CMPT 384 – Information Visualization

D3.js

Lab 4

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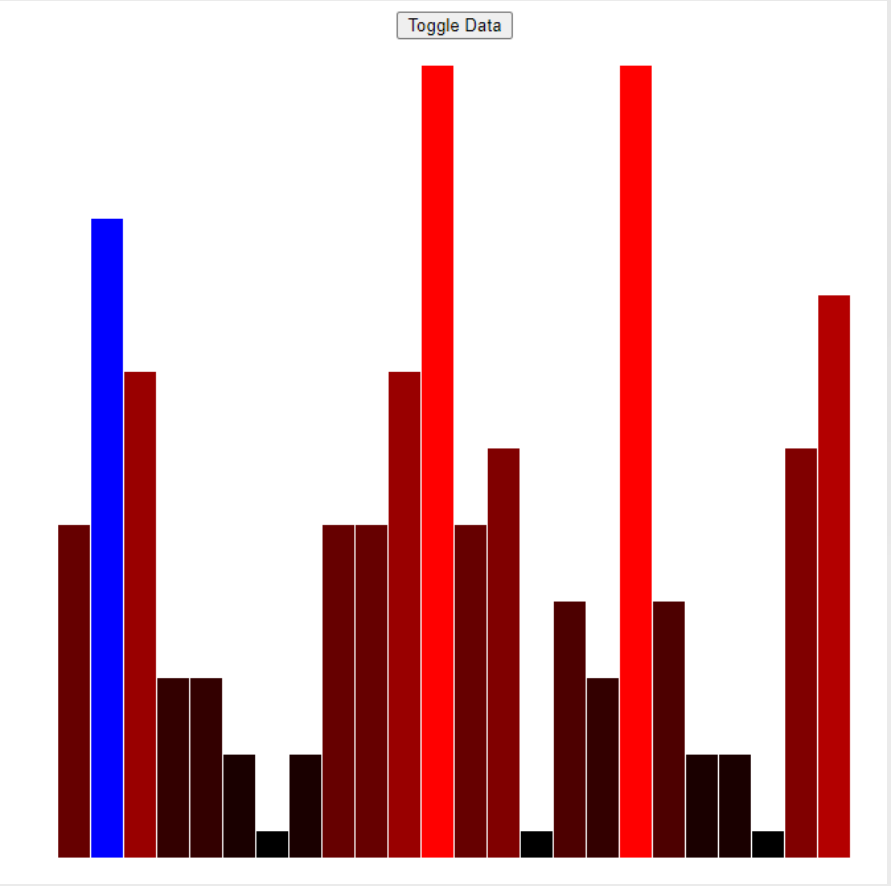
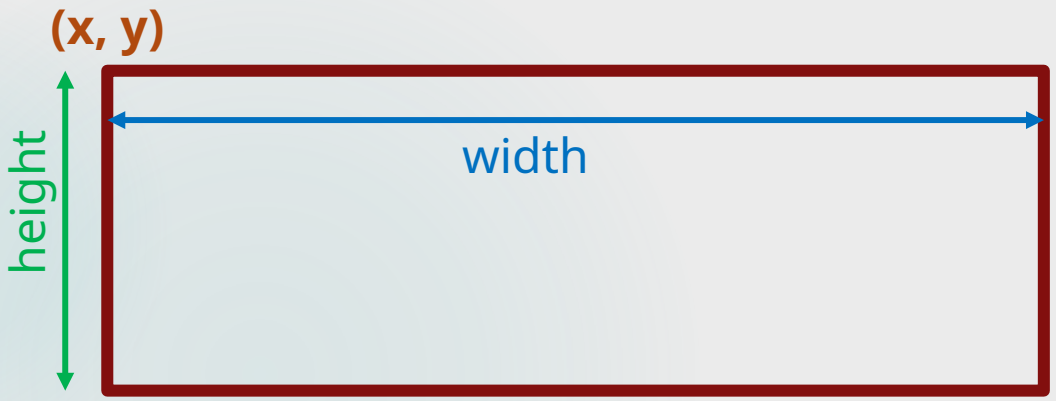
Agenda

- D3 Bar Chart with scale
- D3 Event Handler
- D3 Transition (Animation)



D3 Rectangle Draw

- Rectangle is another primary shape

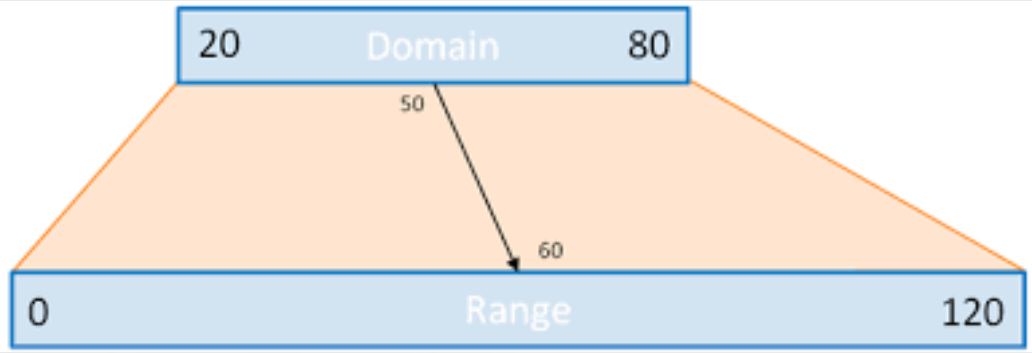


Required Attributes

- Top-Left Co-ordinate (x, y)
- width
- height

```
<rect x="50" y="20" width="150" height="150“></
rect>
```

