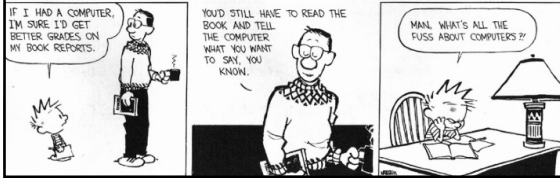


Principles of Programming Languages

Prof. Evan Chang

Meeting 1: Welcome, CSCI 3155, Fall 2009



Distraction-Free Classroom

- Let's turn off our cell phones and wi-fi



... just imagine that we have class at 30,000 feet

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Introductions: Your guide this semester



- Office hours: **TR 11:00am-12:00pm** and by appointment in ECOT 621

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Introductions: Your TA this semester

Chenyu Zheng



- Office hours: **M 4:15pm-5:15pm** in ECCR 1B54, **R 7:30pm-8:30pm** in ECCS 128, and by appointment

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Introductions: About you?

PL!

- What do you want to get out of this class?

Alan - Japanese

Colin - SUNY
Story Book

Giot - Aerospace

Garrett - Edu Tech

Jan - work w/ PLS
Mike

AlanJ - Entrepreneurial,
Music

Canon - Foundations

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Introductions: About you?

- What do you want to get out of this class?

6

Introductions: About you?

- What do you want to get out of this class?

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Announcements

- Recitation
 - "Structured office hours" with Chenyu
 - No recitation section today. Recitation section starts next week Sep 1.
 - Enjoy one more hour of summer!
- Website
 - <http://www.cs.colorado.edu/~bec/courses/csci3155-f09/>
 - syllabus, announcements, readings, slides, assignments, etc.

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Today

- Requirements and grading
- Some historical context
- Goals for this course
- Course administration

- Convince you that PL is useful

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Meta-Level Information

- Discussion, not lecture

- Please interrupt at any time!
- It's completely ok to say:
 - I don't understand. Please say it another way.
 - Slow down!
 - Wait, I want to read that!

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Requirements

Prerequisites

- CSCI 2270 (CS2: Data Structures)
- CSCI 2400 (Computer Systems)

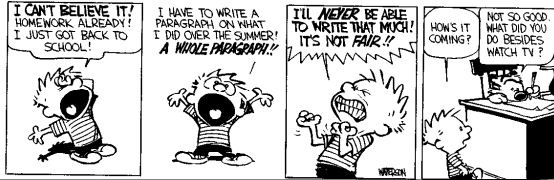
- Programming experience
 - ideally with more than one language

- If you have not satisfied the prerequisites or have any concerns, please see me.

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Assignments

- Reading and Participation (10%)
- Weekly Homework (25%)
- 2 Midterm Exams (40%)
- Final Exam (25%)



Reading and Participation

- Reading before each meeting
 - Spark class discussion, post/bring questions
 - *Skills* help focus your reading
- Textbook:
 - Robert W. Sebesta. Concepts of Programming Languages, 9th edition. 8th edition is ok.
 - On reserve in the Engineering Library
 - Problems getting the textbook?
- In-Class and Online Participation!

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Moodle and Online Discussion

- Online discussion forum
 - Post ≥ 1 **substantive** comment, question, or answer each week
 - On moodle.cs.colorado.edu
 - Post questions or comments for a class meeting **before** the next meeting
- Take a moment to reflect upon the day's reading or class discussion

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Homework and Exam

- Homework/Problem Sets
 - You have **one week** to do each one (some may last two weeks), due Thursdays 11:55pm
 - Collaboration and groups are encouraged (but you must acknowledge!)
 - Lowest grade dropped
- Midterm Exams: **Oct 1** and **Nov 5**
- Final Exam: **Dec 14**
 - Mark your calendars. No make-ups (except special circumstances)

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Skills

- Help you focus your reading
- ~80% of the points on exams and assignments will come from the *skills*

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Why Study PL?

"Isn't PL ancient history?"

- PL is an old field within Computer Science
- 1920's: "computer" = "person"
- 1936: Church's Lambda Calculus (= PL!)
- 1937: Shannon's digital circuit design
- 1940's: first digital computers
- 1950's: FORTRAN (= PL!)
- 1958: LISP (= PL!)
- 1960's: Unix
- 1972: C Programming Language
- 1981: TCP/IP
- 1985: Microsoft Windows

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Don't we have enough prog. languages?

DOCTOR FUN

19 Mar 97



Progress

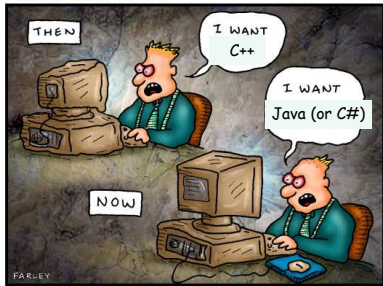
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A Dismal View of Prog. Languages

DOCTOR FUN

19 Mar 97



Progress

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So Why Study PL?

