Web Services

Author's Name: Lawrence Millard
Coach Name: Ken Amunrud
Host Organization: Lockheed Martin
ETP Type: Enhance Existing Curriculum
Subject/Grade: Junior AP CSP

Abstract

Web Services: Lesson Abstract
This lesson shows students how to add dynamic content to their web applications using XML and XQuery. Students will build on their prior knowledge of SQL and the python http-client from previous lessons to create XML documents, generate schema, and access that data without a database. Students will work in groups to design and develop a web service driven application. Work is guided through discussions, guided practice worksheets, and a final project presentation to the class. Emphasis is placed on an understanding of the role of protocols and the W3C in the developing the internet as a 21st century tool for collaboration.

Focal Standard(s)

AP CSP Standard P6: The Internet
Essential Knowledge EK 6.2.2d - Interfaces and protocols enable widespread use of the internet.

Measurable Objective(s)

Identify the role of the W3C in the development of the XQuery language.
Compare XML to SQL in representing data.
Explain how an XML schema acts as a contract between the server and the client.
Describe the capabilities of XQuery and how these capabilities are used in many internet applications.
Use XQuery to read from an XML document and show it in a data driven web page.
Use XQuery to write data from a user data input form into an XML document.

Formative Assessment(s)

Whole Class Discussion: Students share what kinds of information they most commonly interact with on the web. Examples might include posts on chat boards such as facebook and twitter, online shopping, knowledge banks like wikipedia, and others. Teacher checks for understanding that communication of data takes many forms and is fundamental to the purpose of the web and emphasizes the need for standard protocols.

Small Group Discussion: Students brainstorm ways that information is stored and transported to others both online and offline including the need for privacy. Examples might include letters and texts, documents, and databases.

Guided Practice: Individuals complete exercises and share with instructor the results. Each student must be able to create a well formed XML document, generate a schema, and write code that reads the document and shows the content in a terminal window.

Summative Assessment

Project Based: Two groups of two become a working unit to design a web based data appliance. Then one pair completes the server side xml document while the other group creates a web page that can edit and display information from the document. The groups then review and revise, reversing roles and repeating. The final project is then checked against a rubric and presented to the class where students in the group describe the project and reflect on the design process.

21st Century Skills and Applications

3. Information, Media and Technology Skills - Students learn how XML and XQuery increases access to information and improves the ability of individuals to collaborate and contribute.

Fellowship Description

I am using my skills in visual basic, xml, and sql to analyze and edit an existing application that interfaces between process data and a remote database. The client wishes to modify the web services employed by the application so that data is stored to and retrieved from local xml documents instead of a remote database site.

Fellowship Connection to School/Classroom

Current curriculum covers sql and uses JQuery to extract information from a database using javascript and python. This modification will add the core technology XML and demonstrate how, using XQuery, information can be stored and retrieved from xml documents in ways comparable to JQuery and databases.

Instructional Plan

Focus Lesson: Day Twelve (of this three week unit Web Services)

Warmup Question: "How can we use XML to make our websites more interesting?" Check for prior knowledge (understand what xml is, understand the concept of data driven design)

Content:
Students download the practice xml document and watch video XPath Basics Tutorial HD by Dathan Ellis

Guided Practice:
Following the video tutorial, teacher demonstrates representative scripts similar to those in the worksheet.

Students complete the XPath worksheet individually.

Teacher circulates, answering questions and guiding progress.

Formative Assessment:
By observing student success, a formative assessment is made of student learning.

Summative Assessment - Final Project:

Students work in groups of 4 to create a data driven web app using the technologies covered in class. Applications are presented to class on final day and scored with a project rubric.

Supply List

Notepad++ For editing XML documents
Xmlquire   For creating and testing xpath scripts
mySQL   For creating and testing SQL scripts
Sublime Text or other integrated development software capable of creating and testing html, css, php, javascript, and python programs

Bibliography

Keywords

Internet, Web Services, Database, XML, XPath, XQuery

Links to Files in this ETP

Practice XML document
XPath Worksheet
Project Rubric
Web Services - three week outline