15-122: Principles of Imperative Computation

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http://cs.cmu.edu/~15122
http://c0.typesafety.net/
Overview

• Goals of this course

• Interactions
  – Lectures, labs, recitations, office hours

• Assessment
  – Quizzes, homework (written, prog.), exams

• The course begins ...
Activity

TABLE
REPLY
HANDLE
BELOW
DEFINE

BL ___
PIA ___
CL ___
STU ___
DA ___

• Copy these words on a sheet of paper
• Complete the blanks to create new words (in any language)
• Turn the sheet of paper over and leave it that way
Programming Skills

• Transforming algorithmic ideas to code
  – *Deliberate programming*
  – Writing tests
• Imperative programming in C and C0
• Basic Unix survival
Algorithmic Ideas

• Asymptotic complexity
  – time/space
  – worst case/average case/amortized analysis
  – important classes: $O(1)$, $O(\log n)$, $O(n \log n)$, $O(n^k)$, $O(2^n)$

• Important ideas like order and randomness

• Lots of fundamental data structures
  
  (Psst... this is often what tech interviews test on!)
Computational Thinking

• “Thinking like a computer scientist” is important for lots of people, not just computer scientists!
• A computer science approach to thinking about the correctness of programs
The Big Picture

• Pre- or co-requisites
  – either 15-151 (Math Foundations for CS)
  – or 21-127 (Concepts of Mathematics)

• Counterpart
  – 15-150 (Principles of Functional Programming)

• Pre-requisite for
  – 15-213 (Introduction to Computer Systems)
  – 15-210 (Parallel and Sequential Data Structures and Algorithms)
  – 15-214 (Principles of Software System Construction)
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Lectures

• Tuesday and Thursday
• Please be here, please be active
  – Ask and answer questions, pay attention
  – Lecture notes for review
• Laptops for note-taking only
  – No surfing, email, games, …
  – Work on your homework elsewhere
  – If you can see board from the back row, be there
  – Too distracting for other students
Labs and Recitations

• Labs Monday (programming exercises)
• Recitations Friday (review & written exercises)

• Collaborative problem solving
• How-to programming and tool support
• *Attend the lab/recitation you’re registered for*
Laptop Setup Office Hours

• Wednesday 4:30pm, Porter Hall 100
• Set up using the C0 tools with Andrew Linux
• Format: drop-in for half an hour
• or do it yourself:
  http://c0.typesafety.net/tutorial/C0-at-CMU.html
Online communication

• **Autolab** and **Gradescope** for homework
• Grades from web page
• **Piazza** for announcements, questions, and communication with course staff
  – Get help, help each other!
• Cluster Linux machines and SSH to shared machines for assignments
Grades

Grade Forecaster

david49's Past Performance and Future Projections

Grade projection as of Hw7
Click and drag in the plot area to zoom in

... what if ...

Hw8: NA %  Hw9: NA %  Hw10: NA %  Hw11: NA %  Hw12: NA %  BN12: NA %  Final: NA %

david49's Grades

<table>
<thead>
<tr>
<th></th>
<th>Hw1</th>
<th>Hw2</th>
<th>Hw3</th>
<th>Hw4</th>
<th>Hw5</th>
<th>Midterm</th>
<th>Hw6</th>
<th>Hw7</th>
<th>Hw8</th>
<th>Hw9</th>
<th>Hw10</th>
<th>Hw11</th>
<th>BN12</th>
<th>Final</th>
<th>Labs</th>
<th>Participation</th>
</tr>
</thead>
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Other Resources

• Course home page
  – http://cs.cmu.edu/~15122
  – Schedule, lecture notes, calendar, contact info…
  – Office hours start soon

• C0 home page
  – http://c0.typesafety.net/
  – Tutorial, reference, examples, binaries
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Assessment

• 50% - Exams (2 midterms and a final)
• 45% - Weekly Homework
  – *Written* due Monday by 9pm through Gradescope
    • No late days: 50% penalty if handed in within 12 hours
    • ∞ submissions
  – *Programming* due Thursday 9pm through Autolab
    • Download assignments and code from Autolab
    • 3 late days, at most 1 per homework
    • No extensions
• 5% - Quizzes and lab/recitation participation
  – Quizzes in lecture and recitation
  – Basically: attend, make a good effort, get full credit.
Academic integrity

• Quizzes, exams, homework must be your own

• You must hand in your work
  – **OK**: discussing course material, practice problems, study sessions, going over handed-back homework in groups
  – **Not OK**: copying or discussing answers, looking at or copying code or tests (even parts)
  – **Not OK**: talking through the assignment as you code with a classmate

• **Whiteboard policy**
  – **OK**: discussing approaches to solving a problem
  – **Wait at least 4 hours**, write solutions individually
  – **Not OK**: taking notes or pictures, memorizing answers

• We use MOSS to catch code duplication across semesters

If you make a mistake, come to us, don’t let us come to you
How to do Well in this Course

• Do not stress over grades
• Participate
• Manage your time wisely
• Start homework early
• Get all the help you need
• Make time for fun
Activity debrief

• Without looking at your paper, write down as many of those words as you can recall
Activity debrief

• **Without looking at your paper, write down as many of those words as you can recall**

• **How many people got more from the left column?**
Activity debrief

• *Without looking at your paper, write down as many of those words as you can recall*

• *How many people got more from the left column?*
• *From the right column?*
Activity debrief

• Without looking at your paper, write down as many of those words as you can recall

• How many people got more from the left column?
• From the right column?

• It’s going to be a lot easier if you take good handwritten notes
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A Mysterious Function Approaches ...