

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
Programming 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

- o IT Services
- o Automation
 - Office
 - Financial Systems
 - Stock markets
 - Energy Market
 - Factory
- o Mobile computing
- o Healthcare IT
- o SmartGrid – Power & Energy System, Renewable energy resources (solar, wind, biomass, etc)
- o 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
 - o Chapter 1: Programming Languages for Web Applications
 - o 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 Collections
- 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
 - Perl 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 Headers
 - Content-type" text/html
 - MIME type (Multipurpose Internet Mail Extensions)
 - Image/jpeg
 - HTTP get and post Requests
 - Get (Client <= Server)
 - Post (Client => Server)
- Multitier 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
 - o Facebook
 - o Twitter
 - o Groupon
 - o Foursquare
 - o Skepe
 - o 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
 - o Input type **color**
 - o Input Type **date**
 - o Input Type **datetime**
 - o Input Type **datetime-local**
 - o Input Type **email**
 - o Input Type **month**
 - o Input Type **number**
 - o Input Type **range**
 - o Input Type **tel** (Telephone)
 - o Input Type **time**
 - o Input Type **url**
 - o 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

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

Chapter 7 JavaScript: Control Statements I

- `<script type = "text/javascript"> .... </script>`
- JavaScript Keywords (commonly used)
 - o `var`
 - o `if, else, true, false`
 - o `for, do, while`
 - o `switch, case, break, continue, default`
- Conditional Operator
 - o `(? : )`
- Assignment Operators
 - o `+=, -=, *=, /=, %=`
- Increment and Decrement Operators
 - o `++` (`++a`, Pre-increment); (`a++`, Post-increment)
 - o `--` (`--a`, Pre-decrement); (`a--`, Post-decrement)
- Nested if, else
- Repetition Statements
 - o `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
 - o Declaring and Allocating Array Objects
 - `var c = new Array(100);`
 - o Zeroth element
 - o 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
 - o images collection
 - o link collection
 - o forms collection
 - o anchors collection
- Dynamic Styles and Animated Effects
 - o window.setInterval()
 - o 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
 - o Elements
 - o Vocabularies
 - o Viewing and Modifying XML Documents
 - o Processing XML documents
 - o Validating XML documents
- Structuring Data
 - o XML declaration
 - o Root nodes and XML prolog
 - o XML Element Names
 - o Viewing an XML Document in a Web Browser
- Application Examples
 - o A Business Letter
 - o XML document
 - o DTD(Data Type Definition) file
- XML Namespaces
 - o xmlns attribute
 - o unique URIs
 - o Namespace Prefix
 - o Namespaces in CML vocabularies
- Data Type Definition (DTD)
 - o !Element
 - o !ATTLIST
 - o CDATA, #PCDATA
 - o #REQUIRED, #IMPLIED, #FIXED, EMPTY
- W3C XML Schema Documents
 - o 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
 - addEventListener()
 - open()
 - send()
 - setRequestHeader()
 - getResponseHeader()
 - getAllResponseHeaders()
 - abort()
 - Properties
 - Readystatechange
 - readyState
 - responseText
 - responseXML
 - status
 - statusText
- Exception Handling
 - try
 - catch

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

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