D3.js Tutorial

(Hands on Session)

Ayush Kumar

D3: Data-Driven Documents

D3 Show Reel

- AAPL
- AMZN
- IBM
- MSFT

https://bl.ocks.org/mbostock/1256572

D3: Data-Driven Documents

D3.js is a JavaScript library for manipulating documents based on data

Data

Driven

Transformation

D3: Technology & Concept

- D3 Library
- JQuery (Bonus)
- Data Visualization
- JSON/CSV
- Array & Objects

- SVG – Scalable Vector Graphics
- Transitions
- Data Scaling
- Data Binding
- Data Display & Charting

Directory Structure

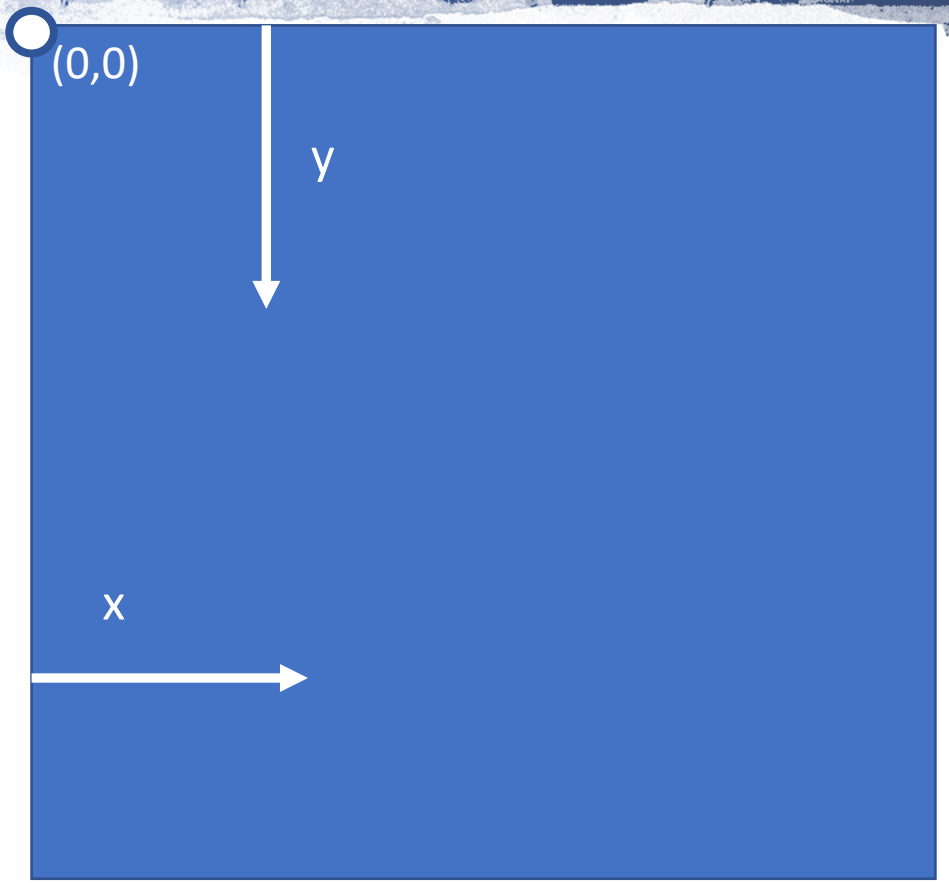
Replace “CSE332” with your “Project_Folder” name

- CSE332/
  - index.html
- CSE332 /lib/
  - d3.v5.js
- CSE332 /js/
  - test.js
- CSE332 /css/
  - style.css
- CSE332 /data/
  - iris.csv

VERY VERY IMPORTANT !!!

Please do not be hesitant to ask questions!

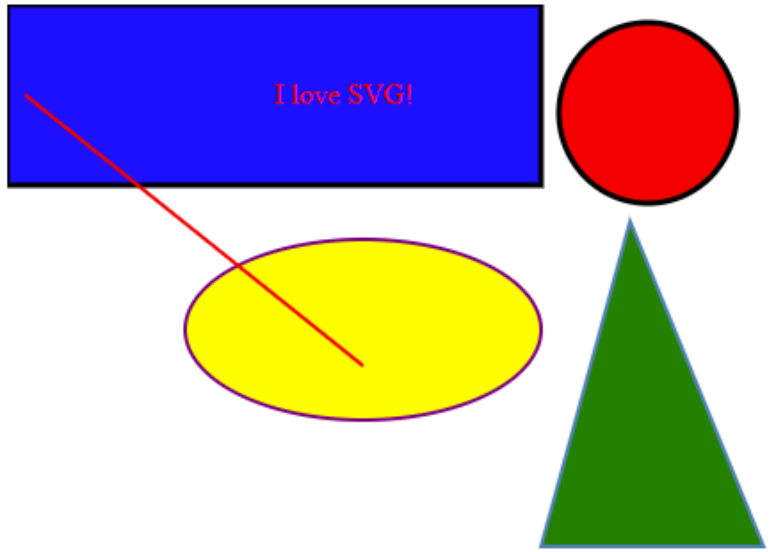
SVG Basics



- SVG is an XML language, similar to XHTML, which can be used to draw vector graphics.
- It can be used to create an image either by specifying all the lines and shapes necessary, by modifying already existing raster images, or by a combination of both.

