COMS W3101: SCRIPTING LANGUAGES: JAVASCRIPT (FALL 2019)

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LECTURE-1

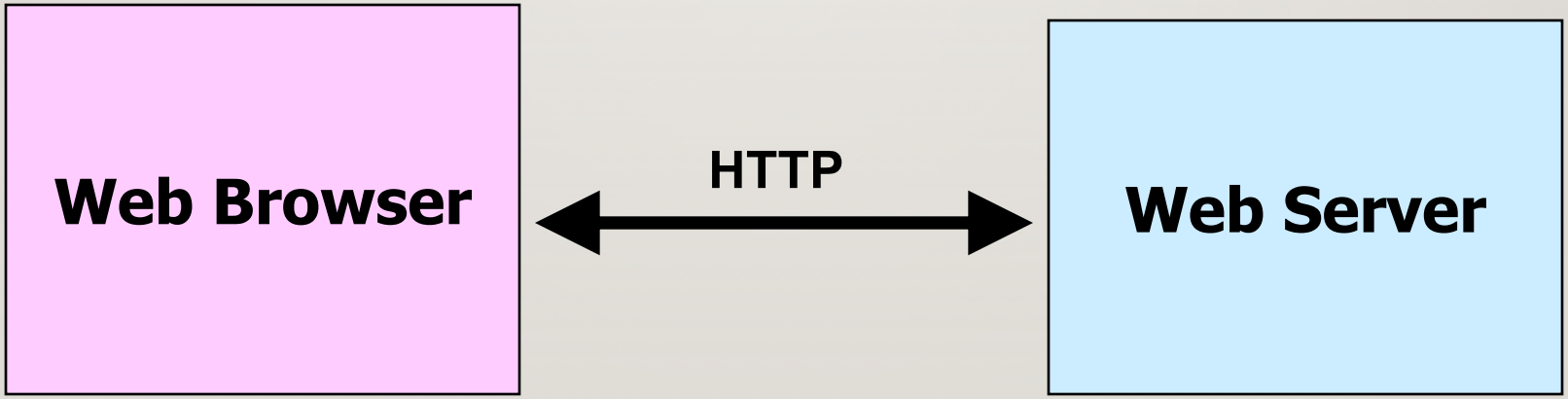
- Course overview
  - See http://www.cs.columbia.edu/~ramana
- Overview of HTML
  - Formatting, headings, images, colors, tables, forms, etc.
  - XHTML – difference with HTML
  - DHTML
    - What is it?
    - Why is it needed
- Javascript
  - Overview, what is it, why is it needed, etc.
  - How does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

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 child 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)

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.

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>
```