**CPET 499/ITC 250 Web Systems**

**Dec. 12, 2013**

**Review of Courses**

**Final Exam 2013/12/19 Friday, 10:30 AM-12:30 PM**

\*\* **Final Exam** (Comprehensive, All in-class, covering class lectures, reading and homework assignments; No Online Exam given - Thursday, December 19, 10:30AM-12:30PM, Room ET 346)  
\*\*\* Final Exam Part 1 (closed books/notes): 10:30AM - 11:30 AM, Multiple-choice questions  
\*\*\* Final Exam Part 2 (Open books/notes, no computer usage): 11:30 AM-12:30 PM, Q/As, and Programing Problems

**First Meeting of the Class, 8/27/2013**

**Last meeting of the Class, 12/12/2013**

**Systems**

* Hardware systems vs. Software System
  + Computer systems
  + Network systems
  + Communication systems
* Web systems
  + Computers
    - Web servers
    - Web clients
  + Software
    - Authoring tools
    - Browsers
    - Servers
  + Communication/Networking
  + Protocols
  + Information/Data
  + Audio/Video
* Industries/Business
  + E-learning
  + Advertisement
  + Books/Publishing
  + E-Commerce/Business
  + Collaboration Tools
  + Control/Monitoring Tools
  + Entertainment
  + Audio/Video
  + IT Services
  + Automation
    - Office
    - Financial Systems
    - Stock markets
    - Energy Market
    - Factory
  + Mobile computing
  + Healthcare IT
  + SmartGrid – Power & Energy System, Renewable energy resources (solar, wind, biomass, etc)
  + Cloud Computing
    - Software as a Service (SaaS)
    - Platform as a Service (PaaS)
    - Infrastructure as a Service (IaaS)

**SUMMARY – Coverage on HTML Topics**

* **Chapter 2. Introduction to HTML (Part 1)**
* **Chapter 3. Introduction to HTML (Part 2)**
* **E-book: Building Web Applications with HTML, by Paul Lin**
  + **Chapter 1: Programming Languages for Web Applications**
  + **Chapter 3. Hypertext Markup Language Basics**
* **Lecture on Web System Infrastructure and Protocols (PPT file)**
* **Chapter 5. Cascading Style Sheet (CSS) Part 1**
* **Related Demos, Homework Assignments**

**SUMMARY – JavaScript, Program Design Tool, Server Side Scripting Topics**

* **Chapter 6. JavaScript: Introduction to Scripting**
* **Chapter 7. JavaScript: Control Statements I**
* **Chapter 8. JavaScript: Control Statements II**
* **E-book: Developing Advanced Web Applications Using JavaScript, by Paul Lin**
* **Chapter 17. Web Servers: Introduction to Web Servers (pp. 606-614), XAMPP Server Installation: Apache, MySql, Perl, etc**
* **Chapter 9. JavaScript: Functions**
* **Chapter 10. JavaScript: Arrays**
* **Chapter 11. JavaScript: Objects**
* **Chapter 12. Document Object Model (DOM): Objects and Colelctions**
* **Lecture on Web System Infrastructure and Protocols (PPT file)**
* **Unified Programming Language – UML (11/12):**
* **E-Book: Programming with Perl/CGI, by Paul Lin**
  + **Web Servers and CGI/Perl Programming**
  + **Per Programming Environment**
  + **CGI Environmental Variables**
  + **Processing and Analyzing Data**
* **Chapter 13. JavaScript Event Handling**
* **Related Demos, Readings and Homework Assignments**

**SUMMARY – XML , AjAX, Web Servers, Database**

* **Chapter 15. XML (eXtensible Markup Language)**
* **E-Book: XML and Enterprise Application Integration**
* **Chapter 16. AJAX – Enable Rich Internet Applications with XML and JSON**
* **Chapter 17. Web Servers (Apache)**
* **Chapter 18. Database: SQL**
* **Related Demos, Readings and Homework Assignments**

