Intro to Java

not intro to computer science

Outline of this lecture

- Introduction to me
- About the course / Resources for course
- Intro to Intro to Java
- Hortsmann Chapter 1 / 2
- About homework
- Homework

ME!

- At heart, I'm a software engineer
  - which fits nicely with this course; it's not theoretical it's really an engineering course
- Studied at University of Chicago
- Been coding Java professionally for 12 years
  - worked at Union Pacific Railroad / McGraw Hill / HBO
- CTO / Cofounder of Dash - https://dash.by

About CS9053 - Fall 2019 Section II

- Not intro to computer science / programming
- Introduction to Java - practical & pragmatic

To Be Successful...

→ Write your **own** code

→ Attend lectures

→ Program the concepts / don’t just know them

Resources for CS9053 - Fall 2019

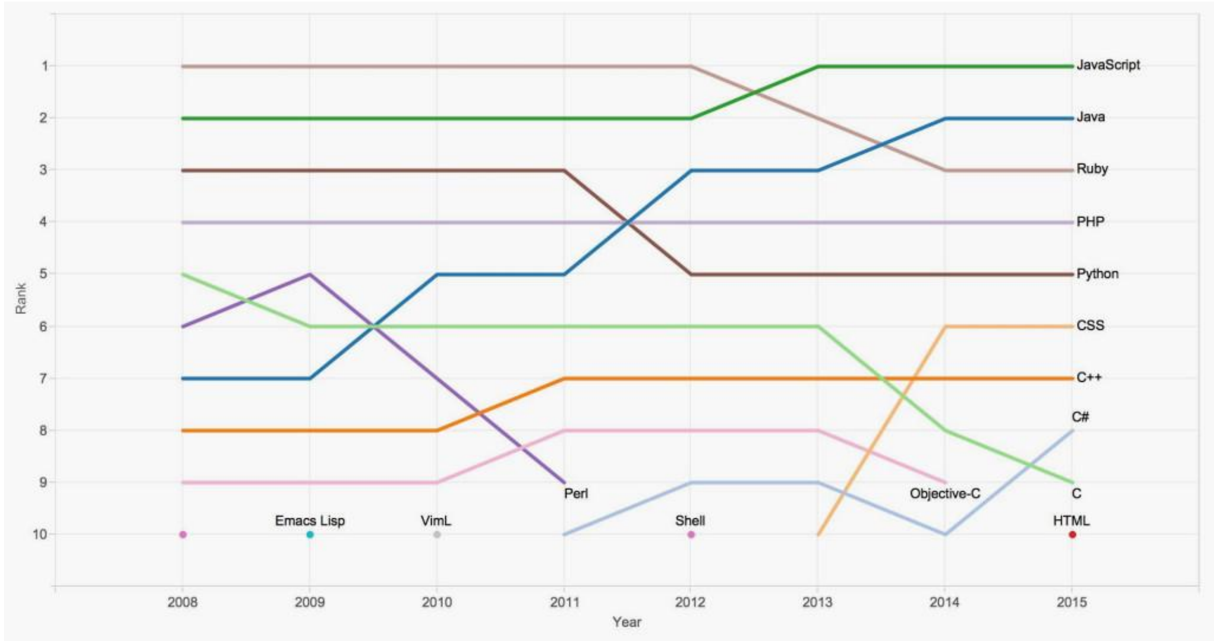
Github! https://github.com/NYU-CS9053/Fall-2019-II

- must become a member to access
  - supplemental material
  - all lectures posted after presentation
- All homeworks posted/submitted via GitHub Classroom
  - https://classroom.github.com/classrooms/8402142-nyu-cs9053-fall-2019-section-ii

WAT?!? You're using Java?!?

Why not Python/Ruby/Javascript/C++/...

- Java's virtual machine (JVM) is **fast**
- Java is ubiquitous (libraries/JSR/support)
- Java as a language/ecosystem is mature
- Java plays nicely with others

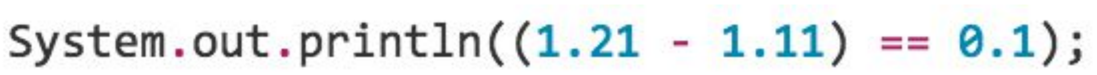


- from GitHub - https://github.com/blog/2047-language-trends-on-github

WAT?!? You’re using Ruby/Javascript

Every language has its thorns...

