

CSC 142

Introduction to Java [Reading: chapter 0]

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What to expect in this class

- Background: knowledge of basic programming in any language (VB, C, ...)
 - functions (or subs), loops, conditionals and arrays
- Outcome: how to program in Java (syntax, using objects, java libraries, ...)
- Class organization:
 - Lectures, lab practice with sample code, homework assignments, tests and quizzes
 - class web site
seattlecentral.edu/~flepeint/javaclass

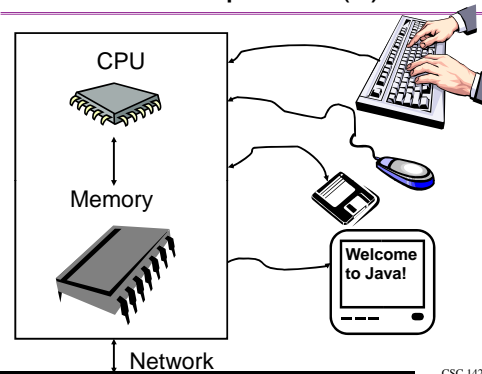
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What is a computer? (1)

- Programmer's viewpoint
 - CPU (central processing unit): the "brain" of the computer. It can perform simple tasks very fast (e.g. adding...)
 - Memory: where the microprocessor stores data (results of computations,...). Memory comes in many types (RAM, ROM, ...)
 - Input/Output devices: e.g. keyboard, screen, ... They allow the user to interact with the computer.
- Our goal: Make the computer perform complex tasks for us.
- How: Write programs.

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What is a computer? (2)



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Programming

- Machine language
 - The CPU set of instructions: coded as a series of 0's and 1's
 - Fast
 - Machine dependent (two different CPU don't use the same machine language)
 - Time consuming to write programs
- Instead, use a high level language
 - Closer to plain English. Programming is easier. (this doesn't mean easy!)
 - Machine independent
 - Can't be understood by the CPU. A translation program is required (compiler, interpreter, ...)

Programming languages

- Thousands of programming languages (many are just for research purposes)
- Historically (with many omissions!)
 - FORTRAN (scientific) (50's)
 - COBOL (business) (60's)
 - PASCAL, BASIC, C (multi purposes) (70's)
 - C++ (OOP) (80's)
 - Java (OOP + platform independence) (90's)

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Why are we learning Java?

- A modern language
 - object oriented, portable, secure
 - able to harness the power of networks
- A better C++?
 - some features of C++ are overly complex (e.g. multiple inheritance)
 - Java doesn't include any of these
- A good language to learn programming (the modern way: OOP, ...)

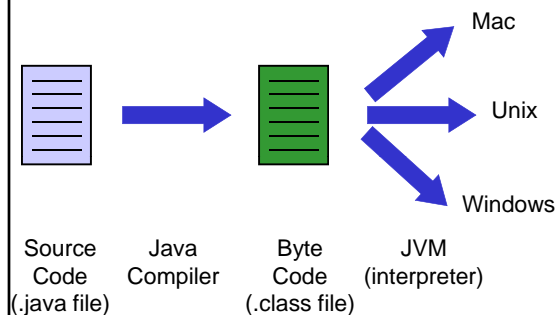
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A brief history

- Created in the 90's by Sun Microsystems (Bill Joy and James Gosling)
 - first for cell phones and PDA (failure)
 - explosion of the internet rescued the language (small, robust, object oriented, architecture independent, secure)
 - free and open code distribution
- Now
 - used widely on PC, cell phones, palm pilots, ...
 - But there are other languages, e.g. Python, etc...

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The Java virtual machine



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Java Applications vs Applets

- Applications: a stand alone java program that is executed locally on your computer
 - Applications can be trusted (in general)
- Applets: a java program that is executed in the context of a web browser (this is how java programs can easily be distributed)
 - Applets should not be trusted

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Some security features

- An applet can't
 - read or write from or to the computer's file system
 - run programs on the user's computer
 - establish a connection between the user's computer and any other computer except for the server where the applet is stored.
- Java doesn't support pointers (a programmer can't access the memory directly)
- Memory management is done automatically by the JVM (not the programmer's job \neq C++)

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The present Java

- Java 6
 - Many libraries
 - Swing (user interface toolkit)
 - Data bases (JDBC)
 - Java security, Servlets ...
- Software: many free products for all platforms (Unix, Solaris, Mac, Windows...)
 - Sun jdk available at java.sun.com
 - Eclipse at eclipse.org (what we will use).
 - Other Java IDE's available.

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Resources

- Text: "An introduction to OOP with Java"
McGraw-Hill
- Other books
 - Niemeyer & Knudsen: "Learning Java" O'Reilly
(Good if you already know C/C++)
 - Deitel & Deitel: "Java how to program" (lots of examples)
- Enormous amount of resources on the web
 - java.sun.com (excellent on-line tutorials)
 - Check www.cs.washington.edu. We will use the UW java library.