

CS 211: Introduction

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Week 1

Goals

- ▶ Motivate: Java and OO
- ▶ Problem Solving
- ▶ Course Mechanics
- ▶ Tools

Why Java / OO

Object-Oriented Design

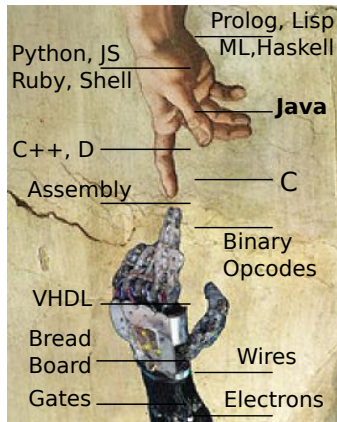
- ▶ Method to decompose problems for solution (by computer programs)
- ▶ Style of programming / arranging code
- ▶ A way of thinking independent of any particular PL

Java

- ▶ Built around OO methodology
- ▶ Garbage collection
- ▶ Huge and useful standard library
- ▶ Tons of 3rd party libraries
- ▶ Widely deployable
- ▶ Huge corporate backers
- ▶ Fashionable methodology
- ▶ Will help get you a job

Java's Place in the World

Pure Abstraction



Bare Metal

- ▶ Closer to hardware than some contemporaries
- ▶ "Hardware" is a Virtual Machine that is reasonably close to actual machines
- ▶ Abstracts away memory management (woot!)
- ▶ Basic language mechanisms are still C-spirited
- ▶ Allows single dynamic dispatch

Kauffman's Philosophy

- ▶ You will not program in java your entire career
- ▶ Object-oriented programming. . .
 - ▶ Vaguely defined
 - ▶ Not widely understood
 - ▶ May or may not make programs better
 - ▶ May go out of style
- ▶ **Problem solving** will always be fashionable
- ▶ **Good Program Design** transcends time

Programming is

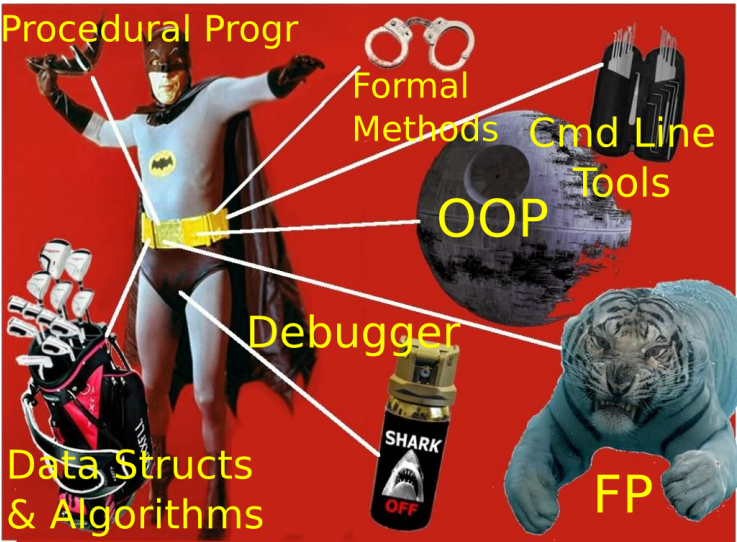
- ▶ Formalizing a solution method
- ▶ Translating into a mechanically executable form

Designing is

- ▶ Ensuring the solution can be implemented correctly
- ▶ Ensuring the solution can adapt to changes

Programmers Are Like Super Heroes

OO will be one tool in your growing utility belt.
Make sure it's not the only one



Let's Solve a Problem (or at least start)

- ▶ Each GTA is assigned some lab sections for CS211
- ▶ Each lab section has a day/time and a student count

Your program (pseudocode / python/ whatever)

1. Accept 3 lists/arrays with contents in the table below
2. Compute the Head Count for each GTA
3. Return the *Discrepancy*: difference between biggest and smallest total head count

3 Input Arrays: String, String, Integer

Head Counts

Slot	Sec	GTA	count
0	214	Umang	23
1	210	Parastoo	24
2	211	Fardina	21
3	209	Parastoo	24
4	207	Umang	12
5	212	Fardina	23
6	208	Umang	11

GTA	total
Fardina	44
Parastoo	48
Umang	46

Discrepancy: 4

Full Data

Input Arrays/Lists

Slot	Sec	GTA	count
0	211	Fardina	21
1	219	Lubaba	24
2	208	Yue	14
3	222	Umang	12
4	220	Lubaba	24
5	2H1	Maryam	15
6	205	Mingrui	11
7	207	Yue	16
8	206	Mingrui	14
9	209	Parastoo	24
10	210	Parastoo	24
11	212	Fardina	23
12	221	Umang	23
13	218	Maryam	24
14	214	Umang	11

Head Counts

GTA	total
Fardina	44
Lubaba	48
Maryam	39
Mingrui	25
Parastoo	48
Yue	30
Umang	46

Discrepancy: 23

Advisement

If you don't think you could derive a solution to the aforementioned problem after a few days of trying in your favorite programming language, you are starting CS 211 below the expected proficiency level

- ▶ Work hard in the first few weeks of class to get oriented
- ▶ Visit office hours for Profs and GTAs with **questions**
- ▶ Practice on your on using one of the practice sites mentioned on the course Piazza page
- ▶ **Be proactive about your education**

Code

Today's code pack contains two Java solutions to this problem.

- ▶ By the end of CS 211 you will certainly understand the first
- ▶ By the end of CS 310 you will certainly understand the second
- ▶ It is useful to examine these solutions to get a sense how java programs look even if you don't understand everything yet

Variants

File Input

Read the input arrays from a file - much nicer

Feasibility

Determine if a GTA assignment is possible/impossible based on room assignment

- ▶ Is the following assignment possible?

Sec	Day	Time	Room	Count	GTA
201	R	12:30	4457	19	Li
202	R	01:30	4457	15	Raj
203	R	02:30	5358	6	Adam
204	R	03:30	4457	21	Raj
206	R	12:30	5358	22	Li

Balance

Determine the GTA assignment that is possible and has the lowest discrepancy - computationally much harder...

Course Mechanics

See the course mechanics slides

Upcoming

Lab this week

- ▶ Set up jdk 1.8
- ▶ Install DrJava if desired
- ▶ Compile a few basic programs
- ▶ Submit lab code by 5:00pm Sunday

Project 1 will be finalized in the next day or so

If weather affects some labs, we will make a Piazza Announcement

This Week/Weekend

- ▶ Make sure you set up your environment and can compile programs
- ▶ **READ** Reges/Stepp Ch 1-4
 - ▶ Overview of procedural programming in Java
 - ▶ Good review, entertaining writer
- ▶ Practice It Exercises associated with the chapters