Java WAT

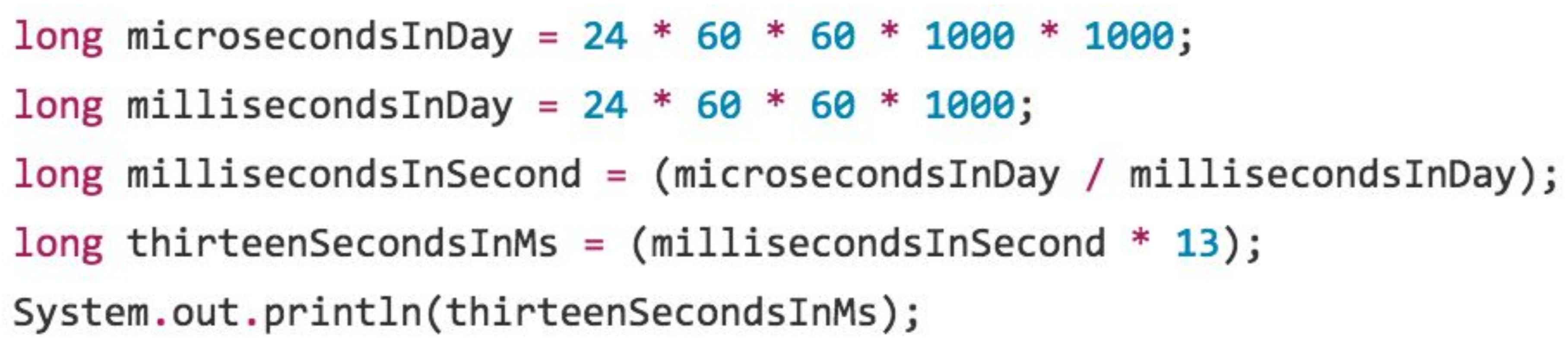


```java
System.out.println((1.21 - 1.11) == 0.1);
```

https://gist.github.com/blangel/da2921fa73f23824ff7e

1.21 giga wat

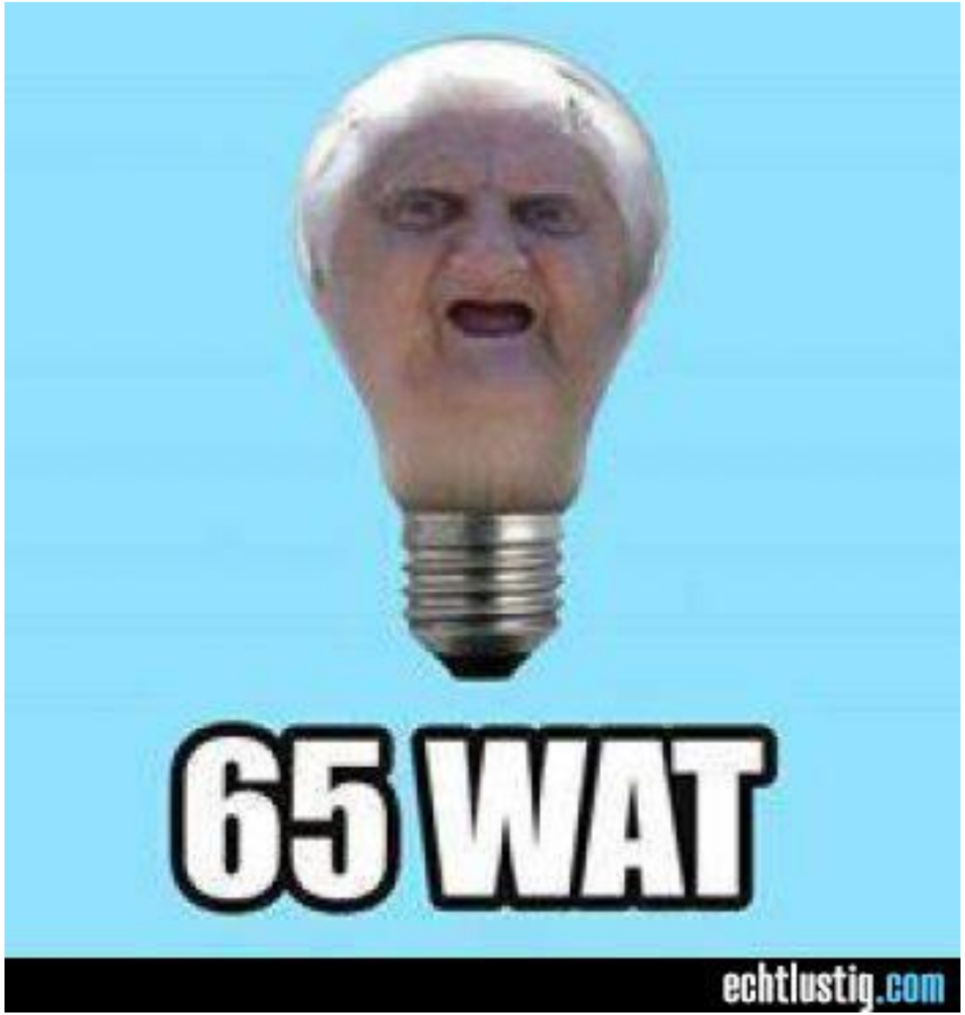
Java WAT



```java
long microsecondsInDay = 24 * 60 * 60 * 1000 * 1000;
long millisecondsInDay = 24 * 60 * 60 * 1000;
long millisecondsInSecond = (microsecondsInDay / millisecondsInDay);
long thirteenSecondsInMs = (millisecondsInSecond * 13);
System.out.println(thirteenSecondsInMs);
```

