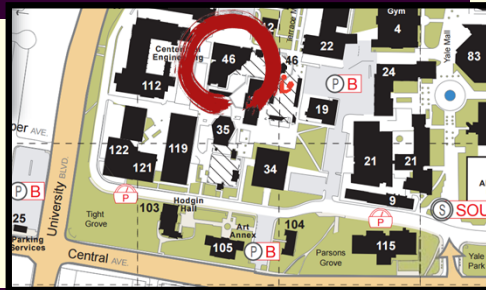




Welcome to
CS 259
Data Structures with Java



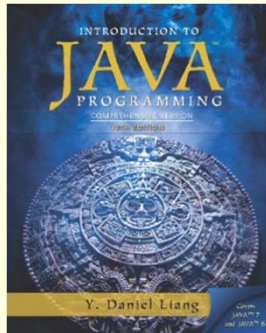
Instructor: **Joel Castellanos**
e-mail: joel.unm.edu
Web: <http://cs.unm.edu/~joel/>
Office: Electrical and Computer
Engineering building (ECE).
Room 233



9/9/2016

Textbook & Reading Assignment

Introduction to Java Programming (10th Edition) by Y. Daniel Liang



Due Friday: Aug 26

Chapter 1: Intro to Computers,
Programs & Java

Skip 1.11 and 1.12

Chapter 2:
Elementary Programming

Lab 1 (due Sunday at Midnight):
ComputeChange (modification of textbook Listing 2.10).

INTRODUCTIONS



- Name
- Background in Computer Programming:
 - Visual Basic, C, C++, Java, Javascript, HTML, Python, WoW scripting,
- UNM major, intended major, just this one class....
- Why you are taking this class and what do you expect to get from it.

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The Amazing CS-259 Students of Fall 2016

- Lama Luc
- Moses Marble
- Zesty Zeke
- Jarett the Jaguar
- Tomas (Toma) the Tiger
- Coulomb Clark
- Wonderful Winston
- Rhino Ryan
- Masterful Matthew
- Calvin Coolidge
- Banana Ben
- Camille the Colorful
- Jackalope Jacob
- Ruminating Rafael
- Jovial Jay
- Easy Ernie

4

Blackboard Learn: <https://learn.unm.edu/>

Turn-in Assignments
Grades
Discussions

Class Website: www.cs.unm.edu/~joel/cs259

Syllabus
Lecture Notes
Videos
Source Code

5

<http://cs.unm.edu/>

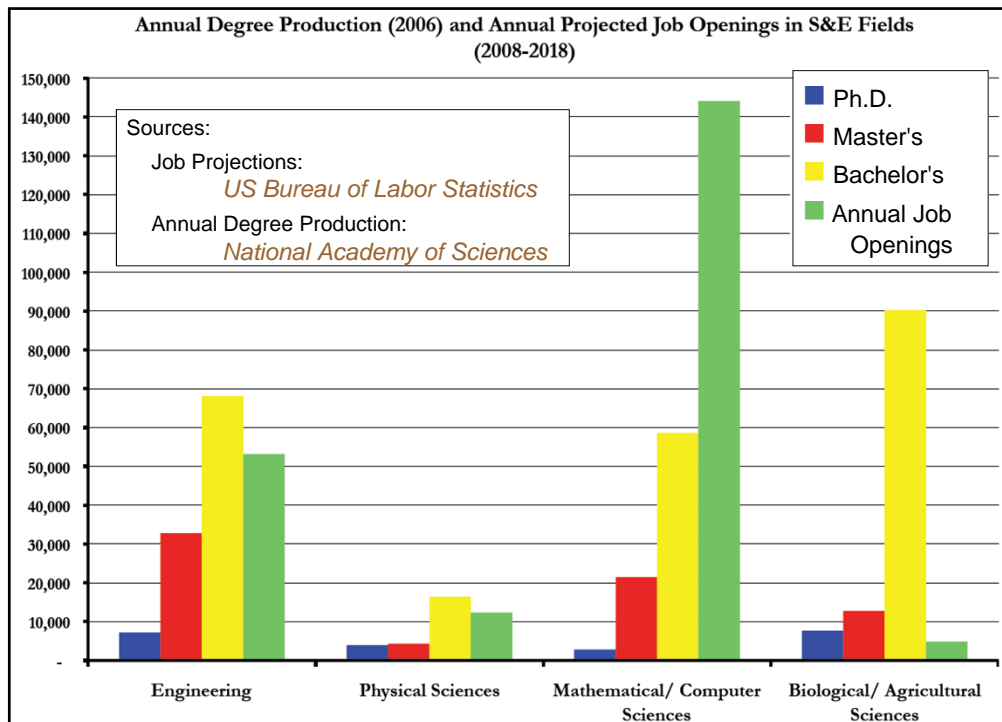
Mailing Lists: csundergrad, cssports, Colloquia, ...
How to get CS account & 24x7 Building Access

