

Ch. 2: XSLT

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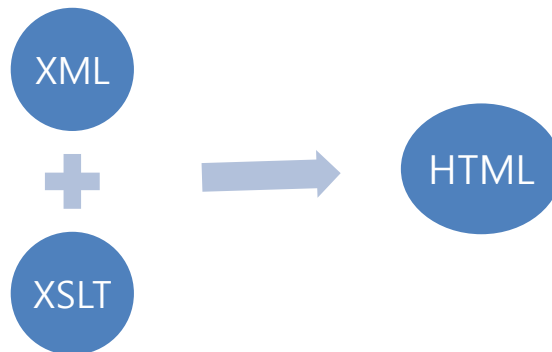
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Contents

- XSLT
- Transforming XML with XSLT
- Outputting Values
- Looping Over Nodes
- Processing Nodes Conditionally
- Adding Conditional Choices
- Sorting Nodes Before Processing
- Generating Output Attributes
- Creating and Applying Templates

XSLT

- XSLT: eXtensible Style Language for Transformations
 - Describes the rules of the transformation
- Used to
 - Format XML documents
 - Reorder the output according to specific criteria
 - Display only certain pieces of information
 - ...
- Transforming XML with XSLT into other mark-up format



Transforming XML with XSLT

- Linking XML document to XSLT style sheet
 - Using **xml-stylesheet** processing instruction

[xml]

```
<?xml version="1.0"?>  
<?xml-stylesheet type="text/xsl" href="02-03.xsl"?>  
  
<ancient_wonders>  
  <wonder>  
    <name language="English">Colossus of Rhodes</name>  
    <location>Rhodes, Greece</location>  
  </wonder>  
</ancient_wonders>
```

Figure 2.1

This XML file is calling 02-03.xsl file

Transforming XML with XSLT

- Analyzing the source XML
 - Convert XML into a **node tree**
 - node tree: hierarchical representation of XML document
 - node: one individual piece of XML document (e.g. element, attribute...)

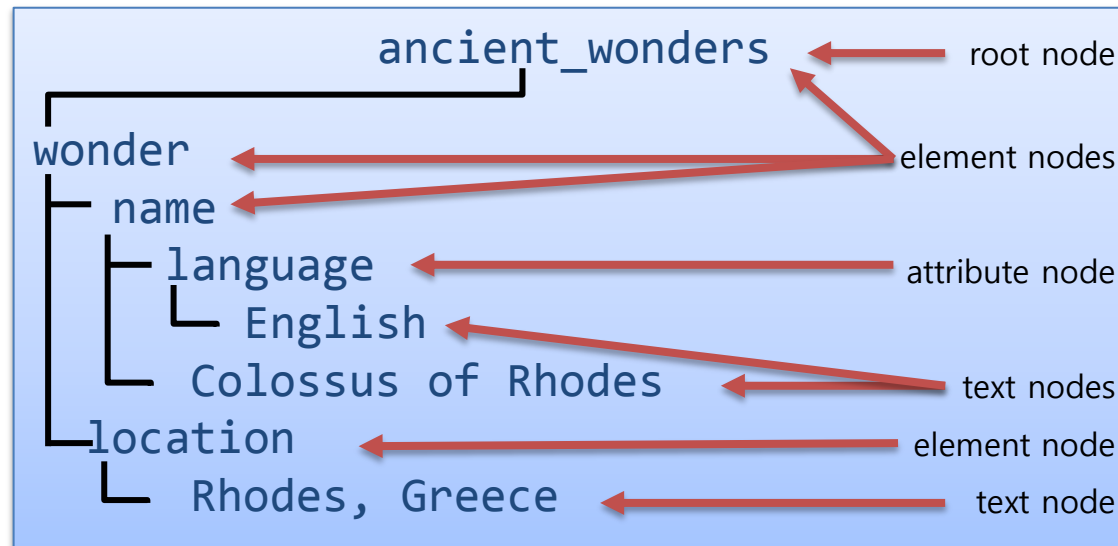


Figure 2.2

Transforming XML with XSLT

- Assessing the XSLT style sheet

Set the output method to HTML

Root template

Namespace & prefix

XPath Expression

[02-03.xsl]

