

XPath - XSL

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**Selezione, Elaborazione e Presentazione di documenti XML-TEI mediante
i linguaggi XPath e XSL**

Istituto di Linguistica Computazionale “A. Zampolli”,
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Outline

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References

1 Lesson path

2 Introduction

3 XPath

4 XSL Transformations

5 XSL in action

6 References

Progress status

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References

1 Lesson path

2 Introduction

3 XPath

4 XSL Transformations

5 XSL in action

6 References

Lesson path

XPath - XSL

A.M. Del
Grosso

Lesson path

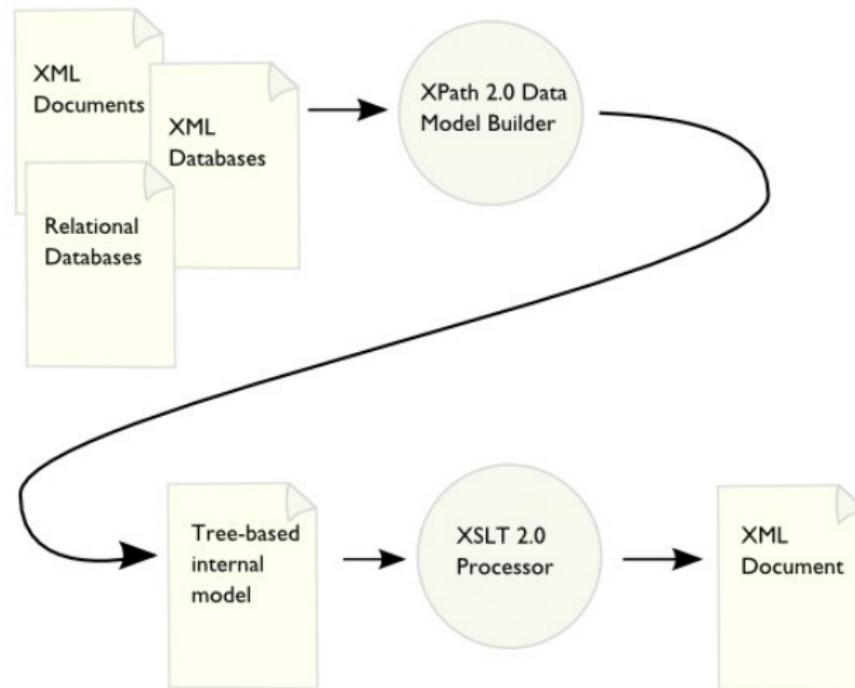
Introduction

XPath

XSL Trans-
formations

XSL in action

References



Progress status

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References

1 Lesson path

2 Introduction

3 XPath

4 XSL Transformations

5 XSL in action

6 References

XSL XQuery

A family of languages

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Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

XSL is a family of W3C recommendations for defining XML document transformation and presentation.

XSL

- **XSL Transformations (XSLT):**
a language for transforming XML
- **The XML Path Language (XPath):**
an expression language to refer to parts of an XML document;
- **XSL Formatting Objects (XSL-FO):**
an XML vocabulary for specifying formatting semantics.

XQuery

XQuery is a query language for XML to extract data.

XSL Transformations

Versioning

XPath - XSL

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Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

W3C > Standards > All Standards and Drafts

Skip

XSLT COVER PAGE

| | | |
|------------|----------------|---|
| 2021-03-30 | Recommendation | XSL Transformations (XSLT) Version 2.0 (Second Edition) This specification defines the syntax and semantics of XSLT 2.0, a language for transforming XML documents into other XML documents. XSLT 2.0 is a revised version of the XSLT 1.0 Recommendation [XSLT 1.0] published on 16 November 1999. XSLT 2.0 is designed to be used in conjunction with XPath 2.0, which is defined in [XPath 2.0]. XSLT shares the same data model as XPath 2.0, which is defined in [Data Model], and it uses the library of functions and operators defined in [Functions and Operators]. XSLT 2.0 also includes optional facilities to serialize the results of a transformation, by means of an interface to the serialization component described in [XSLT and XQuery Serialization]. <i>This document contains hyperlinks to specific sections or definitions within other documents in this family of specifications. These links are indicated visually by a superscript identifying the target specification: for example XP for XPath, DM for the XDM data model, FO for Functions and Operators.</i> |
| 2017-06-08 | Recommendation | XSL Transformations (XSLT) Version 3.0 This specification defines the syntax and semantics of XSLT 3.0, a language for transforming XML documents into other XML documents. |
| 1999-11-16 | Recommendation | XSL Transformations (XSLT) Version 1.0 This specification defines the syntax and semantics of XSLT, which is a language for transforming XML documents into other XML documents. XSLT is designed for use as part of XSL, which is a stylesheet language for XML. In addition to XSLT, XSL includes an XML vocabulary for specifying formatting. XSL specifies the styling of an XML document by using XSLT to describe how the document is transformed into another XML document that uses the formatting vocabulary. XSLT is also designed to be used independently of XSL. However, XSLT is not intended as a completely general-purpose XML transformation language. Rather it is designed primarily for the kinds of transformations that are needed when XSLT is used as part of XSL. |

RELATED RETIRED SPECIFICATIONS

| | | |
|------------|---------|---|
| 2001-08-24 | Retired | XSL Transformations (XSLT) Version 1.1 |
|------------|---------|---|

XSL Transformations

Versioning

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

W3C > Standards > All Standards and Drafts

> Skip <

XPATH COVER PAGE

| | | |
|------------|----------------|---|
| 2017-03-21 | Recommendation | XML Path Language (XPath) 3.1 XPath is an expression language that allows the processing of values conforming to the data model defined in the XQuery and Xpath Data Model. |
| 2014-04-08 | Recommendation | XML Path Language (XPath) 3.0 XPath 3.0 (renamed from XPath 2.1 to align with the family of "3.0" specifications) is an expression language that allows the processing of values conforming to the data model defined in [XQuery and XPath Data Model (XDM) 3.0]. Some of the important new features since XPath 2.0 are: Literal function items, inline functions, dynamic function invocations, and function item coercion Clarification of rules associated with sequence type matching let expressions EQNames (QNames with a namespace URI instead of a namespace prefix) Support for union types in casting and function arguments |
| 2010-12-14 | Recommendation | XML Path Language (XPath) 2.0 (Second Edition) XPath is a way to refer to parts of an XML document. XPath 2.0 is based on the XQuery 1.0 and XPath 2.0 Data Model (XDM), and also introduces Schema awareness and data typing. |
| 1999-11-16 | Recommendation | XML Path Language (XPath) Version 1.0 XPath is a language for addressing parts of an XML document, designed to be used by both XSLT and XPointer. |

XSL Transformations

elements

XPath - XSL

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Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

80 elements ca

| | | | | |
|----------------------|-------------------------|------------------------|----------------------------|---------------------|
| xsl:accept | xsl:copy | xsl:include | xsl:non-matching-substring | xsl:sort |
| xsl:accumulator | xsl:copy-of | xsl:iterate | xsl:number | xsl:source-document |
| xsl:accumulator-rule | xsl:decimal-format | xsl:key | xsl:on-completion | xsl:stream |
| xsl:analyze-string | xsl:document | xsl:map | xsl:on-empty | xsl:strip-space |
| xsl:apply-imports | xsl:element | xsl:map-entry | xsl:on-non-empty | xsl:stylesheet |
| xsl:apply-templates | xsl:evaluate | xsl:matching-substring | xsl:otherwise | xsl:template |
| xsl:assert | xsl:expose | xsl:merge | xsl:output | xsl:text |
| xsl:attribute | xsl:fallback | xsl:merge-action | xsl:output-character | xsl:transform |
| xsl:attribute-set | xsl:for-each | xsl:merge-key | xsl:override | xsl:try |
| xsl:break | xsl:for-each-group | xsl:merge-source | xsl:package | xsl:use-package |
| xsl:call-template | xsl:fork | xsl:message | xsl:param | xsl:value-of |
| xsl:catch | xsl:function | xsl:mode | xsl:perform-sort | xsl:variable |
| xsl:character-map | xsl:global-context-item | xsl:namespace | xsl:preserve-space | xsl:when |
| xsl:choose | xsl;if | xsl:namespace-alias | xsl:processing-instruction | xsl:where-populated |
| xsl:comment | xsl:import | xsl:next-iteration | xsl:result-document | xsl:with-param |
| xsl:context-item | xsl:import-schema | xsl:next-match | xsl:sequence | |

XSL Transformations

Documentation

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

xsl:template

Defines a processing rule for source elements or other nodes of a particular type.

