

Comp 336/436 - Markup Languages

Fall Semester 2019 - Week 9

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DEV Week assessment

Course total = 25%

- project outline and introduction
- developed using a chosen markup language
- consider and apply metadata schemes and semantic organisation for chosen domain
- current working examples - what does and does not work...
- demo and project report
 - *due on Wednesday 31st October 2018 @ 4.15pm*
- anonymous peer review
 - *similar to user comments and feedback*
 - *chance to respond to feedback before final project*

DEV Week Demo

DEV week assessment will include the following:

- brief presentation or demonstration of current project work
 - *~ 5 to 10 minutes per group*
 - *analysis of work conducted so far*
 - e.g. during semester & DEV week
 - *presentation and demonstration*
 - outline current state of application/project
 - show prototypes, designs, outlines &c.
 - explain what works & does not work
 - i.e. outline what has been completed to date...
 - ...

XML - XPath details - location - select children

- use a shortcut to refer to child nodes
- instead of writing the location path from the root node
 - *reference child nodes using their name, e.g.*

```
<xsl:template match="history">
...
<xsl:value-of select="dynasty"/>
```

- `dynasty` matches a child of the `history` element
- also use standard paths to get grandchild &c.
- use `*` to select all the current node's children
- `xsl:text` element used to add literal text to output
 - *can't contain other elements*
 - *often used to add special characters, e.g. `&`, `>`*
 - *can be used to control white space...*

XML - working example - ancient sites - select children

XML

```
<history>
  <period>New Kingdom</period>
  <dynasty>19th</dynasty>
  <year era="BC">c. 1264</year>
</history>
```

XSL

```
<xsl:template match="site">
  <tr>
    <xsl:apply-templates select="name[@language='english']"/>
    <xsl:apply-templates select="history"/>
  </tr>
</xsl:template>
...
<xsl:template match="history">
  <td>
    <xsl:value-of select="year"/>
    <xsl:text>&#160;</xsl:text>
    <xsl:value-of select="year/@era"/>
  </td>
</xsl:template>
```

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XML - XPath & XSLT tests - select children

Exercise - part 3

- update your XSL stylesheet
 - *match required current node for parent*
 - *add template for matching child elements*
 - *combine values and text for output*
- test stylesheet with XML file

~ 10 minutes

XML - XPath details - location - select parent or siblings

- if relationship between current node and required node is clear
 - e.g. *between element nodes*
- select parent node
 - add *..* - select current node's parent
- select a node's siblings
 - *locate node's parent*
 - add */sibling* - where sibling is name of required node
 - add */niece* - where niece is name of child of sibling
 - &c. for grandniece...
- repeat as necessary to access multiple hierarchies...
- also get attributes from these nodes
 - e.g. *../@attribute*
- also use wildcard option within a location path
 - e.g. *../**

XML - working example - ancient sites - select parent or siblings

XSL

```
<xsl:template match="history">
  <td>
    <xsl:value-of select="year"/>
    <xsl:text>#160;</xsl:text>
    <xsl:value-of select="year/@era"/>
  </td>
  <td>
    <xsl:value-of select="./dynasty"/>
    <xsl:text>#160;dynasty</xsl:text>
  </td>
</xsl:template>
```

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XML - XPath & XSLT tests - select parent or siblings

Exercise - part 4

- update your XSL stylesheet
 - *use current node in XSL*
 - *get value for a parent or sibling*
 - *combine values and text for output*
- test stylesheet with XML file

~ 10 minutes

XML - XPath details - location - select attributes

- @ to specify returning an attribute
- to select a node's attributes specify the following
 - *location path to the node*
 - *add /@ to indicate values from attributes required*
 - *add attribute name to get specific attribute on current node*
 - *or add * to select all attributes on current node*
- @ sometimes referred to as *attribute axis*
- in XPath - axis is a set of nodes relative to current node
- in addition to attribute axis - 12 other axes defined in XPath, e.g.
 - *ancestor, ancestor-or-self, child, descendant, descendant-or-self, following*
 - *following-sibling, namespace, parent, preceding, preceding-sibling, and self*
- each axes specifies a *direction* relative to current node
 - *represents the corresponding node set*
 - *each axis may also be represented by a shortcut*

XML - working example - ancient sites - select attributes

XSL

```
<xsl:apply-templates select="links/overview[@type='general']"/>
...
<xsl:template match="links/overview[@type='general']">
  <td>
    <a>
      <xsl:attribute name="href">
        <xsl:value-of select="./@url"/>
      </xsl:attribute>
      <xsl:value-of select="."/>
    </a>
  </td>
</xsl:template>
```

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XML - XPath & XSLT tests - select attributes

Exercise - part 5

- update your XSL stylesheet
 - *select a node in your XML file*
 - *get attribute value to select another attribute value on current node*
 - *combine values and text for output*
- test stylesheet with XML file

~ 10 minutes

XML - XPath details - location - conditional selection

- create boolean expressions called *predicates*
 - *test a condition*
 - *use results of test to select specific subset of node set...*
- predicates can
 - *compare values, test existence, perform mathematics...*
- to conditionally select nodes
 - *create location path to node that contains desired subset*
 - *add [*
 - *add expression to define required subset*
 - *add]*

XML - XPath details - location - conditional selection - predicates

- predicates not only for comparisons
 - e.g. we could use `[@language]`
 - selects all current node's elements with language attribute
- also use multiple predicates to narrow search, e.g.

```
name[@language='English'][position() = last()]
```

- also add attribute selector after predicate - if required
- example XSL usage

```
<xsl:template match= "name[@language!='english']"> (<em><xsl:value-of sele
```

