

# Computer Science E-259

XML with J2EE

## Lecture 6: Namespaces in XML 1.1, SVG 1.1, and XSL (XSL-FO) 1.0

9 March 2006

David J. Malan  
`malan@post.harvard.edu`

1

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# Computer Science E-259

Last Time

- XSLT, Continued

2

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# Last Time

## XSLT 1.0, Continued

- Data Types
- Conditions
- Iteration
- Iteration, Sorted
- Patterns
- Modes
- Built-In Templates, Revisited
- Priorities
- Includes
- Imports
- Variables
- Result Tree Fragments
- Copying Nodes
- Outputting Nodes
- Attribute Value Templates
- Multiple Source Documents
- Recursion
- Extension Elements and Functions

3

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# Computer Science E-259

## This Time

- Namespaces in XML 1.1
- SVG 1.1
- XSL (XSL-FO) 1.0
- Project 2

4

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# Namespaces in XML 1.1

## History

- Recommendation as of 1/99.
  - "XML namespaces provide a simple method for qualifying element and attribute names used in Extensible Markup Language documents by associating them with namespaces identified by URI references."

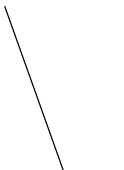
5

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# Namespaces in XML 1.1

## Declaring

```
<cscie259:foo  
  xmlns:cscie259="http://www.fas.harvard.edu/~cscie259/namespace">  
  <bar baz="qux"/>  
  <oogle cscie259:foogle="google"/>  
</cscie259:foo>
```



a unique URI

6

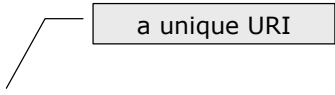
Source available at <http://www.fas.harvard.edu/~cscie259/distribution/lectures/6/examples6/xml/ns1.xml>.

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# Namespaces in XML 1.1

## Defaulting

```
<foo  
  xmlns="http://www.fas.harvard.edu/~cscie259/namespace">  
  <bar baz="qux"/>  
  <oogie foogle="google"/>  
</foo>
```



a unique URI

7

Source available at <http://www.fas.harvard.edu/~cscie259/distribution/lectures/6/examples6/xml/ns2.xml>.

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# SVG 1.1

## History

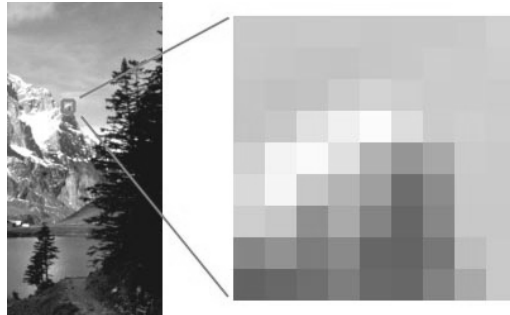
- Recommendation as of 1/03.
  - "SVG is a language for describing two-dimensional graphics in XML. SVG allows for three types of graphic objects: vector graphic shapes (e.g., paths consisting of straight lines and curves), images and text."

8

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# SVG 1.1

## Bitmaps



9

Image from <http://www.prepressure.com/image/bitmapvector.htm>.

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# SVG 1.1

## Bitmaps



10

Source of screen shot unknown.

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.



# SVG 1.1

## Vector Graphics



# SVG 1.1

## Vector Graphics



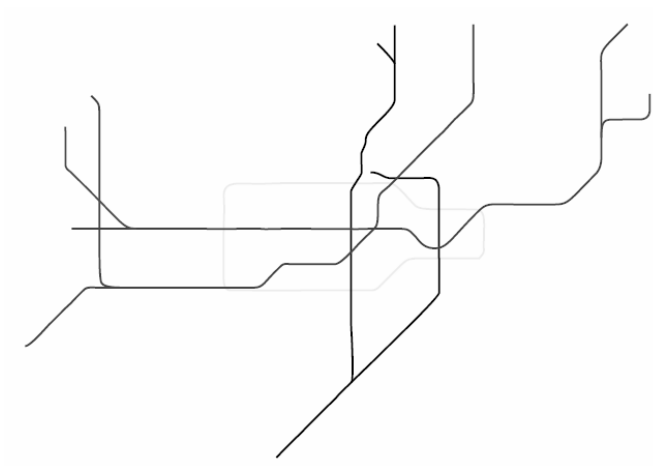
13

Image from <http://www.adobe.com/support/downloads/main.html>.