**Chapter 1 Introduction to Computers and the Internet**

* The Internet in Industry & Research
  + E-Commerce & Business
  + Mobile Computing and SmartPhone
  + Electronic Health Record
  + Cloud Computing
  + SmartGrid
  + Email, Instant Messaging, Video Chat, etc
* Evolution of the Internet & WWW
  + ARPANET
  + Packet switching
  + TCP/IP
  + World Wide Web, HTML, HTTP, HTTPs
* Web Basics
  + Hyperlinks
  + URIs, URLs, URNs
  + Web servers and clients
  + Making a Request and Receiving a Response
    - Get /books/downloads.html HTTP/1.1
    - Status of the transactions
      * HTTP/1.1 200 OK
      * HTTP/1.1 404 Not found
      * [www.w3.org/Protocols.rfc2616/rfc2616-sec10.html](http://www.w3.org/Protocols.rfc2616/rfc2616-sec10.html)
  + HTTP Headers
    - Content-type” text/html
    - MIME type (Multipurpose Internet Mail Extensions)
      * Image/jpeg
  + HTTP get and post Requests
    - Get (Client <= Server)
    - Post (Client => Server)
* Muiritier Application Architecture
  + Three-Tier Architecture
    - Client Tier (Browser) ⬄ Business Logic Tier (Web Server) ⬄ Data tier (Databases)
* Client-Side Scripting versus Server-side Scripting
* World Wide Web Consortium (W3C)
* Web 2.0, Search Engine, Social Media, Web Services, AJAX
* Social Applications
  + Facebook
  + Twitter
  + Groupon
  + Foursquare
  + Skepe
  + YouTube
* Data Hierarchy
* Operating Systems
* Mobile Operating Systems
* Types of Programming Languages
* Object Technology

**Chapter 2 Introduction to HTML 5 (Part 1)**

* Components of HTML5
* Tools for creating HTML5 documents
* Add images
* Create and use hyperlinks
* Create tables
* Create and use forms to get user input

**Chapter 3 Introduction to HTML 5 (Parts1)**

* New input types
  + Input type **color**
  + Input Type **date**
  + Input Type **datetime**
  + Input Type **datetime-local**
  + Input Type **email**
  + Input Type **month**
  + Input Type **number**
  + Input Type **range**
  + Input Type **tel** (Telephone)
  + Input Type **tim**e
  + Input Type **url**
  + Input Type **week**

**Chapter 4 Introduction to Cascading Style Sheets (CSS): Part 1**

* Purposes
  + Control a website’s appearance
  + Use style sheets to separate presentation from content
  + Use a style sheet to give all the pages of a website the same look and feel
  + Class attribute
  + Specify the Font, Size, Color, and other properties of displayed text
  + Specify element backgrounds and colors
* Types of Style Sheets
  + Inline Styles
  + Embedded Style Sheets
  + External Styles Sheets & Methods of Linking

**SUMMARY – Coverage on JavaScript, Program Design Tool, Server Side Scripting**

**Topics**

* **Chapter 6. JavaScript: Introduction to Scripting**
* **Chapter 7. JavaScript: Control Statements I**
* **Chapter 8. JavaScript: Control Statements II**
* **E-book: Developing Advanced Web Applications Using JavaScript, by Paul Lin**
* **Chapter 17. Web Servers: Introduction to Web Servers (pp. 606-614), XAMPP Server Installation: Apache, MySql, Perl, etc**
* **Chapter 9. JavaScript: Functions**
* **Chapter 10. JavaScript: Arrays**
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  + **Web Servers and CGI/Perl Programming**
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  + **Processing and Analyzing Data**
* **Chapter 13. JavaScript Event Handling**
* **Related Demos, Readings and Homework Assignments**

**Chapter 6 JavaScript: Introduction to Scripting**

**<!DOCTYPE html>**

**<html>**

**<head>**

**<meta charset =”utf-8”>**

**<title>**

**<script type = “text/javascript”>**

**…**

**…**

**…**

**</script>**

**</head>**

**<body>**

**…**

**</body>**

**</html>**

* Document object
  + Methods
    - document.writeln()
    - document.write()
* Window object
  + Methods
    - document.writeln()
    - window.alert(), with OK button
    - window.prompt(), Prompt, Get user input, OK & Cancel buttons
* Other System wide methods
  + parseInt()
* Javascript programming
  + Arithmetic Operators
    - +, -, \*, /, %
  + Decision Making and Related Operators
    - >, <, >= <=, ==, !=
    - If, else
  + Adding integers example
    - Variables
    - Operators

**Chapter 7 JavaScript: Control Statements I**

* <script type = “text/javascript”> …. </script>
* JavaScript Keywords (commonly used)
  + var
  + if, else, true, false
  + for, do, while
  + switch, case, break, continue, default
* Conditional Operator
  + (? : )
* Assignment Operators
  + +=, -=, \*=, /=, %=
* Increment and Decrement Operators
  + ++ (++a, Pre-increment); (a++, Post-increment)
  + – (--a, Pre-decrement); (a--, Post-decrement)
* Nested if, else
* Repetition Statements
  + while

