

COMS W3101: SCRIPTING LANGUAGES: JAVASCRIPT (SPRING 2019)

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LECTURE-I

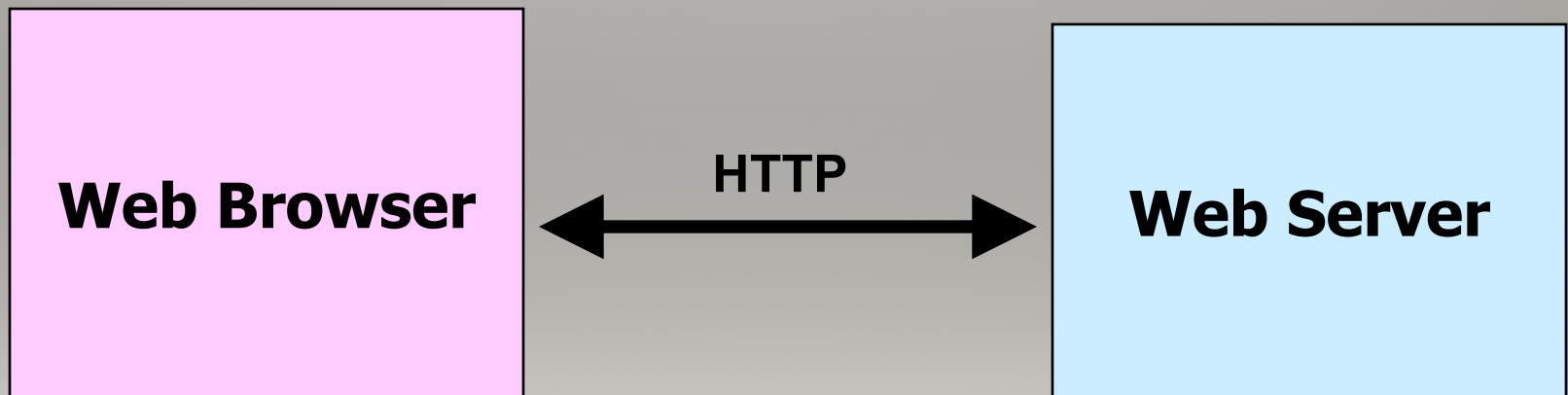
- Course overview
 - See <http://www.cs.columbia.edu/~ramana>
- Overview of HTML
 - Formatting, headings, images, colors, tables, forms, etc.
 - XHTML – difference with HTML
 - DHTML
 - What is it?
 - Why is it needed
- Javascript
 - Overview, what is it, why is it needed, etc.
 - How does it fit with HTML

PREREQUISITES

- A good background in at least one programming language is recommended.
- Ability to learn quickly.

OVERVIEW OF HTML

- HTTP: Communication protocol between
 - Any web server (e.g., www.cnn.com) and
 - Browser (e.g., firefox, IE, Opera, etc.)
- HTML – Hyper-Text Markup Language
 - Format in which web data is stored.



HTML ... CONTD.

- Format in which a web server stores the content.
- Transferred over to the client (using HTTP).
- Hypertext – stores data of many formats
- Simple text – with different fonts, sizes, colors, paragraphs, etc.
 - Audio, video, image files, etc.
 - Uses **markup tags**, e.g., `<h1>` Heading `</h1>`
 - ⇒ Can arrange data in tables, bullets, web links, forms, etc.
- HTML details

<http://www.w3schools.com/html/default.asp>

<http://www.w3.org/TR/html4/>

A TYPICAL HTML PAGE

```
<html>    <!-- Beginning of the HTML page -->
  <head>    <!--Typically has page title, useful for search engines -->
    <title>
      My Web page
    </title> <-- Page title -->
  </head>
  <body>    <-- Body of the web page, has main content-->
    Content
  </body>
</html>    <-- End of the HTML page -->
```

HTML TAGS

- Headings – `<h1>`, `<h2>`, `<h3>`
- Anchor – `<a>`
- Table – `<table>`
- Table row – `<tr>`
- Table cell – `<td>`
- No support for scripts – `<noscript>`
- Form – `<form>`
- Image – `<img>`
- Lists – `<li>`
- Ordered list – `<ol>`
- Unordered list -- `<ul>`
- No support for frames – `<noframes>`

- These tags are used to format a web page content
- A complete list of tags can be found at

<http://w3schools.com/tags/default.asp>

XHTML

- XHTML
 - EXtensible HyperText Markup Language
 - Combines HTML with strict syntax of XML
- Almost identical to HTML
- XHTML is a stricter and cleaner version of HTML.
- XHTML is HTML defined as an XML application.
- XHTML consists of
 - DOCTYPE declaration
 - head
 - body

