Introduction to Computer Science (and Java)
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• Course website:
  https://cs.nyu.edu/courses/spring18/CSCI-UA.0101-007

  (can click from my web site (http://cs.nyu.edu/berger) or cs
department web site courses tab)

• Will also use NYU Classes (for homeworks, quizzes, forum,
handouts, etc)
• What is a computer
   electronic device that stores and process data
   include hardware and software

• CPU (central processing unit)
   retrieves and executes instructions; includes ALU

• memory (RAM)
   organized into bytes (8 bits); every byte has unique
   address; stores programs and data

• storage devices (disk, DVD, thumb drive...)
   holds data even when turned off

• input/output devices
   keyboard, mouse, monitor, printer, ...
• **What is an operating system**
  program that runs on the computer and controls its activities and components (between user and hardware)

• **what is a core**
  computers can have one or more cores (CPUS)

• **bus**
  the circuit that connects all the components

• **clock**
  synchronizes all operations  (2 GHz is typical)

• **cache, network interface card (NIC),...**
Programming Languages

• Computer circuitry understands bits (0/1)
  Uses **machine language** = set of instructions the computer can execute

• **assembly language** = symbolic rep. of machine language

• **high level languages** run on many machines, easier to learn

  • **Interpreters**: translate and execute one statement at a time
  • **Compilers**: translate entire source code to machine code, then execute
What is Java:

• Developed in 1991 by James Gosling (Sun Micro); now owned by Oracle.
• Developed for embedded chips; called Oak originally
• Renamed java in 1995 and redesigned for Web apps.

Three flavors of Java:

• Standard Edition (SE) for standalone and web apps
• Enterprise Edition (EE) for server-based apps
• Micro Edition (ME) for cell phone and mobile dev.

We will use Java SE 8

You might already have it (type java -version). If not, download from http://www.oracle.com/technetwork/java/javase/downloads/index.html
Java Development Kit (JDK) includes:

- all software needed to compile, run, and even debug (jdb) Java programs
- libraries with pre-defined classes and interfaces (we will mostly write our own before using it). Handy to bookmark: https://docs.oracle.com/javase/8/docs/api/

- Java compiler: compiles your program into byte code by typing `javac myprog.java`, producing a file called `myprog.class`. It should run on any machine that has a Java Virtual Machine (JVM) by typing `java myprog`

- These are examples of command line instructions: commands you type at keyboard that are passed to the OS

For intro. to command line see handout in Resources tab in NYU Classes
Editors:  
https://xkcd.com/1823/

I use **emacs** and **vim**, but so we are all on the same feet I will demo: **Atom**


to write (and compile and execute) our first program
Programming Errors

• Syntax Errors: found by compiler
  also called compile-time error

• Runtime Error: program aborts (abnormal termination)

• Logic errors: program produces incorrect result
Java Programs include:

- **class name**: every program has at least one “public” class. Must be same name as file. Convention is to use upper case for classes.

- **class must contain a main method**. Program execution begins in `main`.

- **every java statement ends with a semicolon “;”**

- **reserved words or keywords** have special meaning to compiler and can’t be used for other things (i.e. can’t be variable names)

- **braces** (open and close curly braces “{ }”) form a block of code

- **blocks are indented for readability**

- **comments** denotes by “//” or “/* ... */”

- **string** denoted by “...”, as in “This is a character string”