Available in XSLT 1.0 and later versions. Available in all Saxon editions.

- **Category:** declaration
- **Content:** (`xsl:context-item?`, `xsl:param*`, *sequence-constructor*)
- **Permitted parent elements:** `xsl:package`; `xsl:stylesheet`; `xsl:transform`; `xsl:override`

Attributes

`match?`

`pattern`

Pattern to identify the type of node to be processed. The most common form of pattern is simply an element name. However, more complex patterns may also be used: the syntax of patterns is given in more detail in XSLT Pattern Syntax. The following examples show some of the possibilities:

Pattern

Meaning



XPath functions

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

Number of functions: 177 of 177

[abs](#)
[accumulator-after](#)
[accumulator-before](#)
[adjust-date-to-timezone](#)
[adjustdateTime-to-timezone](#)
[adjust-time-to-timezone](#)
[analyze-string](#)
[apply](#)
[available-environment-variables](#)
[available-system-properties](#)
[avg](#)
[base-uri](#)
[boolean](#)
[ceiling](#)
[codepoint-equal](#)
[codepoints-to-string](#)
[collation-key](#)
[collection](#)
[compare](#)
[concat](#)
[contains](#)
[contains-token](#)
[copy-of](#)
[count](#)
[current](#)
[current-date](#)
[current-datetime](#)
[current-group](#)
[current-grouping-key](#)

[fold-left](#)
[fold-right](#)
[for-each](#)
[for-each-pair](#)
[format-date](#)
[format-datetime](#)
[format-integer](#)
[format-number](#)
[format-time](#)
[function-arity](#)
[function-available](#)
[function-lookup](#)
[function-name](#)
[generate-id](#)
[has-children](#)
[head](#)
[hours-from-datetime](#)
[hours-from-duration](#)
[hours-from-time](#)
[id](#)
[idref](#)
[implicit-timezone](#)
[in-scope-prefixes](#)
[index-of](#)
[innermost](#)
[insert-before](#)
[iri-to-uri](#)
[json-doc](#)
[json-to-xml](#)

[parse-xml](#)
[parse-xml-fragment](#)
[path](#)
[position](#)
[prefix-from-QName](#)
[put](#)
[QName](#)
[random-number-generator](#)
[regex-group](#)
[remove](#)
[replace](#)
[resolve-QName](#)
[resolve-uri](#)
[reverse](#)
[root](#)
[round](#)
[round-half-to-even](#)
[seconds-from-datetime](#)
[seconds-from-duration](#)
[seconds-from-time](#)
[serialize](#)
[snapshot](#)
[sort](#)
[starts-with](#)
[static-base-uri](#)
[stream-available](#)
[string](#)
[string-join](#)
[string-length](#)

XPath

Documentation

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

fn:substring

`substring($sourceString as xs:string?, $start as xs:double) → xs:string`

Returns a substring of a given string starting at the given starting position and continuing to the end of the string.

Arguments

| | | |
|----------------|------------|--|
| \$sourceString | xs:string? | The input string |
| \$start | xs:double | The position of the first character of the input string to be included in the result |

Result

xs:string

`substring($sourceString as xs:string?, $start as xs:double, $length as xs:double) → xs:string`

Returns a substring of a given string starting at the given starting position and continuing to the end of the string, or \$length characters if shorter.

Arguments

| | | |
|----------------|------------|--|
| \$sourceString | xs:string? | The input string |
| \$start | xs:double | The position of the first character of the input string to be included in the result |
| \$length | xs:double | The number of characters to be included in the result |

Result

xs:string

Namespace

<http://www.w3.org/2005/xpath-functions>

Links to W3C specifications

[XPath 2.0 Functions and Operators](#)

[XPath 3.0 Functions and Operators](#)

[XPath 3.1 Functions and Operators](#)

W3C XML standards

XML specs

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Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

XML family specifications

[https:](https://www.w3.org/TR/?tag=xml&status=REC&version=latest)

[//www.w3.org/TR/?tag=xml&status=REC&version=latest](https://www.w3.org/TR/?tag=xml&status=REC&version=latest)

Tree data model (XDM)

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Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References



- The W3C specifications for XSLT, XQuery, and XPath **model an XML document as a tree**. This data model is known as **XDM**, and the nodes of an XDM tree are known as **XDM nodes**.
- XDM defines the information contained in the input to an XSLT processor as well as it defines all **permissible values of expressions** in the XSLT
- The **node-sets of XPath 1.0** are replaced in XPath 2.0 by **sequences of nodes**.

Tree data model (XDM)

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References



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Tree data model (XDM)

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References



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Tree data model (XDM)

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References



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XML Trees

Hierarchical Ordered Nodes

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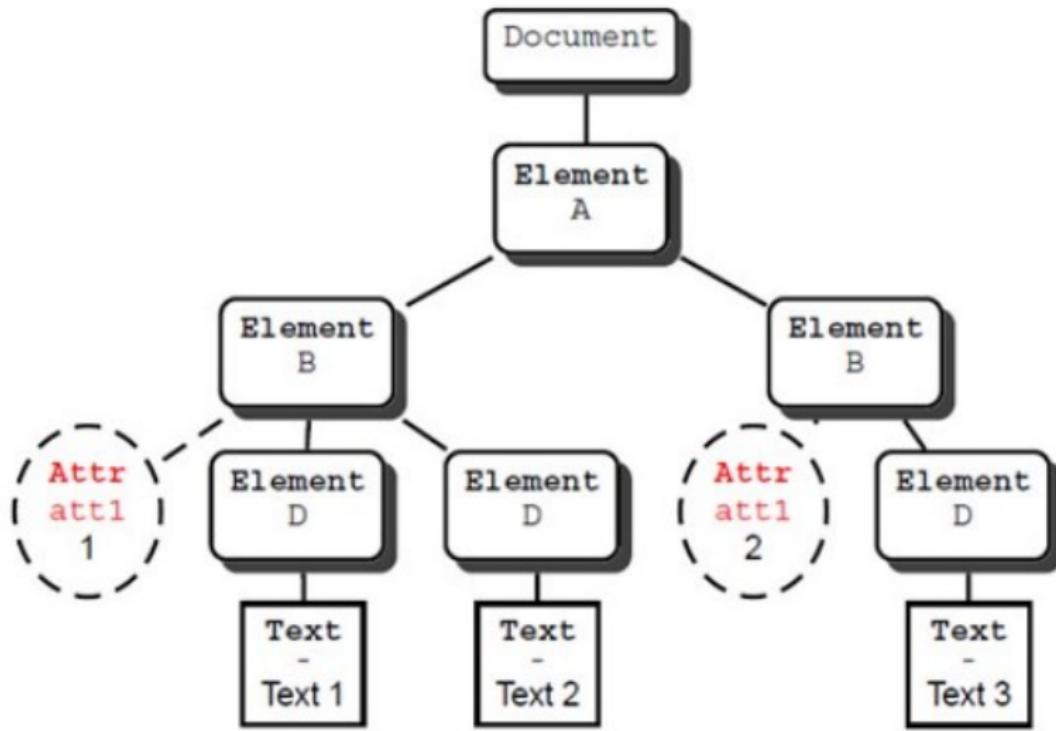
Introduction

