

THE EXTENSIBLE MARKUP LANGUAGE (XML)

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WHAT IS XML?

- XML stands for EXtensible Markup Language
- XML is a markup language much like HTML
- XML was designed to carry data, not to display data
- XML tags are not predefined. You must define your own tags
- XML is a W₃C Recommendation

MAIN COMPONENTS OF AN XML DOCUMENT

- Elements: `<hello>`
- Attributes: `<item id="33905">`
- Entities: `<` (`<`)
- Advanced Components

THE BASIC RULES

- XML is case sensitive
- All start tags must have end tags
- Elements must be properly nested
- Every document must contain a root element
- Attribute values must have quotation marks

THE DIFFERENCE BETWEEN XML AND HTML

- XML is **not a replacement** for HTML.
- XML and HTML were designed with different goals:
 - XML was designed to transport and store data, with focus on what data is
 - HTML was designed to display data, with focus on how data looks
- HTML is about displaying information, while XML is about carrying information.

XML DOES NOT DO ANYTHING

- Maybe it is a little hard to understand, but XML does not DO anything.
- XML was created to structure, store, and transport information.

Look at the following example

```
<note>
```

```
<to>Alice</to>
```

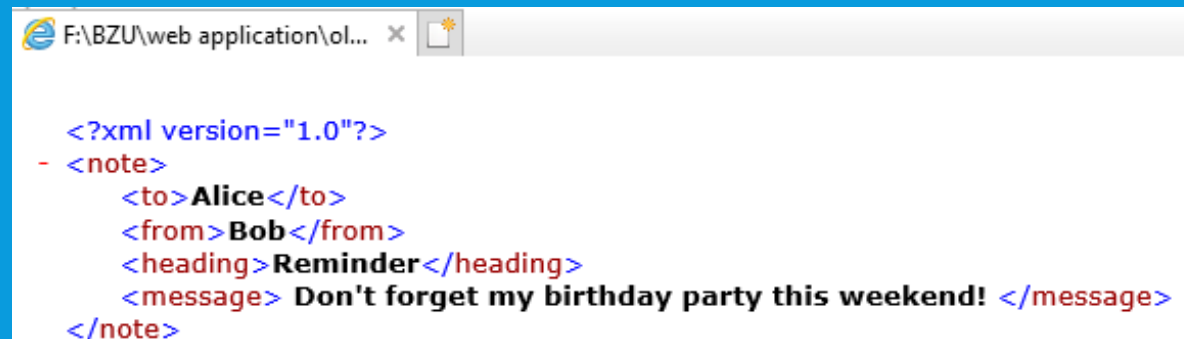
```
<from>Bob</from>
```

```
<heading>Reminder</heading>
```

```
<message> Don't forget my birthday party this
```

```
weekend! </message>
```

```
</note>
```



The screenshot shows a web browser window with the address bar containing "F:\BZU\web application\ol...". The main content area displays the following XML code:

```
<?xml version="1.0"?>
- <note>
  <to>Alice</to>
  <from>Bob</from>
  <heading>Reminder</heading>
  <message> Don't forget my birthday party this weekend! </message>
</note>
```

THE DIFFERENCE BETWEEN XML AND HTML

- How to write and store XML file?
- By using text file in .xml.