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# SVG 1.1

## Animated Graphics



14

Screen shot from [http://kartoweb.itc.nl/public\\_examples/UndergroundMorph.html](http://kartoweb.itc.nl/public_examples/UndergroundMorph.html).

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# SVG 1.1

## Underground Graphics



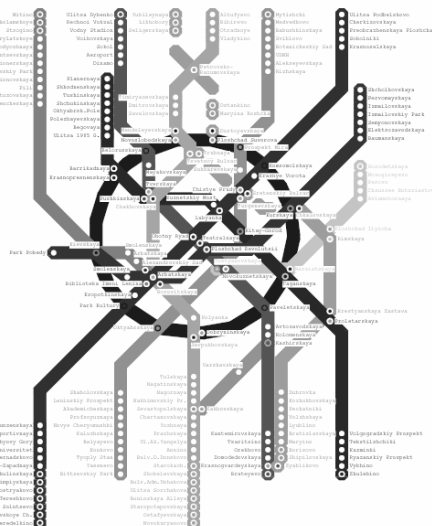
15

Screen shot from <http://home.referral.net.au/thesethings/svg/gtubemap.svgz>.

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# SVG 1.1

## Russian Graphics



16

Screen shot from <http://www.aisee.com/svg/metro.htm>.

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.



# SVG 1.1

## Text

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE svg PUBLIC "-//W3C//DTD SVG 1.1//EN"
    "http://www.w3.org/Graphics/SVG/1.1/DTD/svg11.dtd">

<svg:svg xml:space="preserve"
    xmlns:svg="http://www.w3.org/2000/svg">
    <svg:text style="fill:red;" y="15">This is SVG.</svg:text>
</svg:svg>
```

17

Adapted from <http://www.adobe.com/svg/basics/getstarted2.html>.

Viewable at <http://www.fas.harvard.edu/~cscie259/distribution/lectures/6/examples6/svg/text.svg>.

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# SVG 1.1

## Shapes

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE svg PUBLIC "-//W3C//DTD SVG 1.1//EN"
    "http://www.w3.org/Graphics/SVG/1.1/DTD/svg11.dtd">

<svg:svg xml:space="preserve"
    xmlns:svg="http://www.w3.org/2000/svg">
    <svg:rect style="fill:blue;" width="250" height="100"/>
</svg:svg>
```

18

Adapted from <http://www.adobe.com/svg/basics/getstarted2.html>.

Viewable at <http://www.fas.harvard.edu/~cscie259/distribution/lectures/6/examples6/svg/text.svg>.

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# SVG 1.1

## Shapes

```
<circle cx="25" cy="25" r="20" fill="red"/>
```



```
<ellipse cx="25" cy="25" rx="20" ry="10" fill="red"/>
```



```
<line x1="5" y1="5" x2="45" y2="45" stroke="red"/>
```



```
<polygon points="5,5 45,45 5,45 45,5" stroke="red" fill="none"/>
```



```
<polyline points="5,5 45,45 5,45 45,5" stroke="red" fill="none"/>
```



```
<rect x="5" y="5" rx="5" ry="5" width="40" height="40" fill="red"/>
```



19

Excerpted from <http://www.kevindev.com/tutorials/basics/shapes/svg/index.htm>.

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# SVG 1.1

## Paths

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE svg PUBLIC "-//W3C//DTD SVG 1.1//EN"
    "http://www.w3.org/Graphics/SVG/1.1/DTD/svg11.dtd">
```

```
<svg:svg xml:space="preserve"
  xmlns:svg="http://www.w3.org/2000/svg">
  <svg:path d="M 50 10 L 350 10 L 200 120 z"/>
</svg:svg>
```

Paths are described using the following data attributes: "moveto" [M] (set a new current point), "lineto" [L] (draw a straight line), "curveto" [C] (draw a curve using a cubic Bezier), "arc" [A] (elliptical or circular arc), and "closepath" [z] (close the current path by drawing a line to the last "moveto" point).

20

Adapted from <http://www.adobe.com/svg/basics/getstarted2.html>.

Viewable at <http://www.fas.harvard.edu/~cscie259/distribution/lectures/6/examples6/svg/path1.svg>.

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# SVG 1.1

## Paths

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE svg PUBLIC "-//W3C//DTD SVG 1.1//EN"
    "http://www.w3.org/Graphics/SVG/1.1/DTD/svg11.dtd">

<svg:svg xml:space="preserve"
    xmlns:svg="http://www.w3.org/2000/svg">
    <svg:path d="M5,45 C5,5 45,5 45,45" stroke="red" fill="none"/>
</svg:svg>
```

Paths are described using the following data attributes: "moveto" [M] (set a new current point), "lineto" [L] (draw a straight line), "curveto" [C] (draw a curve using a cubic Bezier), "arc" [A] (elliptical or circular arc), and "closepath" [z] (close the current path by drawing a line to the last "moveto" point).