SVG Shapes

- <rect>
  - <svg width="400" height="110">
    <rect width="300" height="100" style="fill:rgb(0,0,255);stroke-width:3;stroke:rgb(0,0,0)" />
    </svg>
- <circle>
  - <svg height="100" width="100">
    <circle cx="50" cy="50" r="40" stroke="black" stroke-width="3" fill="red" />
    </svg>
- <ellipse>
  - <svg height="140" width="500">
    <ellipse cx="200" cy="80" rx="100" ry="50" style="fill:yellow;stroke:purple;stroke-width:2" />
    </svg>
- <line>
  - <svg height="210" width="500">
    <line x1="0" y1="0" x2="200" y2="200" style="stroke:rgb(255,0,0);stroke-width:2" />
    </svg>
- <text>
  - <svg height="30" width="200">
    <text x="0" y="15" fill="red">I love SVG!</text>
    </svg>
- <path>
  - <svg height="500" width="500">
    <path d="M350 120 L300 300 L425 300 Z" style="fill:green;stroke:steelblue;stroke-width:2" />
    </svg>



https://developer.mozilla.org/en-US/docs/Web/SVG/Tutorial/Basic_Shapes

AND NOW D3 …

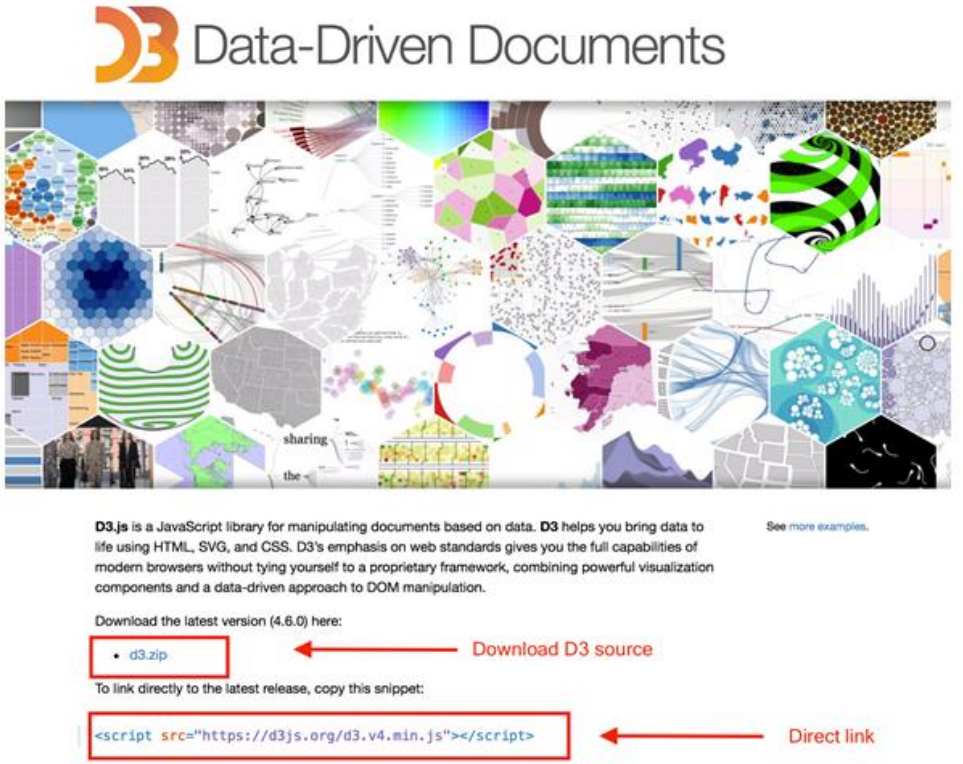
- ❑ DOM SELECTION & MANIPULATION
- ❑ LOADING DATA
- ❑ ENTER-UPDATE-EXIT PARADIGM (DATA BINDING)
- ❑ CHARTS
- ❑ SCALES
- ❑ AXES
- ❑ TRANSITIONS AND INTERACTION

How to make this Work ???

D3 Begins…

Setup D3.js Development Environment

- D3 library
- Web server
- Editor
- Web browser



D3 Begins…

Setup D3.js Development Environment

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```
<script src="../d3.js"></script>

