

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
 - 1995: Netscape Communications, LiveScript, renamed JavaScript
 - 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, H*i*, 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`, 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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