XPath

XSL Trans-
formations

XSL in action

References



XPath Data Model

XDM

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Grosso

Lesson path

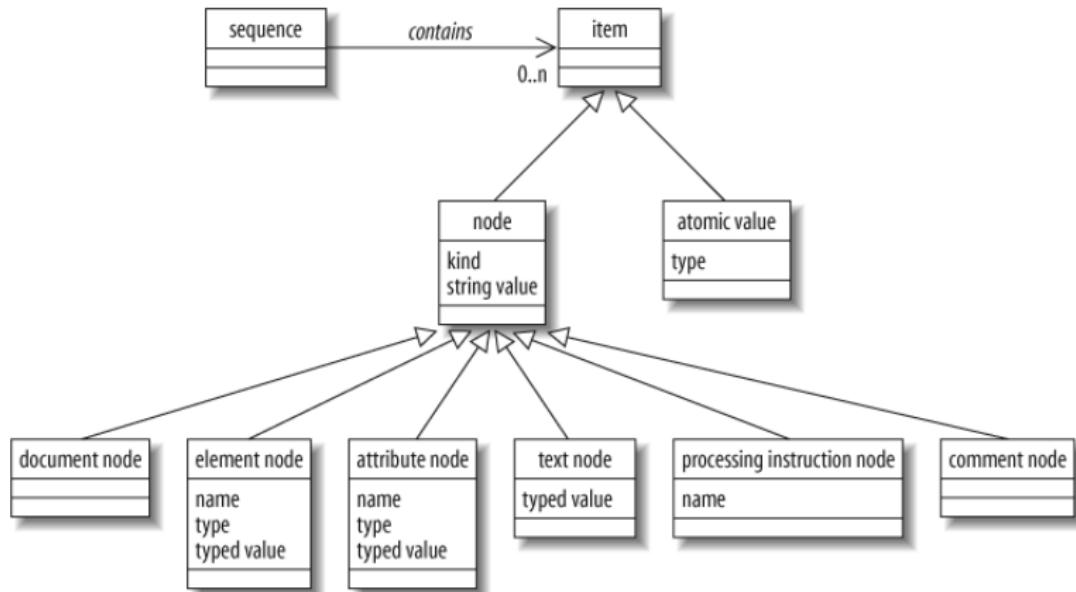
Introduction

XPath

XSL Trans-
formations

XSL in action

References



Fondamenti Extensible Stylesheet Language

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Grosso

Lesson path

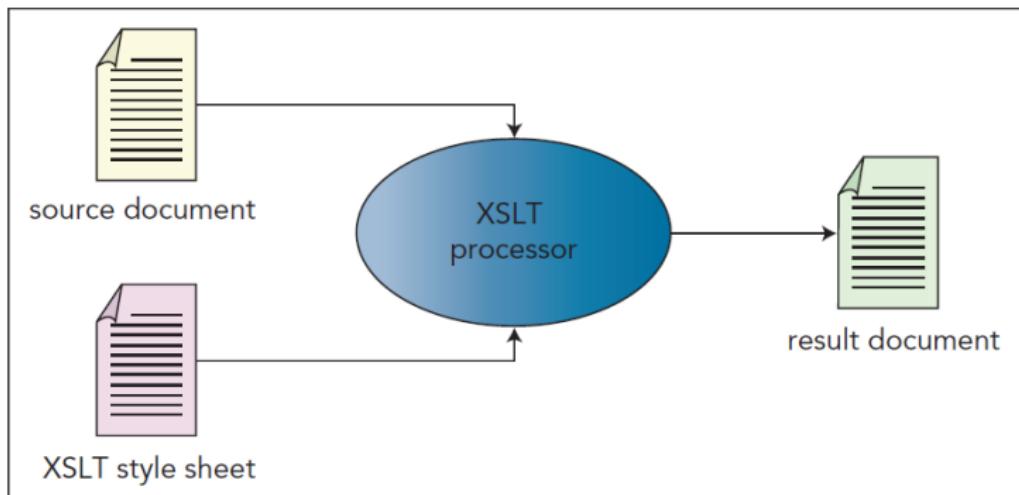
Introduction

XPath

XSL Transformations

XSL in action

References



XML Document

Exemple from The Inscriptions of Roman Tripolitania

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Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

```
<?xml version="1.0" encoding="UTF-8"?>
<TEI xml:lang="en">
    <teiHeader> ...
    </teiHeader>
    <text>
        <body>
            <div type="bibliography"> ...
            </div>
            <div subtype="text-constituted-from" type="history"> ...
            </div>
            <div type="edition" xml:lang="la"><head xml:lang="en">Text</head><ab> ...
            </ab></div>
            <div type="apparatus"> ...
            </div>
            <div type="translation"><head>Translation</head> ...
            </div>
            <div type="commentary"> ...
            </div>
            <div type="figure"> ...
            </div>
        </body>
    </text>
</TEI>
```

eXtensible Style Sheet

Example

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Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

```
1  <?xml version="1.0" encoding="UTF-8"?>
2  <xsl:stylesheet version="1.0">
3  --- xmlns:xsl="http://www.w3.org/1999/XSL/Transform"
4  --- <xsl:output method="text" />
5  --- <xsl:template match="/">
6  -----<xsl:apply-templates select="current()/descendant::text" />
7  -----</xsl:template>
8  -----<xsl:template match="div[@type='edition']|div[@type='translation']">
9  -----<xsl:value-of select="normalize-space(.)" />
10 -----</xsl:template>
11 -----<xsl:template match="div" />
12 </xsl:stylesheet>
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

wsl + □ ☰ ...

```
angelodel80@LAPTOP-V8V3MLG0:/mnt/c/Users/angel/risorse/universita/corsoCodifica/tools$ java -jar SaxonHE10-3J/
saxon-he-10.3.jar -s:source/IRT030.xml -xsl:source/built-in.xsl
```

Text Imperator Caesar Marci Antonini Pii fili diui Pii nep diui Hadriani pronep diui Traiani Parthici
abnep diui Neruae adnep Luci Aeli Aureli Commod August

Translation Emperor Caesar case unknown son of Marcus Antonius Pius, grandson of deified Pius, great
grandson of deified Hadrian, great great grandson of deified Trajan victor in Parthia, great great great grand
son of deified Nerva, Lucius Aelius Aurelius Commodus Augustus



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Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

How Does it work

The XSLT processor **uses the instructions** in the Style Sheet to process the input XML document by **traversing the document's hierarchy**.

How Does it work

XSLT instructions indicate what **portion of the tree should be traversed**, how it should be inspected, and what **output fragment should be generated** at each point.

Ordered Hierarchy of Content Objects

OHCO

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Introduction

XPath

XSL Trans-
formations

XSL in action

References

■ OHCO

The nodes of the tree are ordered. The child nodes of a parent node, which are siblings of one another, **occur in a particular order.**

This is why XML can be described as representing an ordered hierarchy of content objects.

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XPath - XSL

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Grosso

Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References

1 Lesson path

2 Introduction

3 XPath

4 XSL Transformations

5 XSL in action

6 References

Selecting and Processing XML Document Trees

Basic Concepts

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Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

XPath

Path **expressions** will return **node sequences** whose nodes are in document order

Selecting and Processing XML Document Trees

Basic Concepts

XPath - XSL

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Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

Sequence

The group of nodes that an XPath expression returns is a sequence, which is a technical term for an **ordered collection of items** that permits duplicates

Selecting and Processing XML Document Trees

XPath expression language

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Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

XPath

- Select nodes sequence from XML tree
- Process data via functions

Selecting and Processing XML Document Trees

XPath - XSL

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Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

XPath

XPath expressions are extremely accurate (selection of elements, attributes, texts etc.)

Selecting and Processing XML Document Trees

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