<script src="../d3.min.js"></script>

<script src="https://d3js.org/d3.v4.min.js"></script>
```

D3 Begins…

Setup D3.js Development Environment

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- Web server
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python -m http.server 8000

http://localhost:8000/

D3 Begins…

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D3 DOM

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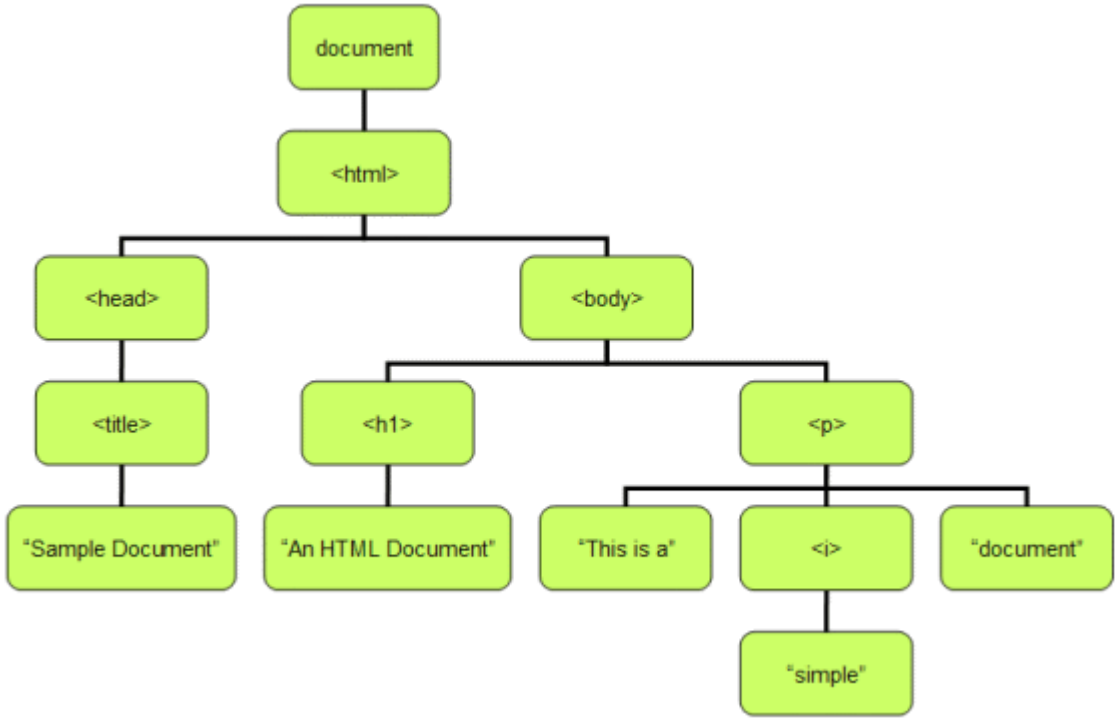
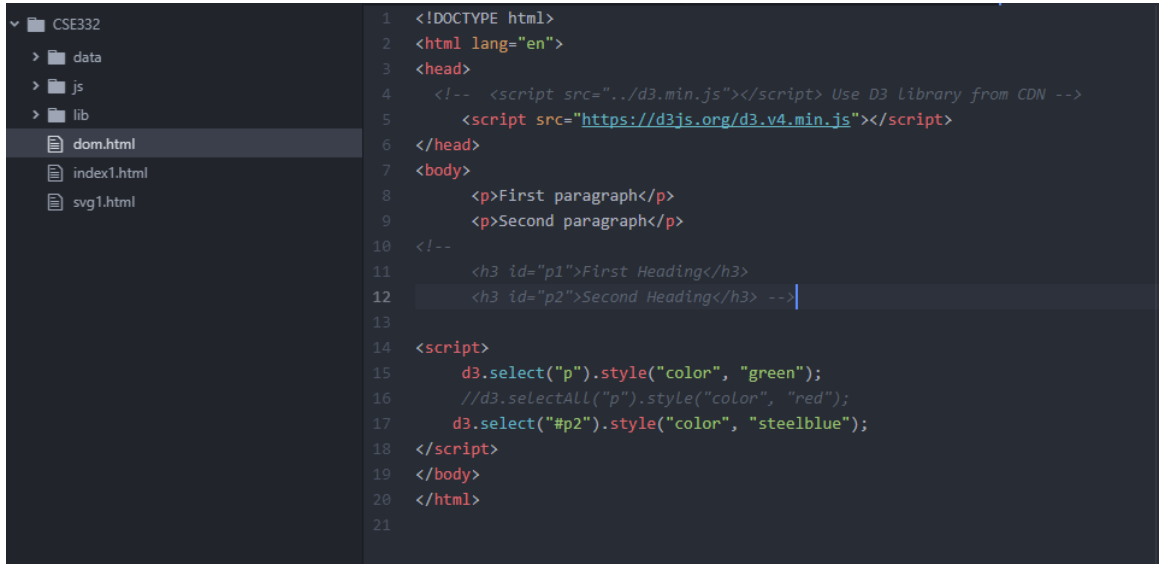


https://www.cs.pu.edu.tw/~tsay/course/webprog/notes/DOM

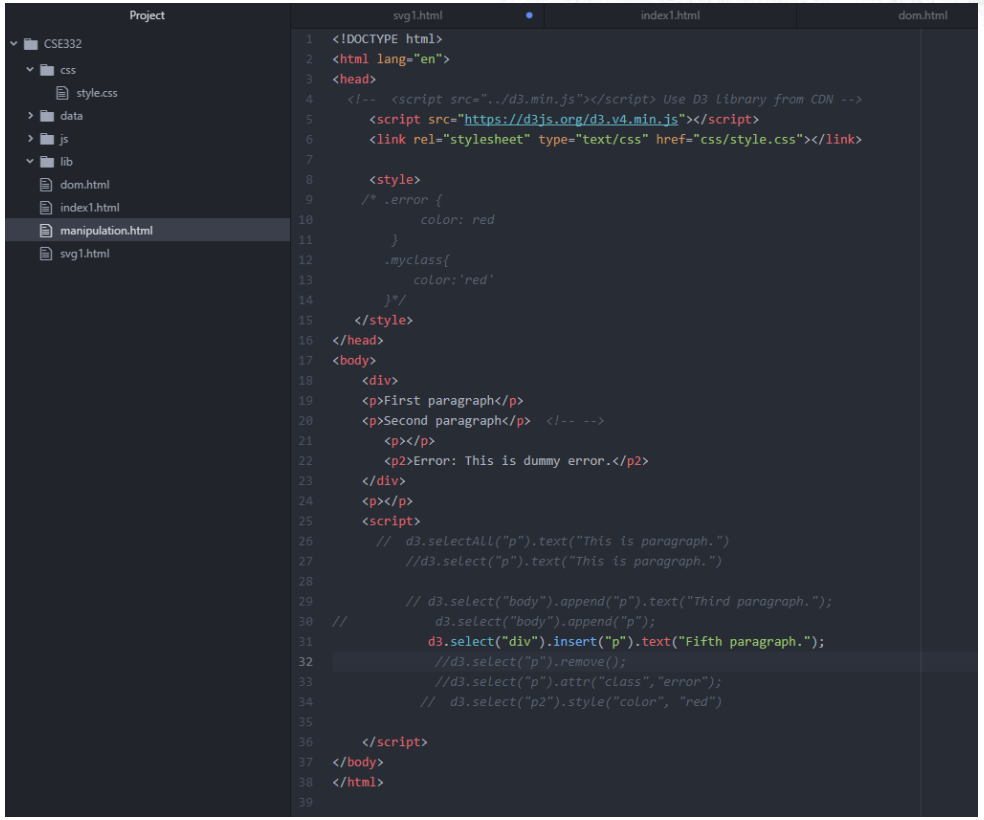
DOM Selection

- d3.select()
  - Select Element By Tag Name
  - Select Element By Id
- d3.selectAll()
  - Select Element By Tag Name
  - Select Element By Id
  - Select Element By CSS Class Name



DOM Manipulation

- text()
- append()
- insert()
- remove()
