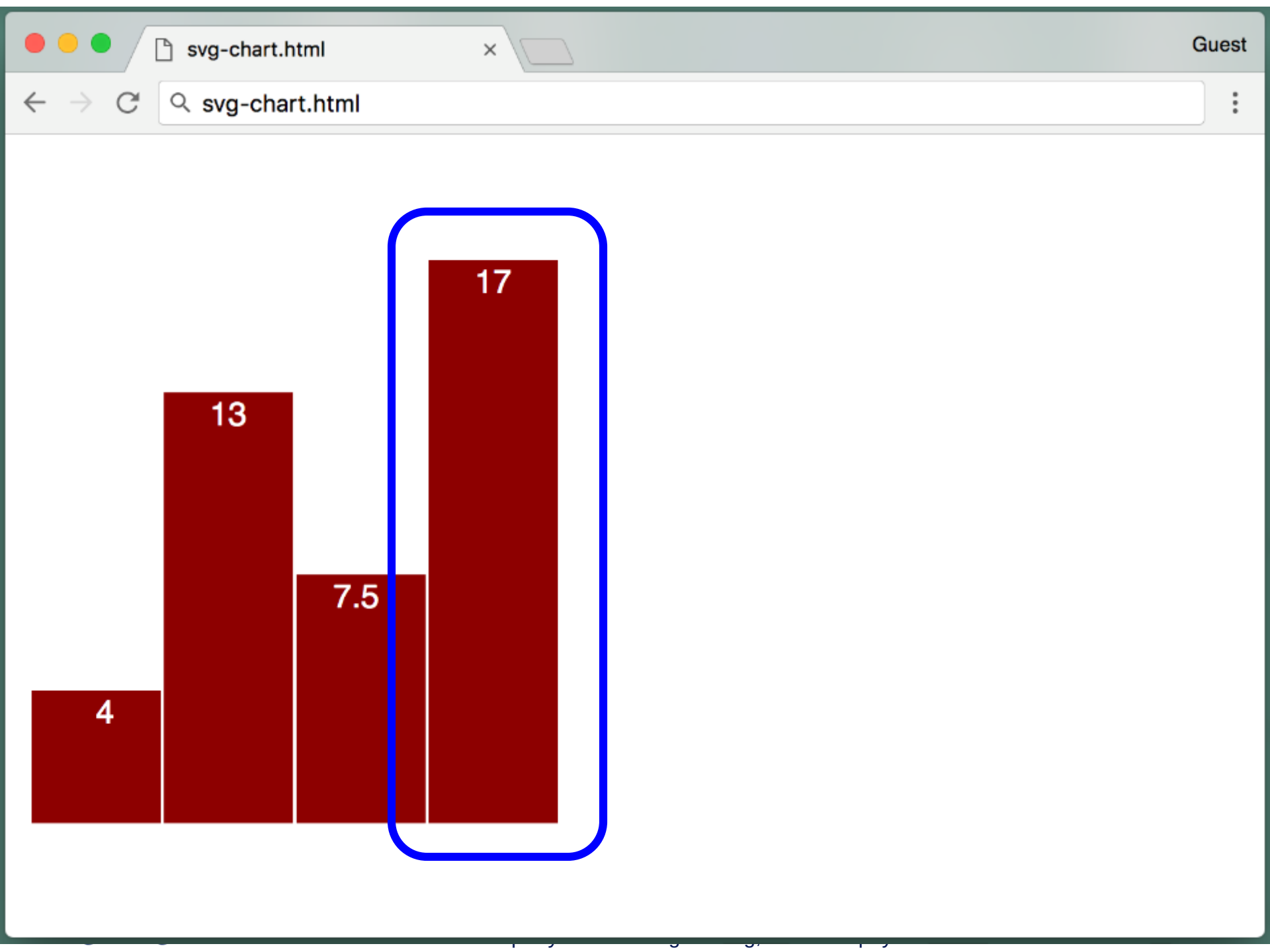
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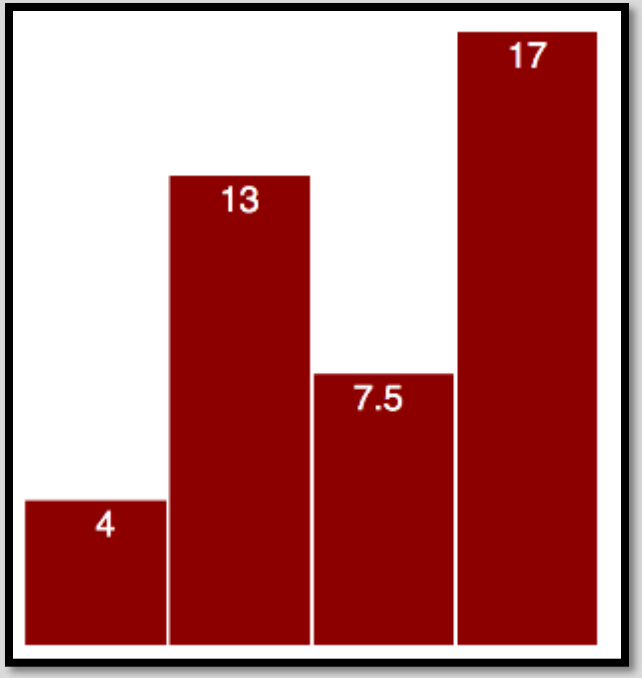

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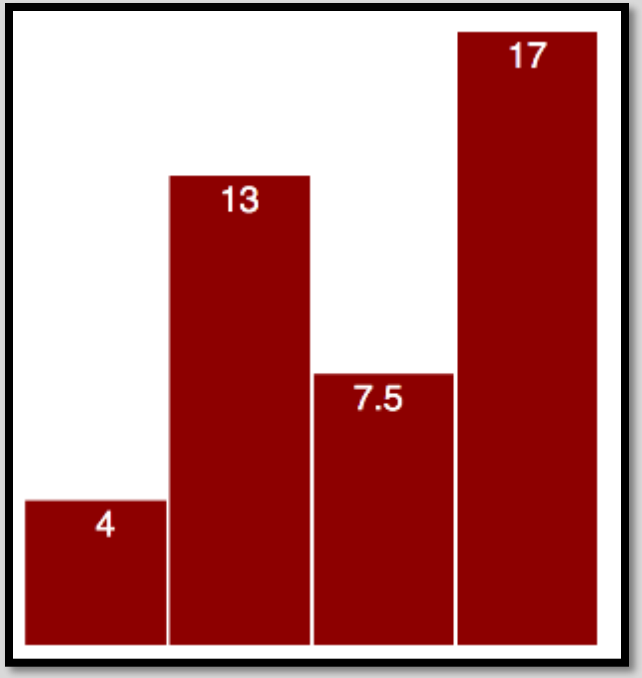

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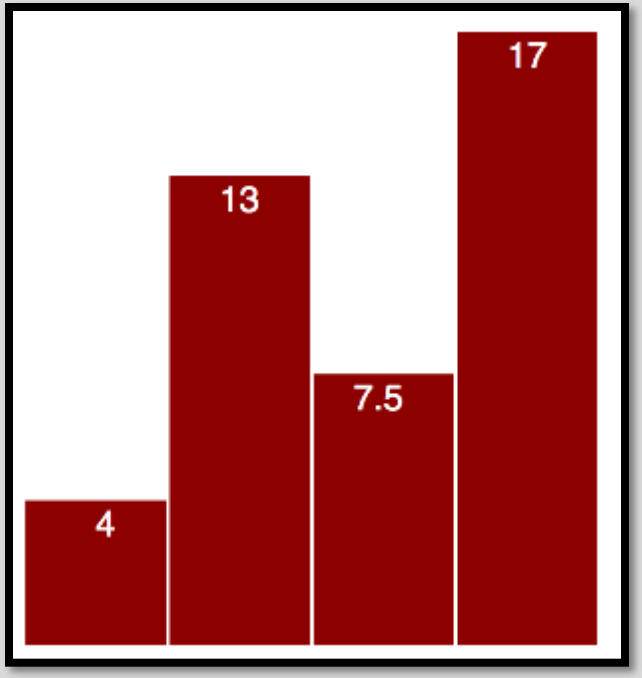

