Mid-Term Review

Pat Morin
COMP 2405
Format

• 1 h 10 minutes
• 58 multiple-choice questions
• Scantron
• Bring a pencil and eraser
• 2 Rooms
  – Last Names A-M : Here
  – Last Names N-Z : UC 180 (Unicenter)
Main Topics

- History of the Internet
- HTTP – How data is transferred
- HTML – What format the data is in
- CRAP – What makes the data look nice
- CSS – How to make the data look nice
- CGI – How to generate the data dynamically (on the server)
- Perl – A programming language that's convenient for handling string data
- PHP (a few easy questions)
History of the Internet

• Origins of the Internet
  – Licklider, Kleinrock, Roberts
  – Late 1960s: ARPANET developed by DARPA

• Internet Timeline
  – 1970s: Email and newsgroups, emoticons
  – 1980s: DNS, FTP, the Morris Worm
  – 1991: Tim Berners-Lee, HTTP and HTML
  – 1996: Sun Microsystems, Java, applets
  – 2000s: Worms, viruses, phishing, blogs
The Hypertext Transfer Protocol (HTTP)

- Initial version created by Tim Berners-Lee
- Current version: HTTP 1.1
- Typical HTTP transaction
  1. client open connection to server
  2. client sends request to server
  3. server sends reply
  4. client and server close connection
HTTP Messages

- HTTP request types
  - GET, HEAD, PUT, POST, OPTIONS
- The HTTP request format:
  - Header, blank line, data
- HTTP response codes
  - 200 (OK), 404 (NOT FOUND), 403 (FORBIDDEN)
- HTTP response format
  - Header, blank line, data
- Common header fields
  - Content-type, Content-length, User-Agent
The Hypertext Markup Language (HTML)

- Created by Tim Berners-Lee and Robert Caillau at CERN in 1991
- Comes in many different versions from 1.0 up to 4.01 and XHTML 1.0 and 1.1
- The DOCTYPE tag is used to indicate which version of the HTML the document is written in
- HTML documents have three parts
  - DOCTYPE tag
  - HEAD tag
  - BODY tag
The HEAD Tag

- There is only one HEAD tag per document
- Contains information about the document:
  - TITLE tag
  - Metadata
  - CSS information (included or an external reference to)
  - Script information
The BODY Tag

- Is a container for the body (contents) of the document
- Any body text (cdata) must be included in some other kind of tag
- Logical Markup Tags:
  - P, H1, H2, H3, Q, BLOCKQUOTE, CITE, ADDRESS, INS, DEL, KBD, VAR, SAMP, PRE
- Lists and Tables
  - OL, UL, DL, LI, DT, DD
  - TABLE, TR, TH, TD
- The A tag
  - As a source or as a target
Principles of Graphic Design

• Contrast
  – Things that are different should be very different

• Repetition
  – Consistent use of elements and styles

• Alignment
  – Our eyes like things to be aligned and evenly spaced

• Proximity
  – Use distance and closeness to group together logically related items and separate unrelated items
Cascading Style Sheets (CSS)

- **Purpose:** To separate visual design (CSS) from logical structure (HTML)
- **Advantages and disadvantages**
- **Three ways to use CSS**
  - External style sheets
  - Inline style sheets
  - Inline style information (usually not a good idea)
- **The CSS naming mechanisms**
  - Tags
  - The CLASS attribute
  - The ID attribute
CSS Continued

- Block (DIV) versus inline (SPAN) elements
- CSS length units
  - %, em, ex, px, in, cm, mm, pt
- CSS colors
  - rgb(255,128,11), #ff800b
- CSS font properties
  - font-family, font-size, font-style, font-weight
- CSS text properties
  - text-align, text-transform, text-decoration
- Special handling of the A tag
  - A:link, A:hover, A:visited
**Layout with CSS**

- Block-level elements in HTML
- The display property
  - inline or block
- The position property
  - static, relative, or absolute
- The top, left, right, bottom, properties
  - specify offsets from some existing thing (containing box or current location)
- The CSS box model
  - From the outside in: margin, border, padding, content
The Common Gateway Interface (CGI)

• A simple interface that allows a web server to respond to a request by calling a program
• Input is passed to the program by environment variables and/or stdin
• Programs can be written in any programming language
• In Perl, we use the cgi-lib.pl module to hide the CGI interface
• Security is a critical concern
  – Program should check all input for validity before using it
  – Program should never execute anything supplied as input
Perl

• Perl is a programming language *that has no special relationship to CGI or the web*

• Scalar variables
  – Numbers, strings, and references
  – prefixed with $  

• Arrays
  – Indexed by 0,...,n-1
  – prefixed with @  

• Hashes
  – indexed by scalar variables (keys)
  – prefixed with %
Perl (Continued)

• By default, Perl variables are global
  – Use my to declare variables local to the current block

• Perl is context-sensitive
  – The same symbol can represent two different operators depending on the context in which it appears
  – See examples in the notes ( , )

• Perl references are absolutely essential
  – for making complicated data structures
  – for passing hashes as parameters to subroutines

• Perl subroutines are just weird
  – no named parameters
  – All parameters are passed as a single array named @_
Perl Regular Expressions

• The =~ operator is used in conjunction with regular expression operators // and s///
  – $myString =~ /regexp/

• Components of a regular expression
  – Alternations: |
  – Character classes: [ ] and named classes \s, \d, \w
  – Range operators: *, +, ?, {n}, {n,m}, {,m}
  – Special characters ^ and $

• RE return values
  – Can be made to return a boolean value or an array (using brackets)
  – Useful for breaking a string into several parts
Substitutions in Regular Expressions

• The substitution operator \( s/// \) allows for substitutions in regular expressions
  – \( s/pattern/replacement/ \)

• The special variables \$1, \$2, \$3, \text{etc} \) can be used in the replacement portion
Mid-Term Format

• A bunch of multiple (5) choice questions to be completed on a scantron form
• Bring a pencil and eraser
• Keep this format in mind when studying
  – Important to understand code
  – Not so important to be able to write code
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