```
1  <?xml version="1.0" encoding="UTF-8"?>
2  <xsl:stylesheet version="2.0">
3      xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
4      <xsl:output method="text"/>
5
6      <xsl:template match="/">
7          ...
8              <xsl:value-of
9                  select="/TEI/text/body/div/@type" />
10             ...
11         </xsl:template>
12     </xsl:stylesheet>
13
14
15
```

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1 bibliography history edition apparatus translation commentary figure

Selecting and Processing XML Document Trees

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

XPath Basics

Path expressions are used to navigate from a current location
(called the context node) to other nodes in the tree.

Selecting and Processing XML Document Trees

XPath - XSL

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Grosso

Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References

XPath Basics

Steps in a path expression are indicated with slash characters
and the context node changes with each step.

XPath Basics

- "div" (*div child*)
- "div/head" (*child of div*)
- "div/*/persName" (*child of child*)
- "div//persName" (*descendant*)

Selecting and Processing XML Document Trees

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

XPath

The XPath expression can be absolute or relative to the **context node**

XPath

The XPath expression encompasses three components: (**Axes, Test, Predicate**)

Selecting and Processing XML Document Trees

XPath - XSL

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Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

XPath

XPath expressions navigate the XML tree by using the so called (*expression axes*).

Selecting and Processing XML Document Trees

XPath - XSL

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Grosso

Lesson path

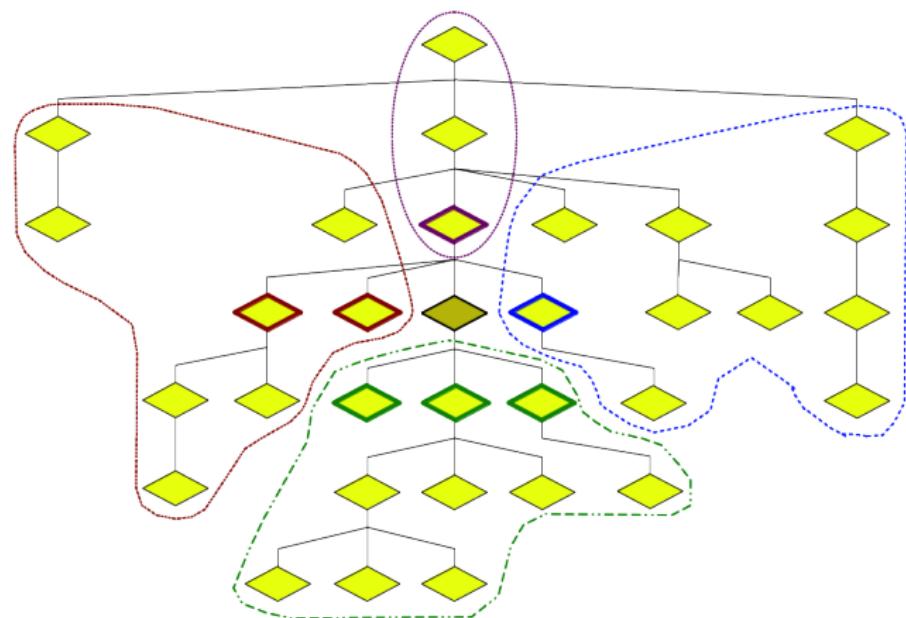
Introduction

XPath

XSL Trans-
formations

XSL in action

References



Selecting and Processing XML Document Trees

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

| Axes | Depiction | Nodes |
|-------------------|----------------------|---|
| child | Dark green edges | The three nodes immediately below the current location |
| descendant | Dashed green line | The three child nodes mentioned above, plus the seven nodes below them, all the way down (their children and their children's children) |
| parent | Magenta edges | The node immediately above the current location |
| ancestor | Magenta dashed line | The parent plus its parent, and its parent's parent |
| preceding-sibling | Dark red edges | The two nodes to the left of the current location that have the same parent |
| preceding | Dark red dashed line | The preceding-sibling nodes plus the six other nodes that are entirely to the left of the current location |
| following-sibling | Blue edges | The node to the right of the current location that has the same parent |
| following | Blue dashed line | The following-sibling node plus the nine other nodes that entirely to the right of the current location |

Selecting and Processing XML Document Trees

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

| Symbol | Meaning | Expanded version |
|--------|----------------------|--|
| . | current context node | <code>self::*</code> (for elements) |
| .. | parent element | <code>parent::*</code> |
| // | descendant axis | <code>descendant::</code> . At the beginning of a path expression, it means that the path starts at the document node. |
| @ | attribute axis | <code>attribute::</code> |

Selecting and Processing XML Document Trees

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References

```
1  <?xml version="1.0" encoding="UTF-8"?>
2  <xsl:stylesheet version="2.0"
3  .... xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
4  .... <xsl:output method="text" encoding="UTF-8" />
5  ....
6  .... <xsl:template match="/">
7  ....
8  .... |.... <xsl:value-of select="TEI/descendant::langUsage/language" />
9  ....
10 ....
11 </xsl:template>
12 </xsl:stylesheet>
```

out-text.txt U X

```
1  Arabic English French German Ancient Greek Transliterated Greek Modern Greek Hebrew Italian Latin Punic
```

Selecting and Processing XML Document Trees

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

XPath Predicate

Predicates are **conditional expression** and are used to **filter the results** of the path expression.

XPath Predicate

Predicate expression are written in **square brackets after the step** in the path expression to which they apply

Any expression in square brackets that filters a step in a path expression is a predicate

Selecting and Processing XML Document Trees

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

```
1  <?xml version="1.0" encoding="UTF-8"?>
2  <xsl:stylesheet version="2.0">
3      xmlns:xsl="http://www.w3.org/1999/XSL/Transform"
4      <xsl:output method="text" encoding="UTF-8" />
5
6      <xsl:template match="/">
7          <xsl:value-of select="//div[1]" />
8
9      </xsl:template>
10
11
12  </xsl:stylesheet>
```

out-text.txt U X

```
1
2      Bibliography
3          Not previously published.
4
```

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Lesson path

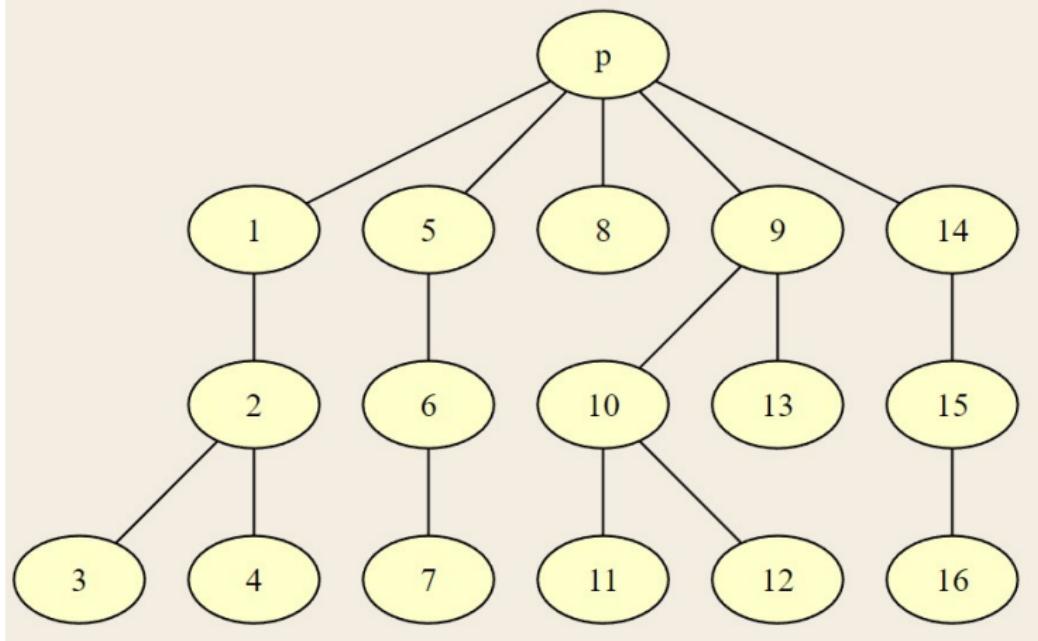
Introduction

XPath

XSL Trans-
formations

XSL in action

References



Selecting and Processing XML Document Trees

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

| Description | Value | General |
|---|-------|---------------|
| Equal to | eq | = |
| Not equal to | ne | != |
| Greater than | gt | > (>) |
| Greater than or equal to (not less than) | ge | >= (>=) |
| Less than | lt | < (<) |
| Less than or equal to (not greater than) | le | <= (<=) |

Selecting and Processing XML Document Trees

XPath - XSL

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Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

Selecting and Processing XML Document Trees

Examples of Predicates

- `div[@type]`
- `div[@type="edition"]`

Selecting and Processing XML Document Trees

XPath - XSL

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Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

XPath Basics

"jolly" element selection

- *
- *[@type]
- *[@type="book"]

Selecting and Processing XML Document Trees

XPath: functions

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

Esempio predicati

- `//div[@type="edition"]`
- `//div[@type!="translation"]`
- `//div[@n > 2]`
- `//div[1]`
- `//div[last()]`
- `//div[position() = last() - 1]`
- `//div[position() mod 2 = 0]`

Selecting and Processing XML Document Trees

XPath location path

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Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

XPath Basics

Use of OR to select more than one named elements and ID
function to select the element with the given ID

- "title | author"
- id("irt1952")

Selecting and Processing XML Document Trees

XPath location path

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