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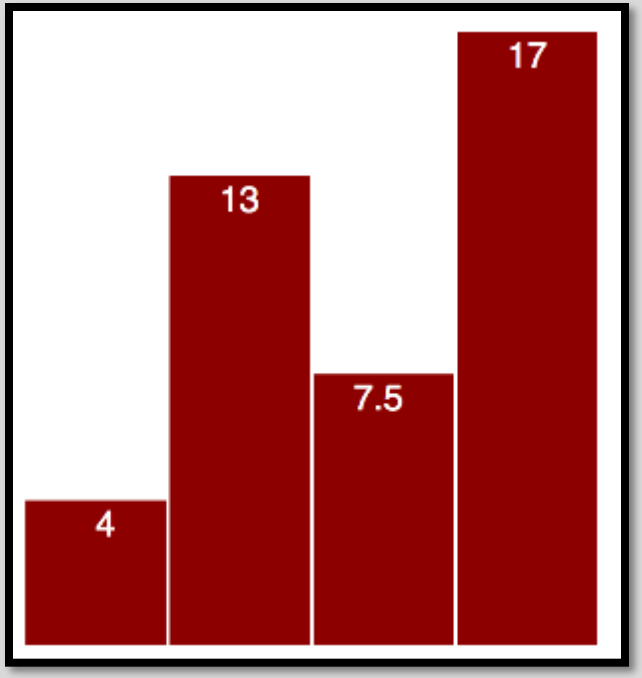

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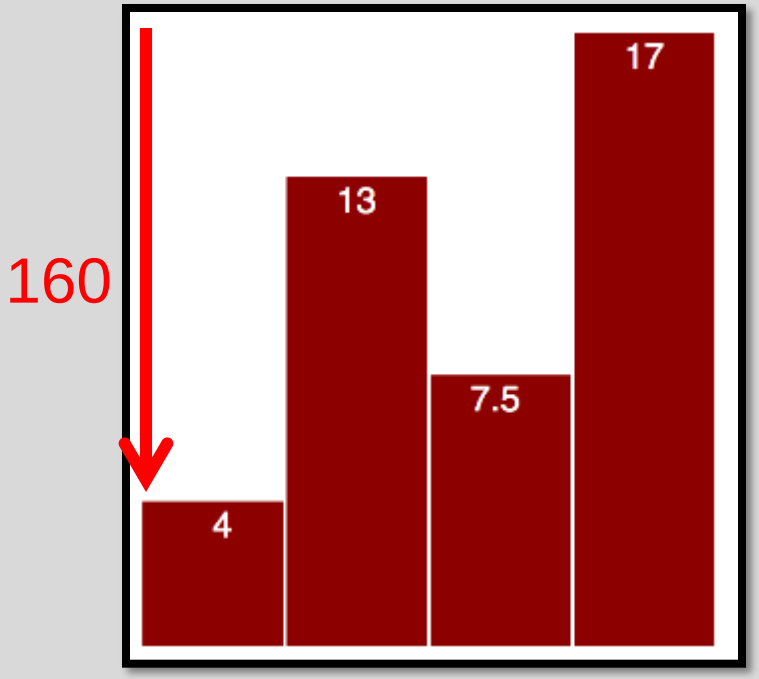

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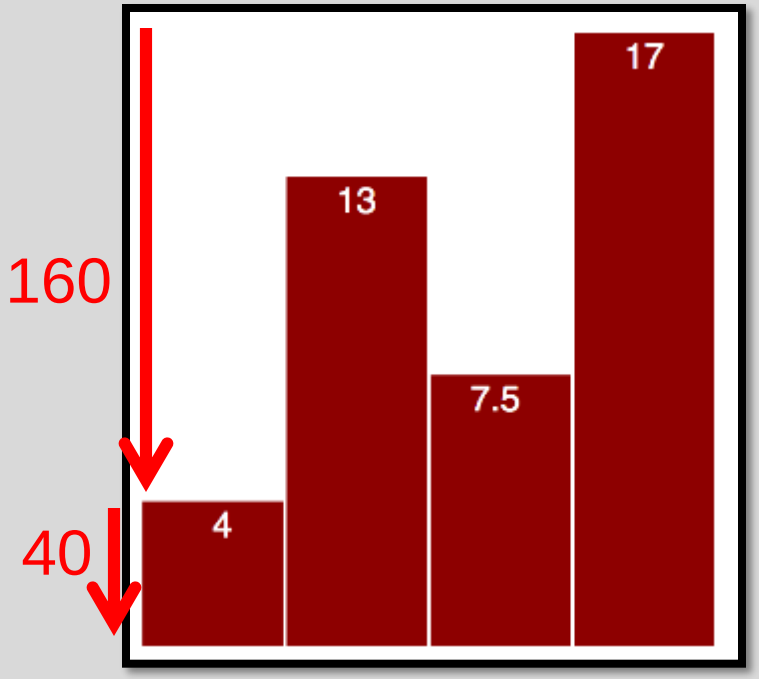

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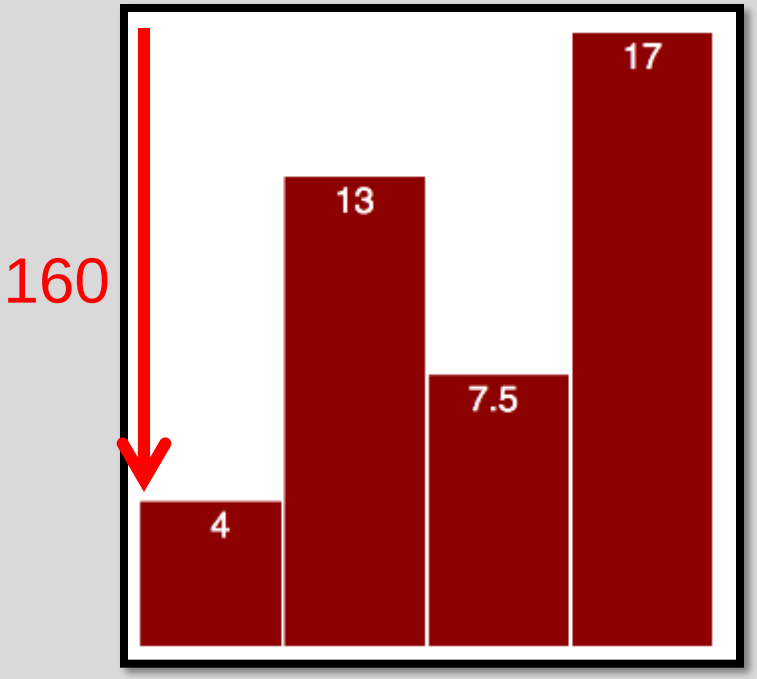

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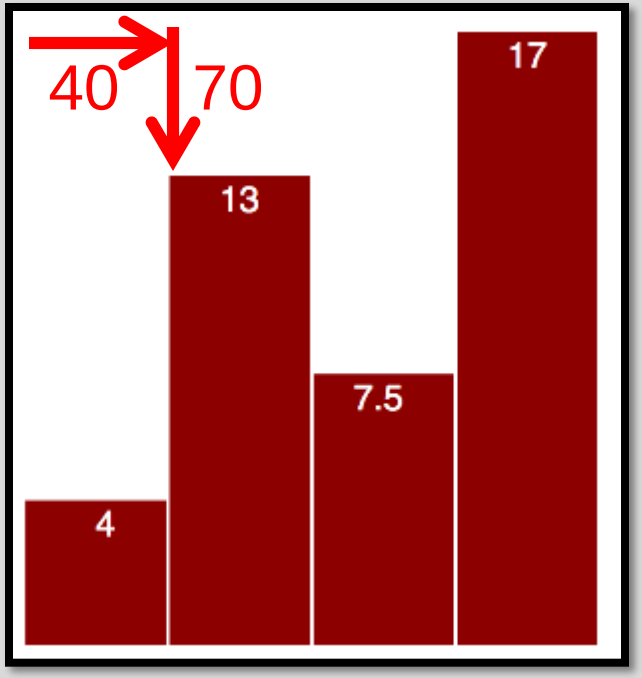