- html()
- attr()
- property()
- style()



D3 Data Loading

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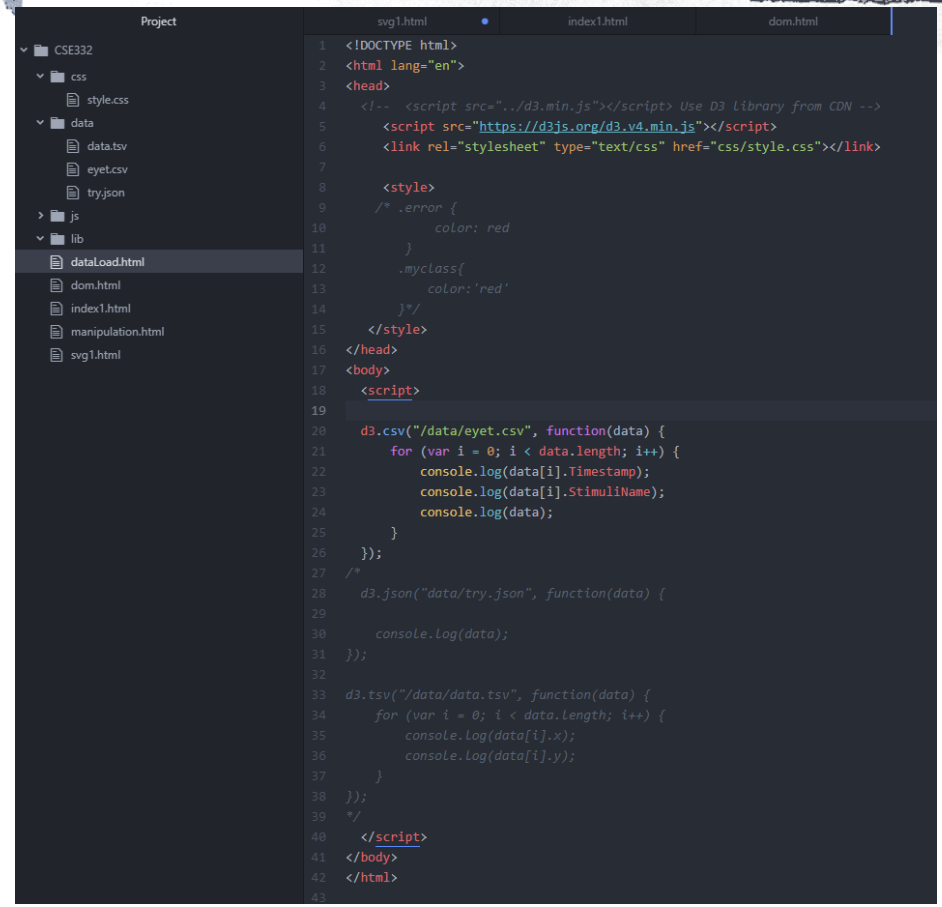
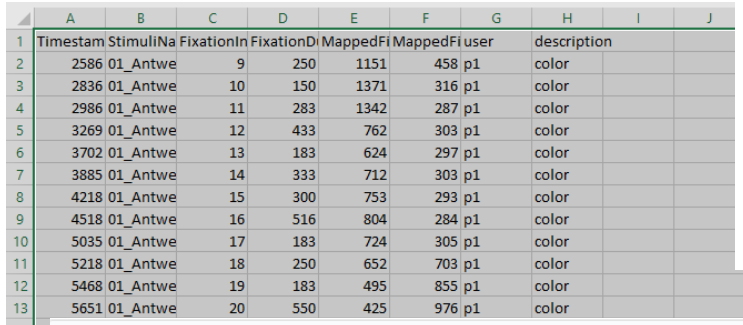


D3 Data Loading

- d3.csv()
- d3.json()
- d3.tsv()
- d3.xml()



	A	B	C	D	E	F	G	H	I	J
1	Timestam	StimuliNa	FixationIn	FixationDu	MappedFi	MappedFi	user	description		
2	2586	01_Antwe	9	250	1151	458	p1	color		
3	2836	01_Antwe	10	150	1371	316	p1	color		
4	2986	01_Antwe	11	283	1342	287	p1	color		
5	3269	01_Antwe	12	433	762	303	p1	color		
6	3702	01_Antwe	13	183	624	297	p1	color		
7	3885	01_Antwe	14	333	712	303	p1	color		
8	4218	01_Antwe	15	300	753	293	p1	color		
9	4518	01_Antwe	16	516	804	284	p1	color		
10	5035	01_Antwe	17	183	724	305	p1	color		
11	5218	01_Antwe	18	250	652	703	p1	color		
12	5468	01_Antwe	19	183	495	855	p1	color		
13	5651	01_Antwe	20	550	425	976	p1	color		