Ph.D. Student Highlights
Ben Edwards
How can we make the Internet a safer place? PHD student Benjamin Edwards uses tools from Complex Systems

Admissions & Financial Aid
• Undergraduate Admissions
• Graduate Admissions
• International Graduate Admissions
• Financial Aid
• Student Employment Opportunities

Faculty & Staff
• Faculty Directory
• Staff Directory
• Graduate Directory
• By Research Area
• Employment

Useful Links
• Computer Facilities
• Webmail
• Map & Directions
• Schedule a Visit
• Contact an Advisor
• News & Colloquium Archive



U.S. Bureau of Labor Statistics

(<http://data.bls.gov/projections/occupationProj>)

Computer Programming:

- Median Pay, 2012: \$74,280 / year
- Entry-Level Education: Bachelor's degree
- Number of Jobs, 2012: 1.2 million



"Despite the economic slowdown of the early 2000s, Computer programmers are likely to remain in high demand in the U.S. for the next decade."

[in 2010] "Women hold only 21% of the baccalaureate or higher information technology jobs, yet this field has the largest number of woman who report being "highly satisfied" in their career."

Course Description

This is an introductory Java programming course that moves at an accelerated pace covering the material in both CS-152L (Computer Programming Fundamentals) and CS-251L (Intermediate Java Programming) in 5 credits in one semester.

The breath of the course is similar to CS-152L and CS-251L, but the depth of the programming projects requires more problem solving skills and creativity.

Programming assignment every week.

See **Syllabus** on Course Website for details on grading, late policy, etc.

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The logo for i-clicker, featuring the text "i-clicker" in a white sans-serif font on a blue rectangular background.

- We will use i-clicker for quizzes in lecture only.
- We will use i-clicker every lecture.
- For **CS-259**, Register your i-clicker using Blackboard Learn.
- One i-clicker can be registered and shared by more than one person (as long as no two of them are in an i-clicker class at the same time).

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Quiz Question #1:

Do you have your i-clicker?

- a) Yes – I am ready to go.
- b) I bought one from the bookstore, but forgot it.
- c) My dog ate it.
- d) No – I did not get one yet.
- e) What is an i-clicker anyway?

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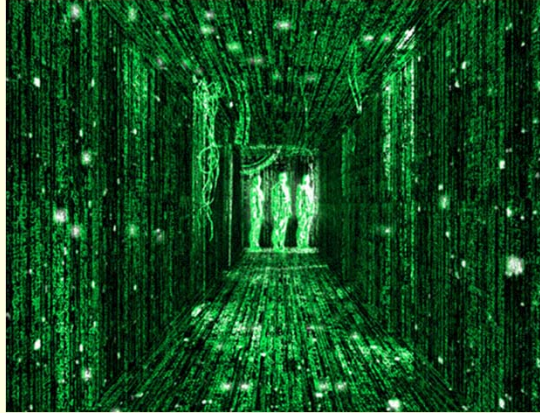
Forgotten i-clicker?

- If you forget your i-clicker, you may borrow one of my loner i-clickers.
- Each loner i-clicker has an animal picture.
- If you borrow an i-clicker, then to get credit, you must ***e-mail me on the same day***:
 - **Subject:** CS-259 borrowed i-clicker
 - **Body:** Name, Date, and Animal.
- Loner i-clickers are not intended to replace buying an i-clicker or a lost i-clicker.

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In the Computer it is All Just Numbers

- Bach's Sonata No. 5 in F minor
- Owl City's Fireflies
- The motion picture: Shrek Forever After
- Hamlet, Prince of Denmark.
- World of Warcraft



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A computer file is just a list of 1s & 0s

Hard Disk Drive (HDD)

Read Head

Magnetic Grains

0 1 1 0

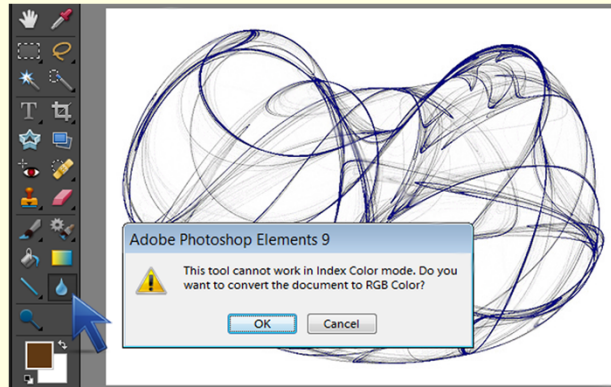
14

Writing verses *Using* Software

Authoring a computer program is like writing an essay.
NOT like learning to use software such as Photoshop,
PowerPoint or League of Legends.