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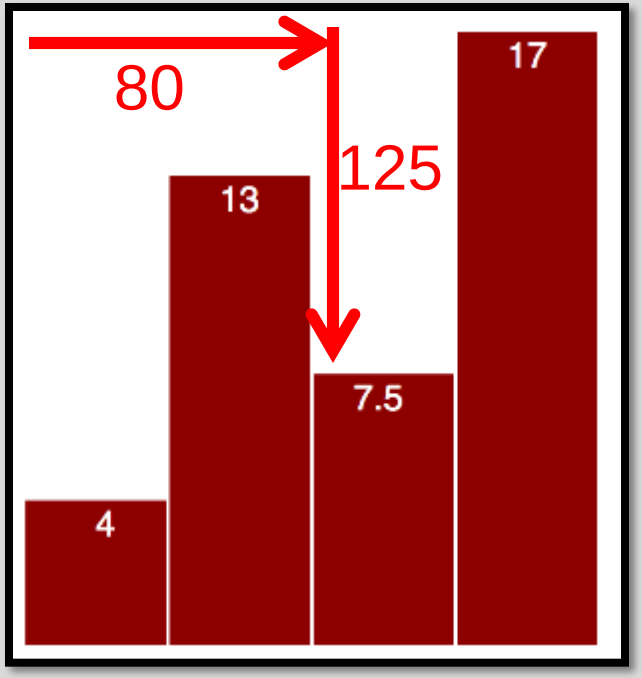

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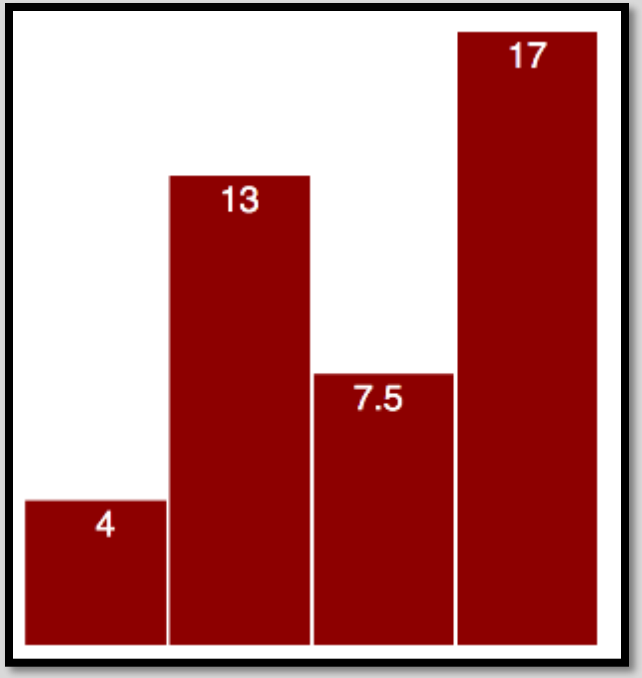

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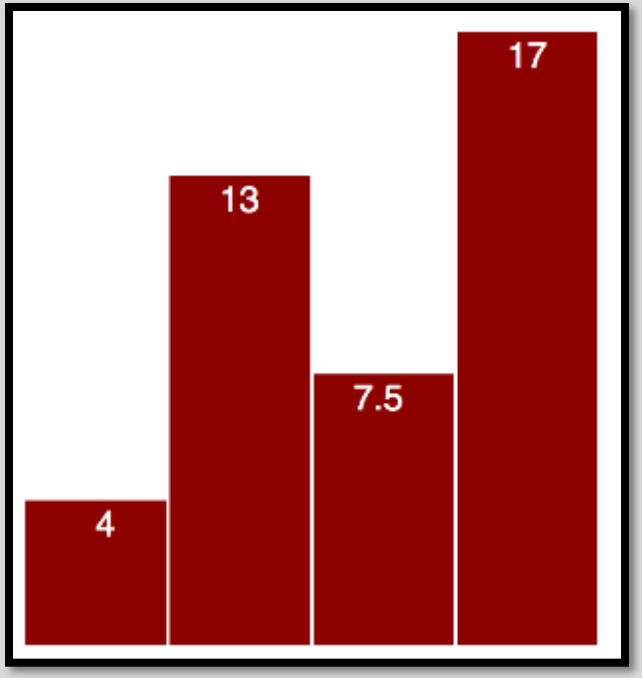
}
.chart text {
  fill: white;
  font: 10px sans-serif;
  text-anchor: end;
}
</style>
<svg class="chart" height="200">
  <g transform="translate(0,160)">
   <rect width="39" height="40"></rect><text x="25" y="10">4</text>
  </g>
  <g transform="translate(40,70)">
   <rect width="39" height="130"></rect><text x="25" y="10">13</text>
  </g>
  <g transform="translate(80,125)">
   <rect width="39" height="75"></rect><text x="25" y="10">7.5</text>
  </g>
  <g transform="translate(120,30)">
   <rect width="39" height="170"></rect><text x="25" y="10">17</text>
  </g>
</svg>
```



Dynamic SVG with D3.js

- D3.js is specifically designed to allow us to manipulate HTML/SVG elements based on data

- We can dynamically render SVG elements by applying functionality to a set of data

```
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          return "translate(" + 40*i + "," + (200-d) + ")"; });

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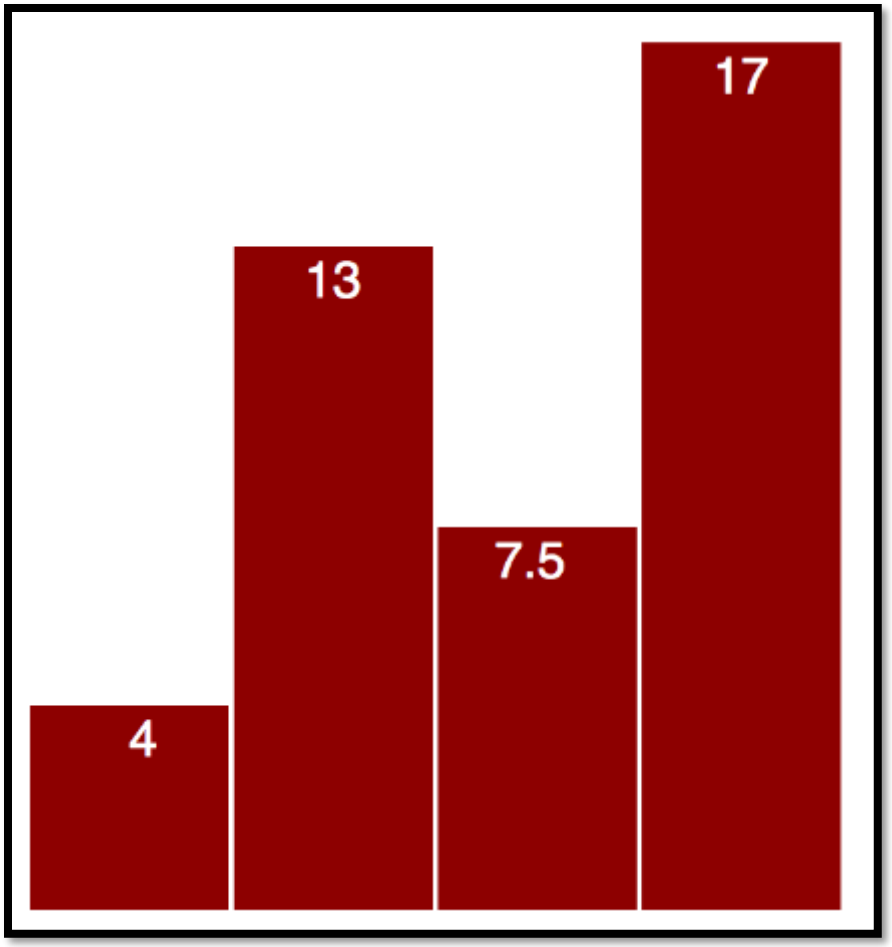