```
1  <?xml version="1.0" encoding="UTF-8"?>
2  <xsl:stylesheet version="2.0">
3  ....xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
4  ....<xsl:output method="text" />
5  ....
6  ....<xsl:template match="/">
7  ....
8  ....<xsl:value-of
9  .... select="descendant::langUsage/language[@ident='it']/preceding-sibling::*[1]/text()"
10 .... />
11 ....
12 ....</xsl:template>
13
14 </xsl:stylesheet>
15
```

out-text.txt U ×

1 Hebrew

Selecting and Processing XML Document Trees

XPath - XSL

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Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

XPath functions

- Functions operate on the information returned by a path expression or another function
- Functions can be nested
- functions can be used in predicates to filter expressions

Selecting and Processing XML Document Trees

XPath functions

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

```
2 <xsl:stylesheet version="2.0">
3   xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
4   <xsl:output method="text" encoding="UTF-8" />
5   <xsl:template match="/">
6     <xsl:value-of select="concat(
7       name(TEI/descendant::langUsage/language[1]), ',',
8       count(TEI/descendant::langUsage/language), ',',
9       //w[contains(., 'filii')]/@lemma, ',',
10      upper-case(
11        substring(TEI/descendant::langUsage/language[@ident eq 'it'], 0, 4)
12      ), ','
13    )"
14   "/>
15 </xsl:template>
16 </xsl:stylesheet>
```

out-text.txt U X

1 language 12 filius ITA

Selecting and Processing XML Document Trees

XPath functions

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

fn:count

Counts the number of items in a sequence.

`count($arg as item()*) → xs:integer`

Arguments

\$arg item()*

The sequence whose items are
to be counted

Result

xs:integer

Namespace

<http://www.w3.org/2005/xpath-functions>

Links to W3C specifications

[XPath 2.0 Functions and Operators](#)

[XPath 3.0 Functions and Operators](#)

[XPath 3.1 Functions and Operators](#)

Saxon availability

Available in XPath 2.0, XSLT 2.0, XQuery 1.0, and later versions. Available in all Saxon

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XPath - XSL

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Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

fn:contains

Returns true if the second string is a substring of the first.

`contains($arg1 as xs:string?, $arg2 as xs:string?) → xs:boolean`

| Arguments | | |
|-----------|------------|-----------------------|
| \$arg1 | xs:string? | The containing string |
| \$arg2 | xs:string? | The contained string |
| Result | xs:boolean | |

`contains($arg1 as xs:string?, $arg2 as xs:string?, $collation as xs:string) → xs:boolean`

| Arguments | | |
|-------------|------------|--|
| \$arg1 | xs:string? | The containing string |
| \$arg2 | xs:string? | The contained string |
| \$collation | xs:string | The collation to be used for comparing the strings |
| Result | xs:boolean | |

Namespace

<http://www.w3.org/2005/xpath-functions>

Links to W3C specifications

[XPath 2.0 Functions and Operators](#)

[XPath 3.0 Functions and Operators](#)

[XPath 3.1 Functions and Operators](#)

Selecting and Processing XML Document Trees

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

fn:name

`name() → xs:string`

Returns the name of the context node, as a string in the lexical form of a QName.

There are no arguments

| | |
|---------------|-----------|
| <i>Result</i> | xs:string |
|---------------|-----------|

`name($arg as node())? → xs:string`

Returns the name of the supplied node, as a string in the lexical form of a QName.

Arguments

| | |
|-------|---------|
| \$arg | node()? |
|-------|---------|

The node whose name is
required

| | |
|---------------|-----------|
| <i>Result</i> | xs:string |
|---------------|-----------|

Namespace

<http://www.w3.org/2005/xpath-functions>

Links to W3C specifications

[XPath 2.0 Functions and Operators](#)

[XPath 3.0 Functions and Operators](#)

[XPath 3.1 Functions and Operators](#)

Saxon availability

Selecting and Processing XML Document Trees

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

fn:substring

`substring($sourceString as xs:string?, $start as xs:double) → xs:string`

Returns a substring of a given string starting at the given starting position and continuing to the end of the string.

Arguments

| | | |
|-----------------------------|-------------------------|--|
| <code>\$sourceString</code> | <code>xs:string?</code> | The input string |
| <code>\$start</code> | <code>xs:double</code> | The position of the first character of the input string to be included in the result |

Result

`xs:string`

`substring($sourceString as xs:string?, $start as xs:double, $length as xs:double) → xs:string`

Returns a substring of a given string starting at the given starting position and continuing to the end of the string, or `$length` characters if shorter.

Arguments

| | | |
|-----------------------------|-------------------------|--|
| <code>\$sourceString</code> | <code>xs:string?</code> | The input string |
| <code>\$start</code> | <code>xs:double</code> | The position of the first character of the input string to be included in the result |
| <code>\$length</code> | <code>xs:double</code> | The number of characters to be included in the result |

Result

`xs:string`

Selecting and Processing XML Document Trees

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

fn:upper-case

Converts a string to upper case.

`upper-case($arg as xs:string?) → xs:string`

Arguments

\$arg xs:string?

The string to be converted to
upper-case

Result

xs:string

Namespace

<http://www.w3.org/2005/xpath-functions>

Links to W3C specifications

[XPath 2.0 Functions and Operators](#)

[XPath 3.0 Functions and Operators](#)

[XPath 3.1 Functions and Operators](#)

Saxon availability

Available in XPath 2.0, XSLT 2.0, XQuery 1.0, and later versions. Available in all Saxon

Selecting and Processing XML Document Trees

XPath - XSL

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Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

fn:concat

Concatenates the string-values of the arguments into a single string. There must be at least two arguments.

`concat($arg1 as xs:anyAtomicType?, $arg2 as xs:anyAtomicType?, $etc... as xs:anyAtomicType?) → xs:string`

Arguments

| | | |
|----------|-------------------|--|
| \$arg1 | xs:anyAtomicType? | The first string |
| \$arg2 | xs:anyAtomicType? | The second string |
| \$etc... | xs:anyAtomicType? | The third and subsequent strings (as many as required) |

Result

xs:string

Namespace

<http://www.w3.org/2005/xpath-functions>

Links to W3C specifications

[XPath 2.0 Functions and Operators](#)

[XPath 3.0 Functions and Operators](#)

[XPath 3.1 Functions and Operators](#)

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XPath - XSL

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Grosso

Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References

1 Lesson path

2 Introduction

3 XPath

4 XSL Transformations

5 XSL in action

6 References

XPath - XSL

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Grosso

Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References

Basics

A transformation expressed in XSLT **describes rules for transforming input data into output data**. The inputs and outputs will all be instances of the XDM data model.

eXtensible Style Sheet

XSL-T

XPath - XSL

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Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References

Basics (cont.)

The input often is an XML document referred to as the **source tree**, and the output is a document referred to as the **result tree**.

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Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References

Basics (cont.)

The transformation is achieved by **a set of template rules**. A template rule associates a pattern, which typically **matches nodes** in the source document, with a **sequence constructor**.

XPath - XSL

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Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References

Basics (cont.)

The structure of the result trees can be completely different from the structure of the source trees.

XSLT main elements

XPath - XSL

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Grosso

Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References

URL to Documentation

- <https://xsltdev.com/xslt/xsl-stylesheet/>
- <https://xsltdev.com/xslt/xsl-template/>
- <https://xsltdev.com/xslt/xsl-value-of/>
- <https://xsltdev.com/xslt/xsl-apply-templates/>
- <https://xsltdev.com/xslt/xsl-for-each/>
- <https://xsltdev.com/xslt/xsl-if/>
- <https://xsltdev.com/xslt/xsl-choose/>

XSLT main elements

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References

URL to Documentation

- <https://xsltdev.com/xslt/xsl-sort/>
- <https://xsltdev.com/xslt/xsl-variable/>
- <https://xsltdev.com/xslt/xsl-element/>
- <https://xsltdev.com/xslt/xsl-attribute/>
- <https://xsltdev.com/xslt/xsl-key/>
- <https://xsltdev.com/xslt/xsl-preserve-space/>
- <https://xsltdev.com/xslt/xsl-strip-space/>
- <https://xsltdev.com/xslt/xsl-analyze-string/>

XSLT main elements

xsl:stylesheet

XPath - XSL

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Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

xsl:stylesheet

The `xsl:stylesheet` element is always the top-level element of an XSLT stylesheet. The name `xsl:transform` may be used as a synonym.

Available in XSLT 1.0 and later versions. Available in all Saxon editions.

- **Content:** (*declarations*)

Attributes

`id?`

id

Used to reference stylesheet modules embedded in a document.

`version`

decimal

Standard attribute that may appear on any XSLT element. Indicates the version of XSLT required by the stylesheet.

<https://xsltdev.com/xslt/xsl-stylesheet/>



XSLT main elements

xsl:stylesheet

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

<xsl:stylesheet version="2.0">
    ...
        xmlns:xsl="http://www.w3.org/1999/XSL/Transform"
    ...
</xsl:stylesheet>
```

