



Σημασιολογικός και Κοινωνικός Ιστός

Διάλεξη 04: Αναζήτηση και χρήση XML εγγράφων

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XML – Αναζήτηση με XPath

- XPath stands for XML Path Language
 - XPath uses "path like" syntax to identify and navigate nodes in an XML document
 - XPath contains over 200 built-in functions
 - XPath is a major element in the XSLT standard
 - XPath is a W3C recommendation
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- Υποστηρίζεται από διάφορες γλώσσες προγραμματισμού, π.χ. Javascript

XML - Αναζήτηση

▶ XPath

▶ Παράδειγμα

▶ https://www.w3schools.com/xml/xml_xpath.asp

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

```
<?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">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>
```

XML - Αναζήτηση

- ▶ ΧΡΑΤΗ
- ▶ Παράδειγμα
- ▶ https://www.w3schools.com/xml/xml_xpath.asp



```
<?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">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>
```

XPath

- ▶ Nodes
- ▶ In XPath, there are seven kinds of nodes:
 - element,
 - attribute,
 - text,
 - namespace,
 - processing-instruction,
 - comment, and
 - root nodes.
- ▶ XML documents are treated as trees of nodes. The topmost element of the tree is called the root element.

```
<?xml version="1.0" encoding="UTF-8"?>
<bookstore>
  <book>
    <title lang="en">Harry Potter</title>
    <author>J K. Rowling</author>
    <year>2005</year>
    <price>29.99</price>
  </book>
</bookstore>
```

```
<bookstore> (root element node)
<author>J K. Rowling</author> (element node)
lang="en" (attribute node)
```

Atomic
values:

J K. Rowling
"en"

XPath

- ▶ Σχέσεις μεταξύ κόμβων:
- ▶ Γονέας
- ▶ Παιδί
- ▶ Αδερφός
- ▶ Πρόγονος
- ▶ Απόγονος

```
<?xml version="1.0" encoding="UTF-8"?>
<bookstore>
  <book>
    <title lang="en">Harry Potter</title>
    <author>J K. Rowling</author>
    <year>2005</year>
    <price>29.99</price>
  </book>
</bookstore>
```

Expression	Description
<i>nodename</i>	Selects all nodes with the name " <i>nodename</i> "
/	Selects from the root node
//	Selects nodes in the document from the current node that match the selection no matter where they are
.	Selects the current node
..	Selects the parent of the current node
@	Selects attributes

Παραδείγματα

Path Expression	Result
<code>/bookstore/book[1]</code>	Selects the first book element that is the child of the bookstore element. Note: In IE 5,6,7,8,9 first node is[0], but according to W3C, it is [1]. To solve this problem in IE, set the SelectionLanguage to XPath: <i>In JavaScript: <code>xml.setProperty("SelectionLanguage","XPath");</code></i>
<code>/bookstore/book[last()]</code>	Selects the last book element that is the child of the bookstore element
<code>/bookstore/book[last()-1]</code>	Selects the last but one book element that is the child of the bookstore element
<code>/bookstore/book[position()<3]</code>	Selects the first two book elements that are children of the bookstore element
<code>//title[@lang]</code>	Selects all the title elements that have an attribute named lang
<code>//title[@lang='en']</code>	Selects all the title elements that have a "lang" attribute with a value of "en"
<code>/bookstore/book[price>35.00]</code>	Selects all the book elements of the bookstore element that have a price element with a value greater than 35.00
<code>/bookstore/book[price>35.00]/title</code>	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

Xpath – Άγνωστοι κόμβοι

▶ Άγνωστοι κόμβοι

Wildcard	Description
*	Matches any element node
@*	Matches any attribute node
node()	Matches any node of any kind

Path Expression	Result
/bookstore/*	Selects all the child element nodes of the bookstore element
//*	Selects all elements in the document
//title[@*]	Selects all title elements which have at least one attribute of any kind