Student Identification

ID Number: 1

Name: Ali Ahmed

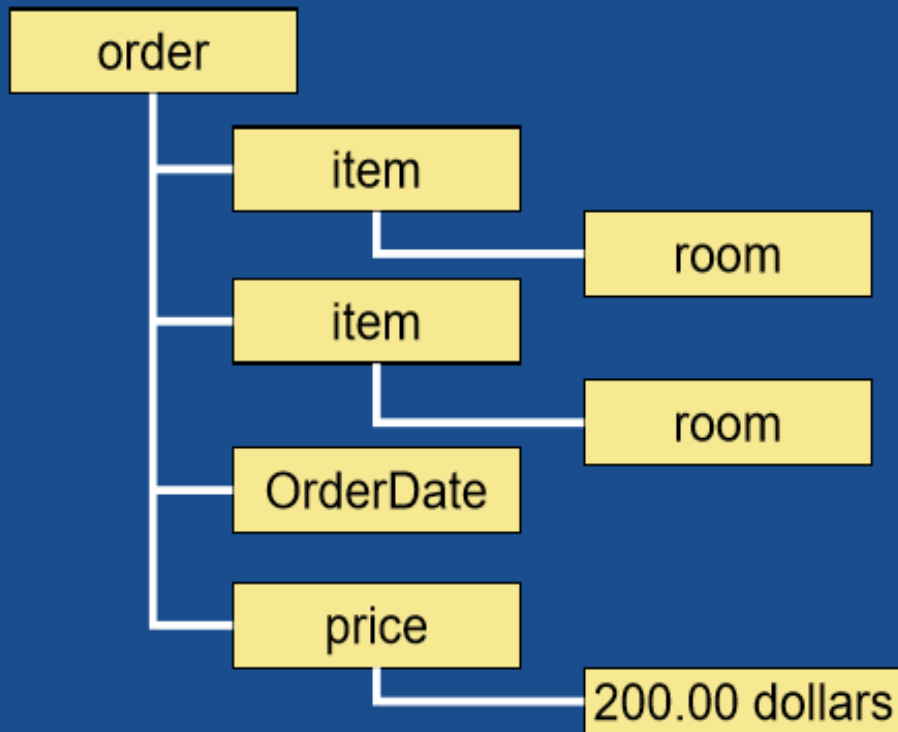
BOD: 9/9/1999

Issuing Date: 10/4/2011

XML file:

```
<studentID>  
  <IdNumber>1</IdNumber>  
  <Name> Ali Ahmed </Name>  
  <BOD> 9/9/1999</BOD>  
  <IssueDate> 10/4/2018</IssueDate>  
  
</studentID>
```


Look at the following example



```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<order OrderID="10643">
  <item>
    <room id="Room10"/>
  </item>
  <item>
    <room id="Room11"/>
  </item>
  <OrderDate
    ts="2005-10-17T00:00:00"/>
  <price>200.00 dollars</price>
</order>
```

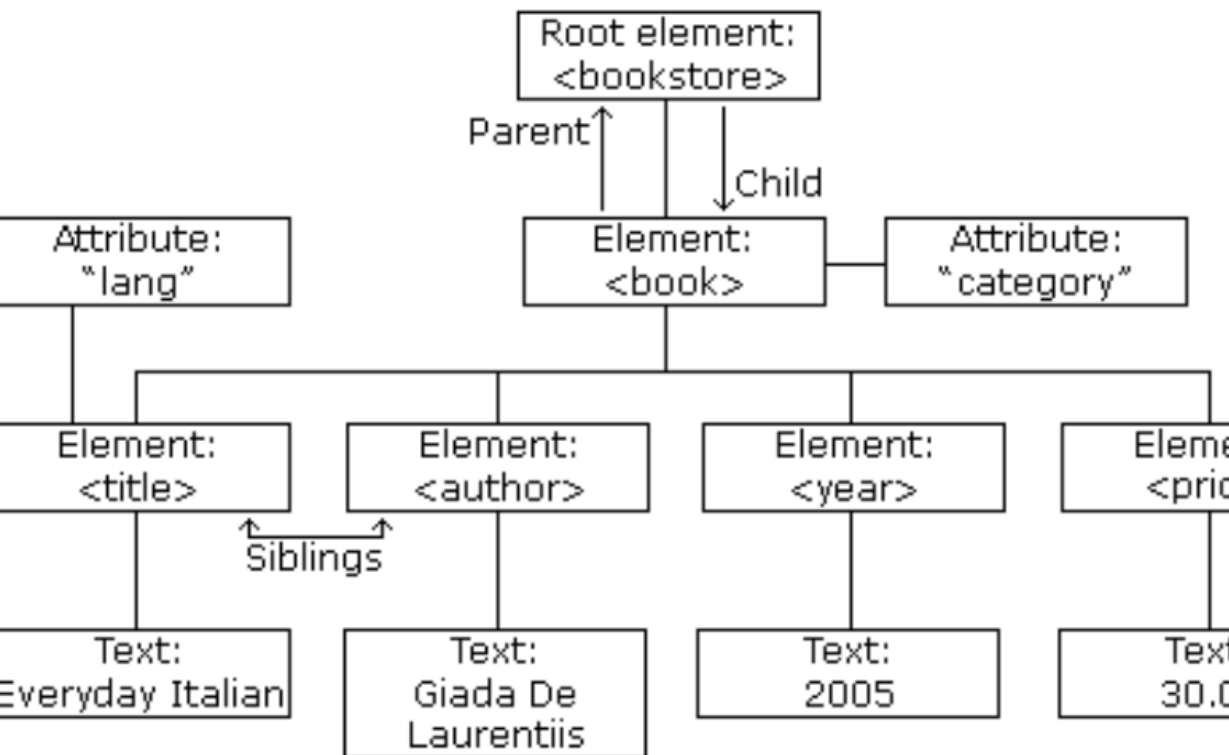
Look at the following example

```
order - Notepad
File Edit Format View Help
<?xml version="1.0" encoding="ISO-8859-1" ?>
<order OrderID="10643">
  <item>
    <room id="Room10"/>
  </item>
  <item>
    <room id="Room11"/>
  </item>
  <OrderDate
    ts="2005-10-17T00:00:00"/>
  <price>200.00 dollars</price>
</order>
```

```
C:\Documents and Settings\bebo\Desktop\order.xml
File Edit View Favorites Tools Help
Back - Forward - Stop Refresh Home Search Favorites
Address C:\Documents and Settings\bebo\Desktop\order.xml

<?xml version="1.0" encoding="ISO-8859-1" ?>
- <order OrderID="10643">
- <item>
  <room id="Room10" />
</item>
- <item>
  <room id="Room11" />
</item>
  <OrderDate ts="2005-10-17T00:00:00" />
  <price>200.00 dollars</price>
</order>
```

