



JavaScript Context

INFO/CSE 100, Spring 2006
Fluency in Information Technology

<http://www.cs.washington.edu/100>

Readings and References

- References
 - » Wikipedia articles on HTML, XML, XHTML and scripting languages
 - <http://en.wikipedia.org/wiki/HTML>
 - <http://en.wikipedia.org/wiki/XML>
 - <http://en.wikipedia.org/wiki/XHTML>
 - http://en.wikipedia.org/wiki/Scripting_language
 - » IBM Home Page Reader 3.0
 - http://www-3.ibm.com/able/solution_offerings/hpr.html

Language Layers

- Sure, JavaScript is fun. But where does it fit in the larger picture?
- *Markup language*
 - » information structure and content, hyperlinking
- *Lightweight scripting language*
 - » dynamic creation of HTML, response to events
- *Heavyweight programming language*
 - » active graphics creation, numerical computation

Markup Language - HTML

- HyperText Markup Language
 - » a language for describing the *content* and *presentation* of a web page
 - content: The meaning and structure of the web page
 - presentation: How the page is to be presented
 - » HTML pages have a basic *hierarchical structure* defined by the tags
 - <html>, <head>, <body>, and so on
 - » Basic HTML describes a *static* page
 - once parsed and rendered, the page doesn't change
 - **hyperlinking** was the big step forward in basic HTML

Content vs. Presentation

- Early versions of HTML mixed these two ideas
 - » For example: `<p align="left">`
 - » The `<p>` tag identifies the basic structure of the page content
 - » The `align="left"` attribute guides the presentation
- Newer versions are separating content and presentation
 - » All "presentation attributes" of HTML elements were *deprecated* in HTML 4.01.
 - » All "presentation attributes" of HTML elements are *not supported* in XHTML 1.0 Strict DTD.
- This separation is a very useful distinction to make
 - » “what is the meaning?” vs “what is the format of the display?”

Why is this distinction useful?

- Once you have easy access to the structure and meaning, there are many useful ways to manage and present the information that is available
- Manage the information
 - » extract a travel map from a directions page
 - » filter an inventory list to select only certain attributes
- Present the information
 - » graphical browser on a full-size screen
 - » cell-phone browser display

Manage the information

- Information that is well structured can be
 - » filtered, reorganized, used as program input, presented in a variety of reports, ...
- This is what a database program is used for
 - » If we can separate the content from the presentation in web pages, we can use the web as a giant database
 - » Not a single database, but we can use it like one
- Web scraping, screen scraping
 - » extract the content and discard the presentation



Web Scraping Example

New Brunswick, NJ, January 07, 2003 – Connotate Technologies, Inc., a leading provider of Web Mining solutions, today announced that Cinergy Marketing & Trading, L.P., a Houston affiliate of Cinergy Corp. has selected Connotate Technologies vTag Web Mining Server to **harvest energy market information from the web**. Using the server’s automated monitoring, extraction, filtering, and delivery capabilities, Cinergy can now **access energy information from hundreds of Web sources**. ...

Structured Data Example

The screenshot shows the MyUW website interface. The main content area is titled "Class Schedule" and includes a "Reload" button. Below this, a message states: "Autumn Quarter Class Schedule: You are not registered for Autumn quarter". A section titled "Important Dates and Deadlines:" contains a bullet point: "There is a \$20 Change of Registration Fee and possible tuition forfeiture charged for all registration changes made to your autumn quarter schedule on a single day through NOVEMBER 16, 2004." Below this is a section for "Computer Science and Engineering" with a "Reload Remove" button. It features a table for "CSE 100 - Autumn 2004" and a "News" section with "Talks and Colloquia".

Class Schedule Reload

Autumn Quarter Class Schedule: You are not registered for Autumn quarter

Important Dates and Deadlines:

- There is a \$20 Change of Registration Fee and possible tuition forfeiture charged for all registration changes made to your autumn quarter schedule on a single day through **NOVEMBER 16, 2004**.