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

  <xsl:output method="html"/>

  <xsl:template match="/">

    <html> <head> <title>Wonders of the World</title> </head>
    <body>
      <h1>Wonders of the World</h1>
      The <xsl:value-of select="ancient_wonders/wonder/name" />
      is located in <xsl:value-of select="ancient_wonders/wonder/location" />.
    </body>
  </html>
</xsl:template>
</xsl:stylesheet>
```

Figure 2.3

- The final transformed HTML

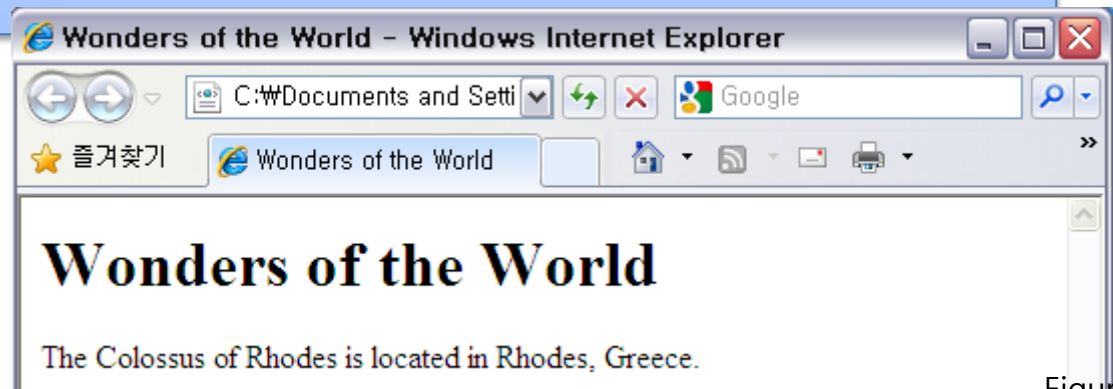


Figure 2.4

Beginning an XSLT Style Sheet

- **1st line** indicates XSLT is an XML document
- **2nd line** specifies namespace and declare prefix
- **</xsl:template match="/">**: forward slash matches the root node of XML source document (즉 XML source의 root node로 이동하여 준비)
- **</xsl:template>**: complete root template
- **The last line** completes style sheet

Figure 2.5

[xsl]

```
<?xml version="1.0"?>

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

</xsl:template match="/">
...
</xsl:template>

</xsl:stylesheet>
```

Outputting HTML in XSLT [1/2]

[02-07.xsl]

Setting output method to html

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

<xsl:output method="html"/>

<xsl:template match="/">

  <html>
    <head>
      <title>Wonders of the World</title>
    </head>
    <body>
      <p align="center">  </p>
      <p> The famous Greek historian Herodotus wrote of seven great architectural
        achievements. And although his writings did not survive, he planted seeds
        for what has become the list of the <strong> Seven Wonders of the Ancient
        World </strong>. </p>
    </body>
  </html>

</xsl:template>

</xsl:stylesheet>
```

Figure 2.7

Outputting HTML in XSLT [2/2]

[html] ■ Generated HTML

```
<html>
<head>
  <meta http-equiv="Content-Type"
    content="text/html; charset=UTF-8">
  <title>Wonders of the World</title>
</head>

<body>
  <p align="center">
    </p>
  <p>The famous Greek historian
    Herodotus wrote of seven great
    architectural achievements. And
    although his writings did not
    survive, he planted seeds for what
    has become the list of the
    <strong>Seven Wonders of the Ancient
    World</strong>.
  </p>
</body>
</html>
```