```
<?xml version = "1.0" encoding = "utf-8"?>
<!-- xslplane.1.xml -->
<?xml-stylesheet type = "text/xsl"  href = "xslplane.1.xsl" ?>
<plane>
   <year> 1977 </year>
   <make> Cessna </make>
   <model> Skyhawk </model>
   <color> Light blue and white </color>
</plane>
```

data.tsv

Search this file...

	x	y
2	5	90
3	25	30
4	45	50
5	65	55
6	85	25

```
[
  {
    color: "magenta",
    value: "#f0f"
  },
  {
    color: "yellow",
    value: "#ff0"
  },
  {
    color: "black",
    value: "#000"
  }
]
```

D3 DOM

- ❑ DOM SELECTION & MANIPULATION
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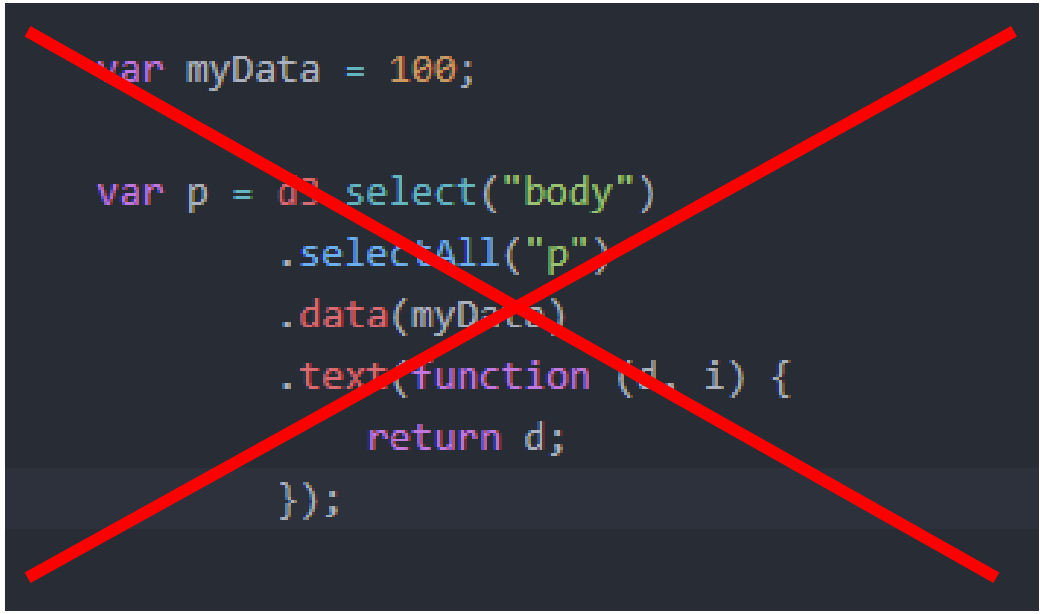
D3 Data Binding

- data()
- enter()
- exit()
- datum()



D3 Data Binding

- data()
- enter()
- update()
- exit()
- datum()