https://gist.github.com/blangel/60de4bc1fcc349ccfc0d

variant of Puzzle 3 in **Java Puzzlers by Joshua Bloch & Neal Gafter**


65 WAT
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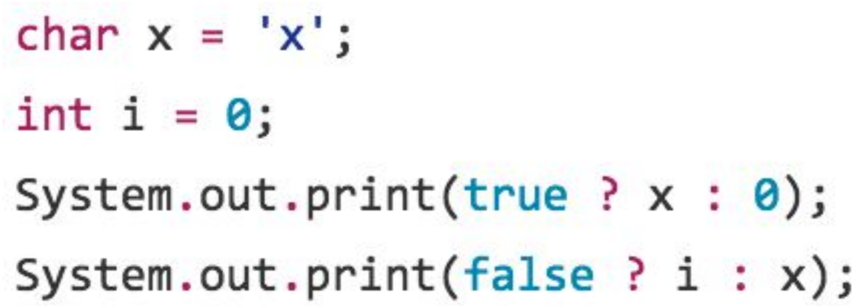
Java WAT



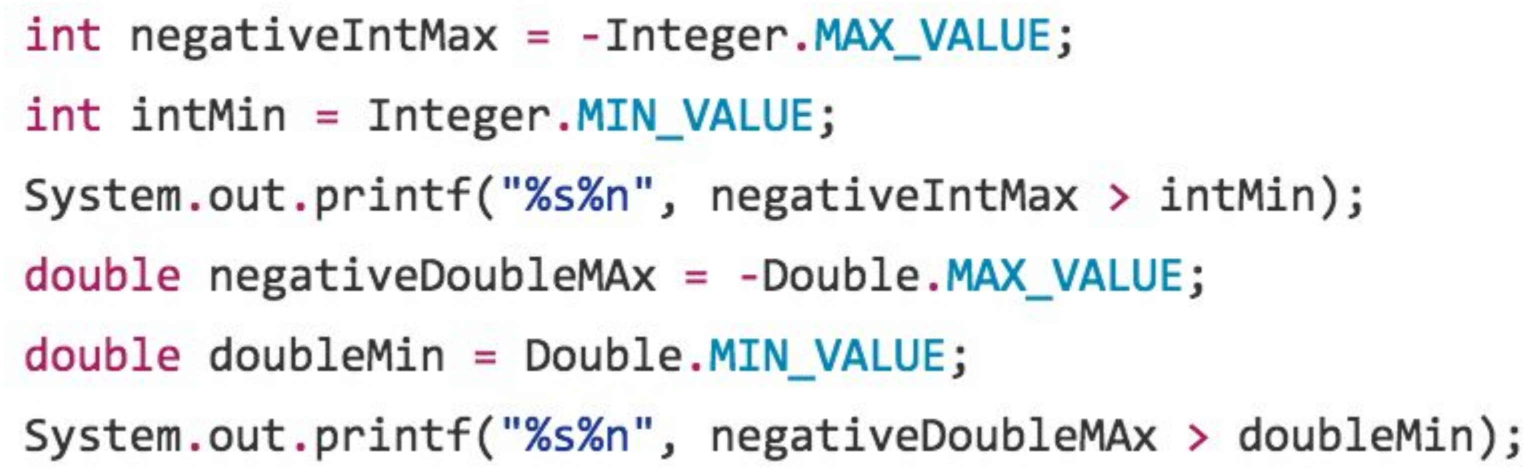
```java
char x = 'x';
int i = 0;
System.out.print(true ? x : 0);
System.out.print(false ? i : x);
```

https://gist.github.com/blangel/9f1cc619adb253de628b

variant of Puzzle 8 in **Java Puzzlers by Joshua Bloch & Neal Gafter**

WAT

Java WAT



```java
int negativeIntMax = -Integer.MAX_VALUE;
int intMin = Integer.MIN_VALUE;
System.out.printf("%s%n", negativeIntMax > intMin);
double negativeDoubleMAx = -Double.MAX_VALUE;
double doubleMin = Double.MIN_VALUE;
System.out.printf("%s%n", negativeDoubleMAx > doubleMin);
```

https://gist.github.com/blangel/06d2f4a34618d84fe08f9e0f23899e80

CHURN DOWN
FOR WAT

WATs in all langs - why learn Java?