Figure 2.8

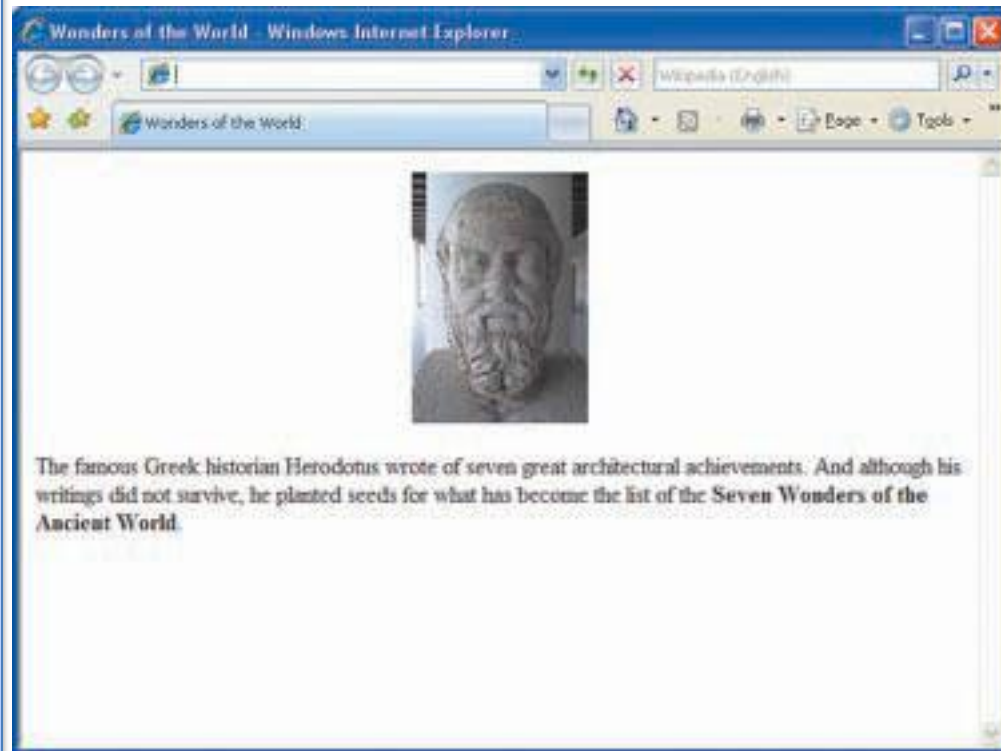


Figure 2.9

Outputting Values from XML using XSLT

[xml]

```
<?xml version="1.0"?>
<?xml-stylesheet type="text/xsl"
href="02-10.xsl"?>

<ancient_wonders>
  <wonder>
    <name language="English">Colossus
      of Rhodes</name>

    <name language="Greek">Κολοσσός της
      Ρόδου</name>

    <location>Rhodes, Greece</location>

    <height units="feet">107</height>
  </wonder>
</ancient_wonders>
...
```

name elements

Figure 2.10

[02-10.xsl]

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

<xsl:output method="html"/>

<xsl:template match="/">

  <html>
    <head>
      <title>Wonders of the World</title>
    </head>
    <body>
      <h1>Seven Wonders of the Ancient World</h1>

      <p>The <xsl:value-of
        select="ancient_wonders/wonder/name" /> is one
        of the wonders.</p>

      </p>
    </body>
  </html>

</xsl:template>

</xsl:stylesheet>
```

outputting values of 'name'

Figure 2.11

Outputting Values from XML using XSLT

- Generated HTML

[html]

```
<html>
<head>
  <meta http-equiv="Content-Type"
    content="text/html; charset=UTF-8">
  <title>Wonders of the World</title>
</head>

<body>
  <h1>Seven Wonders of the Ancient World </h1>

  <p>The Colossus of Rhodes is one of the
    wonders.</p>
</body>
</html>
```

Figure 2.12

“ancient_wonders/wonder/name” tag
의 첫번째 value



Figure 2.13

Looping Over Nodes [1/2]

- **<xsl:for-each>** element
 - Processes all the nodes matched by its **select** attribute

[20-14.xsl]

```
...
<xsl:template match="/">
...
<table border="1">
  <tr>
    <th>Wonder Name</th>
    <th>Location</th>
    <th>Height</th>
  </tr>

  <xsl:for-each select="ancient_wonders/wonder">
    <tr>
      <td> <strong> <xsl:value-of
        select="name[@language='English']"/> </strong> <br/>
        (<em> <xsl:value-of select="name[@language!='English']"/> </em>) </td>
      <td><xsl:value-of select = "location"/></td>
      <td><xsl:value-of select = "height"/></td>
    </tr>
  </xsl:for-each>
</table>
...
</xsl:template>
```

XPath Expression

모든
wonder tag
element에
대해서

Figure 2.14

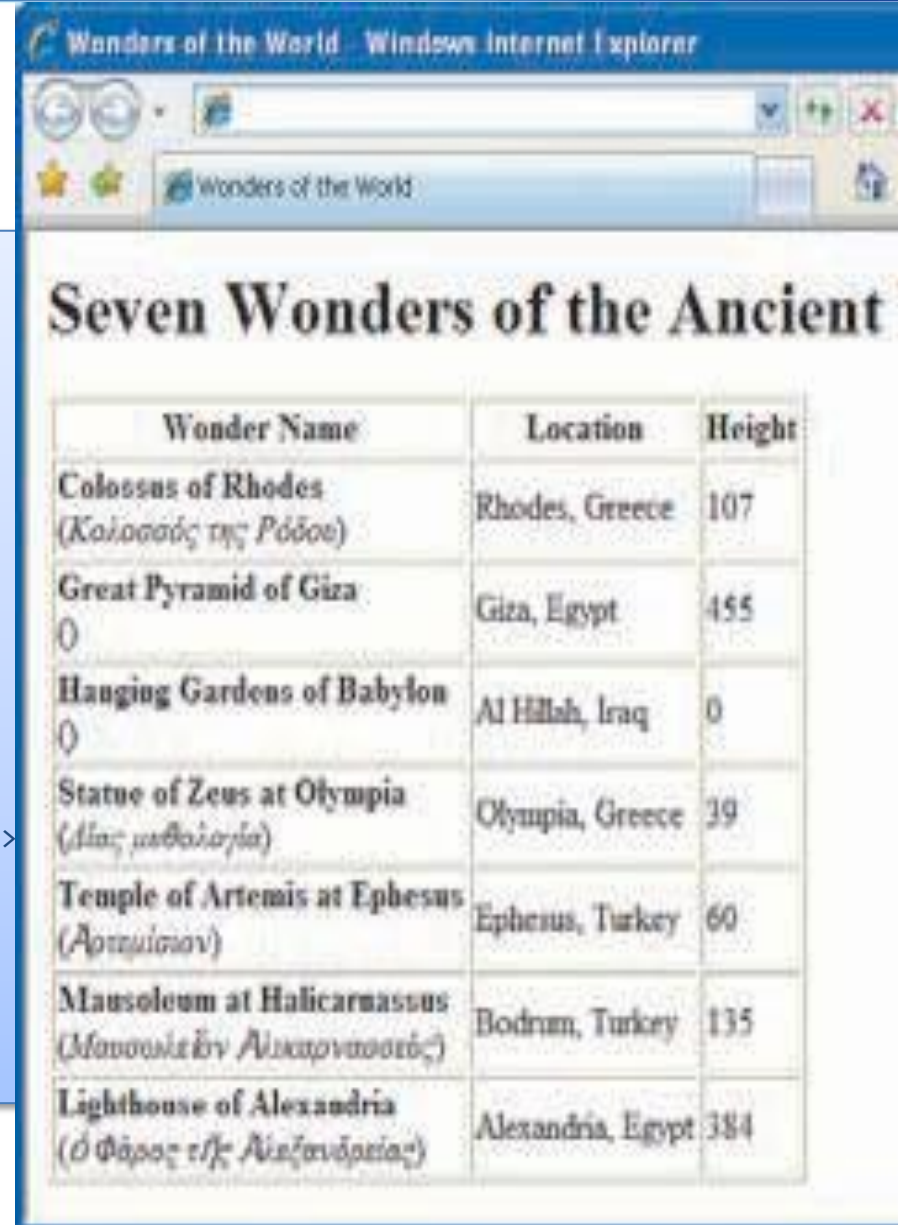
Looping Over Nodes [2/2]

■ Generated HTML

Figure 2.16

[html]

