

D3

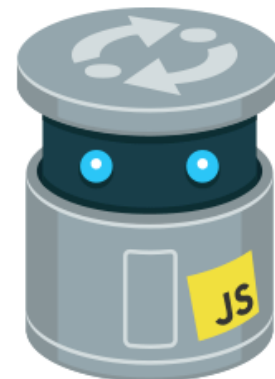
Exercises



Data-Driven Documents

- Intro
- Selection usage
- Some exercises

<http://jsbin.com/?html,output>



- Remember to include d3 library in your files!
- It is compatible with all browsers
- Don't reinvent the wheel: use code snippets
- Declarative approach

D3 Pattern

- `.data()`
 - Attach data to current selection
- `.enter()`
 - Add new elements if existing ones are few for data
- `.exit()`
 - Remove exceeding elements

Remember that D3 stands for Data-Driven Documents!

Selections

- ➔ `d3.selectAll("p").style("color", "white");`
- ➔ `d3.selectAll("p")
 .data([4, 8, 15, 16, 23, 42])
 .style("font-size", function(d)
 { return d + "px"; });`

`selectAll()` provides an array of elements that satisfies the selection criterion

Selections - .enter()

Plz, note that "p" elems may not exist initially

```
➤ d3.select("body").selectAll("p")
➤   .data([4, 8, 15, 16, 23, 42])
➤   .enter().append("p")
➤   .text(function(d) { return "I'm
number " + d + "!"; });
```

Selections - .enter()

```
➤ d3.select("body").selectAll("p")  
➤   .data([4, 8, 15, 16, 23, 42])  
➤   .enter().append("p")  
➤   .text(function(d) { return "I'm  
number " + d + "!"; });
```

It is possible to set a property according to data value associated to the element:

```
function(d){...}
```

Selections

```
➔ d3.selectAll("p").style("color",  
  function(d, i) {  
    return i % 2 ? "#fff" : "#eee";  
  });
```

The function can use data value
associated to the element as
well as its index

.data()

- .data() function attaches data to the current selection.
- Three cases are possible:
 1. Selection size is as long as data selection
 2. Selection size is smaller than data length
 3. Selection size is larger than current data set

Update

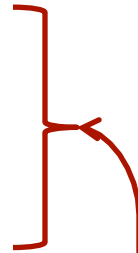
- If data selection is as long as data set, the selection elements are updated according to specs.
- `d3.select("body").selectAll("p").data([4, 8, 15, 16, 23, 42])`

Each array element is associated to a "p" element that descends directly from "body"

- What if the number of elements is less than array length?
- ```
<body>
 <p></p>
 <p></p>
 <p></p>
</body>
```
- ```
d3.select("body").selectAll("p")  
  .data([4, 8, 15, 16, 23, 42])
```

➤ What if the number of elements is less than array length?

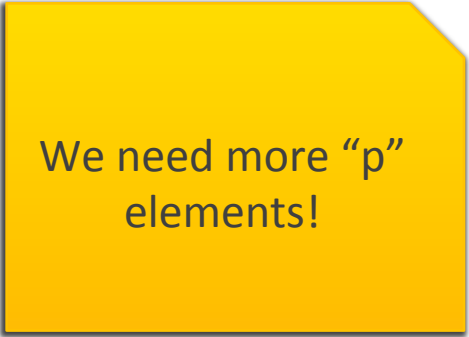
➤ `<body>`
 `<p></p>`
 `<p></p>`
 `<p></p>`
`</body>`



➤ `d3.select("body").selectAll("p")`
 `.data([4, 8, 15, 16, 23, 42])`

- What if the number of elements is less than array length?

- ```
<body>
 <p></p>
 <p></p>
 <p></p>
</body>
```



We need more "p" elements!

- ```
d3.select("body").selectAll("p")  
  .data([4, 8, 15, 16, 23, 42])
```

```
➔ d3.select("body").selectAll("p")  
  .data([4, 8, 15, 16, 23, 42])  
  .enter().append("p")  
  .text(function(d) { return "I'm  
number " + d + "!"; });
```

Missing elements are created and appended.