**Chapter 8 JavaScript: Control Statements II**

* Counter-Controlled Repetition
  + while Loop
  + for loop
* do-while Repetition
* Switch Multiple-Selection
  + switch()
    - case
    - break
    - default
* continue, break
* Logical Operators
  + && (AND), || (OR), ! (NOT)
  + >, >=, <, <=
  + ==, !=
* Conditional Operator
  + ?:

**Chapter 9 JavaScript: Functions**

* Program Modules
* Function Definitions
* User Defined Function
  + Scope Rules
    - Global variables (script-level)
    - Local variables (function-level)
* JavaScript System Support Objects/Functions

**Chapter 10 JavaScript: Arrays**

* Arrays
  + Declaring and Allocating Array Objects
    - var c = new Array(100);
  + Zeroth element
  + length property
* Passing Arrays to Functions
* Sorting Arrays
* Searching Arrays
* Multi-Dimensional Arrays

**Chapter 11 JavaScript: Objects**

* Math Objects
  + Methods
    - Math.sqrt(), Math.pow(), Math.exp(), Mth.log()
    - Math.abs(), Math.min(), Math.max(), Math.round(), Math.ceil()
    - Math.cos(), Math.sin(), Math.tan()
  + Properties
    - Math.E, MART.SQRT2, Math.LN2, Math.LN10, etc
* String Object
  + charAt()
  + concat()
  + split()
  + substring()
  + toLowerCase(), toUpperCase()
  + etc
* Date Object
  + getDate()
  + getDay()
  + getFullYear()
  + getHours()
  + getMinutes()
  + getMonth()
  + getSeconds()
  + getTime()
  + etc
* Boolean and Number Objects
  + toString(radix)
  + valueOf()
  + etc
* Document Object
  + getElementByID(id)
  + getElementByTagName(tagName)
* localStorage and sessionStorage

**Chapter 12 Document Object Model (DOM): Objects and Collection**

* DOM Nodes and Trees
* DOM Collections
  + images collection
  + link collection
  + forms collection
  + anchors collection
* Dynamic Styles and Animated Effects
  + window.seInterval()
  + window.clearInterval()

**Chapter 13 JavaScript Event Handling**

* load event
  + onload
* mousemove event
  + mouseover
  + mouseout
* Form processing with focus and blur events

**Chapter 15 XML**

* XML Basic
  + Elements
  + Vocabularies
  + Viewing and Modifying XML Documents
  + Processing XML documents
  + Validating XML documents
* Structuring Data
  + XML declaration
  + Root nodes and XML prolog
  + XML Element Names
  + Viewing an XML Document in a Web Browser
* Application Examples
  + A Business Letter
  + XML document
  + DTD(Data Type Definition) file
* XML Namespaces
  + xmlns attribute
  + unique URIs
  + Namespace Prefix
  + Namespaces in CML vocabularies
* Data Type Definition (DTD)
  + !Element
  + !ATTLIST
  + CDATA, #PCDATA
  + #REQUIRED, #IMPLIED, #FIXED, EMPTY
* W3C XML Schema Documents
  + Defining an element in XML schema
    - string, Boolean, decimal, float, double, long, int, short, date, time, …
* MathML

**Chapter 16 Ajax-Enables Rich Internet Applications with XML and JSON**

* Ajax Application vs Traditional Web Application
  + Asynchronous
  + Callback function
* AJAX Technologies
  + HTML
  + JavaScript
  + CSS
  + DOM
  + XML
* XMLHttpRequest object
  + Asynchronous Requests
    - addEventListner()
    - open()
    - send()
    - setRequestHeader()
    - getResponseHeader()
    - getAllResponseHeaders()
    - abort()
  + Properties
    - Readystatechange
    - readyState
    - resnoseText
    - responseXML
    - status
    - statusText
* Exception Handling
  + try
  + catch

**Chapter 18 Database: SQL, MySQL, LINQ and Java DB**

* Relational Datbases
* Tables
  + Rows, columns
  + Primary key
  + Foreign keys
* A Books Database Example
  + Author table
  + AuthorISBN table
  + Titles table
* Entity-Relationship (ER) Diagram
  + One-to-many
  + Many-to-one
  + Many-to-Many
* SQL keywords
  + SELECT, FROM, WHERE, GROUP BY, ORDER BY, INNER JOIN, INSERT, UPDATE, DELETE
* SQL Examples