XML TREE STRUCTURE



```
<?xml version="1.0" encoding="UTF-8"?>
<bookstore>
  <book category="cooking">
    <title lang="en">Everyday Italian</title>
    <author>Giada De Laurentiis</author>
    <year>2005</year>
    <price>30.00</price>
  </book>
  <book category="children">
    <title lang="en">Harry Potter</title>
    <author>J K. Rowling</author>
    <year>2005</year>
    <price>29.99</price>
  </book>
  <book category="web">
    <title lang="en">Learning XML</title>
    <author>Erik T. Ray</author>
    <year>2003</year>
    <price>39.95</price>
  </book>
</bookstore>
```

COMMON ERRORS FOR ELEMENT NAMING

- Do not use white space when creating names for elements
- Element names cannot begin with a digit, although names can contain digits
- Only certain punctuation allowed – periods, colons, and hyphens

W₃C DOM WITH JAVASCRIPT

- Example 1: Loading the XML document: DOMDocument
 - The programmer can use a Microsoft Active X object to parse an XML file

```
//Instantiate DOMDocument object  
  
var XMLfile = new ActiveXObject("Msxml2.DOMDocument");  
XMLfile.load("newspaper.xml");  
  
var rootElement = XMLfile.documentElement;  
  
document.write("The root node of the XML file is: ");  
document.writeln("<b>" + rootElement.nodeName + "</b>");
```

W₃C DOM WITH JAVASCRIPT

- Example 2: Accessing the Children Elements
 - The *childNodes* member of any element node gives the programmer access to all of the sibling nodes of that element

```
//traverse through each child of the root element
```

```
//and print out its name
```

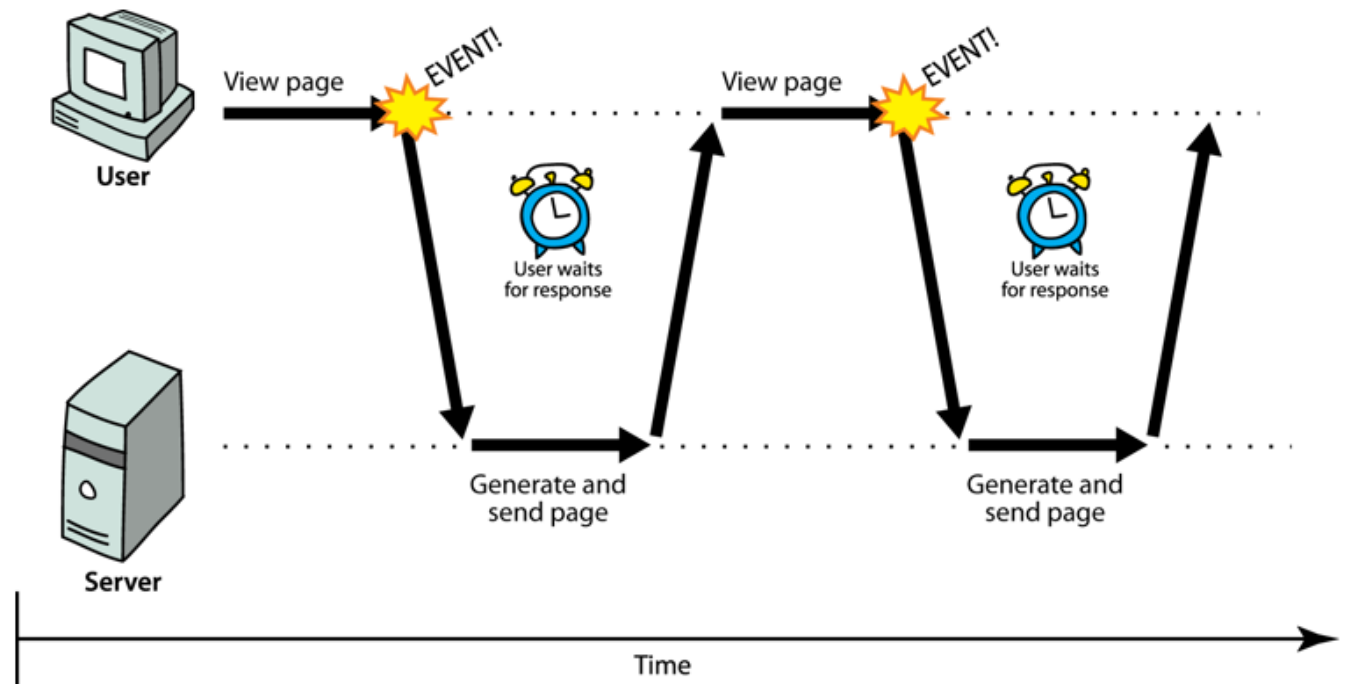
```
for (i=0; i<rootElement.childNodes.length; i++) {  
    var node = rootElement.childNodes.item(i);  
    document.write("The name of the node is ");  
    document.write("<b>" + node.nodeName + "</b>");  
}
```