Then each one is customized with some text

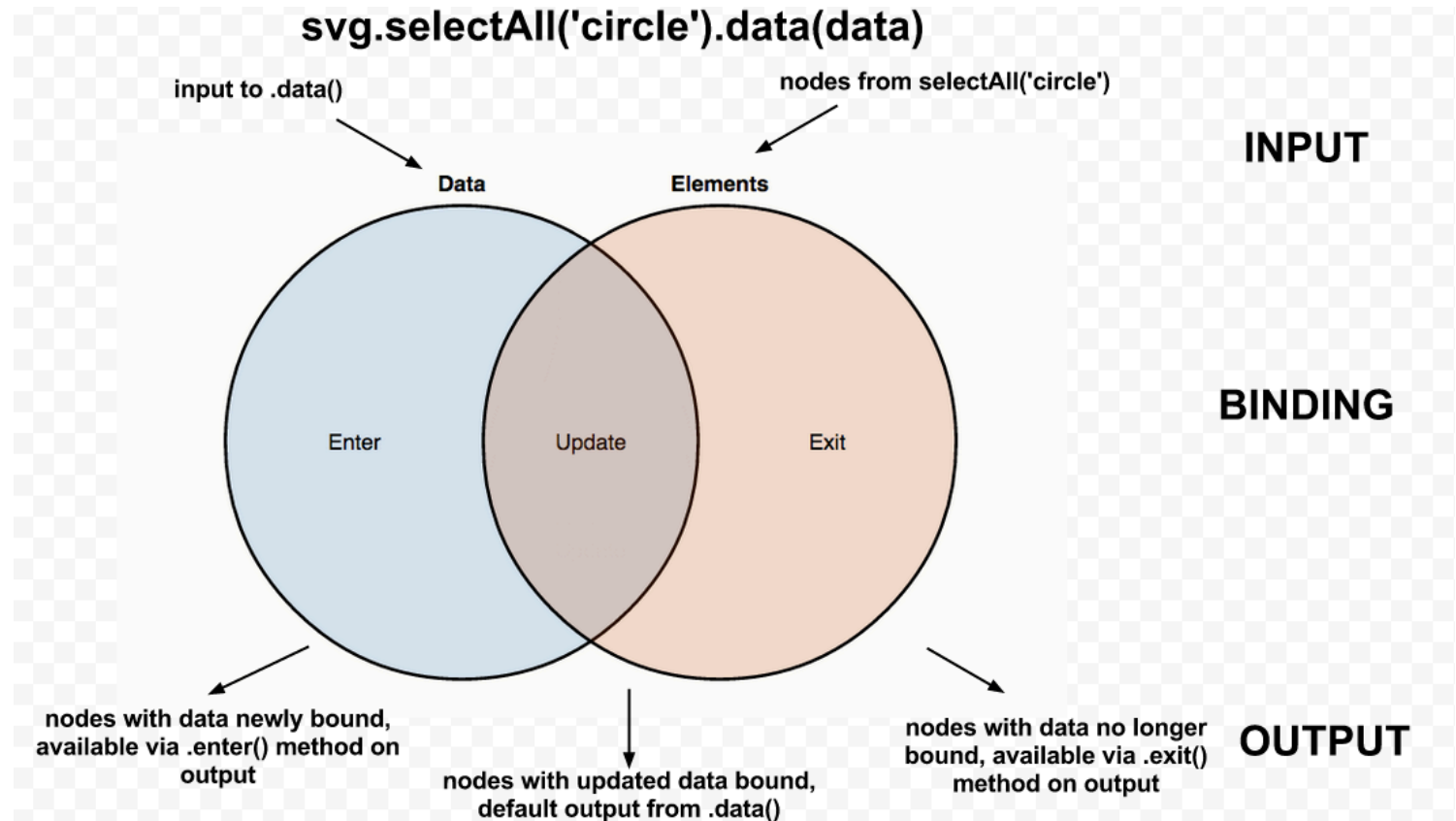
[http://jsbin.com/kuqede/1/edit?
html,js,output](http://jsbin.com/kuqede/1/edit?html,js,output)