```
...  
<table border="1">  
<tr><th>Wonder Name</th><th>Location  
</th><th>Height</th></tr>  
  
<tr> <td><strong>Colossus of Rhodes</strong><br/>  
    (<em>Κολοσσός της Ρόδου</em>)</td>  
    <td>Rhodes, Greece</td>  
    <td>107</td></tr>  
  
<tr><td><strong>Great Pyramid of Giz </strong><br/>  
    (<em />) </td>  
    <td>Giza, Egypt</td>  
    <td>455</td> </tr>  
  
<tr><td><strong>Hanging Gardens of Babylon</strong><br/>  
    (<em/>)</td>  
    <td>Al Hillah, Iraq</td>  
    <td><td/></td></tr>  
  
...  
</table>  
...
```



The screenshot shows a web browser window titled "Wonders of the World - Windows Internet Explorer". The address bar shows "Wonders of the World". The main content area displays a table titled "Seven Wonders of the Ancient". The table has three columns: "Wonder Name", "Location", and "Height". The rows list the following wonders:

Wonder Name	Location	Height
Colossus of Rhodes (Κολοσσός της Ρόδου)	Rhodes, Greece	107
Great Pyramid of Giza ()	Giza, Egypt	455
Hanging Gardens of Babylon ()	Al Hillah, Iraq	0
Statue of Zeus at Olympia (Διας μεθαίστλια)	Olympia, Greece	39
Temple of Artemis at Ephesus (Αρτεμίσιον)	Ephesus, Turkey	60
Mausoleum at Halicarnassus (Μαυσολεῖον Ἀλικαρνασσοῦς)	Bodrum, Turkey	135
Lighthouse of Alexandria (ὁ Φάρος τῆς Αἰγυπτίας)	Alexandria, Egypt	384

Figure 2.15

Processing Nodes Conditionally

■ `<xsl:if>` element

[xsl] XPath Expression

