



Contents

Introduction to XML

What is XML?

I have several friends:

- **Jamil, Badam, Reyaz are my Friends.**
- **Fahim is my best friend**

```
<FriendsList>
  <Friend>
    <Name> Jamil </Name>
  </Friend>
  <Friend>
    <Name> Badam </Name>
  </Friend>
  <Friend>
    <Name> Reyaz </Name>
  </Friend>
  <BestFriend>
    <Name> Fahim </Name>
  </BestFriend>
</FriendsList>
```

Note: This is a more Formatted and the more structure way to communication, is called XML

XML Concepts

- XML stand for eXtensible Markup Language
- eXtensible: tags `< >` are not limited and not predefined, it can be **extended**. So tags `< >` are extensible, that's why its called eXtensible.
- Markup: it's used **tags** `< >`

Cont.....

- XML can be used for data Exchange and Communication between 2 Applications.
- XML is used to store and transport data.
- **Demo** (Notepad, Save {.XML}, xml formatter, Copt-Past, Tree structure).

 FreeFormatter.com
<https://www.freeformatter.com/xml-formatter> :
Free Online XML Formatter
This free **online XML formatter** and lets you chose export to file.



XML Syntax Rules

- The syntax rules of XML are very simple and logical.
- The rules are easy to learn, and easy to use.

1- Root Elements: XML documents must contain one **root** element that is the **parent** of all other elements:

```
<root>
  <child>
    <subchild>.....</subchild>
  </child>
</root>
```

Cont.....

- In this example **<note>** is the root element:

```
<?xml version="1.0" encoding="UTF-8"?>
```

```
<note>
```

```
  <to>Tove</to>
```

```
  <from>Jani</from>
```

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

```
  <body>Don't forget me this weekend!</body>
```

```
</note>
```

Cont.....

2- XML prolog: is optional. If it exists, it must come first in the document.

```
<?xml version="1.0" encoding="UTF-8"?>
```

- To avoid errors, you should specify the encoding, or save your XML files as UTF-8.
- UTF-8 is the default character encoding for XML documents.

Cont.....

3- Closing Tags: in XML, it is illegal to forget the closing tag.

All elements **must** have a closing tag:

<p> This is a paragraph **</p>**

- XML tags are case sensitive. The tag <Letter> is different from the tag <letter>.
- Opening and closing tags must be written with the same case: **<message>** This is correct **</message>**

Cont.....

Note: The XML prolog does not have a closing tag!

- This is not an error.
- The prolog is not a part of the XML document.

Cont.....

4- XML Elements Must be Properly Nested:

- In XML, all elements **must** be properly nested within each other:
- **<i>** This text is bold and italic **</i>**
- In XML, the attribute values must always be quoted:

<note date="1/1/2024">

<to>Khan</to>

<from>Ahmad</from>

</note>

Cont.....

5- Comments in XML:

The syntax for writing comments in XML is similar to that of HTML:

<!-- This is a comment -->

- Two dashes in the middle of a comment are not allowed:

<!-- This is an invalid -- comment -->

Whitespaces

- XML does not truncate multiple white-spaces.
- HTML truncates multiple white-spaces to one single white-space

XML:	Hello Ahmad
HTML:	Hello Ahmad

Note: An XML document that follow all these Rules and Syntax will be a “**Well Formed**” XML

XML Tree

- XML documents are formed as **Tree Element**.
- An XML tree starts with a **Root Element** and branches from the root to **Child Elements**.
- All elements can have sub elements (child elements):

```
<root>  
  <child>  
    <subchild>.....</subchild>  
  </child>  
</root>
```

XML Elements vs. Attributes

`<person gender="female">`

`<firstname>Anna</firstname>`

`<lastname>Smith</lastname>`

`</person>`

In this example, gender is an **Attribute**.

`<person>`

`<gender>female</gender>`

`<firstname>Anna</firstname>`

`<lastname>Smith</lastname>`

`</person>`

In this example, gender is an **Element**.

