CS3157: Advanced Programming

Lecture #14

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Outline

- Advanced topics
  - More html stuff
  - Advanced examples
  - Other issues with multiple languages/environments
  - Thread models
- Review for final

Announcements

- Extra credit project
- Review material
- Review exam
- Extra office hours
  - Please drop email.
- Please fill out evaluations
  - Courseworks.columbia.edu

Basic HTML

- Specific set of tags (depends on version)
- Up to user to set things correctly
- Most browsers will attempt to figure out what you want
  - Example not putting end body end html, will still work

Advanced HTML

- CSS
  - Cascading style sheets
    - Define format of the WebPages
    - Central location of style
    - With a few clicks can completely change thousands of WebPages.
- DOM
  - Document object model
    - Formal data structure to represent web based documents/information
- Client side scripting

DOM problems

- Different browsers supported things differently

```
if (document.getElementById &&
   document.getElementsByTagName) {
 // as the key methods getElementById and getElementsByTagName
 // are available it is relatively safe to assume W3CDOM support.

    obj = document.getElementById("navigation")
    // other code which uses the W3CDOM.
    // .....
 }
```

Examples

- http://www.dynamicdrive.com/dynamicindex12/pong/pong.htm
- http://www.dynamicdrive.com/dynamicindex4/butterfly.htm

javascript

- Client side
  - PHP & CGI were both server side
- Developed under Netscape as LiveScript
  - Currently 1.5
- Developed under IE as Jscript
- Object oriented approach
- Syntax like c
  - No input/output support native
  - Keywords
  - DOM for interfacing between server and client
- Can evaluate reg expressions (eval)

Javascript

- Heavy use of defined functions
  - Example: MouseOver
- Need to adopt to specific browser if doing anything fancy
- Adobe
  - Support javascript in pdf
- MAC
  - Dashboard widgets

Programming

- You need to learn on your own
- Many good books/websites
- Most of the time .js file if not in html
- Powerful example:
  - Thunderbird/firefox
- Get good debugger

How to do research?

- Practical research
  - Know a programming language
  - Have an inquisitive mind
  - Keep an open mind to new ideas
  - Try to solve an open research problem ☺
- Theory research
  - Learn some math
  - Learn some theory
  - Relearn the math
  - Solve something ☺

Where to start?

1. Need an idea
2. See if anyone’s done it or tried it in your way
   1. Citeseer (citeseer.ist.psu.edu)
   2. Google
   3. Appropriate Faculty/Researcher
   4. Google groups

Sketch out the idea on small scale

- Design a small experiment which can validate your idea
- Data, data, data, and Data
  - Make or break you
  - Will help your research
    - Make sure it isn't a circular relationship
- Evaluate results
  - Don't fake them
  - Even bad results are results
  - Can learn of what not to do
- Write up results

Write up

- Word vs Latex
- gnuplot
- cvs
- Element of Style

In the real world

1. Keep it simple
   1. Don't re-invent the wheel
   2. Design first
   3. Even with fancy blinking lights, a bad idea is still a bad idea (but with bad taste)
2. Incremental testing
   1. Recognize when the bug is your fault
   2. See if others have faced it too
3. Make sure version 1 works on most popular browsers

Question

- What is this designed with?
- Can you do a better job?

- Theyrule.net

Multi threaded programming

- Thread ideas
- Support of threads
  - Programming language
  - Hardware support
- Issues
  - Synchronization
  - Shutdowns
  - Share resources

Bottom line

- We’ve covered a lot this semester
  - Some of it was fun
  - Some of it was hard work (ok most)
  - Some of it was frustrating.
- BUT
  - You have lots of tools
  - Have an idea of where to start when dealing with programming projects

Review time

- Focus on C
- Shell programming stuff
- CPP
- PHP
- Perl
- webthumb

c

- Basic constructs
- Basic type
- Advanced types
- (review labs and class examples)
- Memory stuff
- Arrays
- Functions
- Pointers
- Debuggers

C

- Working with CGI
- Working on different platforms
- Makefiles

C++

- Basic language
- Difference to c
- Classes
- Permissions
- new/free memory allocations
- Keywords

php

- Basic stuff we did in lab
- Design and language limitations

- Thanks