Software, such as
Photoshop, is
often learned by
"click and explore"

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Computer Programming Language

A **computer programming language** is a set of symbols and rules designed for humans to more easily represent computer instructions.

A **computer program** is a sequence of instructions – like a recipe.

However, in a computer program, the instructions usually contain many **branches** and **loops**.



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Syntax Errors Verses Semantic Errors

Syntax Errors

"I getted the milk and putted them into me coffee."

```
System.println("Hello");
```

Semantic Error

- 1) Place two slices of Mozzarella cheese, a slice of tomato and some small fresh basil leaves between two slices of bread.
- 2) Lightly spread outside of sandwich with butter.
- 3) Place skillet on medium heat and cook sandwich in skillet for one hour.

17

Save, Save As..., and Multiple Media



Whenever you spend an hour or more working on a program, please, create a backup copy with a version number added to the filename.

Whenever you finish working for a few hours, copy your latest backup to a different media.

18

Small Language with Complex Usage

- Programming Languages are much smaller than natural languages.
- However, programming languages are primarily used to express **complex conditional (branching) logic** not found in common uses of natural languages.
- Logic skills (from one programming language or from Philosophy or Mathematics) have strong carryover.



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Window into How Computers Think

Easy:

- Using only standard arithmetic operations, it takes a few hours to write a Python program that can solve large systems of differential equations.

Hard:

- Being given a bunch of photographs of everyday life, the world's most powerful computer running the world's best artificial intelligence software is currently incapable of deciding this is a photo of a woman walking a dog.



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Java Versions



- The newest version of Java is Java 8
- <http://www.oracle.com/technetwork/java/javase/downloads/index.html>
- **JRE**: Java Runtime Environment (*run*, not build, applets and applications)
- **JDK**: Java Development Toolkit (compile java source code and run applets and applications).
 - **Java SE** (Standard Edition): *What we use in CS-259.*
 - **Java EE** (Enterprise Edition): Includes extra classes to handle running of multi-user servers.

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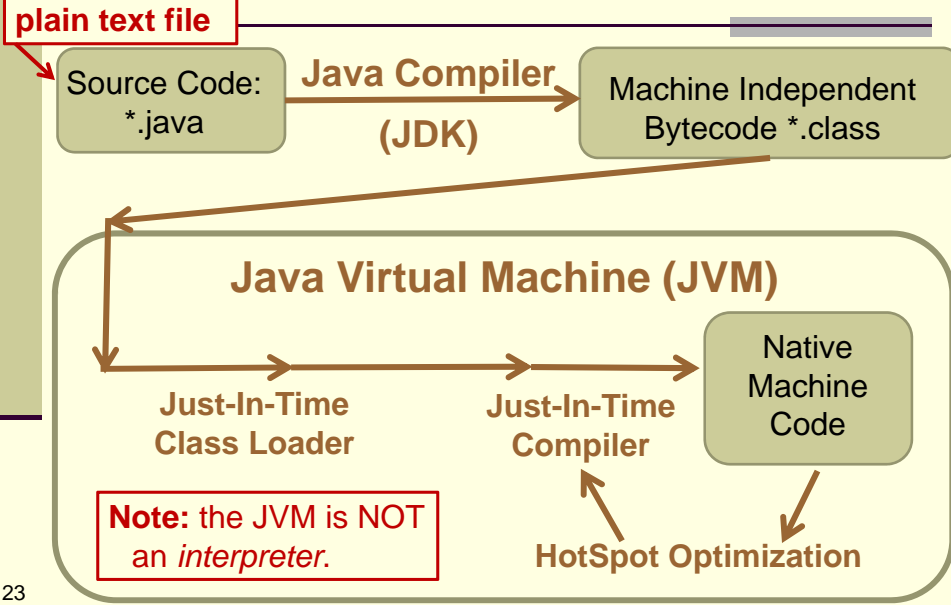
What is Java?



- Java is a programming language originally developed by James Gosling at Sun Microsystems and was released in 1995.
- Originally, Java **was** slow. Now, Java is *fast!*
- Java applications are compiled to bytecode (class file) that can run on any Java Virtual Machine (JVM) regardless of the underlying computer architecture.
- Java is a general-purpose, **Object-Oriented Programming** (OOP) language.
- Java's Moto: "**Write once, run anywhere**".
- Java places a strong emphasis on **early detection of errors**.

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Java Compilation and Run Process



23

Developing Brick skills



24