21

Adapted from <http://www.adobe.com/svg/basics/getstarted2.html>.

Viewable at <http://www.fas.harvard.edu/~cscie259/distribution/lectures/6/examples6/svg/path2.svg>.

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# SVG 1.1

## Anchor

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE svg PUBLIC "-//W3C//DTD SVG 1.1//EN"
    "http://www.w3.org/Graphics/SVG/1.1/DTD/svg11.dtd">

<svg:svg xml:space="preserve"
    xmlns:svg="http://www.w3.org/2000/svg"
    xmlns:xlink="http://www.w3.org/1999/xlink">

    <svg:a xlink:href="http://www.fas.harvard.edu/~cscie259/" target="_blank">
        <svg:text style="fill:red;" y="15">This is CSCI E-259.</svg:text>
    </svg:a>

</svg:svg>
```

22

Viewable at <http://www.fas.harvard.edu/~cscie259/distribution/lectures/6/examples6/svg/anchor.svg>.

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# SVG 1.1

## Using Definitions

```
<defs>
  <rect id="rect" width="15" height="15" fill="red"/>
</defs>
<use x="5" y="5" xlink:href="#rect"/>
<use x="30" y="30" xlink:href="#rect"/>
```



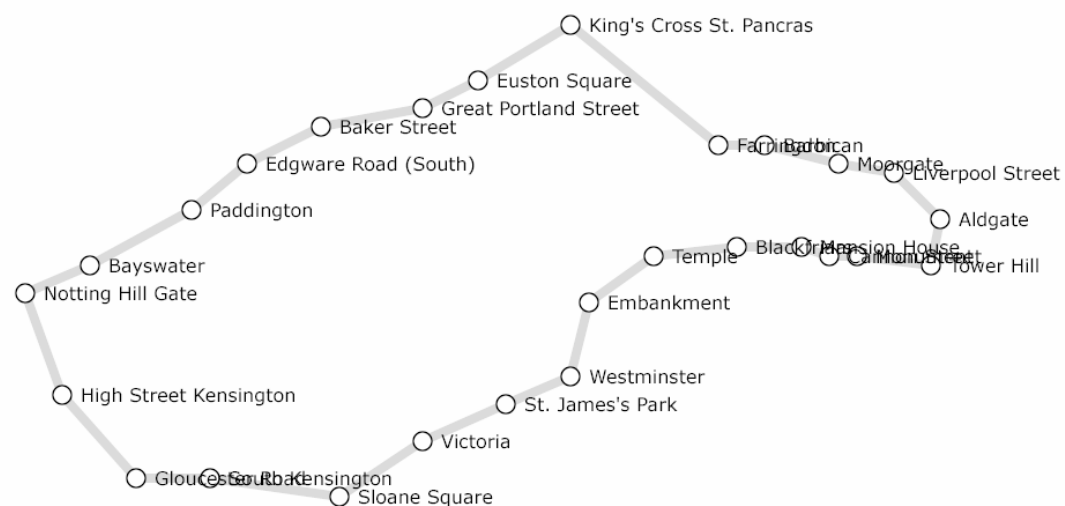
23

Excerpted from <http://www.kevindev.com/tutorials/basics/shapes/svg/index.htm>.

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# SVG 1.1

## XTube



24

Viewable at <http://www.fas.harvard.edu/~cscie259/distribution/lectures/6/examples6/svg/circle.svg>.

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# XSL (XSL-FO) 1.0

## History

- Extensible Stylesheet Language (XSL) Version 1.0 is a recommendation since 10/01.
  - "Given a class of arbitrarily structured XML documents or data files, designers use an XSL stylesheet to express their intentions about how that structured content should be presented; that is, how the source content should be styled, laid out, and paginated onto some presentation medium, such as a window in a Web browser or a hand-held device, or a set of physical pages in a catalog, report, pamphlet, or book."
- Builds on CSS2 and Document Style Semantics and Specification Language (DSSSL).

# XSL (XSL-FO) 1.0

## Rendering

- Framemaker's Maker Interchange Format (MIF)
- HP's Printer Control Language (PCL)
- Java's Abstract Window Toolkit (AWT)
- Portable Document Format (PDF)
- Postscript
- Rich Text Format (RTF)
- Scalable Vector Graphics (SVG)
- Text
- XML Area Tree
- ...

# XSL (XSL-FO) 1.0

hello, world