AJAX

Asyncronous JavaScript and XML

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SYNCHRONOUS WEB COMMUNICATION



- **synchronous:** user must wait while new pages load

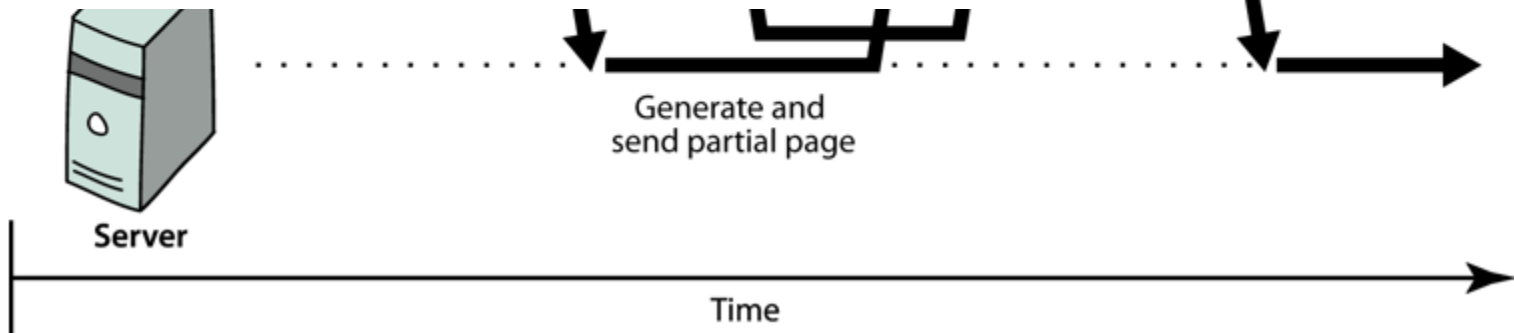
AJAX: ASYNCHRONOUS JAVASCRIPT AND XML

- **Ajax:** Asynchronous JavaScript and XML
- not a programming language; a particular way of using JavaScript
- allows dynamically updating a page without making the user wait
- avoids the "click-wait-refresh" pattern

ASYNCHRONOUS WEB COMMUNICATION



With AJAX, don't not have to wait for the server response but can instead execute other scripts while waiting for server response and deal with the response when the response ready



SIMPLE EXAMPLE

```
<!DOCTYPE html>
<html>
<body>

<div id="demo">
<h1>The XMLHttpRequest Object</h1>
<button type="button" onclick="loadDoc()">Change Content</button>
</div>

<script>
function loadDoc() {
  var xhttp = new XMLHttpRequest();
  xhttp.onreadystatechange = function() {
    if (this.readyState == 4 && this.status == 200) {
      document.getElementById("demo").innerHTML =
        this.responseText;
    }
  };
  xhttp.open("GET", "ajax_info.txt", true);
  xhttp.send();
}
</script>

</body>
</html>
```

The XMLHttpRequest Object

Change Content

AJAX

AJAX is not a programming language.

AJAX is a technique for accessing web servers from a web page.

AJAX stands for Asynchronous JavaScript And XML.

SIMPLE EXAMPLE (EXPLAINED)

1. Need a JavaScript **function to get an 'XMLHttpRequest' object.**
2. Once we have an XMLHttpRequest, we need to write a **function that waits for it to get a response.**
3. There are **five possible states** that the request can be in:
 - 0 = uninitialized
 - 1 = loading
 - 2 = loaded
 - 3 = interactive
 - 4 = **complete**
 - A method name is associated with these state changes
 - `xhrrequest.onreadystatechange = processResponse;`
4. We need to know that the request was successful (http code 200 – 'OK')
5. Once everything is set up, we can **send requests to URLs** and be ready to get a response, This one sends a 'GET' request (asynchronous).