```
...  
<xsl:for-each select="ancient_wonders/wonder">  
  <tr><td><strong><xsl:value-of select="name[@language='English']"/></strong>  
    <xsl:if test="name[@language!='English']">  
      <br/> (<em><xsl:value-of select="name[@language!='English']"/></em>)  
    </xsl:if>  
  </td>  
  ...
```

■ Generated HTML

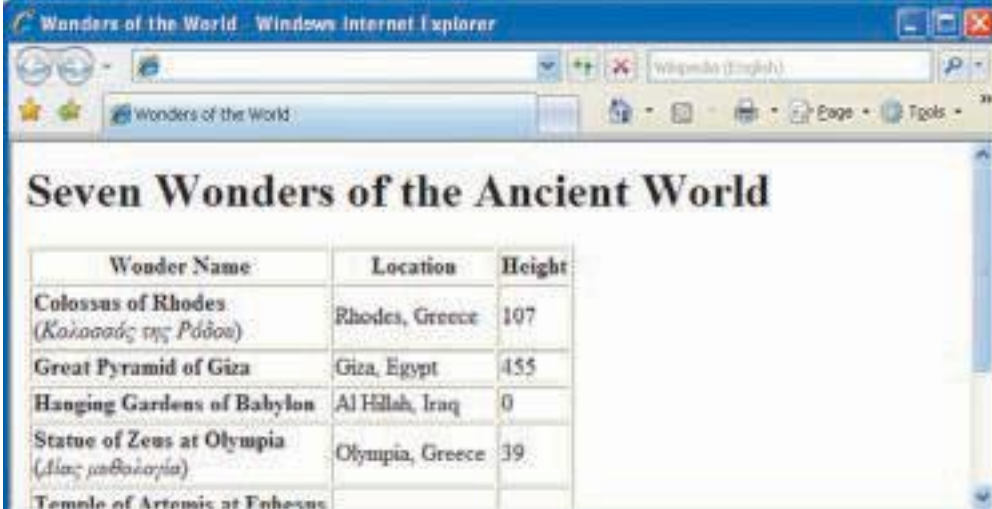
[html]

```
...  
<tr><td><strong>Colossus of  
  Rhodes</strong><br/> (<em>Κολοσσός  
  της Ρόδου</em>) </td>  
<td>Rhodes, Greece</td>  
<td>107</td></tr>  
  
<tr><td><strong>Great Pyramid of  
  Giza</strong><br/> </td>  
<td>Giza, Egypt</td>  
<td>455</td></tr>  
...
```

Figure 2.18

■ Result

Figure 2.17



The screenshot shows a web browser window titled 'Wonders of the World - Windows Internet Explorer'. The address bar shows 'Wonders of the World'. The main content area displays a table titled 'Seven Wonders of the Ancient World'. The table has three columns: 'Wonder Name', 'Location', and 'Height'. The rows are: 'Colossus of Rhodes (Κολοσσός της Ρόδου)', 'Great Pyramid of Giza', 'Hanging Gardens of Babylon', 'Statue of Zeus at Olympia (Λίαν μαρμαίον)', and 'Temple of Artemis at Ephesus'.

Wonder Name	Location	Height
Colossus of Rhodes (Κολοσσός της Ρόδου)	Rhodes, Greece	107
Great Pyramid of Giza	Giza, Egypt	455
Hanging Gardens of Babylon	Al Hillah, Iraq	0
Statue of Zeus at Olympia (Λίαν μαρμαίον)	Olympia, Greece	39
Temple of Artemis at Ephesus		

영어표시아래에 빈괄호가 없음 Figure 2.19

Adding Conditional Choices

■ `<xsl:choose>` element

[xslt]

```
...
<xsl:choose>
  <xsl:when test="height != 0">
    <xsl:value-of select="height"/>
  </xsl:when>
  <xsl:otherwise>
    unknown
  </xsl:otherwise>
</xsl:choose>
...
```

XPath Expression
↓

■ Result

Figure 2.20

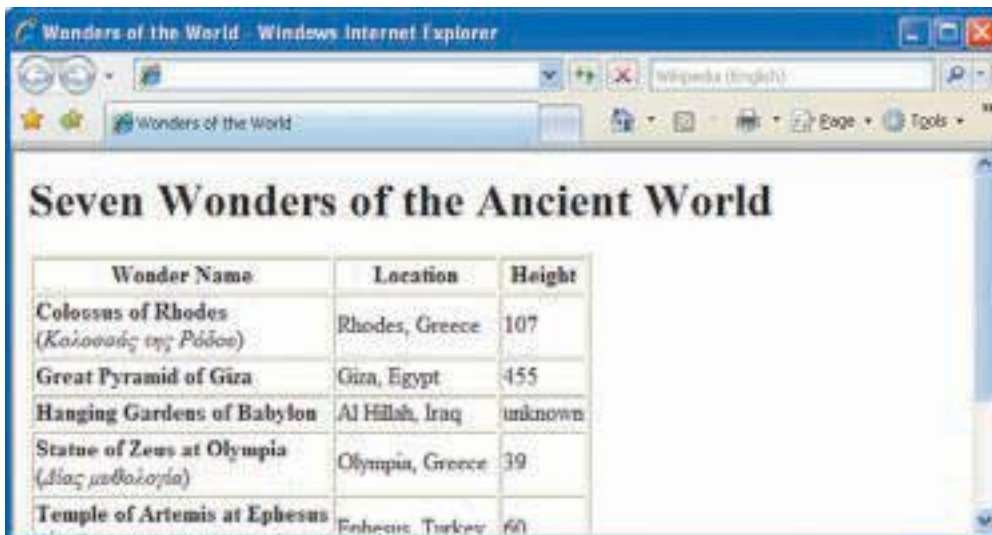
■ Generated HTML

[html]

