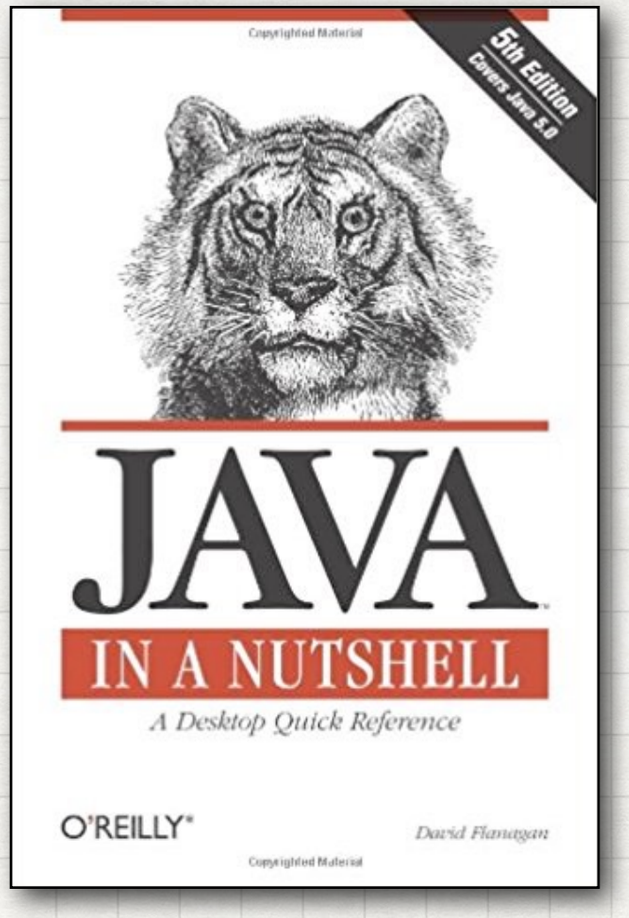
Intro to Javascript

<script> Containers



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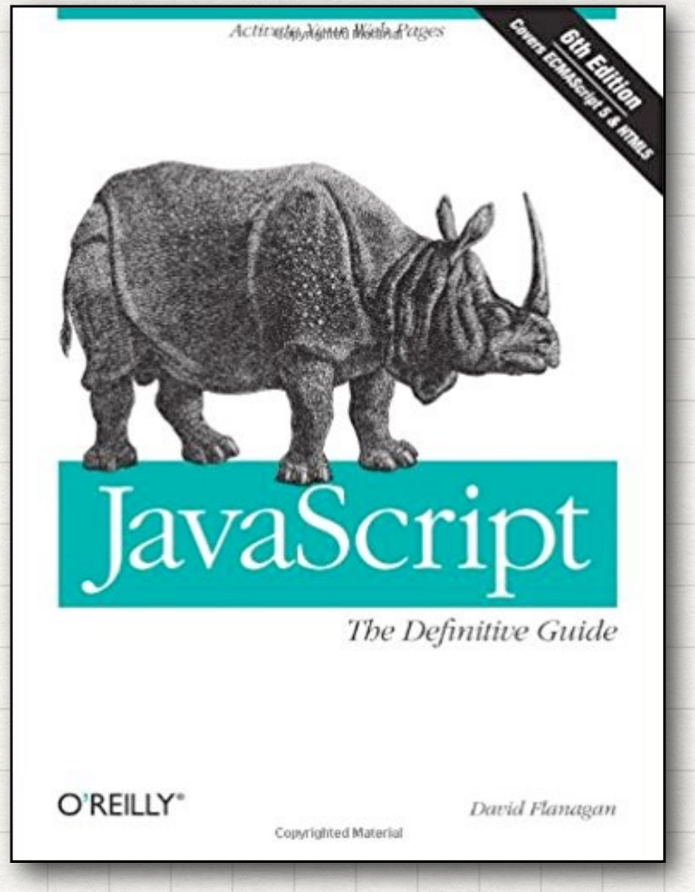


Developed by James Gosling at Sun Microsystems in 1991.