```
var data = [4, 1, 6, 2, 8, 9];
var body = d3.select("body")
             .selectAll("span")
             .data(data)
             .enter()
             .append("span")
             .text(function(d) { return d + " "; });
```

D3 CHARTS

- ❑ DOM SELECTION & MANIPULATION
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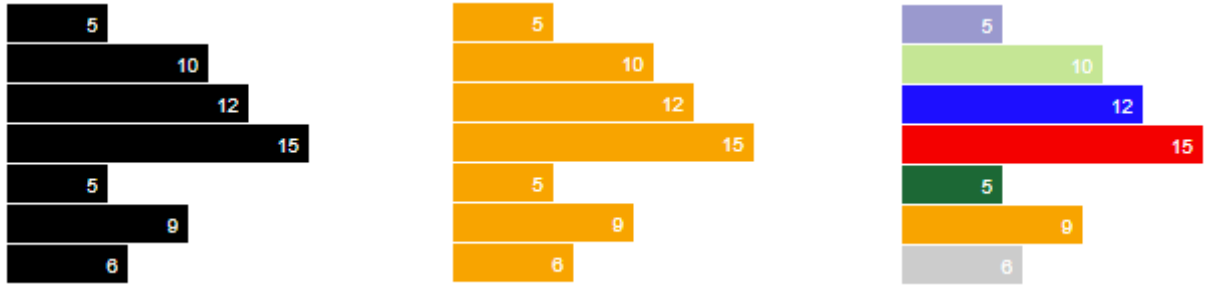

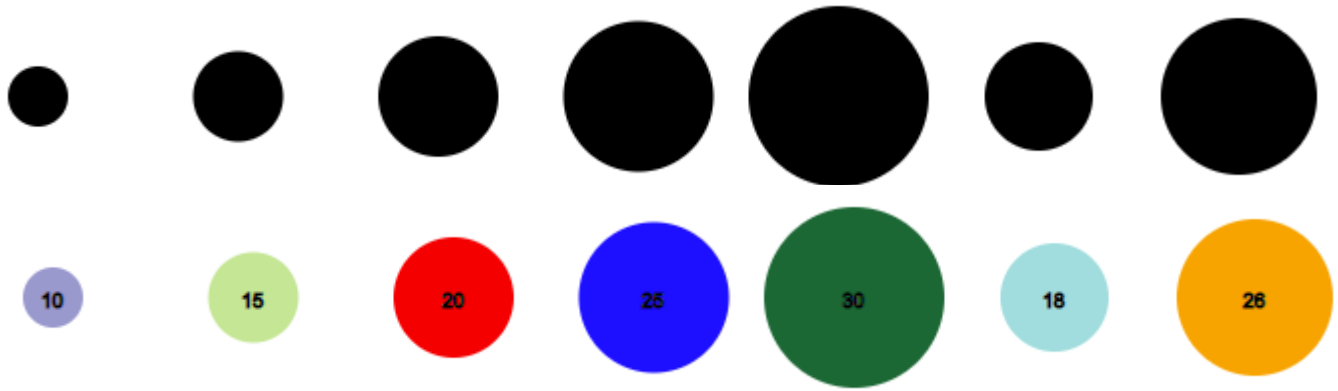

D3 SCALING

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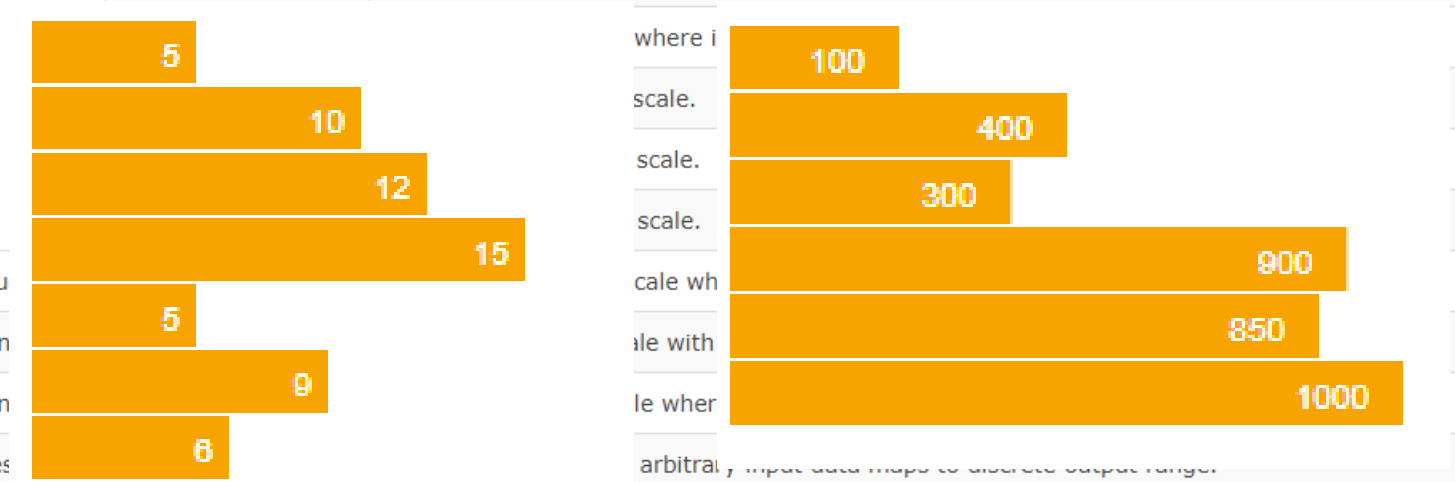
D3 SCALING

Scale Type	Method	Description
Continuous	d3.scaleLinear()	Construct continuous linear scale where input data (domain) maps to specified output range.
