MV4250 Advanced XML Authoring and Design - MV4250 (4-0)

Synopsis

This course takes an advanced look at the Extensible Markup Language (XML) family of markup languages. Our focus is research and design projects to include XML content, XML programming, and surveys of new XML development activities. We further examine principles and practices for Web-based document design and authoring using XML data structures, XML applications and XML-based languages. Examples and class projects are oriented to problems of broad Navy, military and scientific interest.

Instructors

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Office hours are anytime you find me there. Usually I am available as indicated by the schedule posted outside my office. Make an appointment if you want to be sure to see me. If necessary you may call me at home (earlier than 2200 please).

Schedule

Monday-Thursday 13-1350, ME Annex 285.
Exams are project demos and thesis chapter (or equivalent report).
Spanagel 263 PC Lab is normally available for your use.
Curt Blais will instruct during my travel days.
No class held during holidays or SIGGRAPH conference.

July 14-17	To be determined, both Curt and Don gone…
July 26-31	SIGGRAPH, San Diego http://www.siggraph.org/s2003
August 4-8	MOVES Open House http://www.MovesInstitute.org

Software

The software list will grow as we go, maintained on the course web page. For starters:
http://web.nps.navy.mil/~brutzman/xml/XmlReferences.html
See online examples matching the textbooks.
XML Spy (academic license available) http://www.xmlspy.com

Textbook

a. Hunter, David et al., *Beginning XML*, second edition, Wrox Press Ltd., Birmingham UK, 2001. Available via http://www.wrox.com
b. Deitel, Deitel et al., XML How To Program, Prentice Hall, Upper Saddle River NJ, 2001. Available via http://www.prehhall.com
You may need another special-topic textbook for successful completion of this course. There are numerous online references available that will appear (as we go) on the course home page at *http://web.nps.navy.mil/~brutzman/xml*

Guidelines

1. You must devote time to reading and programming to succeed in this course.
2. Students are encouraged to study together. However every assignment submitted must be your own work. Group solutions to project assignments are only acceptable when specified. As in any endeavor your individual integrity is essential. If in doubt, ask.
3. I am designing this course to significantly help you in your thesis and other courses. Your comments, questions and suggestions are always welcome.

Course Objectives

1. Gain a broad view of XML content, programming and languages
2. Demonstrate XML stylesheet transformations (XSLT)
3. Demonstrate how to manipulate XML documents using DOM programming and customized XML application programming interfaces (APIs)
4. Demonstrate how to design tagsets using matched XML Schemas and (to a small extent) DTDs
5. Learn about new XML languages
6. Support thesis work through design projects
7. Use online tutorials and public-domain software
8. Provide tools, techniques and a repeatable methodology that you can use later

Class Policy and Study Recommendations

1. You are learning new ideas and a new language. Thinking and writing in a new language requires fluency. Don't be reluctant to think new thoughts or work hard. Persistence pays.

2. You will get a LOT more out of class by reading assigned material beforehand. Keep ahead of me in your reading. Read each section at least twice. This is a challenging, ambitious course that is worth your while.

3. Discussion and dialog will make class a lot more immediate.

4. Projects make up your entire grade, just like the real world. Exams are boring.

5. Grading is based on merit and performance. I expect everyone to work hard and get an A.

6. You learn how to program solutions to problems by doing. Thus projects and presentations are our products.

7. Students are expected to hand in projects on time. It is your responsibility to contact me in advance for assistance if you are unable to meet an assignment date. I prefer that you hand in something late that is correct, rather than something on time which is broken. Don't get behind, we will follow a fast pace!

8. You must provide an electronic mail address so that I can send messages to the entire class. Numerous online references will be provided that you will need to retrieve. I recommend that you consider building an NPS home page that serves XML content as part of this course.