➔ When the number of elements is larger than data size, exceeding elements are removed.

```
➔ // Update...  
var p = d3.select("body").selectAll("p")  
    .data([4, 8, 15, 16, 23, 42])  
    .text(String);  
  
// Enter...  
p.enter().append("p")  
    .text(String);  
  
// Exit...  
p.exit().remove();
```

[http://jsbin.com/
xenefa/1/edit?
html,js,output](http://jsbin.com/xenefa/1/edit?html,js,output)

Enter – Update – Exit



Example 1 – Bar chart

```
➤ var mydata =  
[4,0,0,0,5,2,5,5,17,17,27,1,3,0,8,7,3,3,14,2  
,1,2,4,1,2,7,18,2,15,6,0,15,10,10,27,5,9,36  
,1,5,24,15,0];
```

```
var svg = d3.select("svg");  
svg.selectAll("rect")  
  .data(mydata)  
  .enter().append("rect")  
  .attr("x", function(d, i) { return i*20+10;})  
  .attr("y", function(d, i) { return 600-  
d*10-0.5;})  
  .attr("width", 20)  
  .attr("height", function(d, i){ return  
d*10+0.5;})  
  .style("fill", "steelblue")  
  .style("stroke", "black");
```

➤ mydata represents a timeseries

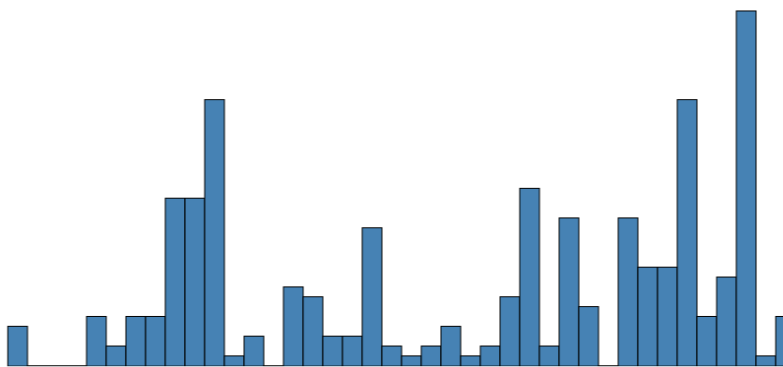
➤ For each value, a new “rect” is created

➤ “rect” size varies according to data value

➤ <http://jsbin.com/xeduto/1/edit?html,css,js,output>

Focus on what you
want, not on how
you get it!

Example 1 – Bar chart



- Can I change color wrt to height?
- Can I add some “interactivity” to the bar chart?

Example 2 – Bar chart

```
➤ function update() {
    var sdata = getData(cur);
    var svgrects = svg.selectAll("rect")
        .data(sdata)
        .attr("x", function(d, i) { return i*20;})
        .attr("y", function(d, i) { return 600-d*10-0.5;})
        .attr("width", 20)
        .attr("height", function(d, i){ return d*10+0.5;})
        .style("fill", "steelblue")
        .style("stroke", "black")
        .style("opacity", 1);

    svgrects.enter().append("rect")
        .style("fill", "steelblue")
        .style("stroke", "black")
        .style("opacity", 1)
        .attr("x", function(d, i) { return i*20;})
        .attr("y", function(d, i) { return 600-d*10-0.5;})
        .attr("width", 20).attr("height", function(d, i){ return d*10+0.5;});
    svgrects.transition().duration(700).delay(50)
        .attr("y", function(d, i) { return (i===0)? 0 : 600-d*10-0.5; }
        ).style("opacity", function(d, i){ return (i===0)? 0 :
1;}) .attr("x", function(d, i) { return (i===0)? 0 : (i-1)*20; });

    svgrects.exit().delay(50)
        .style("opacity", function(d, i){ return 0;})
        .style("fill", "red")
        .attr("x", 580)
        .remove();
}
setInterval(function(){update();}, 1000);
```

➤ Let's do more with bar charts

➤ <http://jsbin.com/boyugo/5/edit?html,css,js,output>

Example 3 - Balls



- Yellow button adds circles
- Green button moves circles
- Multiple elements in the svg
- <http://jsbin.com/xumike/4/edit?html,js,output>