<https://xsltdev.com/xslt/xsl-stylesheet/>

XSLT main elements

xsl:template

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References

xsl:template

Defines a processing rule for source elements or other nodes of a particular type.

Available in XSLT 1.0 and later versions. Available in all Saxon editions.

- **Category:** declaration
- **Content:** (`xsl:context-item?` , `xsl:param*` , *sequence-constructor*)
- **Permitted parent elements:** `xsl:package` ; `xsl:stylesheet` ; `xsl:transform` ;
`xsl:override`

Attributes

`match?`

`pattern`

Pattern to identify the type of node to be processed. The most common form of pattern is simply an element name. However, more complex patterns may also be used: the syntax of patterns is given in more detail in XSLT Pattern Syntax. The following examples show some of the possibilities:

<https://xsltdev.com/xslt/xsl-template/>

XSLT main elements

xsl:template

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

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

<xsl:stylesheet version="2.0">
    <!-- xmlns:xsl="http://www.w3.org/1999/XSL/Transform" -->

        <!--<xsl:template match="/">

        </xsl:template>

        <!--<xsl:template match="div">
            ...
            </xsl:template>

        <!--<xsl:template match="head">
            ...
            </xsl:template>

        <!--<xsl:template match="lb">
            ...
            </xsl:template>

    </xsl:stylesheet>
```

<https://xsltdev.com/xslt/xsl-template/>

XSLT main elements

xsl:value-of

XPath - XSL

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Grosso

Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References

xsl:value-of

Evaluates an expression as a string, and outputs its value to the current result tree.

Available in XSLT 1.0 and later versions. Available in all Saxon editions.

- **Category:** instruction
- **Content:** sequence-constructor
- **Permitted parent elements:** any XSLT element whose content model is sequence-constructor; any literal result element

Attributes

`select?`

`expression`

Identifies the expression. If this is not specified, the value to be output is obtained by evaluating the sequence constructor contained within the `xsl:value-of` element. The full syntax of expressions is outlined in XPath Expression Syntax. Here are some examples of expressions that can be used in the `select` attribute:

<https://xsltdev.com/xslt/xsl-value-of/>

XSLT main elements

xsl:value-of

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

```
<xsl:stylesheet version="2.0">
  <!-- xmlns:xsl="http://www.w3.org/1999/XSL/Transform" -->

  <xsl:template match="/">
    <xsl:value-of select="concat('&#10;', normalize-space(descendant::titleStmt/title=>string()))" />
  </xsl:template>

  <xsl:template match="div">
    <xsl:value-of select="@type" />
  </xsl:template>

  <xsl:template match="head">
    <xsl:value-of select="." />
  </xsl:template>

  <xsl:template match="lb">
    <xsl:value-of select="concat('&#10;', current()/@n)" />
  </xsl:template>

</xsl:stylesheet>

txt.txt u ×
<?xml version="1.0" encoding="UTF-8"?>
Dedication to Commodus
```

<https://xsltdev.com/xslt/xsl-value-of/>

XSLT main elements

xsl:apply-templates

XPath - XSL

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Grosso

Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References

xsl:apply-templates

Causes navigation from the current element, usually but not necessarily to process its children.
Each selected node is processed using the best-match `xsl:template` defined for that node.

Available in XSLT 1.0 and later versions. Available in all Saxon editions.

- **Category:** instruction
- **Content:** (`xsl:sort` | `xsl:with-param`)*
- **Permitted parent elements:** any XSLT element whose content model is sequence-constructor; any literal result element

Attributes

`select?`

`expression`

Sequence of nodes to be processed. If this attribute is omitted, then all the immediate children of the current node are processed.

`mode?`

<https://xsltdev.com/xslt/xsl-apply-templates/>



XSLT main elements

xsl:apply-templates

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

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

<xsl:stylesheet version="2.0"
  xmlns:xsl="http://www.w3.org/1999/XSL/Transform">

  <xsl:template match="/">
    <xsl:value-of select="concat(&#10;, normalize-space(descendant::titleStmt/
      title=>string()))" />
    <xsl:apply-templates select="//text//div" />
  </xsl:template>

  <xsl:template match="div">
    <xsl:text>&#10;</xsl:text>
    <xsl:value-of select="@type" />
    <xsl:text>&#10;</xsl:text>
  </xsl:template>

  <xsl:template match="head">
    <xsl:value-of select=".." />
  </xsl:template>

  <xsl:template match="lb">
    <xsl:value-of select="concat(&#10;, current()/
      @n)" />
  </xsl:template>

</xsl:stylesheet>
```

```
1  <?xml version="1.0" encoding="UTF-8"?>
2  Dedication to Commodus
3  bibliography
4
5  history
6
7  edition
8
9  apparatus
10
11 translation
12
13 commentary
14
15 figure
16
```

<https://xsltdev.com/xslt/xsl-apply-templates/>

XSLT main elements

xsl:apply-templates

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

```
<?xml version="1.0" encoding="UTF-8"?>
<xsl:stylesheet version="2.0">
  <!-- xmlns:xsl="http://www.w3.org/1999/XSL/Transform" -->
  <xsl:template match="/">
    <xsl:value-of select="concat('&#10;', normalize-space(descendant::titleStmt/title[string()]))"/>
    <xsl:apply-templates select="//text//div" />
  </xsl:template>

  <xsl:template match="div">
    <xsl:text>&#10;</xsl:text>
    <xsl:value-of select="name(.)=>concat(':::',@type)" />
    <xsl:text>&#10;</xsl:text>
    <xsl:apply-templates select="head" />
  </xsl:template>

  <xsl:template match="head">
    <xsl:value-of select="name(.)=>concat(':::',.,'.')"/>
  </xsl:template>

  <xsl:template match="lb">
    <xsl:value-of select="concat('&#10;', current()/@n)" />
  </xsl:template>
</xsl:stylesheet>
```

```
1  <?xml version="1.0" encoding="UTF-8"?>
2  Dedication to Commodus
3  div : bibliography
4  head : Bibliography
5  div : history
6  head : Text constituted from
7  div : edition
8  head : Text
9  div : apparatus
10 head : Apparatus
11 div : translation
12 head : Translation
13 div : commentary
14 head : Commentary
15 div : figure
16 head : Photographs
```