Inspired by a language called C++.

Strongly typed.

Designed to be the "one ring to rule them all."

Motto: "Write Once, Run Anywhere."

Developed by Brendan Eich at Netscape in 1995.

Originally called Mocha, then LiveScript. Inspired by a language called Scheme.

Weakly typed. Strong functional philosophy.

Official spec is called *ECMAscript* or *ES*. ECMAScript 2015 was a huge update. Browsers run versions of ES.

PROGRAMS AND SCRIPTS

The art of computer programming is figuring out how to perform a task in a step-by-step manner and then translating those steps into a language that the computer understands. Sometimes it's helpful to try out the process with pencil and paper.

If we cannot perform the action by ourselves with pencil and paper, we'll never get the computer to do it either. For example, to put a bunch of circles on our webpage, we might do the following:

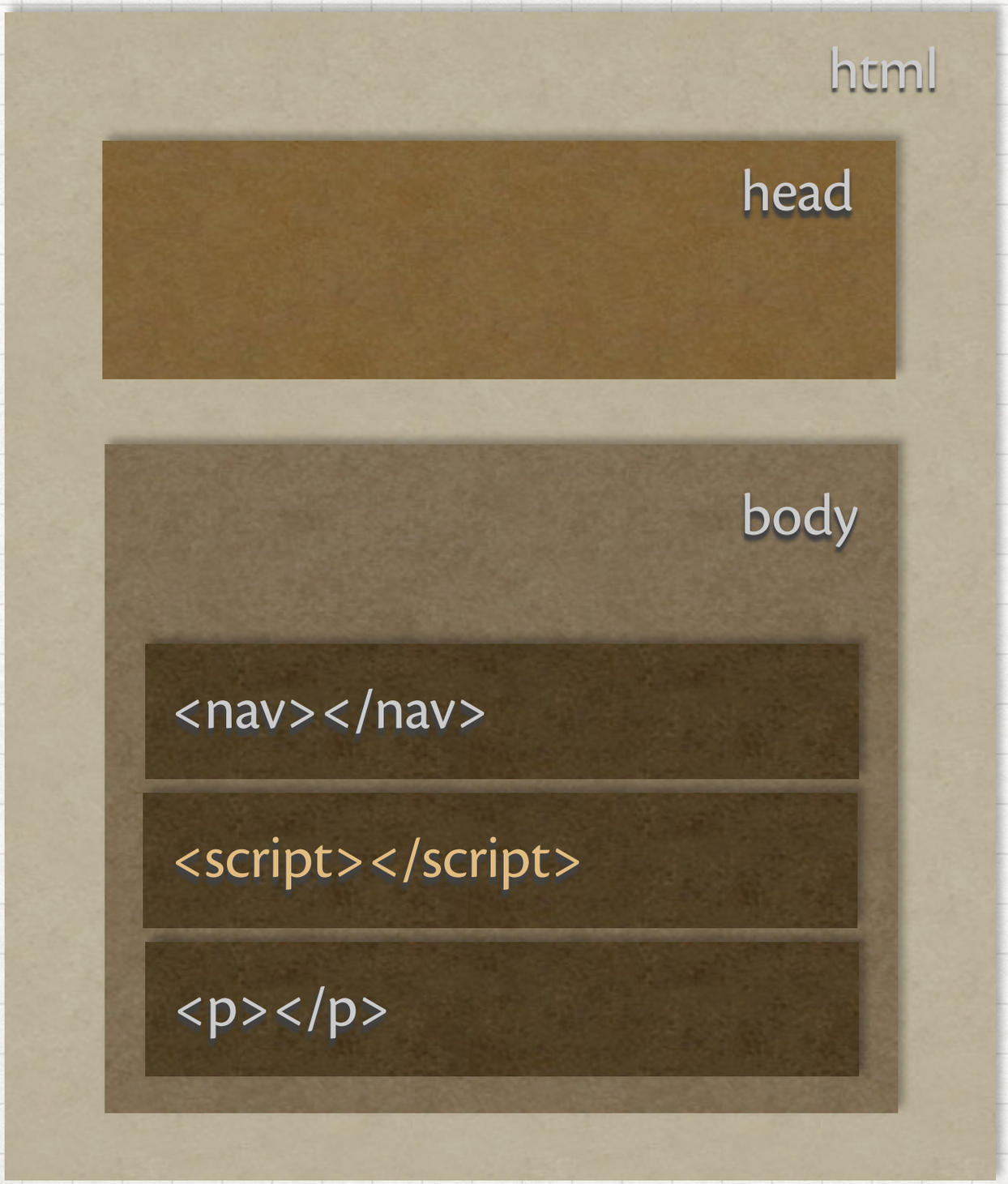
```
Create a new <svg> container
For every data value we have:
    * create a new circle element
    * figure out where to place it (cx and cy)
    * figure out radius
    * figure out fill and stroke colours
    * append it to the <svg> node
     * repeat until there are no more data values
```