What PLs do you know?

Adam Johnson
m68k assembly, C, C++, C#, Perl, Python, Ruby, SQL, Java, BASIC

Dave
matlab, IDL, C, C++, HTML

Gabe
C, C++, Java, Python

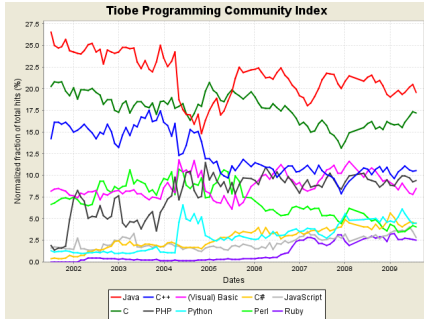
Eliot
Bash/Shell, ...

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What PLs do you know?

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TIOBE Language Popularity Index



http://www.tiobe.com/tiobe_index/

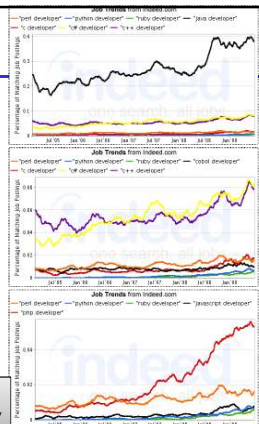
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TIOBE Language Popularity Index

Position Aug 2009	Position Aug 2008	Delta in Position	Programming Language	Rating Aug 2009	Delta Aug 2008	Status
1	1	0	Java	19.527%	-2.04%	A
2	2	0	C	17.220%	+1.04%	A
3	4	1	C++	10.501%	+0.44%	A
4	5	1	PHP	9.390%	+0.04%	A
5	3	2	(Visual) Basic	5.486%	-2.37%	A
6	6	0	Python	4.489%	-0.49%	A
7	8	1	C#	4.443%	+0.76%	A
8	7	1	Perl	4.028%	-0.67%	A
9	10	1	JavaScript	2.812%	-0.68%	A
10	9	1	Ruby	2.490%	-0.43%	A
11	11	0	Delphi	2.337%	-0.39%	A
12	13	1	PL/SQL	0.982%	+0.30%	A
13	14	1	SAS	0.817%	+0.27%	A
14	27	13	SPSS (OS/400)	0.752%	+0.52%	A
15	26	11	ABAP	0.739%	+0.51%	A
16	16	0	Pascal	0.675%	+0.26%	A-
17	12	5	D	0.662%	-0.69%	B
18	17	1	LuaScheme	0.630%	+0.25%	B
19	41	22	Objective-C	0.612%	+0.51%	B
20	25	5	MATLAB	0.560%	+0.32%	B

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Jobs!



<http://blog.timbunce.org/2008/02/12/comparative-language-job-trend-graphs/>

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Increase ability to learn new languages

- You will need to learn many languages during your careers.
- You will learn concepts that make it easier for you to learn new languages in this class.

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Have you ever had to pick a language?

Criteria (Dave)

- Experience
- Execution speed
- Existing code
- Saving work

(Adam)

- Flexibility
- Interoperability
- Syntax

switched to IDC - large arrays "shortcuts"

Python - scripting, no build, just run!

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Have you ever had to pick a language?

30

Improve background for choosing an appropriate language

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How many of you know C++?

Everyone! (19)

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How many of you know about ... in C++?

- virtual methods
- templates
- try-catch (errors/exceptions)
- try-finally use: resources, regardless of error, do something
- polymorphism
- dynamic_cast

all (3)
5 (1)
4

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Better use of languages you already know

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Have you heard of MapReduce?

35

Have you heard of MapReduce?



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Controversial Editorial ...

- Linked on the schedule for Thursday
- Optional, but entertaining
 - note: some mild profanity
- "Take this course to get a first-rate CS education"

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Increased capacity to express ideas

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Other Reasons?

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Other Reasons?

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Better understanding of the significance of implementation

- Lots of ways a program can work
- 1) Get it done faster
 - some methodologies work better for certain tasks
 - 2) how long use resources — hardware
 - efficiency — how fast your app runs

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Course Administration

Policies

- **Read the course syllabus**
<http://www.cs.colorado.edu/~bec/courses/csci3155-f09/>
- Coming next time means you have read and agreed to them.

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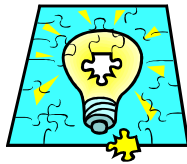
Highlights

- No late assignments but one "freebie" (unless emergency)
- No make-up exams (unless emergency or special accommodation)
- Special accommodation requests (disability, religious observances) within *first four weeks*
- Regrades requests within *one week*
- Send us *e-mail immediately* if you will be absent because of an H1N1 outbreak

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Most Important Goal

Have Lots of Fun!



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For Next Time

- **Read the course syllabus**
<http://www.cs.colorado.edu/~bec/courses/csci3155-f09/>
- Join the course moodle and introduce yourself

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