Welcome to CS 152 Data Structures with Java

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Room 233
Computer Science Course Sequence

1. CS-105: Intro programming JavaScript and HTML5,
2. CS-152: Intro programming Java. More rigorous than 105.
3. CS-251: Intermediate programming Java.
4. CS-241: Data Organization using C.

CS 357: Declarative Programming.
CS-351: Design of Large Programs.
CS-361: Algorithms I.
Textbook & Reading Assignment

*Introduction to Java Programming, Brief Version (11th Edition)*
By Daniel Liang

**Due Friday: Aug 25**

Chapter 1:

Chapter 2:

**Lab 1** (due Wednesday Aug 30 at Midnight):
ComputeChange (modification of textbook Listing 2.10).
Blackboard Learn: https://learn.unm.edu/

Class Website: www.cs.unm.edu/~joel/cs152

- Turn-in Assignments
- Grades
- Discussions

- Syllabus
- Lecture Notes
- Videos
- Source Code
Mailing Lists: csundergrad, cssports, Colloquia, ...

How to get CS account & 24x7 Building Access

Sources:
Annual Degree Production: National Academy of Sciences

[Graph showing annual degree production and job openings in various fields]
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."
We will use i-clicker for quizzes in lecture only.

We will use i-clicker every lecture.

For **CS-152**, Register your i-clicker using Blackboard Learn.

One i-clicker can be registered and shared by more then one person (as long as no two of them are in an i-clicker class at the same time).
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?
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-152 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.
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
A *computer file* is just a list of 1s & 0s.
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"
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.
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.
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.
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.
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.
The newest version of Java is Java 8


**JRE**: Java Runtime Environment (*run*, not build, applets and applications)

**JDK**: Java Development Toolkit (compile java source code and run applets and applications).

- **Java EE** (Enterprise Edition): Includes extra classes to handle running of multi-user servers.
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 emphases on early detection of errors.
Java Compilation and Run Process

Source Code: *.java

Java Compiler (JDK)

Machine Independent Bytecode *.class

Java Virtual Machine (JVM)

Just-In-Time Class Loader

Just-In-Time Compiler

Native Machine Code

HotSpot Optimization

Note: the JVM is NOT an interpreter.
Developing Brick skills