COMS W3101: Scripting Languages: Javascript (Fall 2010)
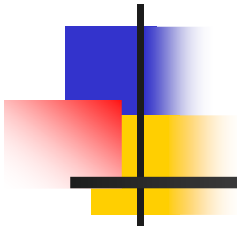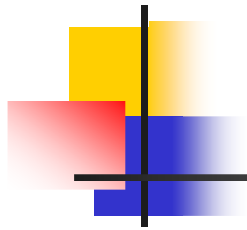
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Lecture-1

- ## 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.
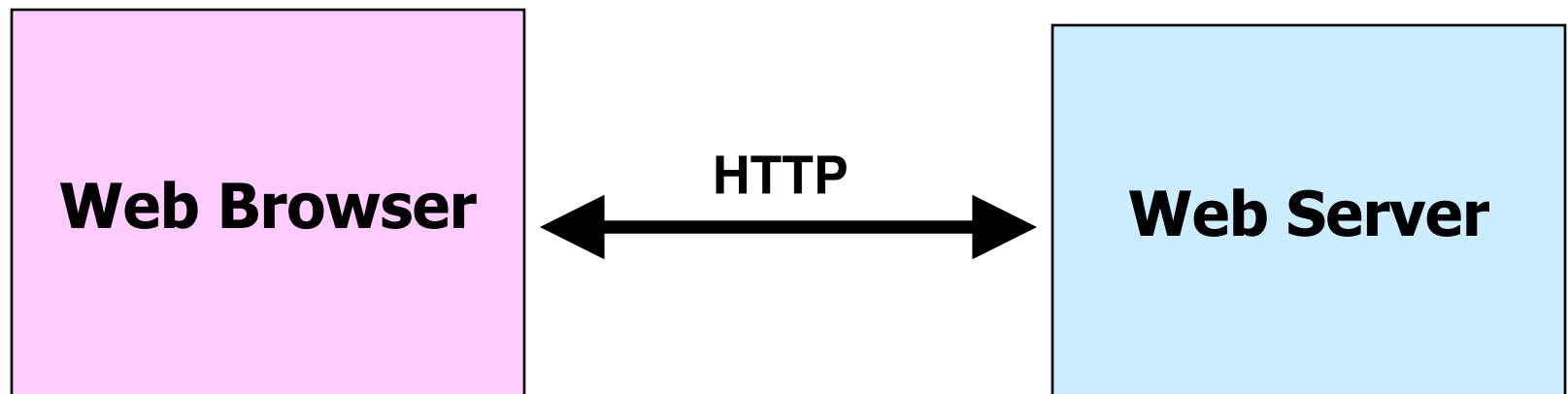 - How does it fit with HTML

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 – <u>H</u>yper-<u>T</u>ext <u>M</u>arkup <u>L</u>anguage
  - Format in which web data is stored.

| **Web Browser**	← HTTP →	**Web Server**

HTML ... contd.

- Format in which a web server stores the content.
- Transferred over to the client (using HTTP).
- Hypertext – stores data of many formatsSimple 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/
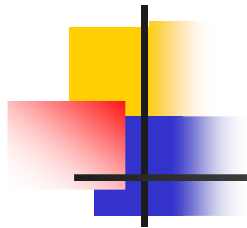
A typical HTML page

```
<html>        <!-- Beginning of the HTML page -->
    <head>        <!--Typically has page title, useful for search engines -->
        <title>

            Sample 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 – EXtensible HyperText Markup Language

- **XHTML**
  - EXtensible HyperText Markup Language
  - Combines HTML with strict syntax of XML
- Almost identical to HTML 4.01
- 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
  - values must be quoted
    - e.g., <table width="100%"
  - minimization is forbidden
    - <input checked="checked" /> instead of <input checked>

DHTML – Dynamic HTML

- Web requirements have become more demanding.
  - Not just "static" requirements, anymore
  - Check validity of input given on a web page.
  - Ability to manipulate data dynamically based on
    - User input
    - Already available data.
  - Provide (simple) 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 "Domain Object Model" (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.

Javascript – overview

- This course is concerned with client side JS
  - Executes on client (browser)
- Scripting – NOT compile/link.
- Helps provide dynamic nature of HTML pages.
- Included as part of HTML pages as
  - Regular code (viewable by user)
  - A file present in some location.
- NOTE: Javascript is NOT the same as JAVA

A simple Javascript program