Advantages of using XML

- Easy to understand and read.
- Supported by a large number of platforms.
- Can be transmitted efficiently.
- XML documents can be modularized, Parts can be reused.

Differences Between HTML and XML

- XML was designed to carry data - with focus on
What data is?
- HTML was designed to display data - with focus on
How data looks?
- XML tags are not predefined like HTML tags are

Naming Styles

- Some commonly used Naming Styles of XML are:

Style	Example	Description
Lower case	<firstname>	All letters lower case
Upper case	<FIRSTNAME>	All letters upper case
Underscore	<first_name>	Underscore separates words
Pascal case	<FirstName>	Uppercase first letter in each word
Camel case	<firstName>	Uppercase first letter in each word except the first

Entity References

- Some characters have a special meaning in XML.
- There are 5 pre-defined entity references in XML:

<code>&lt;</code>	<code><</code>	less than
<code>&gt;</code>	<code>></code>	greater than
<code>&amp;</code>	<code>&</code>	ampersand
<code>&apos;</code>	<code>'</code>	apostrophe
<code>&quot;</code>	<code>"</code>	quotation mark

`<message>salary < 1000</message>` incorrect

`<message>salary < 1000</message>` corrected

DOM (Document Object Model)

- Document is a **File**, Object is **Tag/Element**, and Model is a **Structure**.
- The **XML DOM** defines a standard way for accessing and manipulating XML documents.
- It presents an XML document as a tree-structure.
- The DOM allows you to read, manipulate, and modify an XML document.
- **DOM Viewer (Ref)**