XML - working example - ancient sites - conditional selection

XSL

```
<xsl:apply-templates select="images"/>
...
<xsl:template match="images">
  <td>
    <xsl:value-of select="image[@type='jpg'][position() = last()]" />
  </td>
</xsl:template>
```

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XML - XPath & XSLT tests - conditional selection

Exercise - part 6

- update your XSL stylesheet
 - *apply template for new parent node*
 - *add template for child node*
 - *conditionally select from child nodes using attributes*
 - *combine values and text for output*
- test stylesheet with XML file

~ 10 minutes

XML - XPath details - location - absolute paths

- create absolute location paths
 - *do not rely on the current node*
- to create an absolute location path
 - *add / - indicate starting at root node of XML document*
 - *add root - use root element name of your XML document*
 - *add / - down one level in XML document's tree hierarchy*
 - *add container - identify name of element on next level containing required element*
 - *repeat traversal to reach required depth in tree structure*
 - *add any predicates, select the node's attributes &c.*
- at any point in the location path
 - *we may also use * - specify all the elements at that level*

XML - XPath details - location - select all descendants

- // - useful to select all descendants of a particular node
- use it in either *absolute* or *relative* location path
- example usage includes
 - *all descendants of root node*,
 - //
 - *all descendants of current node*
 - .//
 - *all descendants of any node*
 - locate required node
 - //
 - *some descendants of any node*
 - locate required node
 - //
 - add name of required descendant elements
 - *output matching elements whose element name matches*
 - //element_name (add name of required element...)

XML - XPath details - functions - intro

- with XPath functions
 - *apply additional logic to node sets*
 - *useful option to return only the data you need...*
- e.g. perform one or more operations on a string
 - *operation performed before it is output*
 - *quickly and efficiently modify the final result*
- official specifications for XPath Version 1.0 functions
 - <https://www.w3.org/TR/xpath/#corelib>

XML - XPath details - functions - comparison

- comparison is often a common test on location paths
 - e.g. *one value greater than another...*
- use a standard conditional pattern, e.g.
 - *set path to first node set for comparison*
 - *add =, or !=*
 - *or add >, >=, <, <=*
 - *add value or path to a node set for comparison*
- these options can be used with `xsl:template` and `xsl:apply-templates` processing
- also use with condition testing
 - e.g. *xsl:if* and *xsl:when*
- use and operator to test a series of multiple conditions
- use or operator to test at least one in a series of multiple conditions

XML - working example - ancient sites - comparison

XSL

```
<xsl:apply-templates select="ancient_sites/site[./history/year &lt; 1571]" />
  <xsl:sort select="year" order="descending" data-type="number" />
</xsl:apply-templates>
```

- Demo - Ancient Sites 7

XML - XPath & XSLT tests - functions - comparison

Exercise - part 7

- update your XSL stylesheet
 - *apply template for a specific node selection*
 - *add comparison against a given element for the current node*
 - *add custom sort order for output*
- test stylesheet with XML file

~ 10 minutes

XML - XPath details - functions - test position

- might also choose to select a specific node in the node set
- e.g. first, second, or even the last
- to test a node's position
 - *add `position()` = n (n = position of node in current node set)*
- also get last node in a particular node set
 - *add `last()` to get the last node*
- shortcut can be used
 - e.g. *`site[1]` would return the first `site` node*
- use this shortcut in template processing
- can't use shortcut with `xsl:if` or `xsl:when`
- can't use shortcut in `xsl:value-of` instruction

XML - XPath & XSLT tests - functions - test position

Exercise - part 8

- update your XSL stylesheet
 - *add an option to get first and last node values for a given node set*
 - *use functions to test position with a conditional statement*
 - e.g. `xsl:when`
 - *add output to rendered document*
- test stylesheet with XML file

~ 10 minutes

XML - XPath details - functions - mathematics

- also include simple arithmetic operations with our expressions
- allow us to test for more complicated conditions
 - *or to output calculated values...*
- e.g to multiply, divide, add, or subtract,
 - *add first operand*
 - e.g. numerical constant 12 or a node set
 - *add mathematical operator*
 - * (for multiplication)
 - `div` (for division, since / is reserved)
 - + (for addition)
 - - (for subtraction)
 - add second operand
- multiplication and division are performed before addition and subtraction
 - e.g. $4+5*3 = 19$ and not 27
 - use parentheses to override the default, e.g. $(4+5)*3 = 27$
- modulus operator may also be used
 - e.g. $20 \bmod 4 = 0$ (since 4 divides evenly into 20)
 - but $20 \bmod 3 = 2$ since $20/3$ is 6 with a remainder of 2

XML - working example - ancient sites - mathematics

XML

```
<history>
  <period>New Kingdom</period>
  <dynasty>18</dynasty>
  <year range="start" era="BC">1346</year>
  <year range="end" era="BC">1332</year>
</history>
```

XSL

```
<xsl:choose>
  <xsl:when test="year[@range='end']">
    <xsl:value-of select="year[@range='start'] - year[@range='end']"/>
  </xsl:when>
  <xsl:otherwise>
    <xsl:value-of select="year[@range='start'] + 2017"/>
  </xsl:otherwise>
</xsl:choose>
```

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Demos

■ XML & XSLT

- *Ancient Sites - part 4*
- *Ancient Sites - part 5*
- *Ancient Sites - part 6*

■ XML & XSLT - functions

- *Ancient Sites - comparison - part 7*
 - *Ancient Sites - mathematics - 8*

References

- Oxygen XSLT Processors
- W3C - GRDDL
- W3C - OWL
- W3C - RDF
- W3C - SPARQL
- W3C - XML well formed
- Xalan Project