	d3.scaleIdentity()	Construct linear scale where input data is the same as output.
		where i
		scale.
		scale.
		scale.
Sequ		cale wh
Quan		le with
Quan		le wher
Thres		arbitra
Band		dinal scales except the output range is continuous and numeric.
Point	d3.scalePoint()	Construct point scale.
Ordinal	d3.scaleOrdinal()	Construct ordinal scale where input data includes alphabets and are mapped to discrete numeric output range.



D3 Axis

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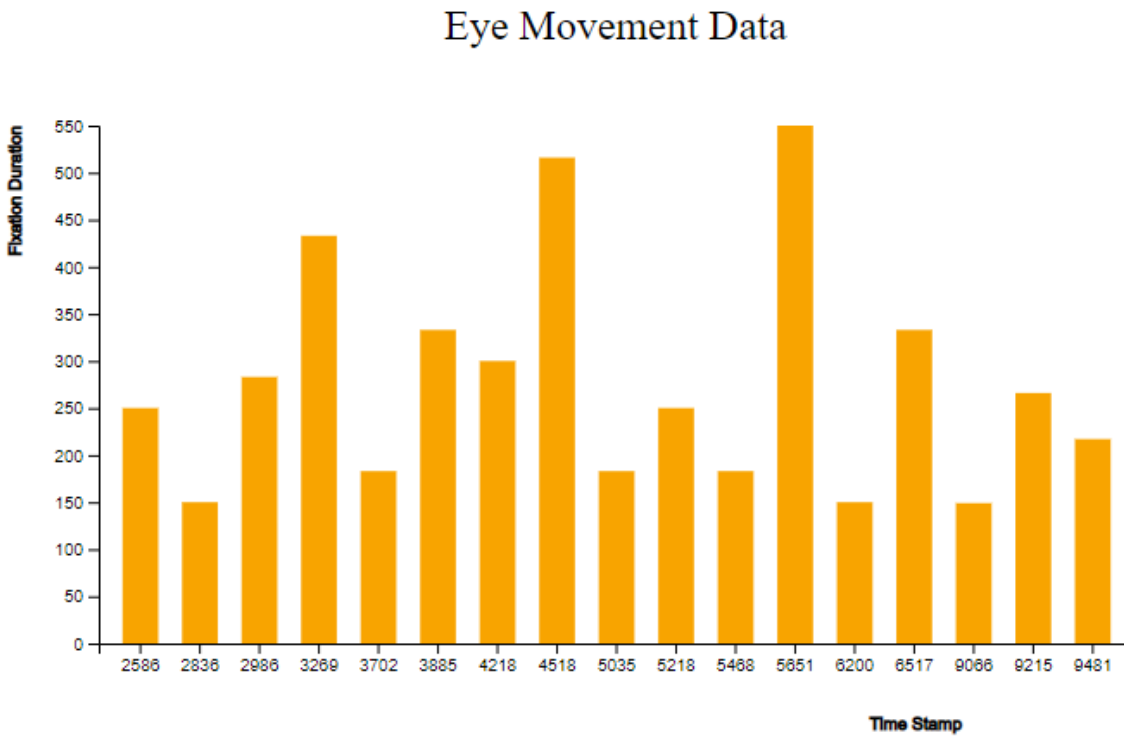
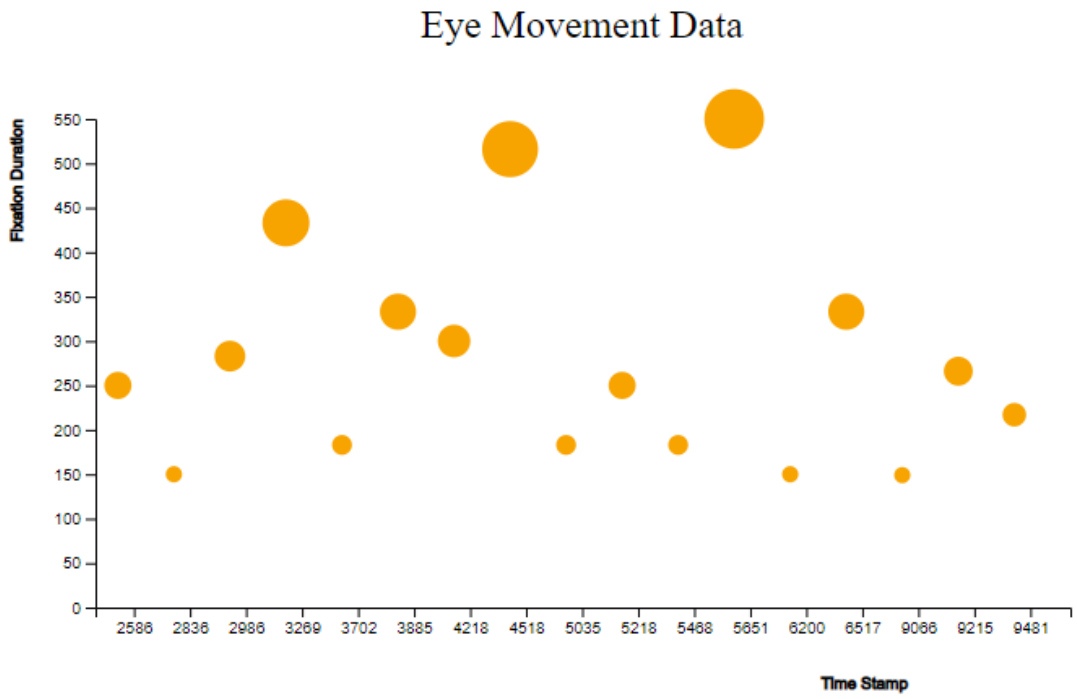
D3 Axis (Exactly Same Data)





D3 Animation