hixie.ch

<https://software.hixie.ch/utilities/live-dom-viewer>

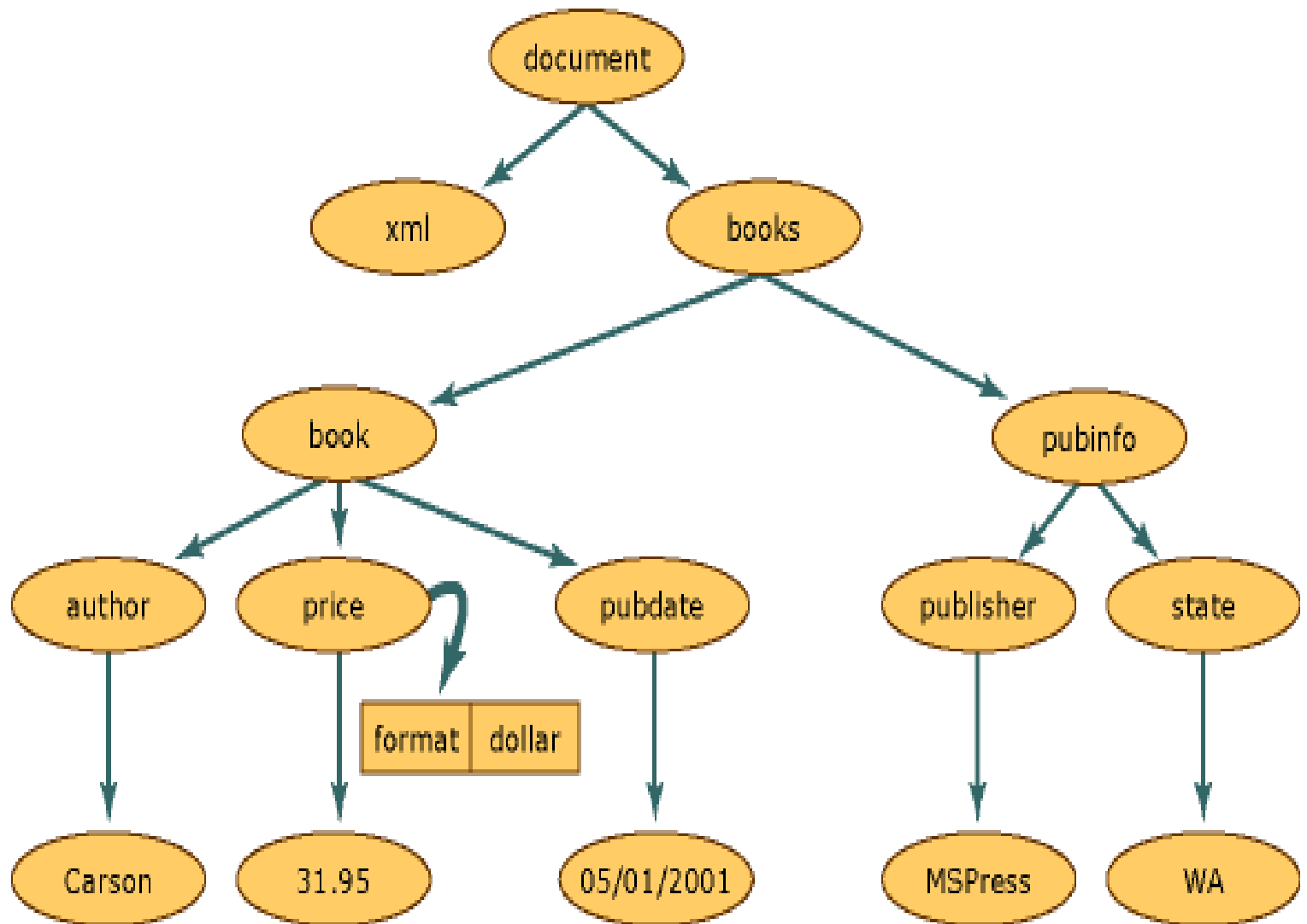
Live DOM Viewer

This script puts a function `w(s)` into the global scope (object to output to the log).

Cont.....

```
<?xml version="1.0"?>
  <books>
    <book>
      <author>Carson</author>
      <price format="dollar">31.95</price>
      <pubdate>05/01/2001</pubdate>
    </book>
    <pubinfo>
      <publisher>MSPress</publisher>
      <state>WA</state>
    </pubinfo>
  </books>
```

Cont.....



XPath

- XPath is a query language for navigating in XML documents.
- XPath is used to find nodes in XML document.
- XPath starts with a single forward slash /
- **XPath Online Tools**



easycodetools.com

<https://easycodetools.com/generate-xpath>

XPath Generator Online

This utility has been built up to generate all XPath's of a XML document. Just need to provide the XML content, it will generate the XPath list of all the ...

```
<?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>
```

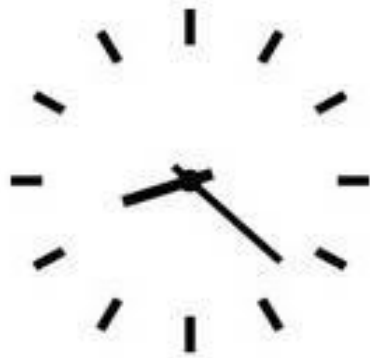
```
  <book category="web">
    <title lang="en">XQuery Kick Start</title>
    <author>James McGovern</author>
    <author>Per Bothner</author>
    <author>Kurt Cagle</author>
    <author>James Linn</author>
    <author>Vaidyanathan Nagarajan</author>
    <year>2003</year>
    <price>49.99</price>
  </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>
```


In the table below we have listed some XPath expressions and the result of the expressions:

XPath Expression	Result
/bookstore/book[1]	Selects the first book element that is the child of the bookstore element
/bookstore/book[last()]	Selects the last book element that is the child of the bookstore element
/bookstore/book[last()-1]	Selects the last but one book element that is the child of the bookstore element
/bookstore/book[position()<3]	Selects the first two book elements that are children of the bookstore element
//title[@lang]	Selects all the title elements that have an attribute named lang
//title[@lang='en']	Selects all the title elements that have a "lang" attribute with a value of "en"
/bookstore/book[price>35.00]	Selects all the book elements of the bookstore element that have a price element with a value greater than 35.00
/bookstore/book[price>35.00]/title	Selects all the title elements of the book elements of the bookstore element that have a price element with a value greater than 35.00



Q & A time



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