Computer Science 121

Intro to Programming: Java - Lecture 1

An intro programming class in Java / 4 credits

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Course home page:

http://twiki-edlab.cs.umass.edu/bin/view/Moll121/WebHome

enrolling: See me after class

Majors: 191U - baby unix MW 4-5

CS major or wannabe - FF event Fri, 3:30 Rm CS150
Course Materials

No paper textbook.
We’re using a (free!) electronic book - iJava
How do you get to it? GO TO WEBSITE
OWL - heavyweight assignment system
IDE - Dr Java is the class’s integrated development environment
Of course you’ll need Java..
Is this the right class for you?

Do you know how to program in any language?

Is this is the only programming class you’ll ever take?

Do you know your way around your computer? (RAM, downloading, text files, applications, spreadsheets, secondary storage, byte, Internet, www...) If many of these terms/concepts are a stretch, consider taking CS 105, CS 120, CS 145. ·

How’s your math? You need to be comfortable with basic math, logic, compound interest, simple logic ·

Do you want to take this class? Here for an R2? This one’s too hard. Do an easier R2.
Who are you? FR / Soph / Jr / Sr / Grad / Staff / HS

Major or probably major:
 CS / Sciences / Engineering / Soc Sci - Hum / SOM

Interested in the IT-Minor?

Never / ever programmed? Java / C++ / VB / Other

CS 191P - Python programming
Course Layout

General Pattern will be Thursday/Tuesday Lectures on a subject... then Wed discussion

There are 3 kinds of work in course (+ 2 exams):

Embedded Questions;

OWL Hwk Problems;

Programs

Course Week link on website gives work due in the coming week or two
More Administration, Details

The grading formula:

- Embedded Questions: 8%
- Programming assignments: 22%
- OWL assignments: 15%
- Midterm exam: 20%
- Final Exam: 35%

Also: to get C in course, you must get C on final!

Collaboration- conceptual collaboration ok, do your own coding (more on this later)

System: You’ll need Java 1.5 You’ll need Dr Java. Information about this online
Agenda

understand, appreciate object-oriented programming, its aims, methods, and (we hope) joys;

Teach yourself to be a skilled beginning Java pgmr

Learn about some additional aspects of computing
What matters

Software is a hybrid endeavor..

Who fails, and why.. phrasebook Java

You must keep up

In general CS is as much about technique as it is about brains

*iJava* - how to succeed... the flaw in working backwards
Days of the Week

**Thursday:** General first lecture on material; embedded problems due that day

**Friday:** Programming assignments usually due this day

**Tuesday:** A lot like Thursday - a general lecture on the chapter’s material -- but with a bit more oompf

**Wednesday** - Discussions - These vary, in general! Different sessions for different audiences.

Help - some available every day; stay tuned...
Computer Programming

High Level Languages- human-oriented: accessible syntax; built-in conceptual decomposition

High level languages require language translation

What Java brings..

Object-oriented
Controlling complexity
Hygiene
recycling
Machinery for dealing with web
Hardware neutral (more or less)
But note: ----> Java is hard: it’s for pros
Hardware / Software

Hardware is easy - it’s the physical computer - the chips, the buses, and so forth.

Software is more subtle - it’s the pattern of instructions that directs the hardware. Think of:

Knitting
Origami
Driving directions
Chili recipe
Early model of a computer program: roughly speaking, a sequence of instructions for shopping:
go to store
buy milk
if bananas cost < 50 cents, buy 6
pay
come home

....

The Java model is more like a library of how-to books with blueprints: e.g., how to frame a house, how to install windows, etc.

Each volume gives sequences of instructions for doing specific jobs..
public class Howto{
// a baby intro example
    public static void main(String args[]) {
        System.out.println("Welcome to 121");
        System.out.println("3 + 5");
        System.out.println(3 + 5);
    }
}

Notice: this Java program (application) consists of a single class

    That class - a single (main) method (subprogram)

    That method consists of three "write something to the console" statements, or instructions
Languages, Translators, and Computing

Our program is actually incomprehensible to a computer.

Machine language instructions are VERY primitive.

One aspect of computer science focuses on the translation process -- most importantly, how can a language for programming that's fairly natural for humans (e.g. Java) be faithfully converted into machine language, a seemingly patternless sea of incomprehensible gibberish?

Languages such as Java, translator called a compiler.

01011010101011 01011010101011 <--- machine language!
Syntax and Semantics In English

“Tomorrow I’ll come”, and “I’ll come tomorrow” mean the same thing (are semantically the same), even though they’re syntactically different (the parts have been rearranged).

This is a big deal for linguists. Also: natural language (English) is often semantically ambiguous:

“Jay doesn’t kiss Bev because he’s worried about her”

Computer languages are far less flexible. The rules of form for Java (say) are absolutely precise and may not be messed with.

The semantics, likewise, of a Java statement, are unvarying (a println statement prints!).
Errors

· Compile-time errors - syntax, type errors
· Run-time errors - divide by 0
· Logic errors - Everything works fine - get wrong answer

System.out.println(5 + 3; System.out.println(5/0);

System.out.println("area = " + " " + (3*radius*radius));
Assignment for Wednesday/Thursday

1) Look at the course web site
   http://twiki-edlab.cs.umass.edu/bin/view/Moll121/WebHome

2) Download Java (JDK), and DrJava (IDE)

3) Get your OWL/textbook account going: instructions on website (look under “TextbookStart”)

4) Read Preface, Chapter 1

Tomorrow’s discussions: All the same - for people who have trouble with 1,2, or 3. (particularly 2). If you try and fail with those downloads, go to discussion, bring your problems