```
<?xml version="1.0" encoding="iso-8859-1"?>

<fo:root xmlns:fo="http://www.w3.org/1999/XSL/Format">

  <fo:layout-master-set>
    <fo:simple-page-master master-name="mylayout">
      <fo:region-body margin="1in"/>
    </fo:simple-page-master>
  </fo:layout-master-set>

  <fo:page-sequence master-reference="mylayout">
    <fo:flow flow-name="xsl-region-body">
      <fo:block>hello, world</fo:block>
    </fo:flow>
  </fo:page-sequence>

</fo:root>
```

27

Source available at <http://www.fas.harvard.edu/~cscie259/distribution/lectures/6/examples6/xsl/hello.fo>.

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# XSL (XSL-FO) 1.0

## Terminology

- master
  - "pagination and layout specifications"
- flow
  - "the content that is distributed into the pages"
- block
  - "The fo:block formatting object is commonly used for formatting paragraphs, titles, headlines, figure and table captions, etc."
- inline
  - "The fo:inline formatting object is commonly used for formatting a portion of text with a background or enclosing it in a border."

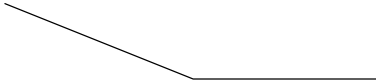
28

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# XSL (XSL-FO) 1.0

hello, world

```
<?xml version="1.0" encoding="iso-8859-1"?>
```



XML declaration

29

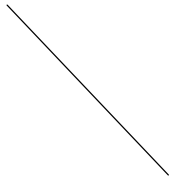
Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# XSL (XSL-FO) 1.0

hello, world

```
<?xml version="1.0" encoding="iso-8859-1"?>
```

```
<fo:root xmlns:fo="http://www.w3.org/1999/XSL/Format">
```



"This is the top node of the formatting object tree. It holds an fo:layout-master-set formatting object (which holds all masters used in the document), an optional fo:declarations, and one or more fo:page-sequence objects. Each fo:page-sequence represents a sequence of pages that result from formatting the content children of the fo:page-sequence."

```
</fo:root>
```

30

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# XSL (XSL-FO) 1.0

hello, world

"The fo:layout-master-set is a wrapper around all masters used in the document. This includes page-sequence-masters, page-masters, and region-masters."

```
<fo:layout-master-set>
```

```
</fo:layout-master-set>
```

31

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# XSL (XSL-FO) 1.0

hello, world

"The fo:simple-page-master is used in the generation of pages and specifies the geometry of the page. The page may be subdivided into up to five regions: region-body, region-before, region-after, region-start, and region-end."

```
<fo:simple-page-master master-name="myfirst">
```

```
</fo:simple-page-master>
```

32

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.



# XSL (XSL-FO) 1.0

hello, world

"Used in constructing a simple-page-master. This region specifies a viewport/reference pair that is located in the 'center' of the fo:simple-page-master."

```
<fo:region-body margin="1in"/>
```

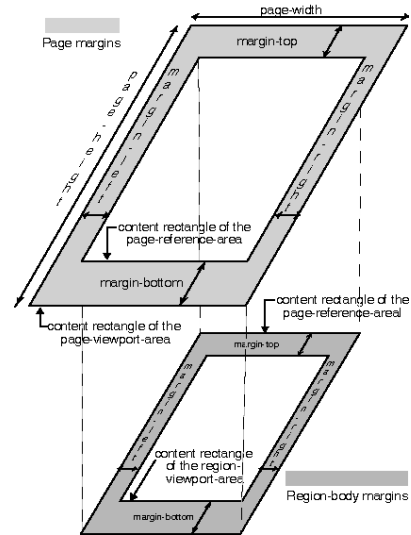


Image from <http://www.w3.org/TR/xsl/slice6.html>, copyright © 1999 – 2003, W3C.

33

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# XSL (XSL-FO) 1.0

hello, world

"The fo:page-sequence formatting object is used to specify how to create a (sub-)sequence of pages within a document; for example, a chapter of a report. The content of these pages comes from flow children (consisting of the single fo:flow and any fo:static-content flow objects) of the fo:page-sequence. The layout of these pages comes from the fo:page-sequence-master or page-master referenced by the master-reference trait on the fo:page-sequence."