Computer Science and Engineering Reload Remove

CSE 100 - Autumn 2004

Assignment	Your score	Max Poss.	Class Mean
C1	1	1	1.00
C2	1	1	1.00
C3	1	1	1.00
C4	1	1	1.00
C5	1	1	1.00
Clicker	149997		
HW1	20	20	19.29
HW2	18	18	17.42
MT1	44	44	36.07
pl a	30	30	26.58

News

Talks and Colloquia

Pedro Domingos (UW CSE)
[Learning, Logic, and Probability: A Unified View](#)
Tue, Nov 02, 2004
3:30 pm, EE-105

Claire Cardie (Cornell University)
[Machine Learning for Noun Phrase Coreference](#)
Wed, Nov 03, 2004
10:00 pm, UWTV

Rick Rashid (Microsoft Research)
[Empowering the Individual](#)

https://myuw.washington.edu/servlet/myuw.mainpage.Mainpage?f=x&tab=stud&h=fr_&identifier=561962224

MyUW Main Page | Grades Entry

Structured Data Example

Grades Entry - Opera

File Edit View Navigation Bookmarks Mail Chat Tools Window Help

Comp Sci
Engr

Doug Johnson
CSE 100 Autumn 2004

[Main Grade Page](#)

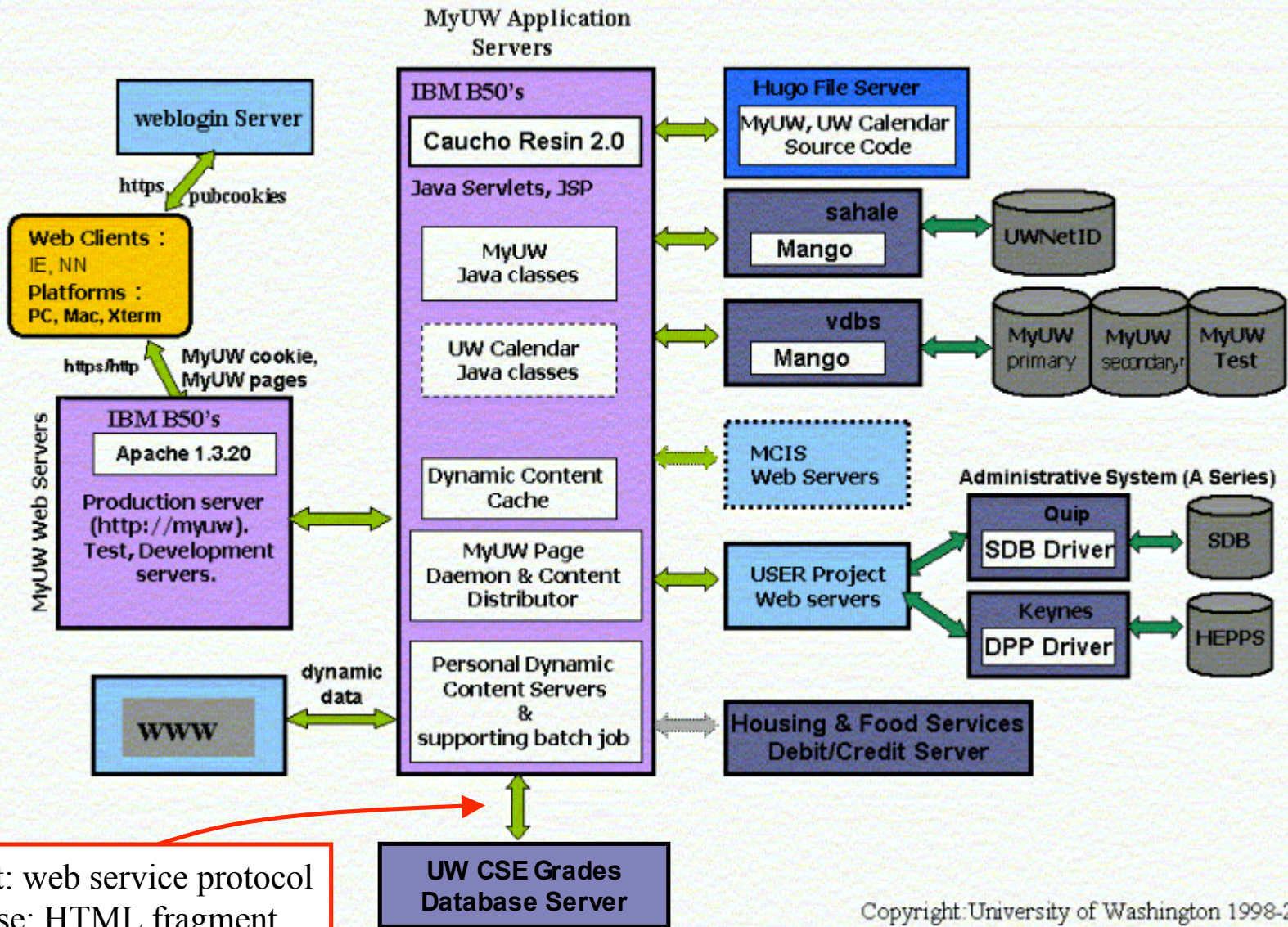
Save

Johnson,Douglas		
Registered: XX		
Attends:	<input type="text" value="XX"/>	Status: (2) <input type="radio"/> Active <input type="radio"/> Presumed Dropped <input checked="" type="radio"/> Confirmed Dropped
UWNetID:	<input type="text" value="finson"/>	
C1 (0 .. 1): 11-Oct	<input type="text" value="1"/>	Notes: <input type="text"/>
C2 (0 .. 1): 13-Oct	<input type="text" value="1"/>	
C3 (0 .. 1): 22-Oct	<input type="text" value="1"/>	
C4 (0 .. 1): 27-Oct	<input type="text" value="1"/>	
C5 (0 .. 1): 1-Nov	<input type="text" value="1"/>	

http://norfolk.cs.washington.edu/htbin-php/boren/grades/choose_student.php

MyUW/ Main Page Grades Entry

MyUW Architecture



request: web service protocol
response: HTML fragment

Giving meaning to *all* web data



Semantic Web

*The **Semantic Web** provides a common framework that allows **data** to be shared and reused across application, enterprise, and community boundaries. It is a collaborative effort led by W3C with participation from a large number of researchers and industrial partners. It is based on the Resource Description Framework ([RDF](#)), which integrates a variety of applications using XML for syntax and URIs for naming.*

"The Semantic Web is an extension of the current web in which information is given well-defined meaning, better enabling computers and people to work in cooperation." -- Tim Berners-Lee, James Hendler, Ora Lassila, [The Semantic Web](#), Scientific American, May 2001

The Semantic Web is based on two fundamental concepts:

- The description of the meaning of the content in the Web
- The automatic manipulation of these meanings

Present the information

- Once you have a database with a defined structure, you can present the information it contains in many different ways
 - Define a style for presenting the data
 - » Cascading Style Sheets associate style with structure
 - Use a browser appropriate to the requirements
 - » desktop graphical: MSIE, Mozilla, Opera, Safari
 - » desktop text-only: Lynx, Links, WannaBe
 - » Audio: IBM Home Page Reader 3.0
 - » PDA and cell phone: Opera, WAP browsers, Pocket IE
 - The information you want exists, but presenting it in a useful, timely, accessible fashion is a real challenge
-

Language Layers

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Lightweight Scripting Language

- JavaScript is a *scripting language*
 - » has many features of larger languages but intended for more casual or rapid development
- Such languages are used to provide dynamic control of the content and display
 - » intended to be used by web page developers, system administrators, and others to quickly develop useful applications

Server-side vs. Client-side ?

- Two kinds of scripting languages for the web
- Client-side languages are executed by the web browser
 - » Javascript, VBscript
- Server-side languages are executed by the web server
 - » PHP, Perl, Python, ...

Other Scripting Languages

- **PHP** is an HTML-embedded scripting language. Much of its syntax is borrowed from C, Java and Perl with a couple of unique PHP-specific features thrown in. The goal of the language is to allow web developers to write dynamically generated pages quickly.
- **Python** is an interpreted, interactive, object-oriented programming language. It is often compared to Tcl, Perl, Scheme or Java. Python is also usable as an extension language for applications that need a programmable interface.
- **Perl** is a language optimized for scanning arbitrary text files, extracting information from those text files, and printing reports based on that information. It's also a good language for many system management tasks. The language is intended to be practical (easy to use, efficient, complete) rather than beautiful (tiny, elegant, minimal).
- **VBScript**. Microsoft Visual Basic Scripting Edition brings active scripting to a wide variety of environments, including Web client scripting in Microsoft Internet Explorer and Web server scripting in Microsoft Internet Information Service.

