# Tutorial Outline
# Using XML and XSL and JavaServer Pages

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## 1. TUTORIAL TITLE

Using XML and XSL with JavaServer Pages

## 2. TUTORIAL ORGANIZER INFORMATION

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## 3. TUTORIAL CATEGORY

Half day – 3 hours.

## 4. TUTORIAL DESCRIPTION

### 4.1  Introduction to the Topic

XML, the Extensible Markup Language, has permeated virtually all areas of computer application development.  It provides a simple paradigm for capturing hierarchical information that is powerful yet easy-to-learn.   Even a cursory look at prevailing application development strategies reveals that XML enjoys wide applicability in virtually all program domains.

XSL, the XML Stylesheet Language, complements XML by providing a way to retrieve data using XPath, a language specifically designed to address nodes in the hierarchical XML structure.  XSL is often used to transform XML data into HTML for rendering by a browser, but applications may also use data retrieved from XML files via XSL and XPath in more sophisticated ways.

A number of XML parsers and XSL engines are freely available that provide access to XML data from Java programs via familiar APIs (Application Programmer Interfaces).   These APIs can be used in Java applets on the client side or Java Servlets and JavaServer Pages (JSPs) on the server side.

The primary purpose of this tutorial is to introduce participants to these topics and give them the knowledge necessary to build Web applications using XML, XSL, and XPath via JavaServer Pages. The tutorial will also demonstrate how these technologies can be used to standardize the creation course Web sites.

### 4.1.1  Behavioral Objectives

Upon completion of this tutorial, participants will be able to:

- create well-formed XML files and understand what it takes to validate them against Document Type Definition (DTD) files

- list the considerations for processing XML documents on the client (browser) side vs. doing so on the server side

- read XML files into JavaServer Pages using the Xerces Java 2 parser

- create static XSL files and apply these to XML files using the XML `xsl-stylesheet` processing instruction

- apply static XSL files to XML files from within JavaServer Pages program using the Xalan Java 2 XSL engine

- understand how an XSL document can be created dynamically within a JavaServer Page and applied to XML data via the Xalan Java 2 XSL engine

- retrieve specific data from XML documents using XPath

- describe how XML and XSL documents can be manipulated dynamically within Java programs using the XML Document Object Model (DOM)

Prior knowledge of Java programming is required. Prior experience with APIs and documentation in Javadoc format is desirable, but may be picked up during the tutorial.

## 4.2 Description of Tutorial Activities

Hands-on activities in the lab will include as many of the following as we have time for.

- create an XML file and verify that it is well-formed by loading it into Internet Explorer

- create an XSL file and verify that it is well-formed by loading it into Internet Explorer

- add an `xsl-stylesheet` processing instruction to an XML file and verify that the specified XSL file is properly applied to the XML data by loading the modified XML file into Internet Explorer

- create a JavaServer Page from a template provided by the instructor that applies the XSL file to the XML file and verify that it runs correctly

- create a JavaServer page that generates an XSL document "on-the-fly" and applies it to an XML file

- create a Java program that retrieves specified data from an XML file using XPath

- discuss various applications of these technologies with the tutorial organizer and fellow participants

## 4.3 Background of the Presenter

Jesse M. Heines is an Associate Professor of Computer Science at the University of Massachusetts Lowell, where he teaches courses on Internet & Web Systems and GUI Programming. He has extensive course Web sites that make use of XML and its related technologies at http://www.cs.uml.edu/~heines.

Jesse has also published a number of papers on the topics covered in this proposed tutorial. The two most recent ones are:

- Heines, J. M., 2003. XSL. To be published in H. Bidgoli (Ed.), *The Internet Encyclopedia*. John Wiley & Sons, New York, NY. Expected date of publication: December 2003. Available on-line at http://www.cs.uml.edu/~heines/techrpts/Papers/Heines_IE_XSL_Article_V3.pdf

- Heines, J. M., 2002. *Creating and Maintaining Data-Driven Course Web Sites.* AACE E-Learn 2002 Conference, Montreal, Canada, October 15-19, 2002. Available on-line at http://www.cs.uml.edu/~heines/academic/papers/2002elearn/Heines-Paper.pdf

Jesse has conducted tutorials for academic audiences at conferences and taught week-long courses on XML and Java for industry audiences through Training Etc. (http://www.trainingetc.com) and Hands On Technology Transfer (http://www.traininghott.com), for whom he even developed their XML course. Class notes for his lectures on XML can be found at: http://www.cs.uml.edu/~heines/91.513/91.513-2001-02s/index.htm.

Jesse was a speaker at ITiCSE '99 in Krakow, Poland, and was most recently an invited speaker at E-Learn 2002. His full curriculum vita is posted at http://www.cs.uml.edu/~heines/academic/jvitadet.pdf.

## 5. 54-WORD PARAGRAPH FOR PUBLICATION IN PROGRAM

Learn how to write JavaServer Pages that access XML data and process it using XSL and XPath. You will create and parse XML documents, apply XSL transformations to XML, and retrieve XML data using XPath. Hands-on activities will demonstrate applications and help you explore ways to apply these technologies in your own subject areas.

## 6. EQUIPMENT NEEDS

This tutorial requires one networked computer for every two participants. It would be nice if the computers had access to the Internet for the tutorial, but this is not required. It is only important that they be networked to each other and that a port be provided for the author to add his laptop to the network.

The author will provide a CD with all the required software to be installed on the participants' computers, and he will do this installation himself on the morning of the workshop if necessary. The author's laptop will also act as the Java Web Server, and he will allow all participants to access it as needed.

Other needs include a standard computer projector at 1024x768 resolution with a complementary screen and a white board with blue and red felt-tipped pens.