MyCS Summer 2011 workshop agenda and plan

- MyCS\textsuperscript{2} \texttt{summer_2011} Piazza class
- (q. for Mike): how many hours are needed for credit at CGU?
- CS4HS materials and list of workshops from which to get a template...
  - http://www.cs4hs.com/
  - http://www.cs.uml.edu/cs4hs/

Monday, July 11 - Unit 1: HCI

- What time to start? 8am 9am?
- What time to end? 4pm?
- breaks? lunch?
- kinds of sessions? talks? break-out/brainstorming? lab times!

- ideas: try to incorporate Google docs at least once in each unit
- have a formal report-out at the end of each morning and afternoon
  - which of these ideas/lesson plans would be well-received by your middle-school students?
  - which would not?
  - how would you adapt these materials -- or how would you like them to be adapted?
  - other improvements or resources that would help?
  - give them time to look at the actual Exploring CS lesson plans

- breakfast?

- 9:00-9:30am Welcome - introductions - ice breaker game - and introduction to computer science

- 9:30-10:00am MyCS: Middle-years computer science and its curriculum, especially Unit 1
• What is computing? What is a computer? pair-activity (create ppt page)
  - hand out Unit 1 lesson plans
  - 5min warmup: strawberry, fire extinguisher, telephone booth, wine, rose... sort in order of "redness"
  - Mac, PC, cell phone, car, dishwasher, traffic light, calculator, abacus, person... sort in order of "computerness"

• 10:00-10:15am Coffee break

• 10:15-11:15am Unit 1 lab time: Computer parts and Search Engines
  - Look up parts on Wikipedia vs Encyclopedia Britannica vs How Stuff Works
  - pictures and Google presentation vs. poster and/or computational sculpture 😊 "Gallery walk"***
  - what other thing can we connect with (Google docs/presentation software, for sure)

• 11:15-11:45 break-out and report-back session
  - we give the teachers a summary of the lessons looked at
  - ask the questions above

• 11:45-12:30pm Lunch
  - one of the CS4HS workshops had videos at lunch -- we're now adding them to the Slides GoogleDoc?
    - The Great Robot Race***
    - Top Secret Rosies -- http://portal.acm.org/citation.cfm?id=1929890***

• 12:30-1:00pm Intro to programming- modeling the spread of disease with Google Docs
  - Google 3d modeling tool, perhaps
    - Google does really great data visualization in Spreadsheet. For example, given the proper data, you can make the x-y bubble graphs in the gapminder link below. Given Prolog-style parent-child pairs, Google Docs can whip you up a tree. --Garrett
  - other cool visualizations links on slides

• 1:00-2:00pm What is computing?
  - activity: Write instructions to make pb&j
    - YouTube² video of results from pb&j -http://youtu.be/1K0vxBNJk88?t=6m43s
    - origami (rose - example of recursion)***
  - LightBot² as intro to programming
    - can we run this stand-alone? This is the best we (well, I) can do.
  - Preview of Scratch's interface
  - Nick Parlante's web coding:
    - http://www.stanford.edu/class/cs101/***

• 2:00-2:45pm Computer Intelligence - the Turing Test
- **Activity 20 from CS Unplugged** This is a game in which 1 person pretends to be a computer and the other a human, and the class has to guess which is which based on answers to their questions.
- Other examples of computer intelligence:
  - Watson! Mention how Watson needed text input (as opposed to audio), and how Watson had trouble parsing some clues ("What is Toronto??????")
  - Eliza --
  - 20 questions game
  - other learning demos (at end, maybe) Latex symbol demo; handwriting-recognition demo, etc.***
  - use Loebner Contest entries online <-- look for these***
    - http://www.pandorabots.com/pandora/talk?botid=f5d922d97e345aa1
    - http://www.abenteuermedien.de/jabberwock/
- Tie back to our discussion of "computerness" in the initial activity: What are the weak points and limitations of computers?

**2:45-3:15pm** Summary & Feedback
- re-gather
- look over all of Unit 1 together
- brainstorm what will work, how it'll work, what needs improvement
- make sure that we refer back to the lesson plans as often as possible.

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**Tuesday, July 12- Unit 2: Problem Solving**

- **Unit 2**
  - the details of how things are presented & what's covered in labs is key ...

- breakfast?

- **9:00-9:30am** Algorithms & problem solving strategies- Ask Prof Ran?
  - DNA folding: paper and TED talk and picture.
  - pageRank
  - shortest paths
  - n-body problem

- **9:30-10:00am** Binary Lab/Activity & Prime numbers
  - Binary Scratch Program
  - CS Unplugged Activity
  - run-length encoding***
  - briefly bring up other bases like hexadecimal colors.
  - Jen can talk about her binary activity

- **10:00-10:15am** Coffee break

- **10:15-11:15am** Unit 2 lab time
  - Create your own code using Legos... *(MikesLegos activity)*
    - create a code that specifies a set of instructions... send it and have them decode and run the instructions
- each instruction is "place a brick at x,y of certain color, (orientation maybe)"
- then, they encode these instructions and then let the other team see if they create the right tower
  - **Finite State Machines** activity- Pirate Islands!