```
<html>
  <head>
    <title> Simple Javascript program
    </title>
  </head>
  <body>
    <script type="text/javascript">
      document.write ("A Simple Javascript program");
    </script>
  </body>
</html>
```

Javascript code

- Javascript code in HTML

- Javascript code can be placed in
  - \<head> part of HTML file
    - Code is NOT executed unless called in \<body> part of the file.
  - \<body> part of HTML file – executed along with the rest of body part.
  - Outside HTML file, location is specified.
    - Executed when called in \<body>

Ways of defining Javascript code.

First:

```
<head>
    <script type="text/javascript">
    function foo(...) // defined here
    </script>
</head>


<body>
    <script type="text/javascript">
        foo(...)  // called here
    </script>
</body>
```

Second:

```
<head>
    ...
</head>
<body>
    <script type="text/javascript">
     function foo(...) // defined here
     {
         ..
     }
    foo( )        // Called here
    </script>
</body>
```

Ways of defining Javascript code, contd.

Third:

```
<head>
<script type="text/javascript"
    src="http://cnn.com/foo.js"> // Any general location
</script>
</head>
<body>
<script type="text/javascript"
    // Javascript code called here.
</script>
</body>
```

Javascript – types

- Not a strongly typed language
  - x = 5; x = "string" is perfectly acceptable.
- Case sensitive.
- A variable has a "var" prefix.
  - "var x = 5" is same as just, "x = 5".
- Re-declaration is possible
  - var x=5; var x; → x is still 5.

Javascript – operators

- **Arithmetic operators: Usual ones**
  - +, -, *, /, %, ++, --
- **Assignment operators**
  - =, +=, -=, *=, /=, % =
- **String operators:**
  - + (concatenation operator)
- **Comparison operators:**
  - ==, !=, ===, >, <, >=, <=
- **Logical operators**
  - &&, ||, !
- **Conditional operator**
  - variable = (condition) ? value1: value2

Javascript – control statements

if statement:

```
if (cond1)
    <code-1>
else if (cond2)
    <code-2>
…
else
    <code-3>
```

for statement:

```
for (i = 0;
        i < n;
        i++)
{
    // code
}
```

for statement:

```
var x;
var mycars =
    new Array();
mycars[0] = "Saab";
mycars[1] = "Volvo";
mycars[2] = "BMW";
for (x in mycars)
 { document.write
    (mycars[x] + "<br />"
);
```

Javascript – control statements … contd.

do statement
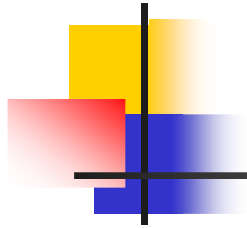
```
do
{
    statements
} while (cond)
```

while statement:

```
while (cond)
{
    statements
}
```

switch statement:

```
switch (n)
{
    case n1:
        <code>
        break;
        …
    default:
        <code>
}
```

Javascript – Popup boxes

- ## Alert box
  - alert ("alert text");
- ## Confirm box
  - confirm ("confirm some text");
- ## Prompt box
  - prompt ("prompt text", "default value")

Javascript functions

Syntax

```
function <functionName> (params)
    {
        // code
    }
```

Note: Parameters do NOT have variable type.

1. Recall: Function definition can be in
    1. <head> part of HTML file.
    2. <body> portion of HTML file
    3. An external file.
2. "return" value of the function is optional.

Functions – example1

```html
<html>
  <head>
    <title> Example of a simple function </title>
    <script type="text/javascript">
      function factorial (input)
        {
          product = 1;
          for (i=1; i <= input; i++)
            product *= i;
          document.write ("factorial of i " + product);
        }
    </script>
  </head>

  <body>
    <h1> Example of a simple function </h1>
      <script type="text/javascript">
        factorial (9);
      </script>
  </body>
</html>
```

Functions – example2

```html
<html>
  <head>
   <title>Browser Information example</title>
   <script type="text/javascript">
    function BrowserInfoFn()
    {
      var browser = navigator.appName;
      var version = navigator.appVersion;
      var ver = parseFloat (version);
      document.write ("Broswer: " + browser + " version: "  +
                              version + " ver: " + ver + "<br />");
    }
   </script>
  </head>

  <body>
   <h1>Browser Information example</h1>
   <script type="text/javascript">
    BrowserInfoFn();
   </script>
   <hr>
  </body>
</html>
```