- It’s ubiquitous - for good reasons
  - learn the language and decide for yourself

- Don’t feel intimidated by Java
  - there are many misconceptions

- You may have to…
  - even if not directly programming with it, many libraries are built with it. And many other languages will be run on the JVM (even non-jvm based languages, like Ruby). Good to know about the level of abstraction beneath you.

Java Terminology

JVM - Java virtual machine

JRE - Java runtime environment (includes JVM and supporting libraries)

javac - java compiler (takes .java and produces .class)

java - command to run the JVM

JDK - Java development kit (JRE, javac and supporting tools)

bytecode - compiled from source by the javac and interpreted by the JVM

jar file - a zip file containing .class files (and some metadata)

classpath - directories the JVM should search for .class / jar files

Java Terminology (cont)

JIT - just-in-time compiling; turning bytecode into machine code

JNI - Java native interface - allows native code and Java to interoperate

javadoc - parses source code comments and generates documentation

J2EE - Java 2 Enterprise Edition - set of libraries to assist in creating client/server architectures (EJBs/etc) Avoid at all costs

J2SE - Java 2 Standard Edition - a.k.a. JDK. Just say JDK

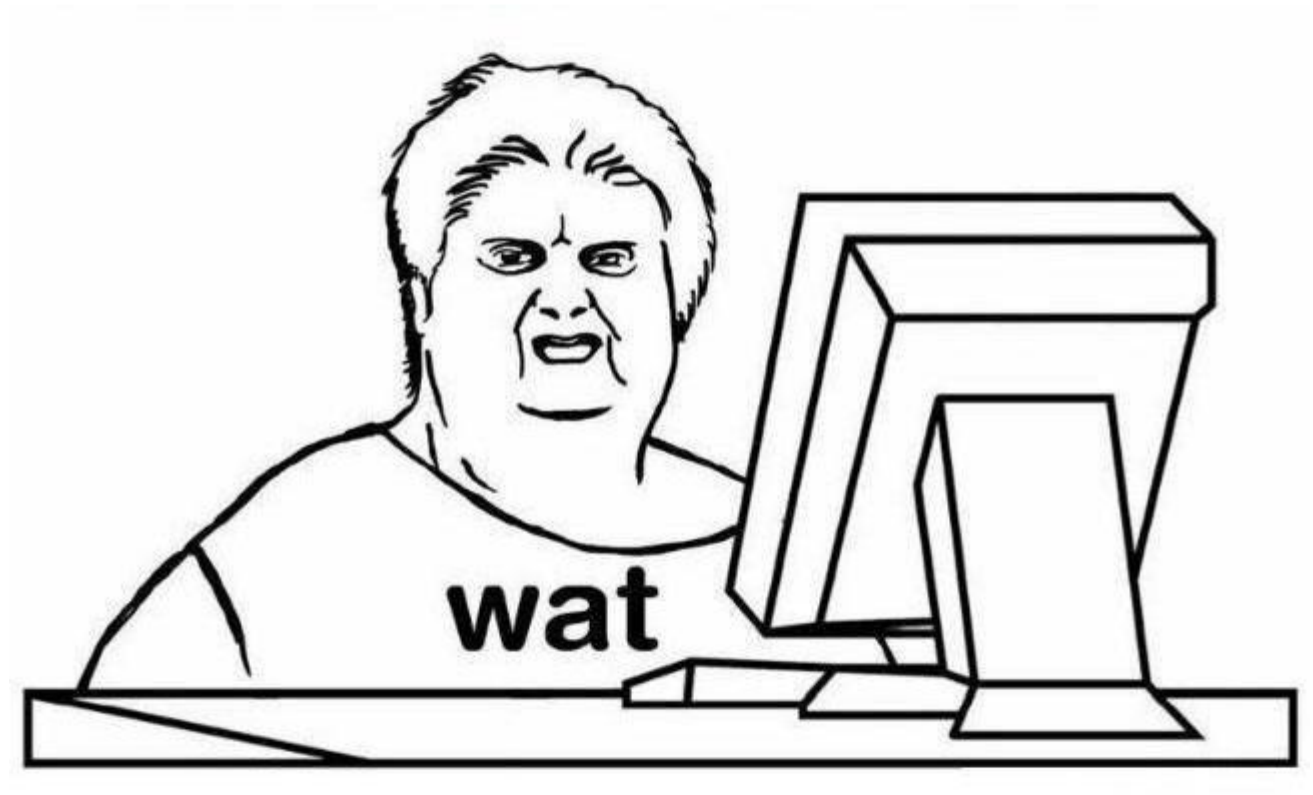
JCP - Java community process (jcp.org) - place to add new features into Java