WHERE DO SCRIPTS LIVE?

Javascript is the only programming language that web browsers can understand and process. We can execute Javascript in our browsers in any one of three ways:

1. Embedded into a webpage.
2. Imported from a separate file.
3. Directly in the “console window” of our browser.

1: EMBEDDED IN THE WEBPAGE



We can locate a `<script>` container anywhere inside an HTML document.

The output of the script—or the result of its actions—will be located at that particular place in the webpage.

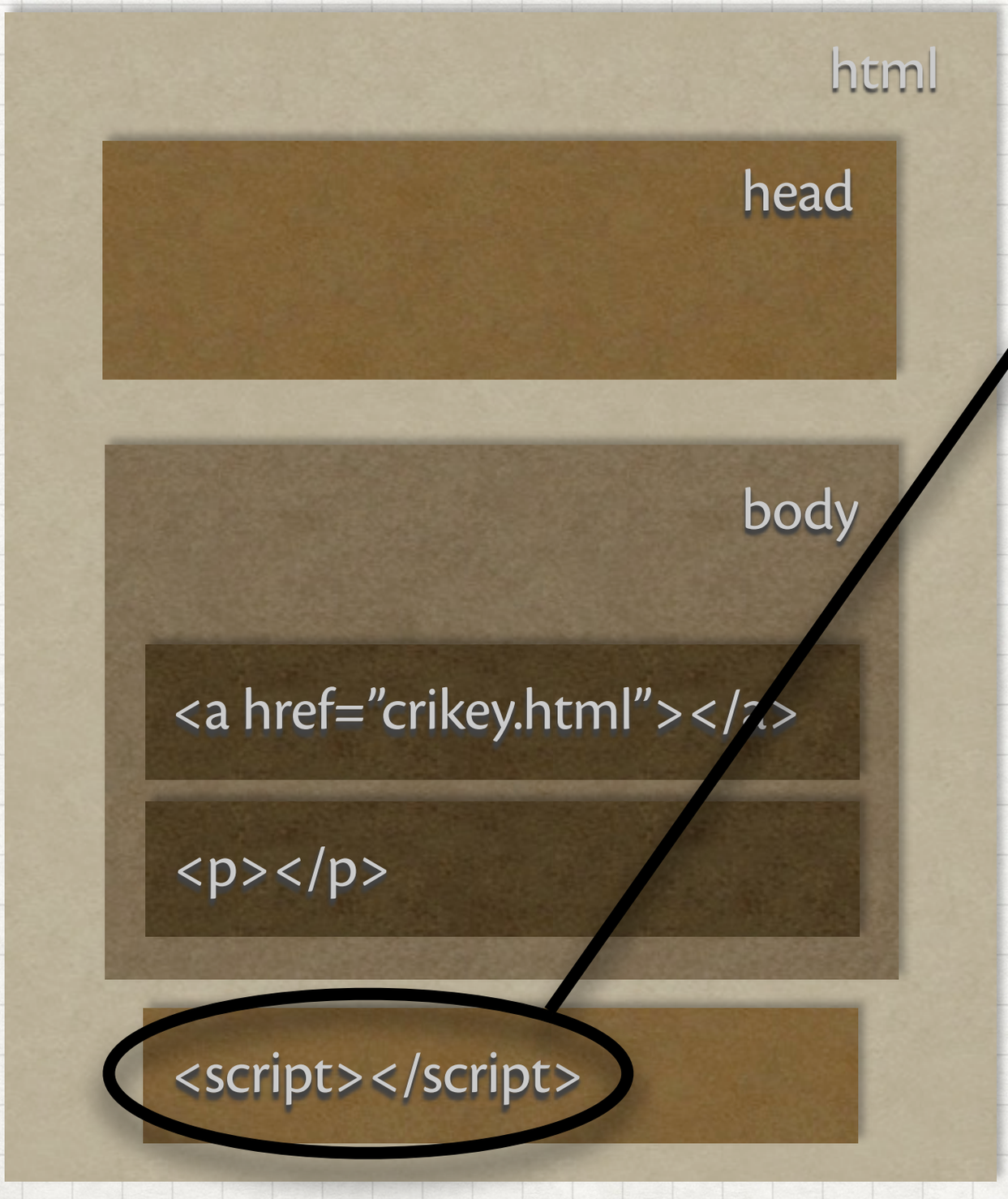
This is an easy way to start with Javascript.