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var numbers = [40, 130, 75, 170];
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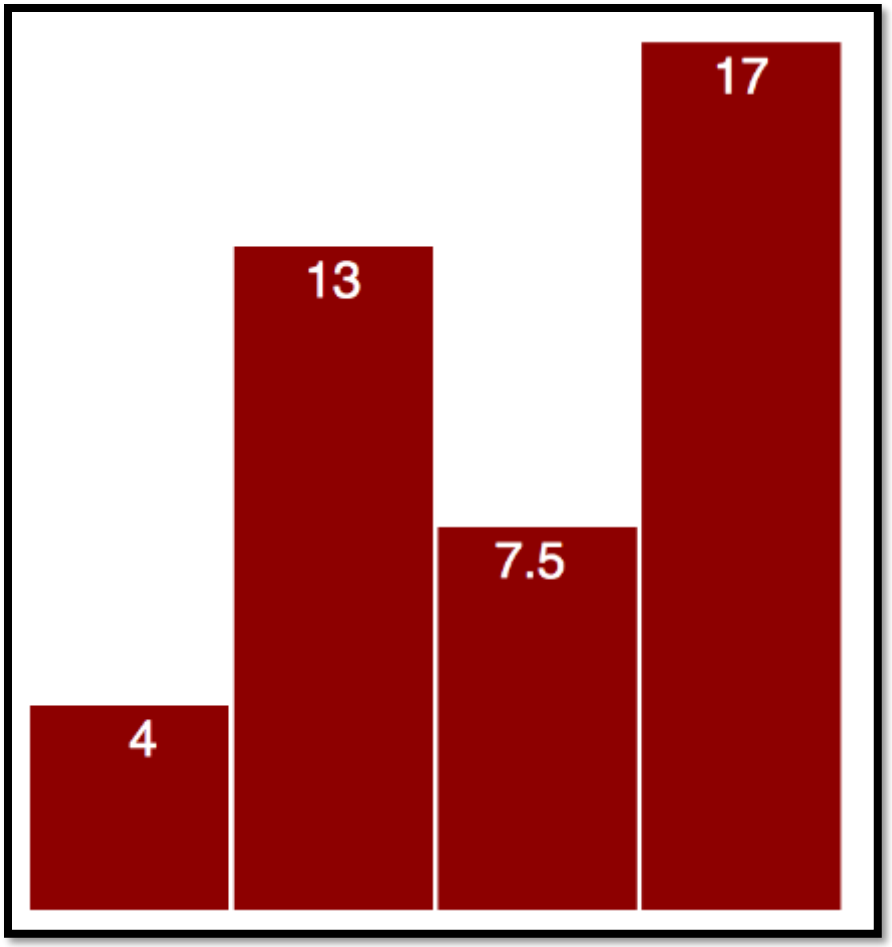


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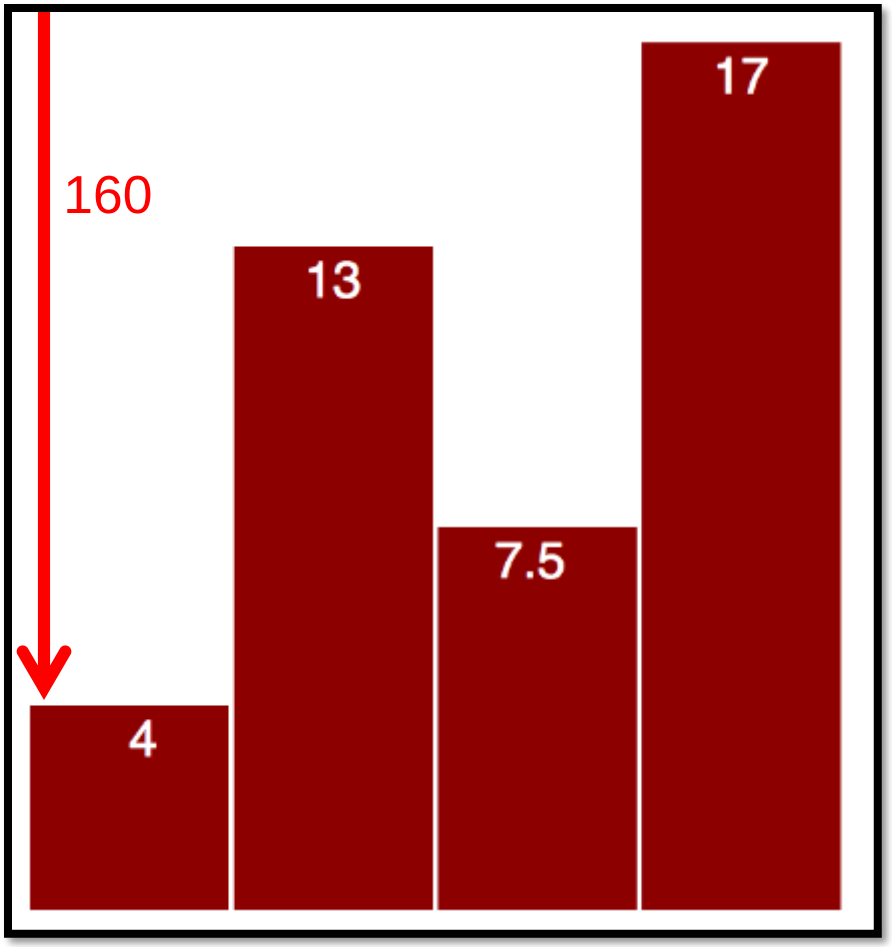


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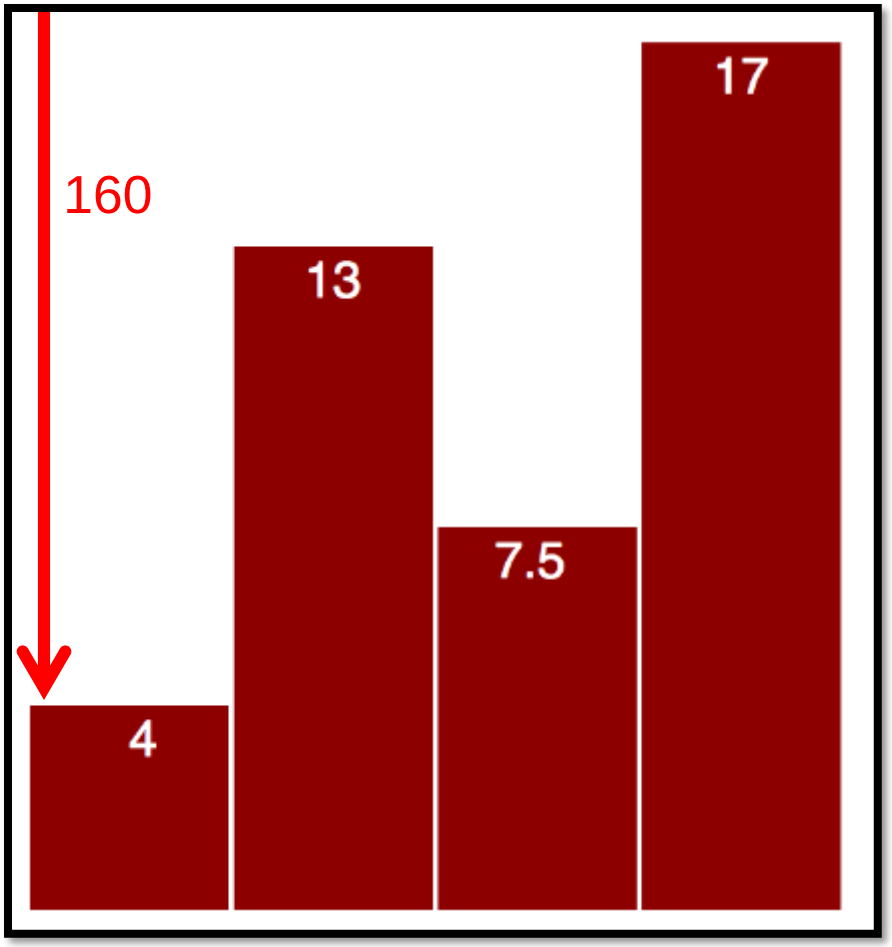
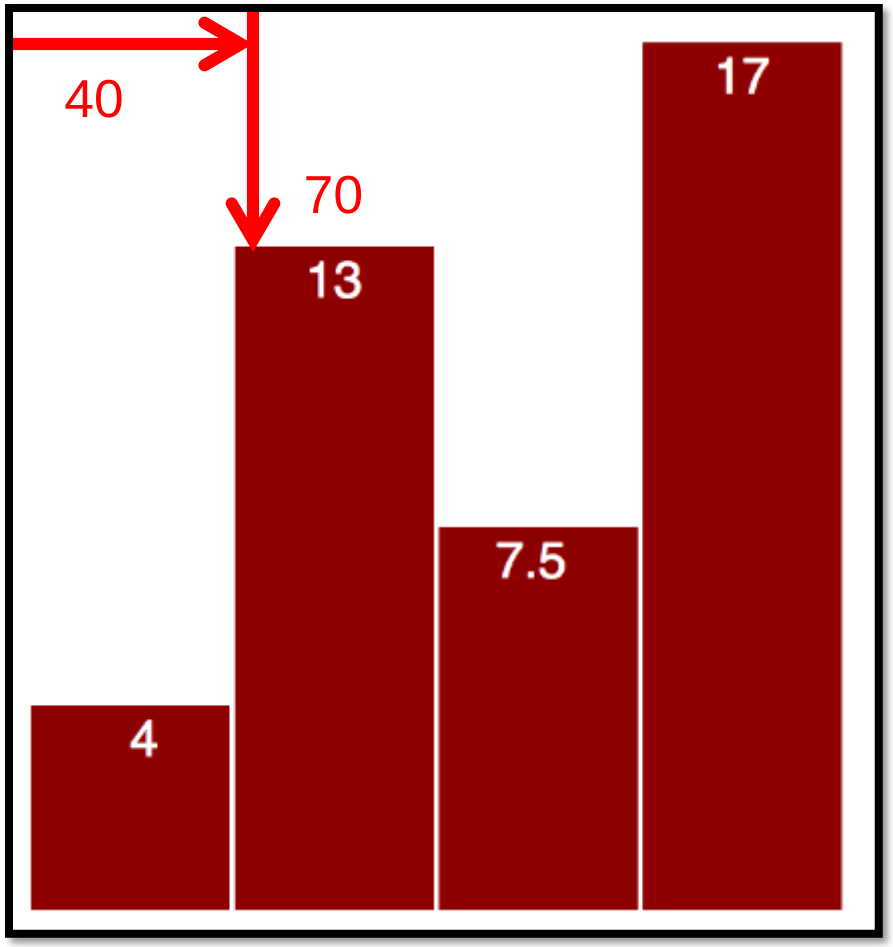
var numbers = [40, 130, 75, 170];
```