XHTML RULES

- XHTML elements must be
 - Properly nested – e.g., `<head> <title>.... </title> </head>`
 - Always closed – e.g., `<body> .. </body>`
 - In lowercase
- XHTML documents must have one root element
- XHTML
 - Attribute names must be in lower case
 - E.g., `<table WIDTH="100%">` is wrong.
 - Attribute values must be quoted
 - e.g., `<table width="100%">`
 - Attribute minimization is forbidden
 - `<input checked="checked" />` **instead of** `<input checked>`

DHTML – DYNAMIC HTML

- Web requirements are very demanding.
 - Not just “static” requirements.
 - Check validity of input given on a web page.
 - Ability to manipulate data dynamically based on
 - User input
 - Already available data.
 - Provide animation
 - Highlight a text area with a different color.
 - Change behavior of images on mouse clicks, focus, etc.
- Solution: DHTML
 - Ability to change HTML content dynamically.

DHTML

- Components of HTML to support dynamic nature of content:
 - CSS – cascading style sheets
 - To present the data
 - HTML DOM
 - Ability to access and change different portions (e.g., head, body, input, etc.) of a web page.
 - Javascript
 - Run scripts for various purposes
 - Running scripts, creating cookies, animation, etc.
- This course is about Javascript.

ANOTHER HTML EXAMPLE

```
<html>
  <head>
    <title>DOM Tutorial
  </title>
</head>
<body>
  <h1>DOM Lesson one </h1>
  <p> Hello world! </p>
</body>
</html>
```

- `<html>` node is the root node
 - Has no parent node
- Parent node of the `<head>` and `<body>` nodes is the `<html>` node.
- Parent node of the "Hello world!" text node is the `<p>` node
- `<html>` node has two children nodes
 - `<head>` and `<body>`
- `<head>` node has one child node
 - `<title>` node
- `<title>` node has one child node
 - text node "DOM Tutorial"
- `<h1>` and `<p>` nodes are siblings
 - Both child nodes of `<body>`

HTML TREE STRUCTURE

- Follow the standard “tree” nomenclature
- Top node is called the root
- Every node, except the root, has exactly one parent node.
 - Root has none.
- A node can have any number of children
- Leaf is a node with no children
- Siblings are nodes with the same parent

ACCESSING HTML NODES

- `getElementById (<id>)`
- `getElementsByTagName(<tag>)`
- A combination of the above
 - Using the tree and parent/child relationship.

HTML PROPERTIES

- For any HTML element (node) `x`,
 - `x.innerHTML` - the inner “HTML” value of `x`
 - `x.innerText` – the inner “text” value of `x`
 - `x.nodeName` - the name of `x`
 - `x.nodeValue` - the value of `x`
 - `x.parentNode` - the parent node of `x`
 - `x.childNodes` - the child nodes of `x`
 - `x.attributes` - the attributes nodes of `x`

BACK TO THE EXAMPLE ...

- `document` - the current HTML document
- `getElementById("intro")` - the element with the id "intro"
- `childNodes[0]` - the first child of the element
- `nodeValue` - the value of the node (e.g., text)

HTML METHODS

- For any HTML element (node) *x*
 - *x.getElementById(id)*
 - get the element with a specified id
 - *x.getElementsByTagName(name)*
 - get all elements with a specified tag name. Tag = “**body**”, for example.
 - *x.appendChild(node)*
 - insert a child node to *x*
 - *x.removeChild(node)*
- Details can be found at
https://www.w3schools.com/js/js_htmlDOM_document.asp

HTML DOM – OBJECT MODEL

- Each node is an **object**.
 - Objects have methods
 - Can use methods to retrieve or change HTML content **dynamically**.
 - **We will cover HTML DOM again later.**
- ⇒ Basis for Dynamic HTML (**DHTML**)

HTML FORMS

- We covered some HTML tags earlier.
- HTML form
 - Another HTML tag
 - Useful to send information from browser to server
 - Can use other HTML tags
 - `<input>`
 - `<button>`
 - `<submit>`
 - `<select>` and `<option>`
 - `<textarea>`
- Javascript functions can be used to verify HTML forms' input

HTML FORM EXAMPLE

```
<input id="id1" type="number" min="100" max="300" required>  
<button onclick="myFunction()">OK</button>
```

```
<p id="demo"></p>
```

```
<script>  
function myFunction() {  
    var inpObj = document.getElementById("id1");  
    if (inpObj.checkValidity() == false) {  
        document.getElementById("demo").innerHTML =  
            inpObj.validationMessage;  
    }  
}  
</script>
```