```
<fo:page-sequence master-reference="myfirst">
```

```
</fo:page-sequence>
```

34

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# XSL (XSL-FO) 1.0

**hello, world**

"The content of the fo:flow formatting object is a sequence of flow objects that provides the flowing text content that is distributed into pages. . . . The flow-names reserved in XSL are: xsl-region-body, xsl-region-before, xsl-region-after, xsl-region-start, xsl-region-end, xsl-before-float-separator, xsl-footnote-separator."

```
<fo:flow flow-name="xsl-region-body">  
  
</fo:flow>
```

35

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# XSL (XSL-FO) 1.0

**hello, world**

"The fo:block formatting object is commonly used for formatting paragraphs, titles, headlines, figure and table captions, etc."

```
<fo:block>hello, world</fo:block>
```

36

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# XSL (XSL-FO) 1.0

## Font Properties (plus fo:inline)

```
<fo:block color="#ff0000"
          font-family="Times"
          font-size="24pt"
          font-weight="bold">
  <fo:inline font-size="300%">h</fo:inline>ello, world
</fo:block>
```

# XSL (XSL-FO) 1.0

## Text Properties (plus fo:inline)

```
<fo:block letter-spacing="3pt"
          text-align="justify"
          text-decoration="underline"
          text-indent="3cm"
          word-spacing="10pt">
  <fo:inline text-transform="uppercase">Intended for
  students with previous Java programming and web
  development experience, this course introduces XML as a
  key enabling technology in today's e-business
  applications.</fo:inline> Students will learn the
  fundamentals of XML: schemas, XSL stylesheets, and
  programmatic access using standard APIs. Building on
  these foundations, the course will explore in detail a
  number of case studies that utilize XML in e-business:
  e-commerce, web personalization, portals, and web
  services. Data modeling techniques in XML will be
  introduced in the context of the case studies.
</fo:block>
```

# XSL (XSL-FO) 1.0

## Tables

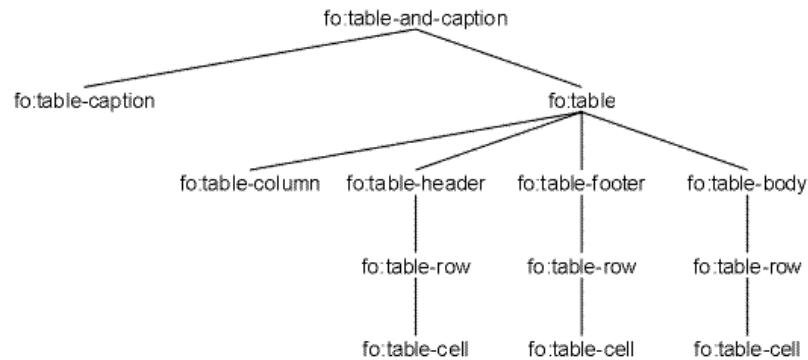


Image from <http://www.w3.org/TR/xsl/slice6.html>, copyright © 1999 – 2003, W3C.

39

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# XSL (XSL-FO) 1.0

## Multiple Blocks

