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DLI Accelerated Data Science Teaching Kit

Lecture 9.6 - Scales and Axes



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Scales

(e.g., sizing a circle based on data value)

```
.attr("height", function(d) { return d; })
```

can blow up really quickly...

Scales

- D3 has many types of scales
- I am only going to cover two:
 - Linear Scales
 - Ordinal Scales

Linear Scales

```
var xscale = d3.scale.linear( )  
    .domain( [min, max] )  
    .range( [minOut, maxOut] )  
  
group.attr("x", function(d,i) {  
    return xscale(d.size);  
})
```

Min and Max

But how do you figure out the min and max
for the domain?

D3

A really powerful for-loop with a ton of
useful helper functions

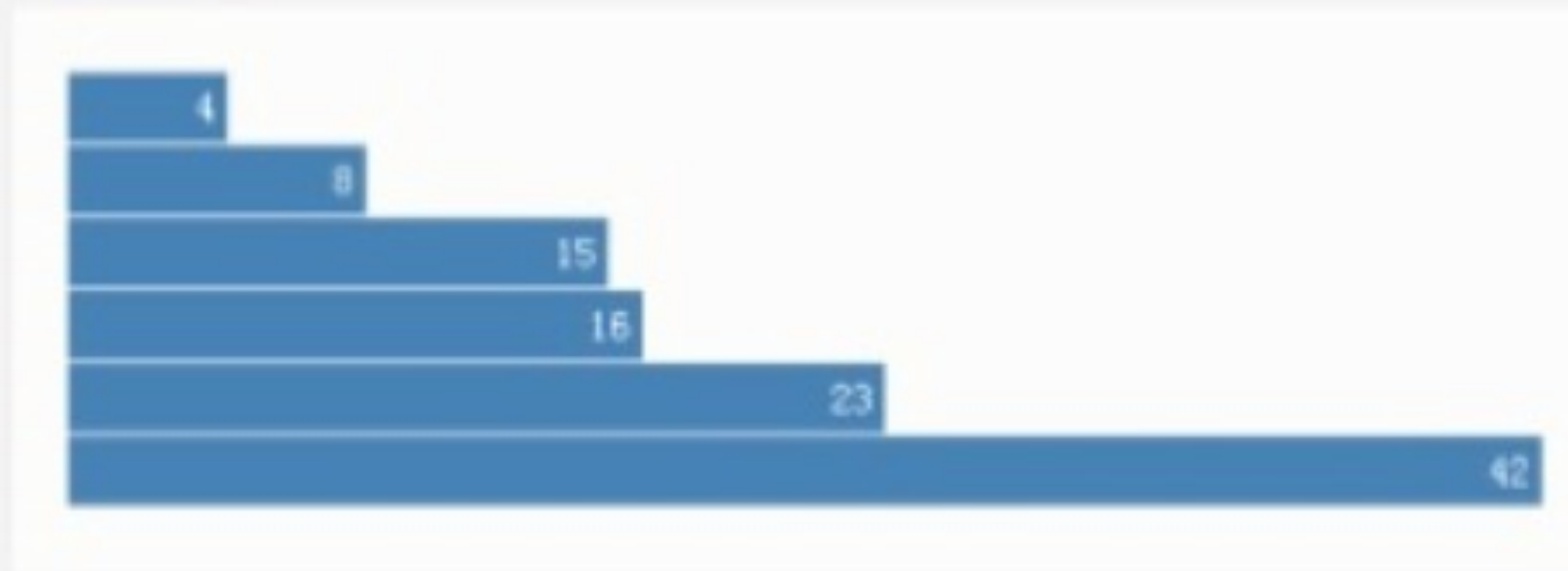
Min and Max

- `d3.min([])` → number
- `d3.max([])` → number
- `d3.extent([])` → [number,number]

Domain & Range

D3.js – scale (Domain and Range)

```
var data = [4, 8, 15, 16, 23, 42];
```



```
var x = d3.scale.linear()
```

```
.domain([0, d3.max(data)])
```

```
.range([0, 420]);
```

Value range of the dataset

Value range for the visualized graph

An optional **accessor** function may be specified, which is equivalent to calling **array.map(accessor)** before computing the maximum value.

```
d3.max (  
    data.map( function(d) { return d.age; } )  
) // returns the maximum age
```

<https://github.com/d3/d3-3.x-api-reference/blob/master/Arrays.md>

```
var maxAge = d3.max(  
    data.map( function(d) { return d.age; } )  
    ) // returns the maximum age  
  
var yscale = d3.scale.linear( )  
    .domain( [0, maxAge] )  
    .range( [0, 100] )
```

Ordinal Scales

- D3 has built-in color scales!
 - (And they're easy!)
- `var colorscale = d3.scale.category10()`
- Also available are:
 - `category20()`
 - `category20b()`
 - `category20c()`
 - (and even a few more)

Ordinal Categorical Scales

- D3 has built-in color scales!
 - (And they're easy!)
- `var colorscale = d3.scale.category10()`

- Also available are:
 - `category20()`
 - `category20b()`
 - `category20c()`
 - (and even a few more)



Think carefully before using a rainbow palette for ordinal data!

http://www.mathworks.com/tagteam/81137_92238v00_RainbowColorMap_57312.pdf

Ordinal Categorical Scales

- `[{type: 'Bird'}, {type: 'Rodent'}, {type: 'Bird'}]`

- `var colorscale = d3.scale.category10()`

- `.attr("fill", function(d,i) {
 return colorscale(d.type)
})`



- `<rect fill="blue"></rect>`
- `<rect fill="orange"></rect>`
- `<rect fill="blue"></rect>`

D3 also has visual helper-functions

Axes

```
yaxisglyph = vis.append("g")
```

```
yaxis = d3.svg.axis( )  
    .scale( yscale )    // must be a numerical scale  
    .orient( 'left' )  // or 'right', 'top', or 'bottom'  
    .ticks( 6 )        // number of ticks, default is 10  
yaxisglyph.call(yaxis)
```



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Thank You

We thank Dr. Chad Stolper for sharing teaching materials for visualization and D3.