Dynamic HTML

- Dynamic HTML is a technique of creating interactive web sites by using a combination of
 - » the static markup language HTML
 - » the style definition language Cascading Style Sheets
 - » a client-side scripting language
- A client-side scripting language provides
 - » Adaptivity ... the page can be customized
 - » Interactivity ... get user input and display results
 - » Applications ... build a general purpose program

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Larger Programming Languages

- Web browsers are handy, but many applications are large and need specialized capabilities
- Large applications are generally written in full featured programming languages like
 - » Java, C++, C#, Fortran
 - » These languages come with extensive function libraries to support extended networking, graphics, data structures, etc.
- Many new languages straddle the line and are appropriate for both scripting and large-scale development



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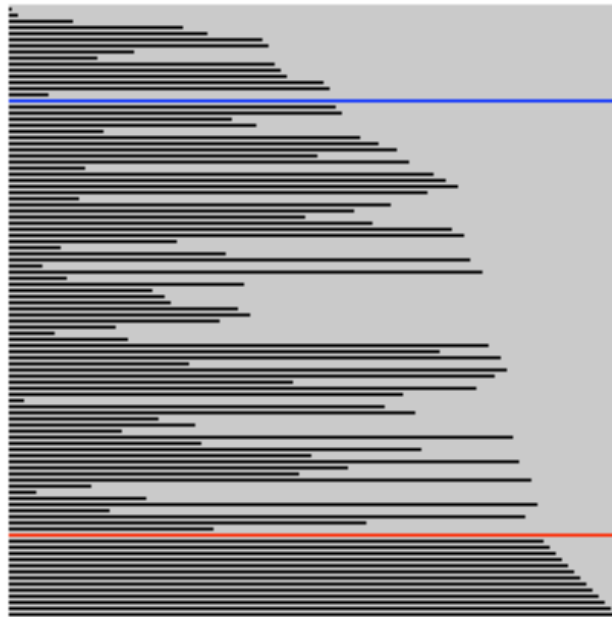
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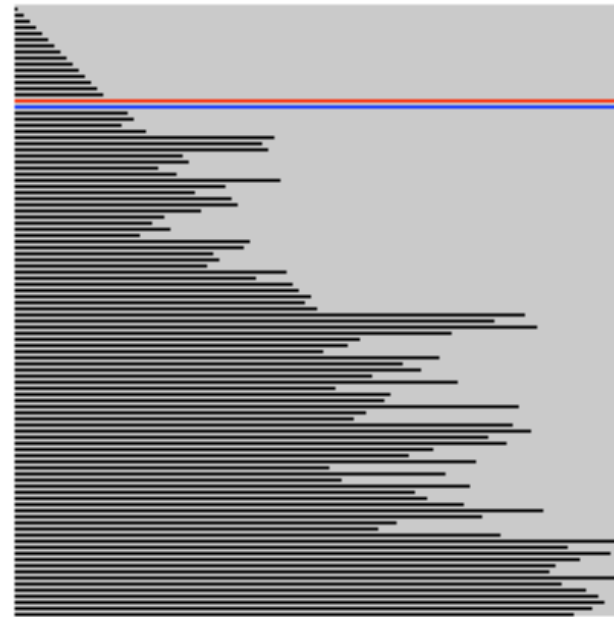
Recall the Sort Demo

- The code that actually does the sorting and graphics is written in Java.
- The programs are compiled and run as *applets*. They use the web page area for display, but are not working with HTML.

Bubble Sort



Quick Sort



<http://java.sun.com/applets/jdk/1.0/demo/SortDemo/example1.html>

Summary

- HTML forms the basic structure for web pages
 - » Modern trends are to separate
 - the structural description of the data
 - the presentation of the data to the user
 - » process the information according to the content
 - » display the information as appropriate to the user
- Programming languages make information management and display dynamic
 - » languages come in many flavors but they share many basic concepts and much of their basic syntax