- **11:15-11:45am** break-out and report-back session
  - we give the teachers a summary of the lessons looked at
  - ask the questions above

- **11:45am-12:30pm** Lunch

- **12:30-1:00pm** Linear & Binary Search
  - activity from lesson plan- Trump Tower Activity
  - model linear & binary search: look for words in dictionary

- **1:00-2:00pm** Sorting
  - activity: have one person sort everybody by name/birthday/height
  - video [http://csunplugged.org/sorting-algorithms](http://csunplugged.org/sorting-algorithms)
  - act out quicksort & selection sort (cs unplugged activity)
  - dancing-out video of sorting algorithms (find!)

- **2:00-2:45pm** Graphs and Minimal Spanning Trees
  - cool graph puzzles (finding hamiltonian & eulerian cycles, Konigsberg bridges,...)
  - CS unplugged activity (Muddy Roads)
  - look at final unit project

- **2:45-3:15pm** Summary & Feedback
  - re-gather and talk about final project ideas (from lesson plan)
  - look over all of unit 2 together
  - brainstorm what will work, how it'll work, what needs improvement
  - make sure that we refer back to the lesson plans as often as possible.

### Wednesday, July 13 - Unit 3: Web Design

- breakfast?

- **9:00-9:30am** Web & Society
  - internet privacy/security issues
    - from lesson plan: **PBS Frontline: Growing up online**
    - article: The Dangers of Facebook
  - discussion: issues of socially responsible web use
    - from lesson plan: write response on blog
    - or perhaps brainstorm through google docs instead?

- **9:30-10:00am** Website Design
  - Intro to web design, sketch out our own website

- **10:00-10:15am** Coffee break
• **10:15-11:15am** HTML lab
  - mini-HTML lesson [www.w3schools.com/html/](http://www.w3schools.com/html/)
  - make a web-page with HTML formatting, images, lists, hyperlinks!
  - maybe web-page contains response to the previous discussion? Or a summary of internet privacy/security issues?

• **11:15-11:45am** break-out and report-back session

• **11:45am-12:30pm** Lunch

• **12:30-1:00pm** Intro to CSS
  - create a web page that uses an internal style sheet (or a separate style sheet?) - augment previous web page
  - css reference: [www.w3schools.com/css/](http://www.w3schools.com/css/)
  - [http://www.w3schools.com/tags/ref_colorpicker.asp](http://www.w3schools.com/tags/ref_colorpicker.asp)

• **1:00-2:00pm** CSS Lab
  - More Trash.CSSHTML & CSS: page layout styles (days 15-16)
  - Adding Images
  - Zebra Tables

• **2:00-2:45pm** Preview of JavaScript and Flash - show demos
  - [http://mootools.net/demos/](http://mootools.net/demos/)
  - connect with algorithmic stuff from Unit 2
    - ex: max, sort
  - go into javascript & flash supplements?

• **2:45-3:15pm** Summary & Feedback
  - re-gather and talk about final project ideas (from lesson plan)
  - look over all of unit 3 together
  - brainstorm what will work, how it'll work, what needs improvement
  - make sure that we refer back to the lesson plans as often as possible.

**Thursday, July 14 - Unit 4: Intro to Programming**

There are Scratch Files - templates - for a bunch of projects <-- go through them & decide which ones we want to do

• breakfast?

• **9:00-9:30am** Intro to Scratch
- show Scratch demos
- create a simple Scratch program
  - get to know basic terms in Scratch
  - dialogue between Sprites
  - moving Sprites
- connect with Java, C++, Python, etc.

- **9:30-10:00am** More Scratch - event driven programming
  - alphabet learning game from lesson plan
  - act out broadcast event driven programming (from lesson plan)
  - look at the Summer Story Project from the lesson plan
  - mention Story Project (days 11-15)

- **10:00-10:15am** Coffee break

- **10:15-11:15am** More Scratch Programming
  - Variables
  - Conditionals
  - And, Or, randomness
    - Simon says with and/or/randomness? ex. Simon says, if you (have a blue shirt and black socks) or (your name starts with A) stand up.
  - Develop a Rock, Paper, Scissors program

- **11:15-11:45am** break-out and report-back session

- **11:45am-12:30pm** Lunch
  - projects/
    - animation
      - Daydream
      - jellyfish
      - Trampoline
    - Games
      - Bug on a plate
    - Interactive Art
      - Kaleidoscope
      - WHEE
      - Zen Rock Garden

- **12:30-1:00pm** Timing
  - make a timer that counts down from 10 to 0
  - share solutions & look at lesson plan solutions
  - look at sample problems

- **1:00-2:00pm** Create a timing game

- **2:00-2:45pm** Continue making game
  - share games with everybody
  - look over final project game ideas

- **2:45-3:15pm** Summary & Feedback
  - re-gather and talk about final project ideas (from lesson plan)
- look over all of unit 3 together
- brainstorm what will work, how it'll work, what needs improvement
- make sure that we refer back to the lesson plans as often as possible.

**Friday, July 15**

- Can we visit Google Irvine? - I bet we have some alums
- Google is trying to make this happen