```
...
<tr><td><strong>Great Pyramid of
Giza</strong><br/>( <em/>)</td>
<td>Giza, Egypt</td>
<td>455</td></tr>

<tr><td><strong>Hanging Gardens of
Babylon</strong><br/>( <em/>)</td>
<td>Al Hillah, Iraq</td>
<td>unknown</td></tr>
...
```

Figure 2.21



The screenshot shows a web browser window titled 'Wonders of the World'. The page displays a table with the title 'Seven Wonders of the Ancient World'. The table has three columns: 'Wonder Name', 'Location', and 'Height'. The data rows are as follows:

Wonder Name	Location	Height
Colossus of Rhodes (Κολοσσός της Ρόδου)	Rhodes, Greece	107
Great Pyramid of Giza	Giza, Egypt	455
Hanging Gardens of Babylon	Al Hillah, Iraq	unknown
Statue of Zeus at Olympia (Ἱστάς μολοχολία)	Olympia, Greece	39
Temple of Artemis at Ephesus	Ephesus, Turkey	60

Height가 0이 아니
면 숫자표기하고 0
이면 unknown표기

Figure 2.22

Sorting Nodes Before Processing

■ `<xsl:sort>` element

```
...
<table border="1"><tr>
<th>Wonder Name</th><th>Location</th><th>Height</th></tr>
<xsl:for-each select="ancient_wonders/wonder">
<xsl:sort select="height" order="descending" data-type="number" />
...

```

Criteria Sorting order text or number [xslt]

Figure 2.23

■ Generated HTML

[html]

```
...
<table border="1"><tr><th>Wonder
Name</th><th>Location</th><th>
Height</th></tr>

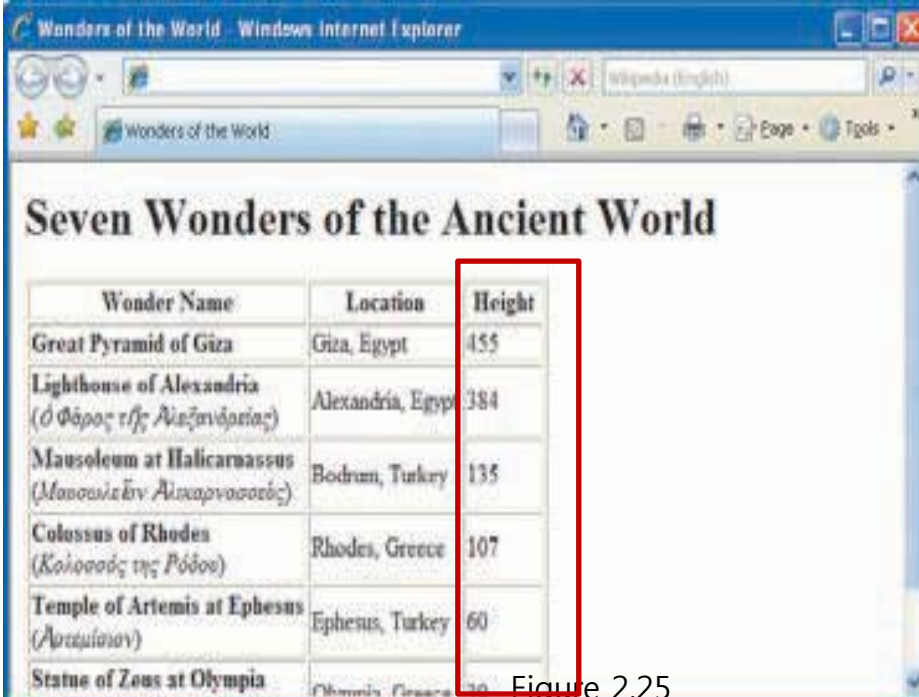
<tr><td><strong>Great Pyramid of
Giza</strong></td>
<td>Giza, Egypt</td>
<td>455</td></tr>

<tr><td><strong>Lighthouse of
Alexandria</strong><br/>(<em>
'ο Φάρος τῆς Ἀλεξανδρείας</em>)
</td><td>Alexandria, Egypt</td>
<td>384</td></tr>
...

```

■ Result

Figure 2.24



Wonders of the World - Windows Internet Explorer

Wonders of the World

Seven Wonders of the Ancient World

Wonder Name	Location	Height
Great Pyramid of Giza	Giza, Egypt	455
Lighthouse of Alexandria (Ὁ Φάρος τῆς Ἀλεξανδρείας)	Alexandria, Egypt	384
Mausoleum at Halicarnassus (Μαυσολεὶὸν Ἀλικαρνασσέως)	Bodrum, Turkey	135
Colossus of Rhodes (Κόλλοσσὸς τῆς Ρόδου)	Rhodes, Greece	107
Temple of Artemis at Ephesus (Ἀρτεμίσιον)	Ephesus, Turkey	60
Statue of Zeus at Olympia	Olympia, Greece	10

Figure 2.25

Generating Attributes inside HTML tags using XML content

- `<xsl:attribute>` element

[xslt]