SCRIPT TAGS

```
<!DOCTYPE html>
<html lang=en>
<head>
   <meta charset=utf-8>
   <title>Hello!</title>
</head>

<body>

<p>
   <script>
      document.write("Hello!");
   </script>
</p>

</body>
</html>
```

This script will display the word *Hello!* inside the paragraph tag.

2: IN A SEPARATE FILE



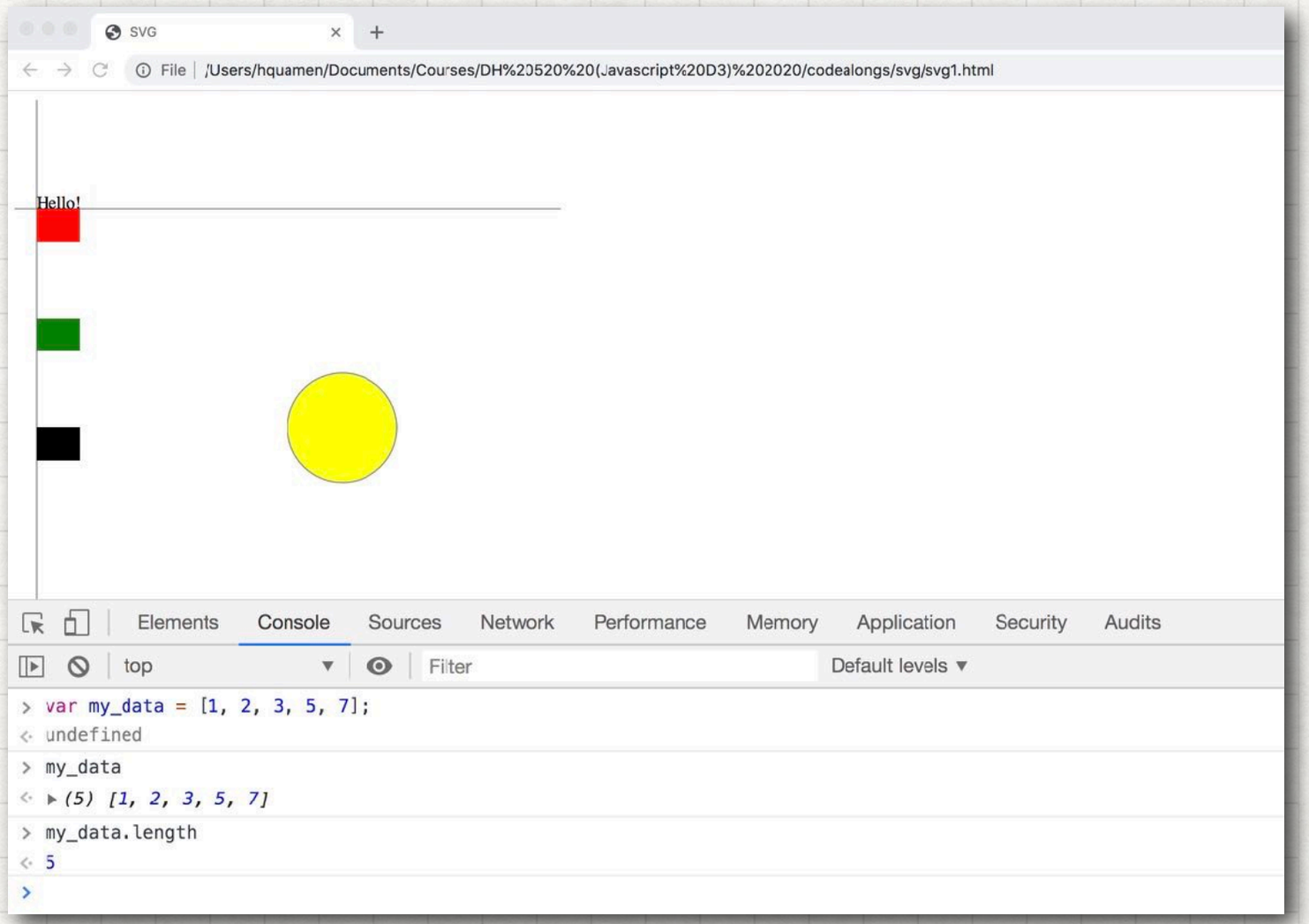

```
// library.js

var my_data = [1, 2, 3, 5, 7];
var colors = ['blue', 'yellow',
'red', 'orange', 'teal'];

d3.select('svg')
        .selectAll('circle')
        .data(my_data)
        .enter()
```