```
var numbers = [40, 130, 75, 170];
```

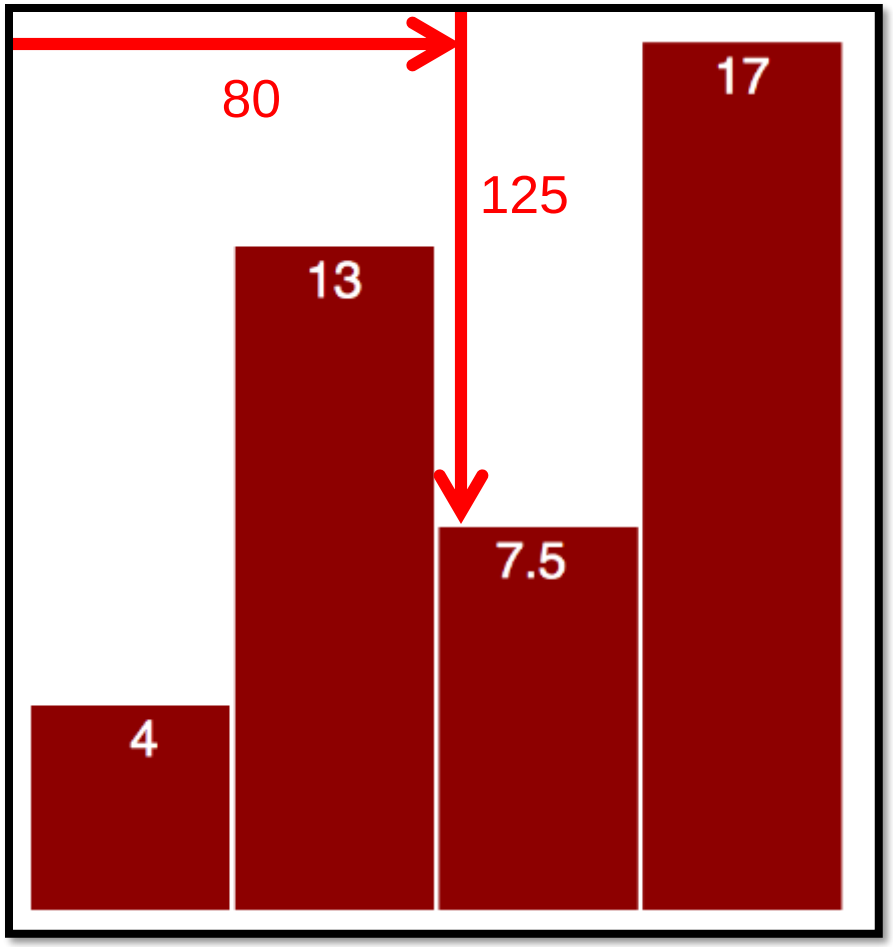
d = 40, **i** = 0 → **x** = 0, **y** = 160




```
var numbers = [40, 130, 75, 170];
```

d = 40, **i** = 0 → **x** = 0, **y** = 160

d = 130, **i** = 1 → **x** = 40, **y** = 70

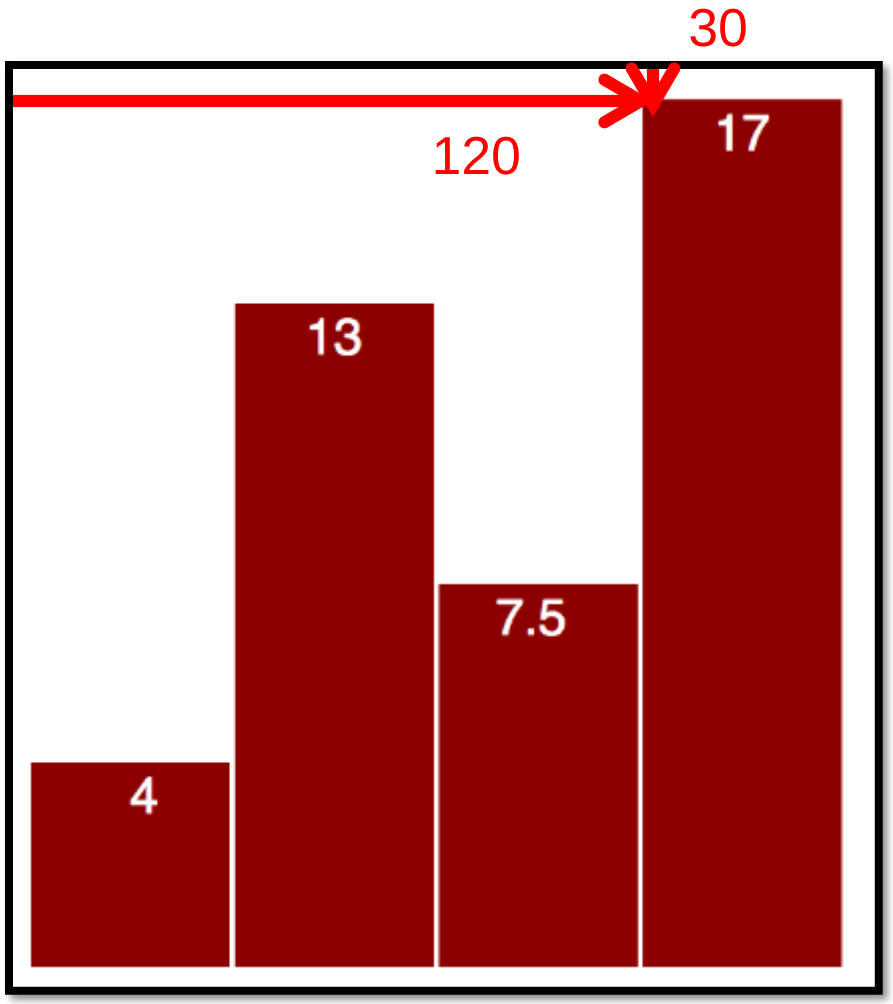