```
...
<tr><td>
  <a>
    <xsl:attribute name="href">
      #<xsl:value-of select="name[@language='English']"/>
    </xsl:attribute>

    <strong><xsl:value-of
select="name[@language='English']"/></strong>
  </a>
...

```

Attribute name

Attribute value

Figure 2.26

HTML에서 href이라는 attribute를 옆에 있는 value와 함께 생성하라!

- Generated HTML

[html]

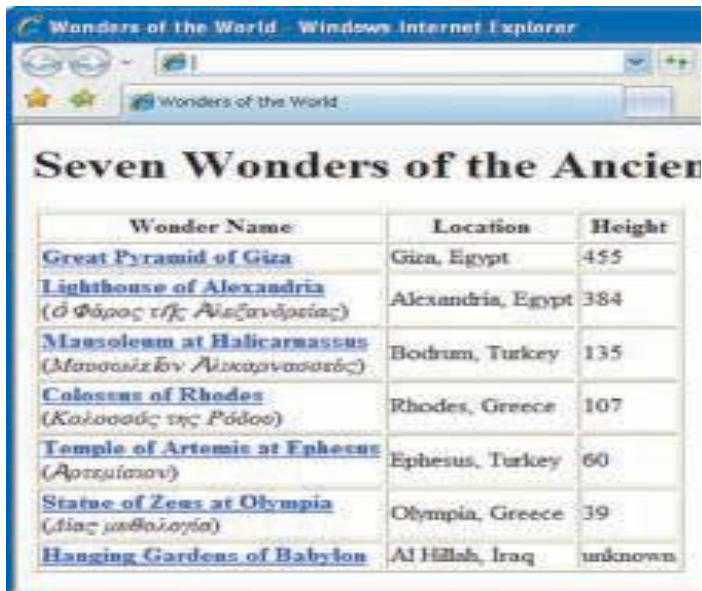
Figure 2.27

```
...
<table border="1">
<tr><th>Wonder Name</th><th>Location
</th><th>Height</th></tr>

<tr><td><a href= "#Great Pyramid of
Giza"><strong>Great Pyramid of
Giza</strong><br/><em/></td>
<td>Giza, Egypt</td>
<td>455</td></tr>
...

```

“#Great Pyramid of Giza”를 XML에서 추출하여 가져옴



Wonder Name	Location	Height
Great Pyramid of Giza	Giza, Egypt	455
Lighthouse of Alexandria (ὁ Φάρος τῆς Ἀλεξανδρείας)	Alexandria, Egypt	384
Mausoleum at Halicarnassus (Μαυσολεῖον Ἀλικαρνασσῶς)	Bodrum, Turkey	135
Colossus of Rhodes (Κολοσσός τῆς Ρόδου)	Rhodes, Greece	107
Temple of Artemis at Ephesus (Ἀρτεμίσιον)	Ephesus, Turkey	60
Statue of Zeus at Olympia (ἑὴς ἰσθμολογία)	Olympia, Greece	39
Hanging Gardens of Babylon	Al Hillah, Iraq	unknown

Figure 2.28

Creating Templates

- `<xsl:template>` element
 - Similar to function call in most programming languages

[xslt]

```
...  
<xsl:template match="/">           ← Root template (main function)  
  <html><head><title>Wonders of the World</title></head>  
  <body>  
    <h1>Seven Wonders of the Ancient World</h1>  
  ...  
</xsl:template>  
  
<xsl:template match="name[@language!='English']"> ← Template 생성  
  (<em><xsl:value-of select="."/></em>)  
</xsl:template>  
...
```

Figure 2.29

name[@language!='English']를 만나면
(<xsl:value-of select="."/>)
를 생성하라!

Applying Templates

[xslt]

```
...
<tr><td>
  <a>
    <xsl:attribute name="href">
      #<xsl:value-of
select="name[@language='English']"/>
    </xsl:attribute>
    <strong><xsl:value-of
select="name[@language='English']"/></str
ong>
  </a><br/>

<xsl:apply-templates
select="name[@language!='English']"/>
</td>
...
```

Figure 2.30

앞에 만들어논
template을 적용하라

[xslt]

```
...
<h2>History</h2>
<xsl:for-each
  select="/ancient_wonders/wonder">
  <xsl:sort select="height"
    order="descending" data-type="number" />
  <a>
    <xsl:attribute name="name">
      <xsl:value-of
select="name[@language='English']"/>
    </xsl:attribute>
  </a>
  <xsl:value-of
    select="name[@language='English']"/>