```
<?xml version="1.0" encoding="iso-8859-1"?>
<fo:root xmlns:fo="http://www.w3.org/1999/XSL/Format">
  <fo:layout-master-set>
    <fo:simple-page-master master-name="mylayout">
      <fo:region-body margin="1in"/>
    </fo:simple-page-master>
  </fo:layout-master-set>
  <fo:page-sequence master-reference="mylayout">
    <fo:flow flow-name="xsl-region-body" font="14pt Times">
      <fo:block font-size="24pt" text-align="center" space-before="30pt"
        space-before.conditionality="retain" space-after="12pt">The Jabberwocky</fo:block>
      <fo:block font-style="italic" text-align="end" space-before="12pt"
        space-after="9pt">Lewis Carroll</fo:block>
      <fo:block start-indent="1.5in" space-after="9pt">
        <fo:block>Twas brillig, and the slithy toves</fo:block>
        <fo:block>Did gyre and gimble in the wabe:</fo:block>
        <fo:block>All mimsy were the borogoves,</fo:block>
        <fo:block>And the mome raths outgrabe.</fo:block>
      </fo:block>
      <fo:block start-indent="1.5in" space-after="9pt">
        <fo:block>Beware the Jabberwock, my son!</fo:block>
        <fo:block>The jaws that bite, the claws that catch!</fo:block>
        <fo:block>Beware the Jubjub bird, and shun</fo:block>
        <fo:block>The frumious Bandersnatch!</fo:block>
      </fo:block>
    </fo:flow>
  </fo:page-sequence>
</fo:root>
```

Example from <http://www.renderx.com/Tests/doc/html/tutorial.html>, copyright © 2000 – 2001, RenderX.

40

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# XSL (XSL-FO) 1.0

## With XSLT

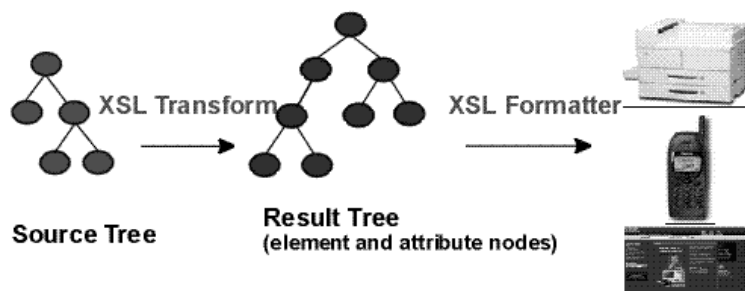
```
<?xml version="1.0" encoding="iso-8859-1"?>
<poem>
  <title>Jabberwocky</title>
  <poet>Lewis Carroll</poet>
  <stanzas>
    <stanza>
      <verse>'Twas brillig, and the slithy toves</verse><verse>Did gyre and gimble in the wabe;</verse>
      <verse>All mimsy were the borogoves,</verse><verse>And the mome raths outgrabe.</verse>
    </stanza>
    <stanza>
      <verse>"Beware the Jabberwock, my son!</verse><verse>The jaws that bite, the claws that catch!</verse>
      <verse>Beware the Jubjub bird, and shun</verse><verse>The frumious Bandersnatch!"</verse>
    </stanza>
    <stanza>
      <verse>He took his vorpal sword in hand:</verse><verse>Long time the manxome foe he sought--</verse>
      <verse>So rested he by the Tumtum tree,</verse><verse>And stood awhile in thought.</verse>
    </stanza>
    <stanza>
      <verse>And, as in uffish thought he stood,</verse><verse>The Jabberwock, with eyes of flame,</verse>
      <verse>Came whiffling through the tulgey wood,</verse><verse>And burbled as it came!</verse>
    </stanza>
    <stanza>
      <verse>One two! One two! And through and through</verse><verse>The vorpal blade went snicker-snack!</verse>
      <verse>He left it dead, and with its head</verse><verse>He went galumphing back.</verse>
    </stanza>
    <stanza>
      <verse>"And hast thou slain the Jabberwock?</verse><verse>Come to my arms, my beamish boy!</verse>
      <verse>O frabjous day! Callooh! Callay!"</verse><verse>He chortled in his joy.</verse>
    </stanza>
    <stanza>
      <verse>'Twas brillig, and the slithy toves</verse><verse>Did gyre and gimble in the wabe;</verse>
      <verse>All mimsy were the borogoves,</verse><verse>And the mome raths outgrabe.</verse>
    </stanza>
  </stanzas>
</poem>
```

41

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# XSL (XSL-FO) 1.0

## The Big Picture



Result XML tree is the result of XSLT processing.

Image from <http://www.w3.org/TR/xsl/slice1.html>, copyright © 1999 – 2003, W3C.

42

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# Next Time

## HTTP 1.1, JavaServer Pages 2.0, and Java Servlet 2.4

- HTTP 1.1
- $n$ -Tier Enterprise Applications
- JavaServer Pages 2.0
- Java Servlet 2.4
- Project 3

43

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.

# Computer Science E-259

## XML with J2EE

### Lecture 6: Namespaces in XML 1.1, SVG 1.1, and XSL (XSL-FO) 1.0

9 March 2006

David J. Malan  
`malan@post.harvard.edu`

44

Copyright © 2006, David J. Malan <malan@post.harvard.edu>. All Rights Reserved.