Week	Chapter		Assignment	Deliverables
1 July 7-10	1, 2	XML overview, X3D-Edit construction	"XML in 10 steps" Install/run X3D-Edit	List of what you want to learn/produce this quarter
2 July 14-17		W3C Specifications Overview http://www.w3.org/2003/03/w3c-track03.html		
3 July 21-24	3	HTML/XHTML, Cascading Stylesheets, Web Accessibility Initiative (WAI)	HTML-Kit, Amaya, WAI author tips	Build XHTML pages describing project goals
4 July 28–31	8, 9, 10, 11	Namespaces, DTDs, XML Schema Internationalization (I18N)		Draft project DTD/schema
5 August 4-7	4, 5	Advanced XSLT/XPath, Saxon/JAXP	Install Saxon, JAXP Build/run a stylesheet	MOVES Open House
6 August 11-14		Web Services		
7 August 18-21		Annotations using Annotea and Amaya		Annotate a web page
8 August 25-28	-	Scalable Vector Graphics (SVG) XMLSpec and W3C's XML slidemaker	Use SVG editors	SVG diagrams
9 September 1-4		Jakarta, server-side programming, XSP X3D Scene Authoring Interface (SAI)	Clif Williams and Khaled Mnif theses	Serve content via XSP
10 September 8-11		Metadata, ontologies, Semantic Web, agents: RDF, DAML, OIL, CoABS		Build/markup RDF, XSLT metadata checks
11 September 15-18		Generic Hub, XML-MTF, XML Oporders	Build SAVAGE scenario	Matching XML Oporders
12 September 22-25	-	Final project presentations: Coolness!		Project presentations

Deliverables

Your grade will be based on weekly programming/authoring projects, contributions to the class and a final project presentation. Some projects will be individual projects, some will be a group effort. Candidate topics appear on the next page. Final deliverables include:

- Stylesheet conversions
- XML Language report
- XML development programming project
- Use of multiple XML languages
- Demonstration of programmatic access via DOM, JDOM, JAXP, SAX or other API
- Metadata integration customized for project domain

Here are typical final project and report attributes, assembled from weekly projects:

- Group approach, or individually designed & executed. We have several interesting ongoing projects that can benefit from improvements and extensions.
- Best approach is work related to your thesis, if possible. Think of this as a prototype.
- Topic mutually agreed upon
- Project outline and methodology proposal
- Deliverables:
    - Slideset
    - minimum five pages of text in report (preferably a draft thesis chapter)
    - multiple references from text bibliography included and evaluated
    - abstract, table of contents, problem statement & solutions, screen snapshots
    - example content
    - appendices: software source code, user guide, session log
    - provide HTML page and links to source code to remain online
    - Published online in class archive
    - 25 minute presentation / demonstration to class during exam week

Candidate XML Projects

- X3D/XML Stylesheets
  - Tactical chat browser adapting Jabber, Annotea, Xj3D etc.
  - X3D to DOM in Java or EcmaScript
  - Producing Scene Authoring Interface (SAI) in EcmaScript from X3D Schema
  - Merge multiple language tooltips into master X3D Schema
  - Advanced Distributed Learning page presentations
  - Dynamic Behavior Protocol (DBP) to Java source
  - SAVAGE virtual environments from operations orders

- XML Languages and W3C Activities
  - Scalable Vector Graphics (SVG) http://www.w3.org/Graphics/SVG
  - MathML http://www.w3.org/Math
  - Chemistry ML http://www.xml-cml.org
  - Synchronized Multimedia Integration Language (SMIL) http://www.w3.org/AudioVideo
  - DOM Developments http://www.w3.org/DOM
  - XHTML/HTML Developments http://www.w3.org/MarkUp
  - Resource Description Framework (RDF) http://www.w3.org/RDF and Semantic Web http://www.w3.org/2001/sw
  - Web Accessibility Initiative (WAI) http://www.w3.org/WAI
  - Internationalization (I18N) http://www.w3.org/International
  - XML Protocol http://www.w3.org/2000/xp

- XML Development Projects
  - Common attributes for development projects:
    - Editor using Xeena (or other repeatable/reusable tool)
    - Tooltips for tagset elements and attributes
    - Is an autogenerated API (similar to SAI) appropriate?
    - Example content
    - Example programs (using DOM and specialty API)
    - Pertinent tools, including
      - IBM Alphaworks http://alphaworks.ibm.com
      - Sun's Java http://java.sun.com
      - Apache http://xml.apache.org
      - Netscape's Mozilla http://mozilla.org
    - Reference list of pertinent books and websites
  - Dynamic Behavior Protocol
  - Message Text Format (XML-MTF)
  - Generic Hub and LC2IEDM Command & Control Model
  - Operations Orders with shared XML-MTF/LC2IEDM tagsets

What is your challenge of interest? Let's discuss it.