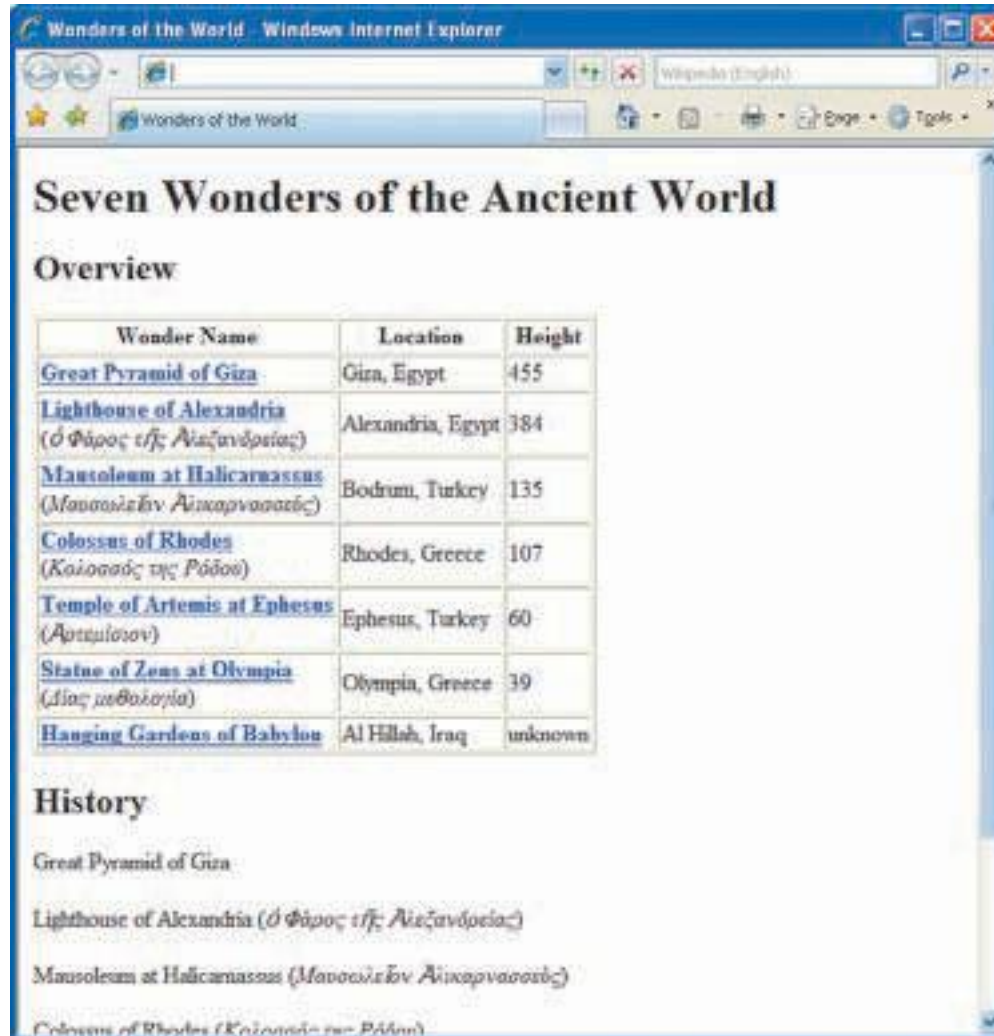
  <xsl:apply-templates
    select="name[@language!='English']"/>

  <br/><br/>
</xsl:for-each>
...
```

Figure 2.31

Generated HTML by Applying Templates

- Result



The screenshot shows a web browser window titled 'Wonders of the World - Windows Internet Explorer'. The address bar shows 'Wikipedia (English)'. The page content includes a title 'Seven Wonders of the Ancient World', an 'Overview' section with a table, and a 'History' section with a list of the wonders.

Wonder Name	Location	Height
Great Pyramid of Giza	Giza, Egypt	455
Lighthouse of Alexandria (ὁ Φάρος τῆς Αἰζανόπολης)	Alexandria, Egypt	384
Mausoleum at Halicarnassus (Μαυσωλεῖον Ἀλικαρνασσοῦς)	Bodrum, Turkey	135
Colossus of Rhodes (Κόλσος τῆς Ρόδου)	Rhodes, Greece	107
Temple of Artemis at Ephesus (Ἀρτεμιῶν)	Ephesus, Turkey	60
Statue of Zeus at Olympia (Ἱστὸς μεθολογία)	Olympia, Greece	39
Hanging Gardens of Babylon	Al Hillah, Iraq	unknown

History

Great Pyramid of Giza

Lighthouse of Alexandria (ὁ Φάρος τῆς Αἰζανόπολης)

Mausoleum at Halicarnassus (Μαυσωλεῖον Ἀλικαρνασσοῦς)

Colossus of Rhodes (Κόλσος τῆς Ρόδου)

Figure 2.32