Example 4 - Ball

Drop Clean 0.00001

➤ <http://jsbin.com/bedexu/8/edit?html,css,js,output>

➤ An example of animation



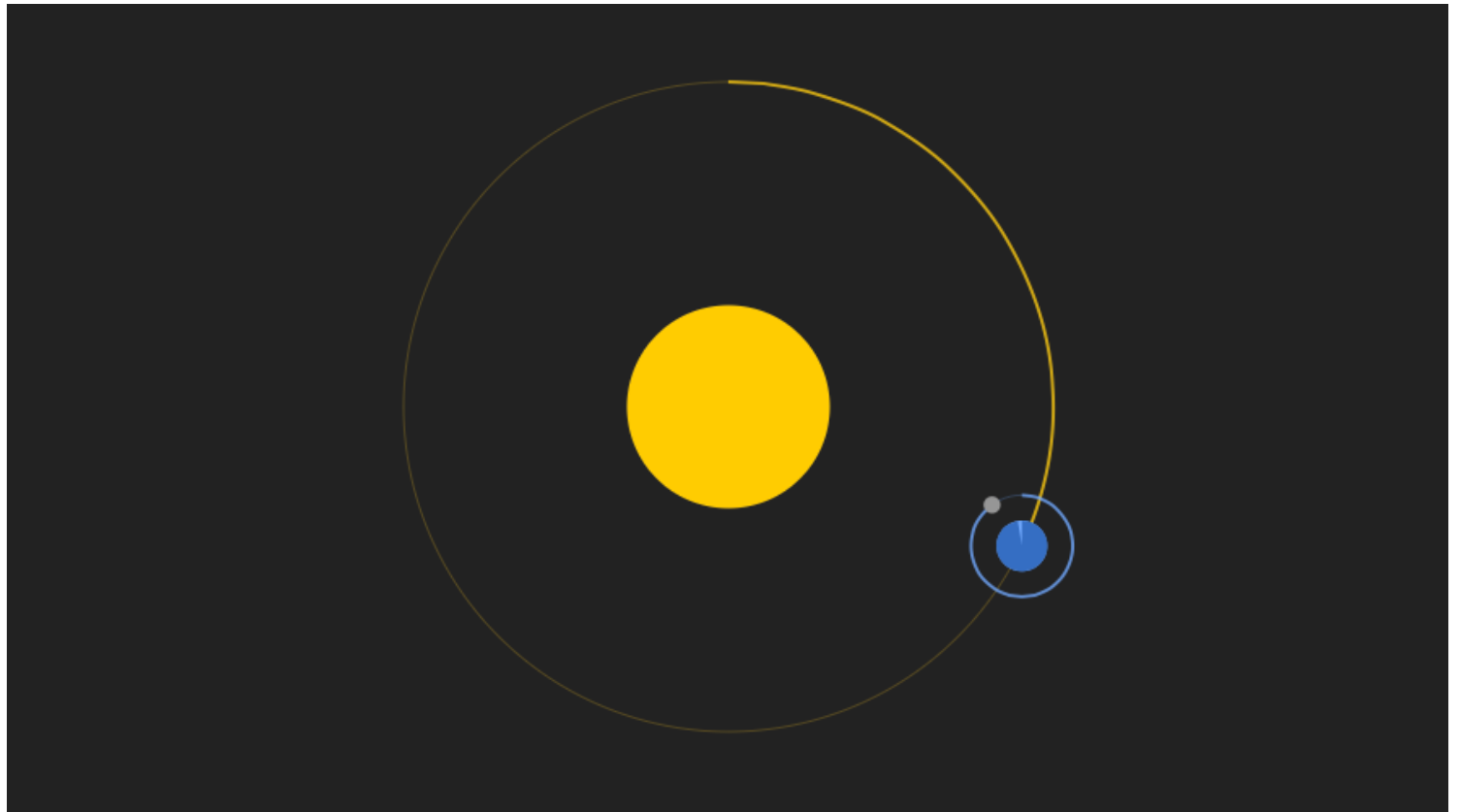
Example 5 – Pattern refresh

enter update exit

1
2
3
4
5

- A simple exercise to refresh what we have seen today
- <http://jsbin.com/xovuce/1/edit?html,js,output>

Exercise X – Something cool



Questions?