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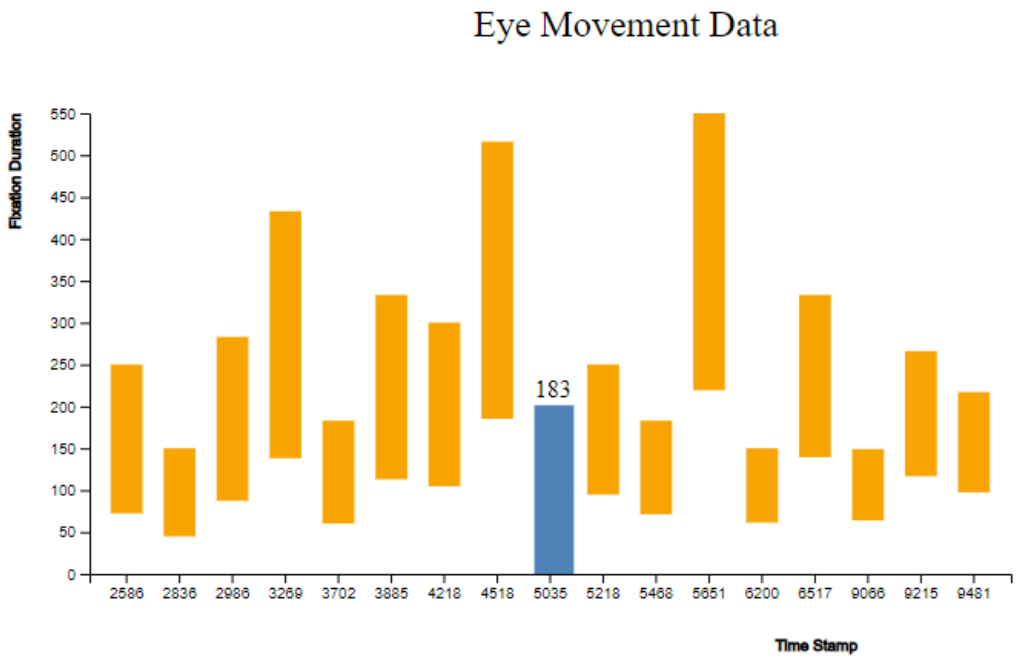
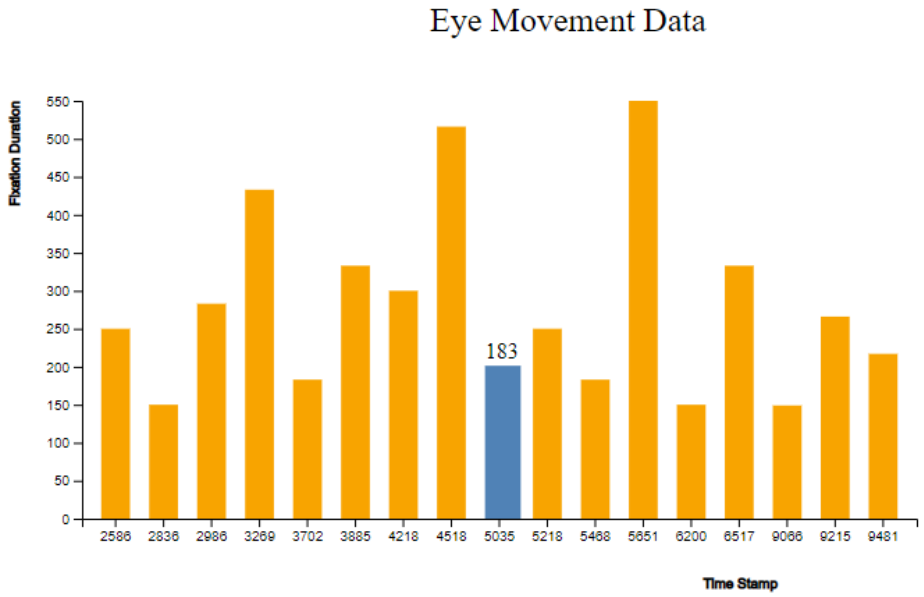
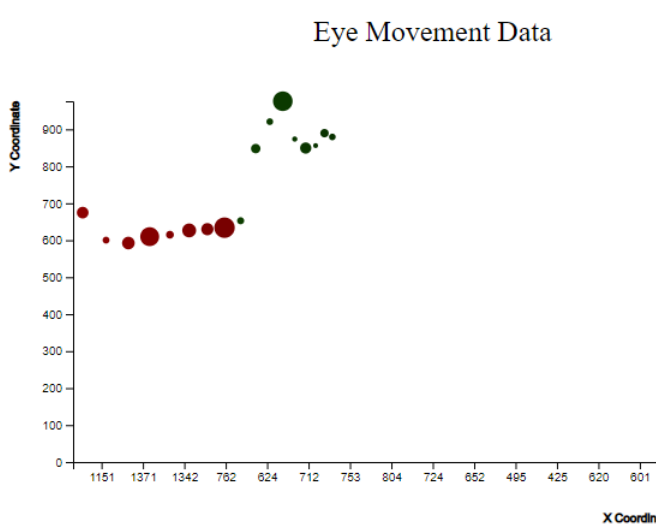
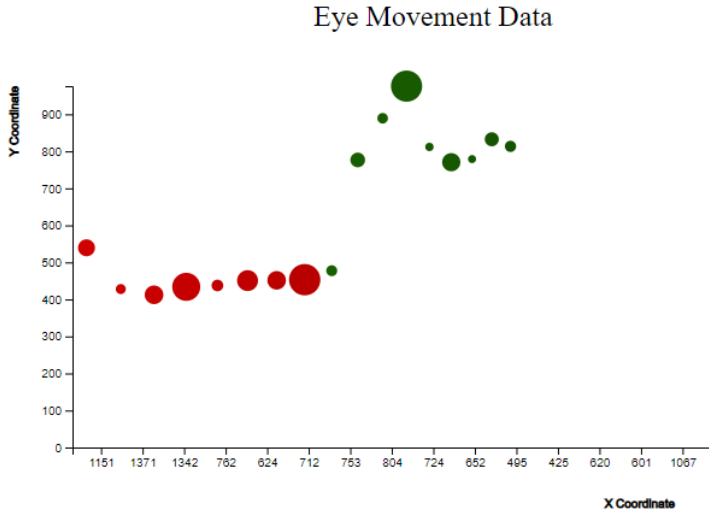
D3 Animation

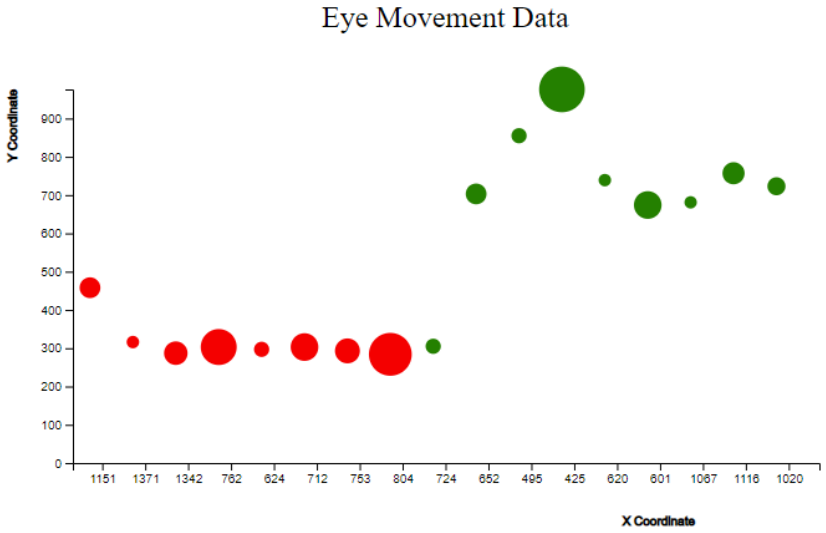




D3 Animation







References

- https://www.dashingd3js.com/d3-v4-tutorial
- https://github.com/d3/d3/wiki/Gallery
- http://poloclub.gatech.edu/cse6242/2014spring/lectures/CSE6242-20140123-Stolper-D3.pdf
- https://bost.ocks.org/mike/d3/workshop/#0
- http://www.tutorialsteacher.com/d3js
- https://square.github.io/intro-to-d3/
- http://alignedleft.com/tutorials
- https://www.tutorialspoint.com/d3js/