Πολλαπλά μονοπάτια: or “|”

```
//book/title | //book/price
```


Xpath - Axis

- ▶ Axis “::”
- ▶ Σχέσεις μεταξύ κόμβων
- ▶ `axisname::nodetest[predicate]`

Example	Result
<code>child::book</code>	Selects all book nodes that are children of the current node
<code>attribute::lang</code>	Selects the lang attribute of the current node
<code>child::*</code>	Selects all element children of the current node
<code>attribute::*</code>	Selects all attributes of the current node
<code>child::text()</code>	Selects all text node children of the current node
<code>child::node()</code>	Selects all children of the current node
<code>descendant::book</code>	Selects all book descendants of the current node
<code>ancestor::book</code>	Selects all book ancestors of the current node
<code>ancestor-or-self::book</code>	Selects all book ancestors of the current node - and the current as well if it is a book node
<code>child::* / child::price</code>	Selects all price grandchildren of the current node

Xpath - operators

Operator	Description	Example
	Computes two node-sets	//book //cd
+	Addition	6 + 4
-	Subtraction	6 - 4
*	Multiplication	6 * 4
div	Division	8 div 4
=	Equal	price=9.80
!=	Not equal	price!=9.80
<	Less than	price<9.80
<=	Less than or equal to	price<=9.80
>	Greater than	price>9.80
>=	Greater than or equal to	price>=9.80
or	or	price=9.80 or price=9.70
and	and	price>9.00 and price<9.90
mod	Modulus (division remainder)	5 mod 2

XSLT

- ▶ XSL (eXtensible Stylesheet Language) is a styling language for XML.
- ▶ XSLT stands for XSL Transformations.
- ▶ XSLT is used to transform XML documents into other formats (like transforming XML into HTML).

XSLT

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="cdcatalog.xsl"?>
<catalog>
  <cd>
    <title>Empire Burlesque</title>
    <artist>Bob Dylan</artist>
    <country>USA</country>
    <company>Columbia</company>
    <price>10.90</price>
    <year>1985</year>
  </cd>
  .
  .
</catalog>
```

File cdcatalog.xsl:

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

<xsl:stylesheet version="1.0"
xmlns:xsl="http://www.w3.org/1999/XSL/Transform">

<xsl:template match="/">
  <html>
  <body>
  <h2>My CD Collection</h2>
  <table border="1">
    <tr bgcolor="#9acd32">
      <th>Title</th>
      <th>Artist</th>
    </tr>
    <xsl:for-each select="catalog/cd">
      <tr>
        <td><xsl:value-of select="title"/></td>
        <td><xsl:value-of select="artist"/></td>
      </tr>
    </xsl:for-each>
  </table>
  </body>
  </html>
</xsl:template>

</xsl:stylesheet>
```

XSLT

- ▶ Xsl:template
- ▶ xsl:value-of
- ▶ xsl:for-each

- ▶ Συνηθήκη Xsl:if ή xsl:choose

- ▶ `<xsl:if test="expression">`
 ...some output if the expression is true...
`</xsl:if>`

```
<xsl:choose>
  <xsl:when test="expression">
    ... some output ...
  </xsl:when>
  <xsl:otherwise>
    ... some output ....
  </xsl:otherwise>
</xsl:choose>
```

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

<xsl:stylesheet version="1.0"
xmlns:xsl="http://www.w3.org/1999/XSL/Transform">

<xsl:template match="/">
  <html>
  <body>
  <h2>My CD Collection</h2>
  <table border="1">
    <tr bgcolor="#9acd32">
      <th>Title</th>
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    </tr>
    <xsl:for-each select="catalog/cd">
      <tr>
        <td><xsl:value-of select="title"/></td>
        <td><xsl:value-of select="artist"/></td>
      </tr>
    </xsl:for-each>
  </table>
  </body>
  </html>
</xsl:template>

</xsl:stylesheet>
```

XML AJAX

- ▶ AJAX: Ασύγχρονη επικοινωνία (λήψη δεδομένων από server)
- ▶ XMLHttpRequest
- ▶ https://www.w3schools.com/xml/ajax_xmlhttprequest_create.asp
- ▶ Request
- ▶ https://www.w3schools.com/xml/ajax_xmlhttprequest_send.asp
- ▶ Response
- ▶ https://www.w3schools.com/xml/ajax_xmlhttprequest_response.asp
- ▶ Παραδείγματα
- ▶ https://www.w3schools.com/xml/ajax_xmlfile.asp