

- Miscellaneous topics. Introduction to
 - XML
 - HTML DOM
 - AJAX

XML - EXtended Markup Language

- XML is a markup language, like HTML
- Designed to carry data
 - Not to display data
- XML tags are NOT predefined.
 - Unlike HTML
 - You must define your own tags
- Self-descriptive
- Represented in plain text.

A simple example

<note>
 <to>Tove</to>
 <from>Jani</from>
 <heading>Reminder</heading>
 <body>Let's meet tomorrow!</body>
</note>
Note:
1. User defined tags.

2. Self descriptive

Introduction to HTML DOM

- DOM Domain Object Model
- HTML DOM
 - Defines objects and properties of HTML elements.
 - A standard object model for HTML
 - A standard programming interface for HTML
 - Platform and language-independent

HTML DOM

- Everything in HTML is a node.
- Entire document a document node.
- Every HTML tag an element node.
- Text in the HTML elements text nodes.
- Every HTML attribute is an attribute node.
- Comments are comment nodes.

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HTML DOM - Object model

- Each node is an object.
- Objects have methods
- Can use methods to retrieve or change HTML content dynamically.
- ⇒Basis for Dynamic HTML (DHTML)

HTML DOM Node Tree



Source: W3 schools web page

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Tree structure ... contd.

- 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

HTML DOM tree - example

<html>

<head>

<title>DOM Tutorial

</title>

</head>

<body>

<h1>DOM Lesson one </h1>

Hello world!

</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 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 nodes are siblings
 - Both child nodes of <body>

HTML DOM properties

- For any HTML element (node) x,
 - x.innerHTML 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

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*)

Special properties

- x.firstChild
 - Returns the first child node
- x.lastChild
 - Returns the last child node
- document.documentElement
 - Returns the root node
- document.body
 - Gives access to the body tag.

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 (the text node)
- nodeValue the value of the node (the text itself)

HTML nodes

- DOM node properties
 - nodename read only
 - Element node same as the tag name
 - Text node text
 - Document node document
 - nodevalue can be changed
 - Elements undefined
 - Text nodes text itself
 - Attributes attribute value
 - nodetype read only
 - Element 1; Attribute 2; Text 3;
 - Comment -8; Document 9

Accessing Nodes

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

Putting it all together

- Nodes can be accessed.
- HTML content can be changed
 - Background color, image sources
 - Text, font, color of an element
- Add Javascript events to the mix
- Can create a very dynamic web content, animation, etc.
- Basis for today's web pages.

AJAX - <u>A</u>synchronous <u>J</u>ava <u>A</u>nd <u>X</u>ML

- Made popular by Google (with Google Suggest).
- NOT a new programming language
 - A new way to use existing standards.
- Based on JavaScript and HTTP requests.
- With AJAX, JavaScript communicates
 - Directly with the (web) server
 - using XMLHttpRequest object
 - To retrieve data as needed
 - Using Javascript events (e.g., keyPressed)
 - WITHOUT refreshing the page.

How does AJAX work



Source: SUN's JAVA web page

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AJAX ... contd.

- Note: Data is typically stored in XML format
- XMLHttpRequest
 - The basic data structure interfacing the client with server.
 - Sends a request to a server (e.g., Google suggest server) on any events
 - Like "onKeyup(..)" when the user types any character search key.
 - Receives data from the server
 - Updates the required fields with data received from server.

Requests and Responses

- XMLHTTPRequest
 - open(..) // open a request to ...
 - setRequestHeader(..) // Set the req hdr
 - send(..) // Send the request
 - status // response 200 OK, or other values
 - readState // Store the state information
 - onreadystatechange // callback function // for status change
 - responseText // response in Text
 - responseXML // response in XML

What Javascript CANNOT do

- Javascript cannot
 - Read or write files on client
 - (Other than cookies).
 - Close a window it did not open.
 - Access information (cookies or web content) of other web pages.
 - Access databases, without the use of AJAX and a server side script
 - Cannot write files to servers without the help of server side script.