XML

vs JSON, YAML, TOML, etc.

Yegor Bugayenko

Lecture #7 out of 16
90 minutes

All videos are in this YouTube playlist.

> Extensible Markup Language (XML)
>
> XSD, XPath, XSLT, XQuery, etc.
>
> JavaScript Object Notation (JSON)
>
> YAML, TOML, CSV
>
> Books, Venues, Call-to-Action

Chapter #1:

Extensible Markup Language (XML)

Library in XML

```
<?xml version="1.0" encoding="UTF-8"?>
<!--
 * SPDX-FileCopyrightText: Copyright (c) 2021 Yegor Bugayenko
 * SPDX-License-Identifier: MIT
-->
<library>
  <book id="42">
    <author>David West</author>
    <title>Object Thinking</title>
  </book>
  <book id='43'>
    <author>Martin Fowler</author>
    <title>Refactoring</title>
  </book>
</library>
```

Namespaces

```
<?xml version="1.0" encoding="UTF-8"?>
<!--
 * SPDX-FileCopyrightText: Copyright (c) 2021 Yegor Bugayenko
 * SPDX-License-Identifier: MIT
-->
<library xmlns="https://innopolis.university/ssd16"
  xmlns:a="https://www.amazon.com"
  xmlns:t="https://www.twitter.com">
  <book id="42">
    <a:dp>0134757599</a:dp>
    <t:author>@martinfowler</t:author>
    <author>Martin Fowler</author>
    <title>Refactoring</title>
  </book>
</library>
```

Escaping

```
<?xml version="1.0" encoding="UTF-8"?>
<!--
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-->
<formulas>
  <f title='Fibonacci&amp;apos;s'> <!-- Fibonacci's -->
    <e>if x &lt; 2 return x</e> <!-- if x < 2 return x -->
    <e>else return f(x-1) + f(x-2)</e>
  </f>
</formulas>
```

XML Based Formats/Protocols

SOAP, RSS, Atom, SVG, XHTML, HTML5,
Open Office XML, XMPP,
SyncML, RDF, XMI, XMIR :)

https://en.wikipedia.org/wiki/Category:XML-based_standards →

Chapter #2:

XSD, XPath, XSLT, XQuery, etc.

XML Schema Definition (XSD)

```
<?xml version="1.0" encoding="UTF-8"?>
<!--
 * SPDX-FileCopyrightText: Copyright (c) 2021 Yegor Bugayenko
 * SPDX-License-Identifier: MIT
-->
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:complexType name="book">
    <xs:sequence>
      <xs:element name="author" minOccurs="1" maxOccurs="1"/>
      <xs:element name="title" minOccurs="1" maxOccurs="1"/>
    </xs:sequence>
    <xs:attribute name="id" type="xs:decimal"/>
  </xs:complexType>
  <xs:element name="library">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="book" type="book" minOccurs="0"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
</xs:schema>
```

XML Path Language (XPath)

```
<library><book id=42><author>David West</..></..></..>
```

```
/library/book[@id='42']
```

```
//book[@id='42']
```

```
//book[first()]
```

```
//book[author='David West']
```

```
//book[author[text()='David West']]
```

XSL Transformations (XSLT)

```
<?xml version="1.0" encoding="UTF-8"?>
<!--
 * SPDX-FileCopyrightText: Copyright (c) 2021 Yegor Bugayenko
 * SPDX-License-Identifier: MIT
-->
<xsl:stylesheet version="2.0"
  xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
  <xsl:template match="book">
    <item>
      <xsl:value-of select="title"/>
      <xsl:text> by </xsl:text>
      <xsl:value-of select="title"/>
    </item>
  </xsl:template>
  <xsl:template match="node()|@*">
    <xsl:copy>
      <xsl:apply-templates select="node()|@*"/>
    </xsl:copy>
  </xsl:template>
</xsl:stylesheet>
```

Chapter #3:

JavaScript Object Notation (JSON)

[JSON]

JSON for the Library

```
[
  {
    "author": "David West",
    "id": 42,
    "title": "Object Thinking"
  },
  {
    "author": "Martin Fowler",
    "id": 43,
    "title": "Refactoring"
  }
]
```

https://www.yegor256.com/2015/11/16/json-vs-xml.html →

JSON to JavaScript Object and Backwards

```
var a = JSON.parse('{"age":  25}').age;
```

```
JSON.stringify({age:  25});
```

Chapter #4:

YAML, TOML, CSV

Yet Another Markup Language (YAML)

```
# SPDX-FileCopyrightText: Copyright (c) 2021 Yegor Bugayenko
# SPDX-License-Identifier: MIT
---
library:
- id: 42
  author: David West
  title: Object Thinking
- id: 43
  author: Martin Fowler
  title: Refactoring
```

TOML

```
[library.a]
  id = 42
  author = "David West"
  title = "Object Thinking"
[library.b]
  id = 43
  author = "Martin Fowler"
  title = "Refactoring"
```

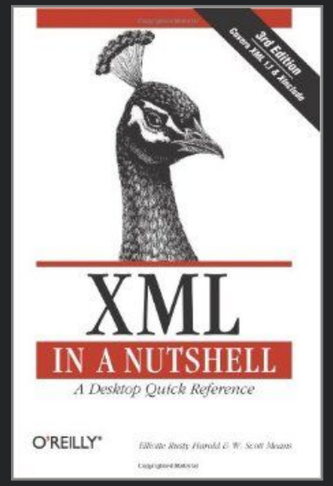
Comma-Separated Values (CSV)

```
Id,Author,Title
42,David West,Object Thinking
43,"Martin Fowler","Refactoring"
```

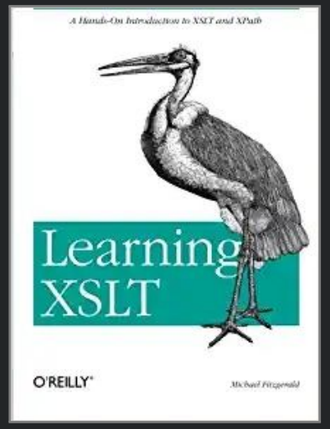
https://en.wikipedia.org/wiki/List_of_file_formats →

Chapter #5:

Books, Venues, Call-to-Action



"XML in a Nutshell, Third Edition"
by Elliotte Rusty Harold et al.



"Learning XSLT: A Hands-On
Introduction to XSLT and XPath"
by Michael James Fitzgerald

Call to Action:

In your application, make sure your data is represented in XML, at least in one place, and being transformed by XSLT.

Design your own data format.

Still unresolved issues:

- How to map XML/JSON to objects?
- How to print object to XML/JSON?
- How to create a common binary format?
- How to restore the popularity of XSLT?