

JavaScript and the Web

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slides courtesy of Eric Roberts

The History of the World Wide Web

- The ideas behind the web are much older than the web itself.
 - In the early 20th century, the Belgian bibliographer Paul Otlet envisioned a universal catalogue that would provide access to all the world's information in an interconnected structure.
 - In 1945, the director of the wartime science program Vannevar Bush published an article entitled "As We May Think," which envisioned an electronic archive of linked information.
 - In the early 1960s, computer visionary Ted Nelson coined the terms *hyperlink* and *hypermedia*.
- The modern web was developed in 1989 by Tim Berners-Lee at CERN, the European particle physics laboratory in Geneva, Switzerland. Berners-Lee developed the first version of the *Hypertext Markup Language (HTML)*.
- Use of the web grew quickly after the release of Mosaic browser in 1993 and Netscape Navigator in 1994.

The Document Object Model

- When the browser reads a web page, it first translates the text of the web page into an internal data structure that is easier to manipulate under the control of a JavaScript program. That internal form is called the *Document Object Model*, or *DOM*.
- The DOM is structured into a hierarchy of data objects called *elements*, which usually correspond to a paired set of tags.
- The relationship between the HTML file and the internal representation is similar to the one between the external data file and the internal data structure in any data-driven program. The browser acts as a driver that translates the HTML into an internal form and then displays the corresponding page.
- Unfortunately, the DOM is poorly designed, giving rise to a structure that is difficult to understand. The best strategy is to learn only those parts of the DOM you need.

Writing Text to a `<div>` Element

- The strategy we'll use in today's examples uses only two features of the DOM, both of which are reasonably simple:
 - *Naming an element in the HTML file.* It is often necessary to refer to a specific element in the web page from inside the JavaScript code. To do so, you need to include an `id` attribute in the HTML tag for that element that gives that element a name. JavaScript code can then find that element by calling `document.getElementById(id)`.
 - *Adding HTML content to an existing element.* The HTML code inside an element is available by selecting the `innerHTML` field of the element. The result is a JavaScript string that you can examine and modify.
- The code on the next slide writes the string `"hello, world"` into the `<div>` element whose `id` attribute is `"log"`.

An Improved Version of Hello World

```
<!DOCTYPE html>
<html>
  <head>
    <title>Hello World</title>
    <script type="text/javascript">
      function sayHello() {
        let div = document.getElementById("log");
        div.innerHTML = "hello, world";
      }
    </script>
  </head>
  <body onload="sayHello()">
    <div id="log">
      <!-- This is where the text eventually goes -->
    </div>
  </body>
</html>
```

Simulating a Countdown

```
<!DOCTYPE html>
<html>
  <head>
    <title>Hello World</title>
    <script type="text/javascript">
      function countdown(n) {
        for (let i = n; i >= 0; i--) {
          log(i);
        }
      }

      function log(str) {
        let div = document.getElementById("log");
        div.innerHTML += str + "<br/>";
      }
    </script>
  </head>
  <body onload="countdown(10)">
    <div id="log"></div>
  </body>
</html>
```

Exercise: Factorial Table

Factorial Table

$$0! = 1$$

$$1! = 1$$

$$2! = 2$$

$$3! = 6$$

$$4! = 24$$

$$5! = 120$$

$$6! = 720$$

$$7! = 5040$$

$$8! = 40320$$

$$9! = 362880$$

$$10! = 3628800$$

The End