D3 Scales – Linear Scale



http://www.jeromecukier.net

```
var xScale = d3.scaleLinear()
    .domain([20, 80])
    .range([0, 120]);
```

```
> xScale(20)
<- 0
> xScale(80)
<- 120
> xScale(50)
<- 60
```

Domain – what we have, e.g. data range
Range – what we want, e.g. pixel range for chart

D3 Transition

- Select Elements
- Join Updated Data
- Transition
- Define the duration of transition (in milli-second)
- Define the type of transition (with ease)

Different type of animation in d3 library
https://observablehq.com/@d3/easing-animations

Start the server

```
Microsoft Windows [Version 10.0.15063]
(c) 2017 Microsoft Corporation. All rights reserved.

C:\> python -m SimpleHTTPServer 8888
C:\Users\jyoti\AppData\Local\Programs\Python\Python37-32\python.exe: No
module named SimpleHTTPServer

C:\> python -m http.server 8888
Serving HTTP on 0.0.0.0 port 8888 (http://0.0.0.0:8888/) ...
```

Generate Random Number

```
function getRandomData(length) {
    //  range creates a simple array like this [0,1,2,3 ....., length-1 ]
    var number_array = d3.range(length);

    // map is used to modify an existing array , the value returned by the function
    // in map replaces the value in the array , this repeats for each value in the array
    var random_number_array = number_array.map(function() {
        // Math the random return a decimal value between 0 to 1
        // we convert it to a round number by multiplying by 10
        // so 0.34 becomes 3.4 and is rounded to 3
        return Math.round(Math.random() * 10);
    });
    return random_number_array;
}

// get a random data array and store in dataset
var dataset = getRandomData(data_length);
```

D3 Scales

```
var xScale = d3.scaleLinear()
    .domain([0, data_length - 1])
    .range([0, w]);

var yScale = d3.scaleLinear()
    .domain([d3.min(dataset), d3.max(dataset)])
    .range([20, h]);

var colorScale = d3.scaleLinear()
    .domain([d3.min(dataset), d3.max(dataset)])
    // 0 to 255 in Decimal System is 00 to FF in Hexadecimal System
    .range([0, 255]);
```

Chart Creation

```
//Create SVG element
var svg = d3.select("body").append("svg").attr("width", w).attr("height", h);

svg.selectAll("rect").data(dataset).enter().append("rect")
    .attr("x", function(d, i) {
        return xScale(i);
    }).attr("y", function(d) {
        return h - yScale(d);
    }) //move away from top
    .attr("width", w / dataset.length)
    .attr("height", function(d) {
        return yScale(d);
    })
    .attr("fill", function(d) {
        return "rgb(" + colorScale(d) + ",0,0)";
    });
```

Event Handler – HTML Tag

HTML TAG

```
<body>
    <button>Toggle Data</button>
</body>
```

SCRIPT TO ATTACH EVENT

```
d3.select("button")
    .on("click", function() {

        // code block that gets called when
        // button is clicked

    });
```

Event Handler – HTML Tag

```
//On click, update with new data
d3.select("button")
    .on("click", function() {

        var updated_dataset = getRandomData(data_length);

        yScale.domain([d3.min(updated_dataset), d3.max(updated_dataset)]);
        colorScale.domain([d3.min(updated_dataset), d3.max(updated_dataset)]);

        svg.selectAll("rect")
            .data(updated_dataset)
            .transition()
            .duration(1000)
            .ease(d3.easeLinear)
            .attr("y", function(d) {
                return h - yScale(d);
            })
            .attr("height", function(d) {
                return yScale(d);
            })
            .attr("fill", function(d) {
                return "rgb(" + colorScale(d) + ",0,0)";
            });
    });
```

Basic Codes for Animation

```
svg.selectAll("rect")
    .data(updated_dataset)
    .transition()
    .duration(1000)
    .ease(d3.easeLinear)
    .attr("y", function(d) {
        return h - yScale(d);
    })
    .attr("height", function(d) {
        return yScale(d);
    })
    .attr("fill", function(d) {
        return "rgb(" + colorScale(d) + ",0,0)";
    });
```

Event Handler for SVG Tag

```
.on('mouseover', function() {
    d3.select(this).transition().duration(500).ease(d3.easeLinear)
        .attr('fill', 'blue');
})
.on('mouseout', function() {
    d3.select(this).transition().duration(500).ease(d3.easeLinear)
        .attr("fill", function(d) {
            return "rgb(" + colorScale(d) + ",0,0)";
        });
})
```

Try this:

Try to create example_challenge.html on your own