<https://xsltdev.com/xslt/xsl-apply-templates/>

XSLT main elements

xsl:apply-templates

XPath - XSL

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Grosso

Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References

```
<?xml version="1.0" encoding="UTF-8"?>
<xsl:stylesheet version="2.0">
  <!-- xmlns:xsl="http://www.w3.org/1999/XSL/Transform">

  <!--xsl:strip-space elements="" /-->

  <xsl:template match="/">
    <xsl:value-of select="concat('&#10;', 'title : ', normalize-space(descendant::titleStmt/title>string()))"
      " />
    <xsl:apply-templates select="//text//div" />
  </xsl:template>

  <xsl:template match="div">
    <xsl:text>&#10;</xsl:text>
    <xsl:value-of select="name(.)=>concat('. : ', @type)" />
    <xsl:text>&#10;</xsl:text>
    <xsl:apply-templates select="head" />
  </xsl:template>

  <xsl:template match="head">
    <xsl:value-of select="name(.)=>concat('. : ', ., '&#10;')"
      " />
    <xsl:apply-templates select="following-sibling::*" />
  </xsl:template>

  <xsl:template match="lb">
    <xsl:value-of select="concat('&#10;', 'riga ', current()
      ()&#n, ' : ')"/>
  </xsl:template>

</xsl:stylesheet>
```

```
1  <?xml version="1.0" encoding="UTF-8"?>
2  title : Dedication to Commodus
3  div : bibliography
4  head : Bibliography
5  Not previously published.
6  div : history
7  head : Text constituted from
8  Transcription (Reynolds, Ward-Perkins)
9  div : edition
10 head : Text
11 riga 1 : ImperatorCaesarMarciAntoniniPiifili
12 riga 2 : diuipinepediuHadrianiprompediu
13 riga 3 : TraianiParthiciabnepdiuNeruaeadnep
14 riga 4 : LuciAeliAureliCommmodAugust
15 div : apparatus
16 head : Apparatus
17 Line 4 is represented by the upper parts only of
two letters with rounded bowls.
18 div : translation
19 head : Translation
20 Emperor Caesar son of Marcus Antonius Pius,
grandson of deified Pius, great grandson of
deified Hadrian, great great grandson of deified
Trajan Victor in Parthia, great great great
grandson of deified Nerva, Lucius Aelius Aurelius
Commodus Augustus
21 div : commentary
22 head : Commentary
23 No comment
24 div : figure
25 head : Photographs
26 head : Ward-Perkins Archive, BSR (BSR 48.XXVII.13)
```

<https://xsltdev.com/xslt/xsl-apply-templates/>

XSLT main elements

xsl:for-each

XPath - XSL

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Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References

xsl:for-each

Causes iteration over the nodes selected by a node-set expression.

Available in XSLT 1.0 and later versions. Available in all Saxon editions.

- **Category:** instruction
- **Content:** (`xsl:sort` * , sequence-constructor)
- **Permitted parent elements:** any XSLT element whose content model is sequence-constructor; any literal result element

Attributes

`select`

`expression`

Defines the nodes over which the statement will iterate. The XSLT statements subordinate to the `xsl:for-each` element are applied to each source node selected by the node-set expression in turn. The full syntax of expressions is outlined in XPath Expression Syntax.

<https://xsltdev.com/xslt/xsl-for-each/>



XSLT main elements

xsl:for-each xsl:sort

XPath - XSL

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Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

```
1  <?xml version="1.0" encoding="UTF-8"?>
2  <xsl:stylesheet version="2.0">
3  ...  xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
4  ...  <xsl:output method="text" encoding="UTF-8" />
5
6  ...  <xsl:template match="/">
7  ...    <xsl:for-each select="distinct-values(//w/@lemma)">
8  ...      <xsl:sort select=". " data-type="text" lang="la"/>
9  ...      <xsl:text>&#32;</xsl:text>
10     <xsl:value-of select=". " />
11     <xsl:text>&#32;</xsl:text>
12   </xsl:for-each>
13 </xsl:template>
14
15 </xsl:stylesheet>

out-text.txt U X
1 diuus filius imperator
```

<https://xsltdev.com/xslt/xsl-for-each/>

XSLT main elements

xsl:if xsl:key

XPath - XSL

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Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

xsl:if

Used for conditional processing. It takes a mandatory test attribute, whose value is a boolean expression. The contents of the `xsl:if` element are expanded only if the expression is true.

Available in XSLT 1.0 and later versions. Available in all Saxon editions.

- **Category:** instruction
- **Content:** sequence-constructor
- **Permitted parent elements:** any XSLT element whose content model is sequence-constructor; any literal result element

Attributes

`test`

expression

The boolean expression to be tested. The full syntax of boolean expressions is outlined in XPath Expression Syntax.

<https://xsltdev.com/xslt/xsl-if/>



XSLT main elements

xsl:key xsl:if

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Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

```
1   <?xml version="1.0" encoding="UTF-8"?>
2   <xsl:stylesheet version="2.0">
3   |   ... xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
4   |   ... <xsl:output method="text" encoding="UTF-8" />
5
6   |   ... <xsl:key name="lang" match="language" use="@ident"></xsl:key>
7
8   |   ... <xsl:template match="/">
9   |   |   ... <xsl:if test="key('lang','la')">
10  |   |   |   ... <xsl:value-of select="key('lang','la')"/>
11  |   |   ... </xsl:if>
12  |   ... </xsl:template>
13
14  </xsl:stylesheet>
15
```

out-text.txt U ×

1 Latin

<https://xsltdev.com/xslt/xsl-key/>

XSLT main elements

xsl:variable

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Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

xsl:variable

Used to declare a variable and give it a value. If it appears at the top level (immediately within `xsl:stylesheet`) it declares a global variable, otherwise it declares a local variable that is visible only within the stylesheet element containing the `xsl:variable` declaration. The value of a variable can be referenced within an expression using the syntax `$name`.

Available in XSLT 1.0 and later versions. Available in all Saxon editions.

- **Category:** declaration
- **Category:** instruction
- **Content:** sequence-constructor
- **Permitted parent elements:** `xsl:package` ; `xsl:stylesheet` ; `xsl:transform` ;
`xsl:override` ; `xsl:function` ; any XSLT element whose content model is sequence-constructor; any literal result element

Attributes

`name`

`eqname`

Defines the name of the variable.

XSLT main elements

xsl:variable

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

```
1 <?xml version="1.0" encoding="UTF-8"?>
2 <xsl:stylesheet version="2.0" xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
3   <xsl:output method="text" encoding="UTF-8" />
4   <xsl:key name="lang" match="language" use="@ident"></xsl:key>
5
6   <xsl:template match="/">
7     <xsl:if test="key('lang', 'la')">
8       <xsl:variable name="latLang" select="key('lang', 'la')"/>
9       <xsl:value-of select="">
10      <xsl:with-param value="concat('Selected Language: ', $latLang/text(), ' (' , $latLang/@ident, ')')"/>
11    </xsl:if>
12  </xsl:template>
13
14 </xsl:stylesheet>
```

out-text.txt U ×

1 Selected Language: Latin (la)

<https://xsltdev.com/xslt/xsl-variable/>

Progress status

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References

1 Lesson path

2 Introduction

3 XPath

4 XSL Transformations

5 XSL in action

6 References

eXtensible Style Sheet

Working with XSL-T

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

```
<teiHeader>
  <fileDesc>
    <titleStmt>
      <title>
        <rs type="textType">Christian</rs>
        <rs type="textType">funerary</rs> inscription for Helladios</title>
        <editor>J. M. Reynolds</editor>
        <editor>J. B. Ward-Perkins</editor>
      </titleStmt>
      <publicationStmt>
        <authority>Centre for Computing in the Humanities, King's College London</authority>
        <idno type="filename">IRT256a</idno>
        <availability>
          <p>Creative Commons licence Attribution UK 2.0 (<ref>http://creativecommons.org/licenses/by/uk/2.0/</ref>)
          <p>All reuse or distribution of this work must contain somewhere a link back to the original source</p>
        </availability>
      </publicationStmt>
    <sourceDesc> ...
```