```
var numbers = [40, 130, 75, 170];
```

d = 40, **i** = 0 → **x** = 0, **y** = 160

d = 130, **i** = 1 → **x** = 40, **y** = 70

d = 75, **i** = 2 → **x** = 80, **y** = 125

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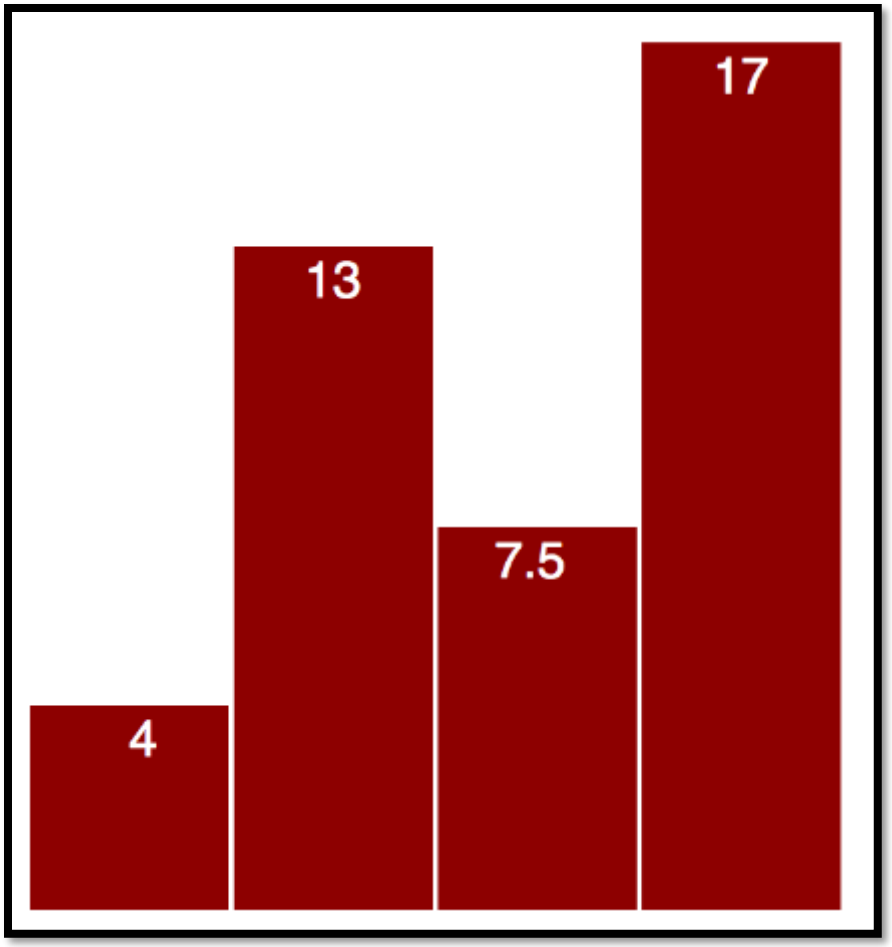
d = 170, **i** = 3 → **x** = 120, **y** = 30

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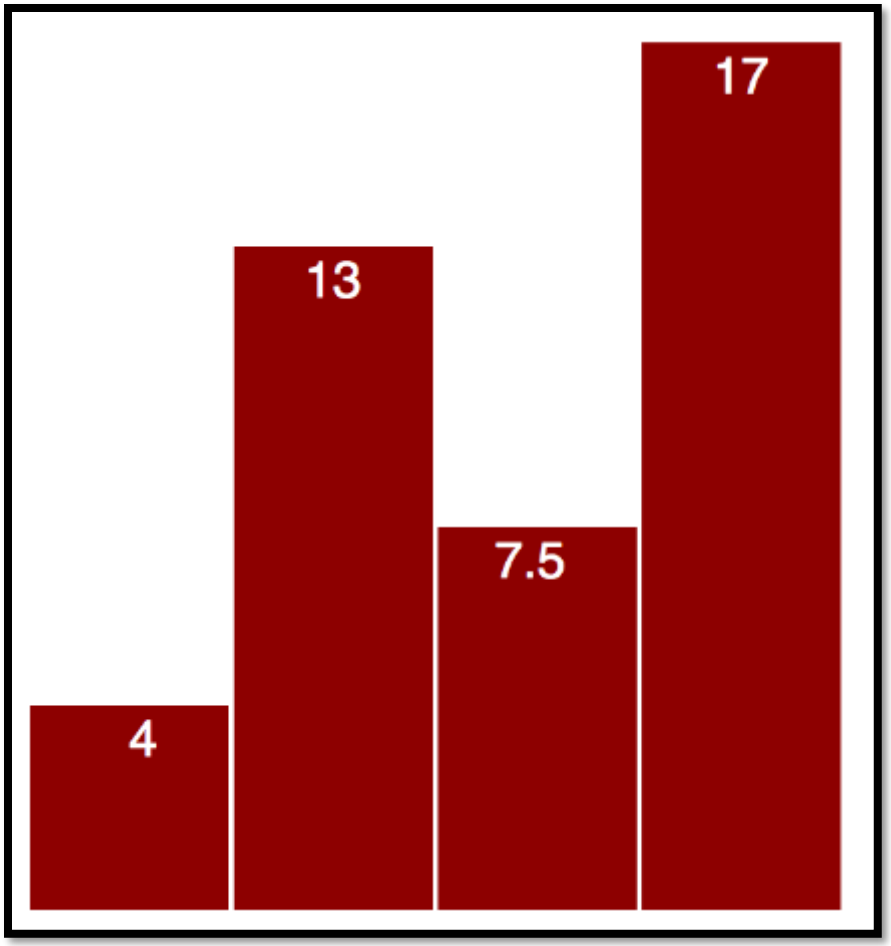


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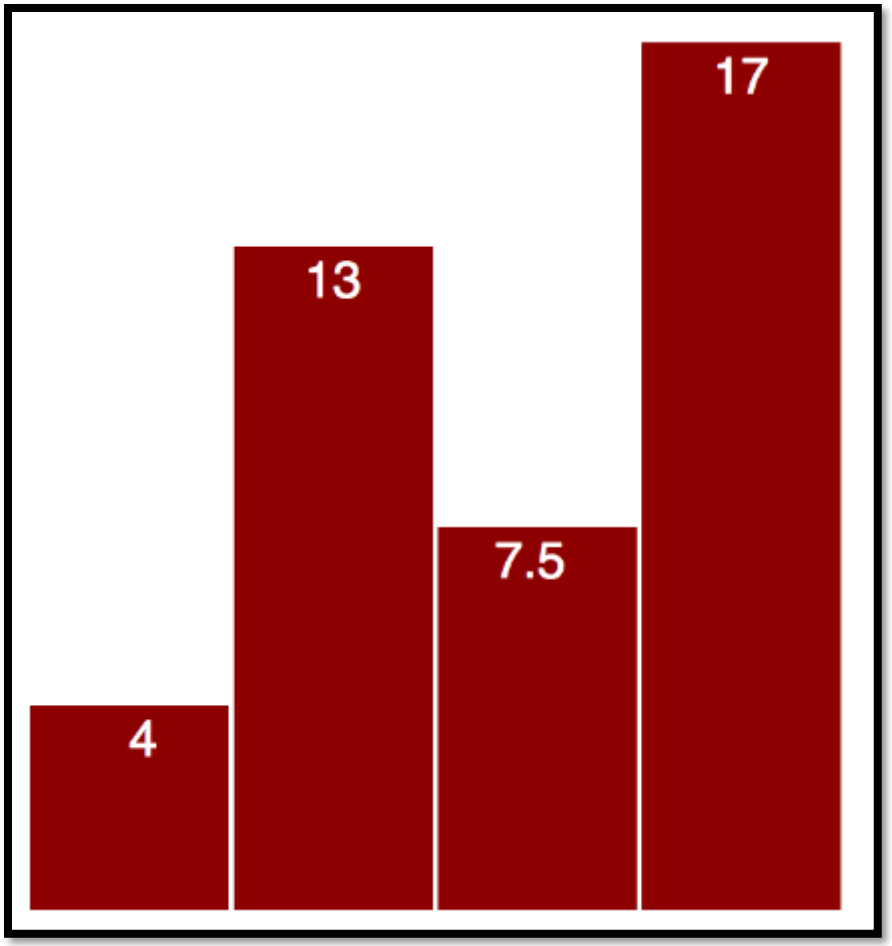


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  var numbers = [40, 130, 75, 170];
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  var selection = svg.selectAll("g")
    .data(numbers)
    .enter().append("g")
    .attr("transform", (d,i) => {
          return "translate(" + 40*i + "," + (200-d) + ")"; });

  selection.append("rect")
    .attr("width", 39)
    .attr("height", (d,i) => { return d; });

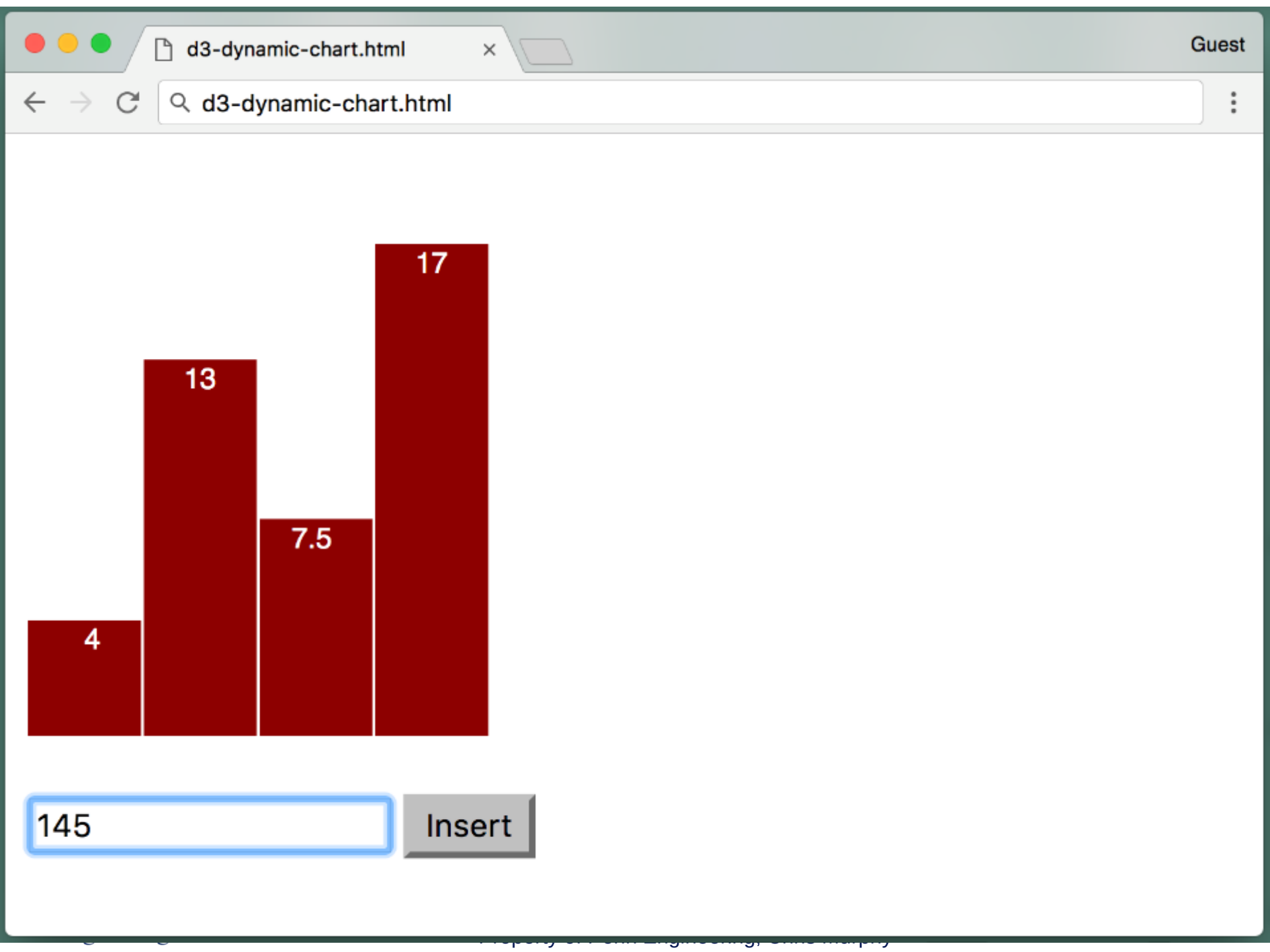
  selection.append("text")
    .attr("x", 25)
    .attr("y", 25)
    .text((d) => { return d/10; });
</script>
```