However, we'll usually put finished Javascript into an external document and then point our `<script>` container to it. The browser will download it. This tag is often located at the bottom of the page to make sure everything loads properly.

3: IN THE CONSOLE WINDOW

We can also execute Javascript from the ***console window*** of our browser. Every modern browser has a console window,* and we can use the window to learn about Javascript and to debug our bigger Javascript projects.

The console window is a crucial tool for web developers and you'll spend a lot of time working in it.



** In Macintosh Safari, the console is not visible unless you go into the app's permissions and click the box telling the app to display the "Developer Tools" in the menu.*

SCRIPT TAGS

```
<!DOCTYPE html>
<html lang=en>
<head>
   <meta charset=utf-8>
   <title>D3 Transition</title>
   <script src="https://d3js.org/d3.v5.min.js"></script>
</head>

<body>
<div><button>Move Circle</button></div>

<svg width=500 height=500>
</svg>

</body>
<script src="transition_library.js"></script>
</html>
```

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<body>
<div><button>Move Circle</button></div>

<svg width=500 height=500>
</svg>

</body>
<script src="transition_library.js"></script>
</html>
```

This tag uses an absolute address to tell the browser to download an external .js file from the D3 website.

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   <title>D3 Transition</title>
   <script src="https://d3js.org/d3.v5.min.js"></script>
</head>

<body>
<div><button>Move Circle</button></div>

<svg width=500 height=500>
</svg>

</body>
<script src="transition_library.js"></script>
</html>
```

This tag uses a relative address to tell the browser to load a local .js file that's located in the same folder as this file.

TWO WARNINGS

```
<script src="https://d3js.org/d3.v5.min.js"></script>
```

Even if the tag has no content, this must always be a paired tag: <script> and </script>. The markup won't validate if we write this as an empty tag.

<script> tags are often located at the bottom of the file, especially when the Javascript needs to act upon nodes in the tree that the browser needs to build. However, the page won't validate if the <script> tag occurs after </body>, although that's a common place to put it.

```
<script src="transition_library.js"></script>
</body>
</html>
```

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