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eXtensible Style Sheet

Working with XSL-T

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

```
1 <?xml version="1.0" encoding="UTF-8"?>
2 <!-- $Id$ -->
3 <xsl:stylesheet>
4   ... xmlns:xsl="http://www.w3.org/1999/XSL/Transform"
5   ... xmlns:tei="http://www.tei-c.org/ns/1.0"
6   ... xmlns:xs="http://www.w3.org/2001/XMLSchema"
7   ... exclude-result-prefixes="t" version="2.0">
8 ...
9 ...
10 ...
11 ...
12 ...
13 ...
14 ...
15 ...
16 ...
17 ...
18 ...
19 ...
20 ...
21 ...
22 ...
23 ...
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36 ...
37 ...
38 ...
39 ...
40 ...
41 ...
42 ...
43 ...
44 ...
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46 ...
47 ...
48 ...
49 ...
50 ...
51 ...
52 ...
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54 ...
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59 ...
60 ...
61 ...
62 ...
63 ...
64 ...
65 ...
66 ...
67 ...
68 ...
69 ...
70 ...
71 ...
72 ...
73 ...
74 ...
75 ...
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

```
angelodel80@LAPTOP-V8V3MLG0:/mnt/c/Users/angel/risorse/universita/corsoCodifica/tools$ java -jar SaxonHE10-
3J/saxon-he-10.3.jar -s:source/IRT256a.xml -xsl:source/Stylesheets-9.4/start-edition.xsl -o:source/out/out-
-text-epidoc.html
```

```
1 <!DOCTYPE HTML><html xmlns:i18n="http://apache
org/cocoon/i18n/2.1">
2 ...
3 ...
4 ...
5 ...
6 ...
7 ...
8 ...
9 ...
10 ...
11 ...
12 ...
```

The Inscriptions of Roman Tripolitania -
<https://inslib.kcl.ac.uk/irt2009/>

eXtensible Style Sheet

Working with XSL-T

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

Bibliography

Not previously published.

Text constituted from

Transcription (Reynolds, Ward-Perkins)

Text

[Εύμοιριτο] Ἐλλάδιος ἔζησε ἔτι ν'
[πλέον ἔλατ(τ)ον μῆν[ες γ'] ἡμέρας
[δεκαπέντε ὁ Χριστὸς μετὰ τ(ο)ῦ πνεύ-
[ματός σ(ο)υ ἐτ]ελεύ[τισεν μ]ηνὶ Παυνὶ⁵
[έβδο]μι κατὰ τοὺς Ἀφρ<ο>υς

Apparatus

Apparatus

The supplied letters are no longer legible.

Translation

[May he be well off]. Helladios lived approximately 50 years, three months and fifteen days. Christ be with your spirit. He died on the seventh of the month of Payn among the Africans.

eXtensible Style Sheet

Working with XSLT

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

```
<parameter>
  <name>edition-type</name>
  <value>interpretive</value>
  <value on="yes">diplomatic</value>
</parameter>


<parameter>
  <name>line-inc</name>
  <value>1</value>
</parameter>
```

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<https://inslib.kcl.ac.uk/irt2009/>

eXtensible Style Sheet

Working with XSL-T

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

Text

- 1 [.....]ΕΛΛΑΔΙΟΣΕΖΗΣΕΕΤΙΝ
- 2 [.....]Ν[...]ΗΜΕΡΑΣ
- 3 [.....]ΠΙΝΕΥ
- 4 [.....]ΕΛΕΥ[.....]ΝΙΑΥΝΙ
- 5 [...]ΜΙΚΑΤΑΤΟΥΣΑΦΡΥΣ

Apparatus

Apparatus

The supplied letters are no longer legible.

Translation

[.....]. Helladios lived approximately 50 years, three months and fifteen days. Christ be with your spirit.
He died on the seventh of the month of Payn among the Africans.

The Inscriptions of Roman Tripolitania -
<https://inslib.kcl.ac.uk/irt2009/>

eXtensible Style Sheet

Working with XSL-T

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

```
<parameter>
  <name>edn-structure</name>
  <value>default</value>
  <value>ddbdp</value>
  <value>hgv</value>
  <value>inslib</value>
  <value>iосре</value>
  <value>edh</value>
  <value>edh-db</value>
  <value>rib</value>
  <value>sammelbuch</value>
  <value on="yes">sample</value>
  <value>eagle</value>
  <value>igcyr</value>
</parameter>
```

eXtensible Style Sheet

Working with XSL-T

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

Current repository: Unknown

Text type: Christianfunerary

Editor(s): J. M. Reynolds, J. B. Ward-Perkins

Changes history: 2010-08-18 GB Converted from TEI P4 (EpiDoc DTD v. 6) to P5 (EpiDoc RNG schema v. 8); 2008-09-09 ZA converted 2009-05-19 RV Added Figures; 2009-08-24 RV Added Figures

Publication details: Centre for Computing in the Humanities, King's College London;

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Interpretive

Text

- 1 [Εύμοιριτο] Έλλαδιος ἔζησε ἐπι ν'
- 2 [πλέον ἐλατ(τ)ον μῆν[ες γ'] ἡμέρας
- 3 [δεκαπέντε ὁ Χριστός μετά τ(ο)ῦ πνεύ-
- 4 [ματός σ(ο)υ ἐτ]ελεύτισεν μι]νι Παυνί
- 5 [έβδομι κατὰ τοὺς Αφρο>υς

Diplomatic

Text

- 1 [.....]ΕΛΛΑΔΙΟΣΕΖΗΣΕΕΤΙΝ
- 2 [.....]Ν[...]ΗΜΕΡΑΣ
- 3 [.....]ΠΝΕΥ
- 4 [.....]ΕΛΕΥ[.....]ΝΙ.ΑΥΝΙ
- 5 [...]ΜΙΚΑΤΑΤΟΥΣΑΦΡΥΣ

eXtensible Style Sheet

Working with XSL-T

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

References

```
<p><b>Text type:</b>
<xsl:choose>
  <xsl:when test="//t:textClass//t:keywords//t:term[@type='textType']">
    <xsl:apply-templates select="//t:textClass//t:keywords//t:term[@type='textType']"/>
  </xsl:when>

  <!--xsl:when test="//t:teiHeader//t:rs[@type='textType']"-->
  <xsl:apply-templates select="//t:teiHeader//t:rs[@type='textType']"/>
</xsl:when-->
  <xsl:when test="//t:teiHeader//t:rs[@type='textType']">
    <xsl:for-each select="//t:teiHeader//t:rs[@type='textType']">
      <xsl:apply-templates select="current()"/><xsl:text></xsl:text>
    </xsl:for-each>
  </xsl:when>
</xsl:choose>
```

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<https://inslib.kcl.ac.uk/irt2009/>

eXtensible Style Sheet

Working with XSLT

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References

The screenshot shows a software interface for XSLT transformation. At the top, there are three tabs: "new-document 1", "transform.xq", and "htm-tpl-struct-sample.xsl". The "transform.xq" tab is currently active. Below the tabs is a code editor containing XQuery code:

```
1 xquery version "3.1";
2
3 let $xml := doc("IRT256a.xml")
4 let $xsl := doc("Stylesheets-9.4/start-edition.xsl")
5
6 return transform:transform($xml,$xsl,())
7
```

Below the code editor is a toolbar with the following buttons: a back arrow, a forward arrow, "XHTML Output" dropdown, "Indent" checkbox (which is checked), "Live Preview" checkbox (which is checked), "Highlight Index Matches" checkbox (which is checked), and a plus sign button.

The main pane displays the transformed XML output:

```
<html xmlns:i18n="http://apache.org/cocoon/i18n/2.1">
<head>
    <title>IRT256a. Christian funerary inscription for Helladios</title>
    <meta http-equiv="content-type" content="text/html; charset=UTF-8" />
    <link rel="stylesheet" type="text/css" media="screen, projection" href="global.css" />
</head>
<body>
    <h1>IRT256a. Christian funerary inscription for Helladios</h1>
    <div id="mainContent">
```

The Inscriptions of Roman Tripolitania -
<https://inslib.kcl.ac.uk/irt2009/>

Progress status

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Transformations

XSL in action

References

1 Lesson path

2 Introduction

3 XPath

4 XSL Transformations

5 XSL in action

6 References

Bibliography

deepen into XPath and XSLT

XPath - XSL

A.M. Del
Grosso

Lesson path

Introduction

XPath

XSL Trans-
formations

XSL in action

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Some References

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