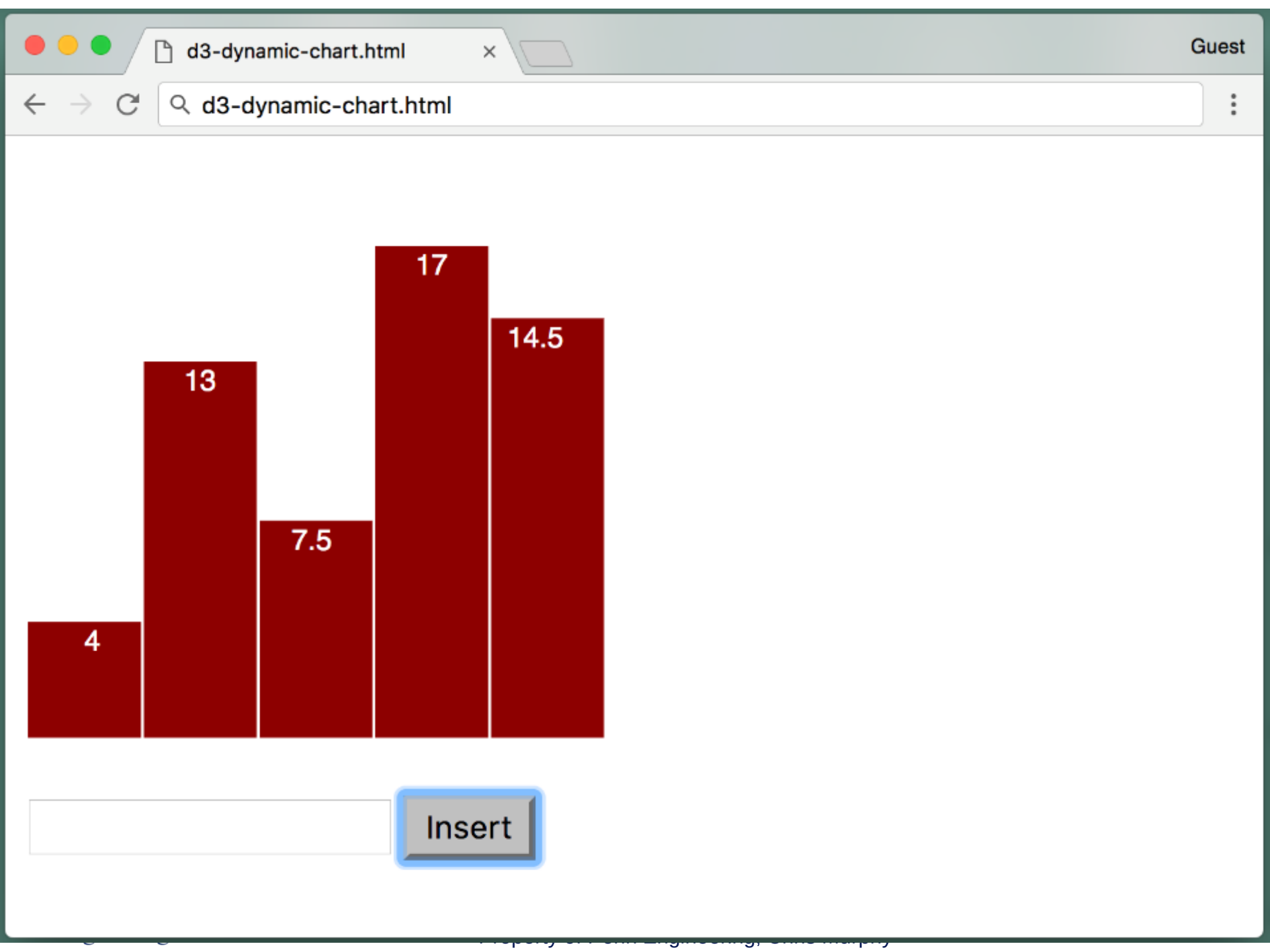
Dynamic Graphics with D3.js

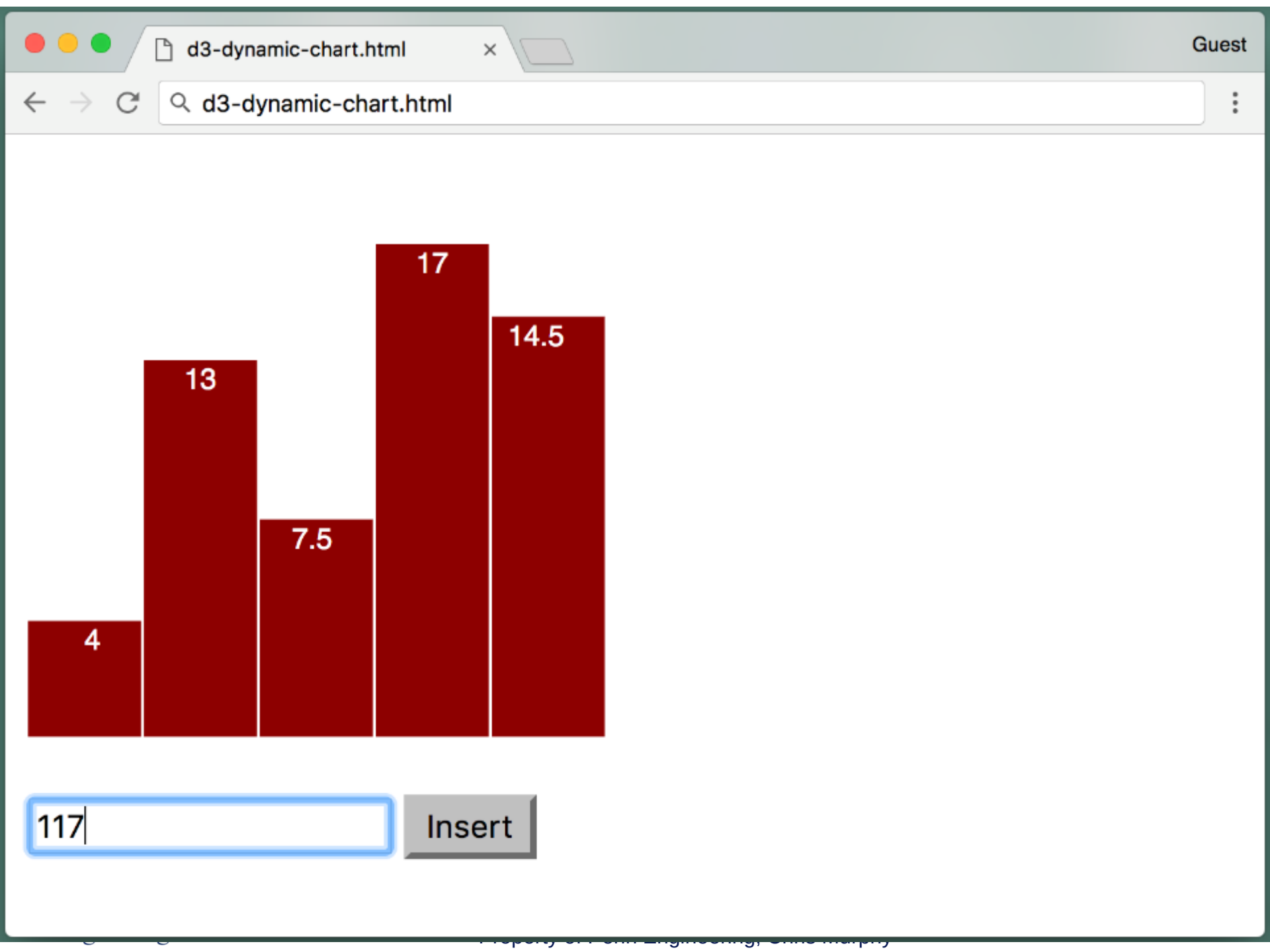
- In addition to rendering HTML/SVG elements using JavaScript, D3.js also allows us to add elements based on any changes to the data

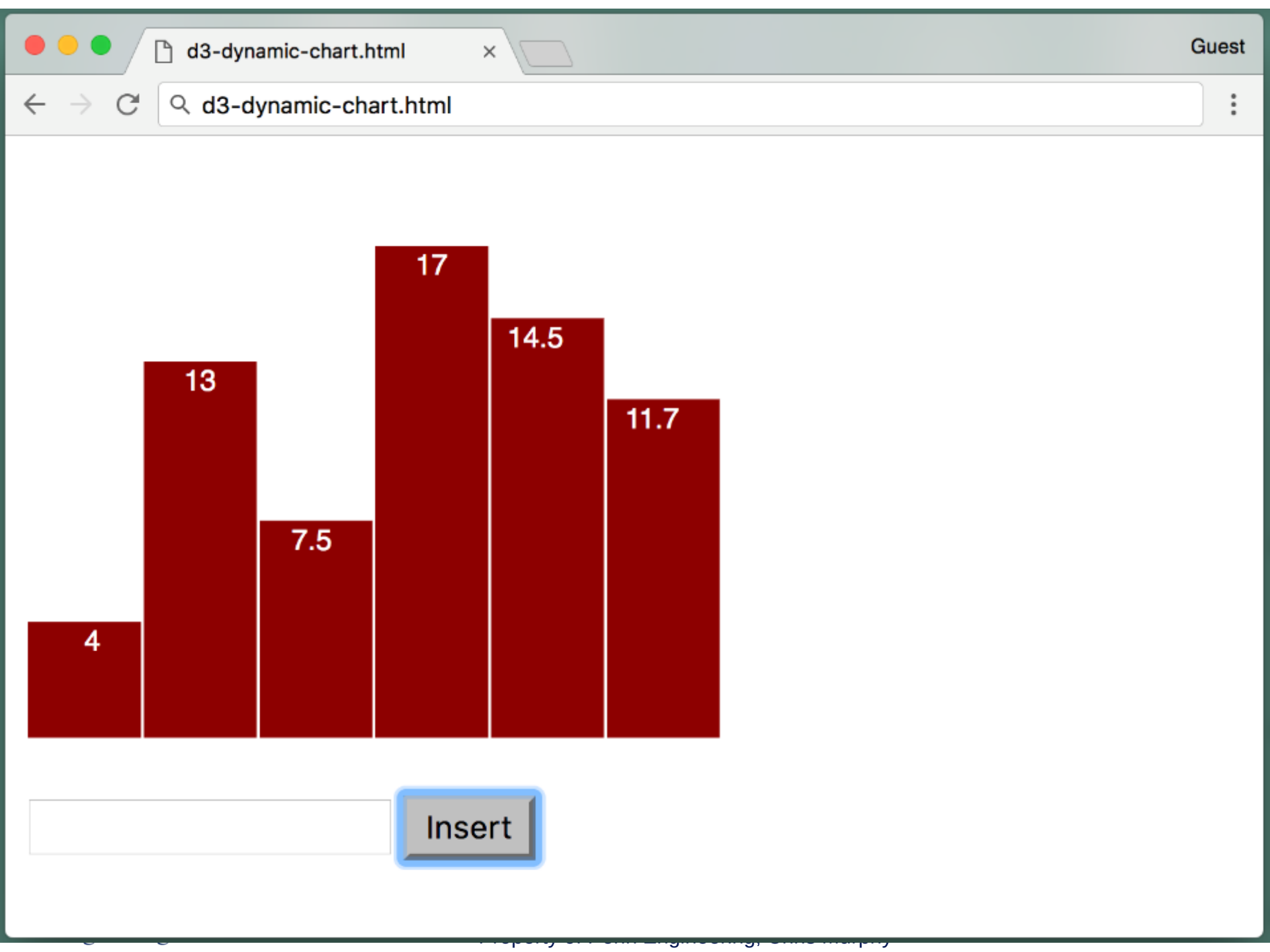
- This allows us to dynamically modify our chart and other graphics


d3-dynamic-chart.html
Guest
d3-dynamic-chart.html
17
13
7.5
4
Insert


d3-dynamic-chart.html
Guest
d3-dynamic-chart.html
17
13
7.5
4
145
Insert


d3-dynamic-chart.html
Guest
d3-dynamic-chart.html
17
14.5
13
7.5
4
Insert


d3-dynamic-chart.html
Guest
d3-dynamic-chart.html
17
14.5
13
7.5
4
117
Insert


d3-dynamic-chart.html
Guest
d3-dynamic-chart.html
17
14.5
13
11.7
7.5
4
Insert

```
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<svg class="chart" height="200"></svg>
<p>
<input id="inputField"></input>
<button onclick="insert();">Insert</button>

<script>
  var numbers = [40, 130, 75, 170];

  function insert() {
     var value = document.getElementById('inputField').value;
     numbers.push(value);
     drawChart();
     document.getElementById('inputField').value = '';
  }

  function drawChart() {
   // same D3 code as before!
  }

  drawChart();

</script>
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Summary

- D3.js is a powerful library for generating HTML and SVG elements based on data
- We can apply functions to data sets to generate graphical elements, e.g. charts
- And use D3.js to modify the elements when new data is added