JSR - Java specification request - request to JCP to add a new feature

IDE - Integrated Development Environment

- Do not use (yet) in this class
  - Like giving someone a power drill who’s never used a screwdriver
- Extremely useful in increasing productivity
  - Can even aid in learning provided you have the basics (so not just yet)
- Increased productivity:
  - Small feedback loop
  - Realtime compiling / static code analysis
  - Automatic imports / code styling / etc

No IDE?!?



No IDE -> what then?

You’ll need an editor.

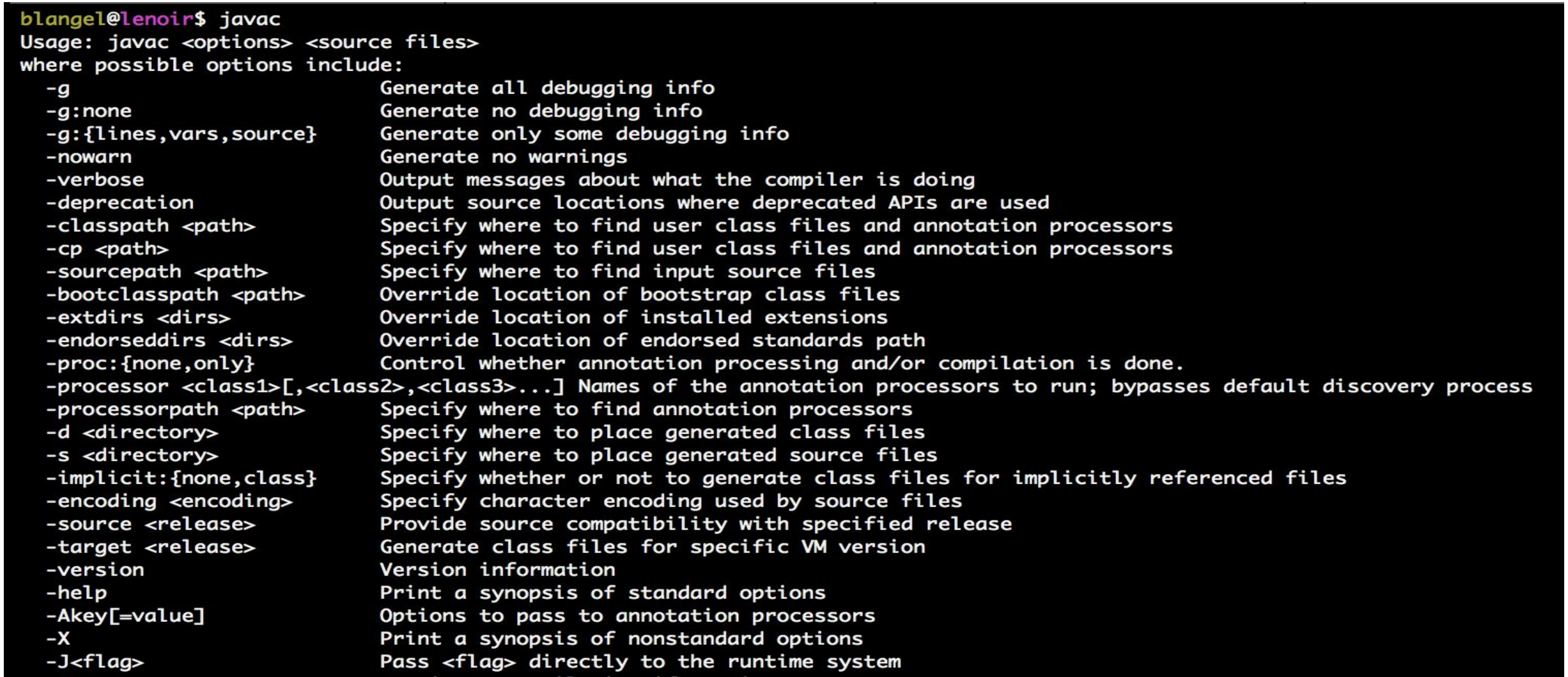
- Emacs
- Vi/Vim
- Sublime

These are not (programming) editors

- Notepad
- TextEdit

No IDE -> what then? (cont)

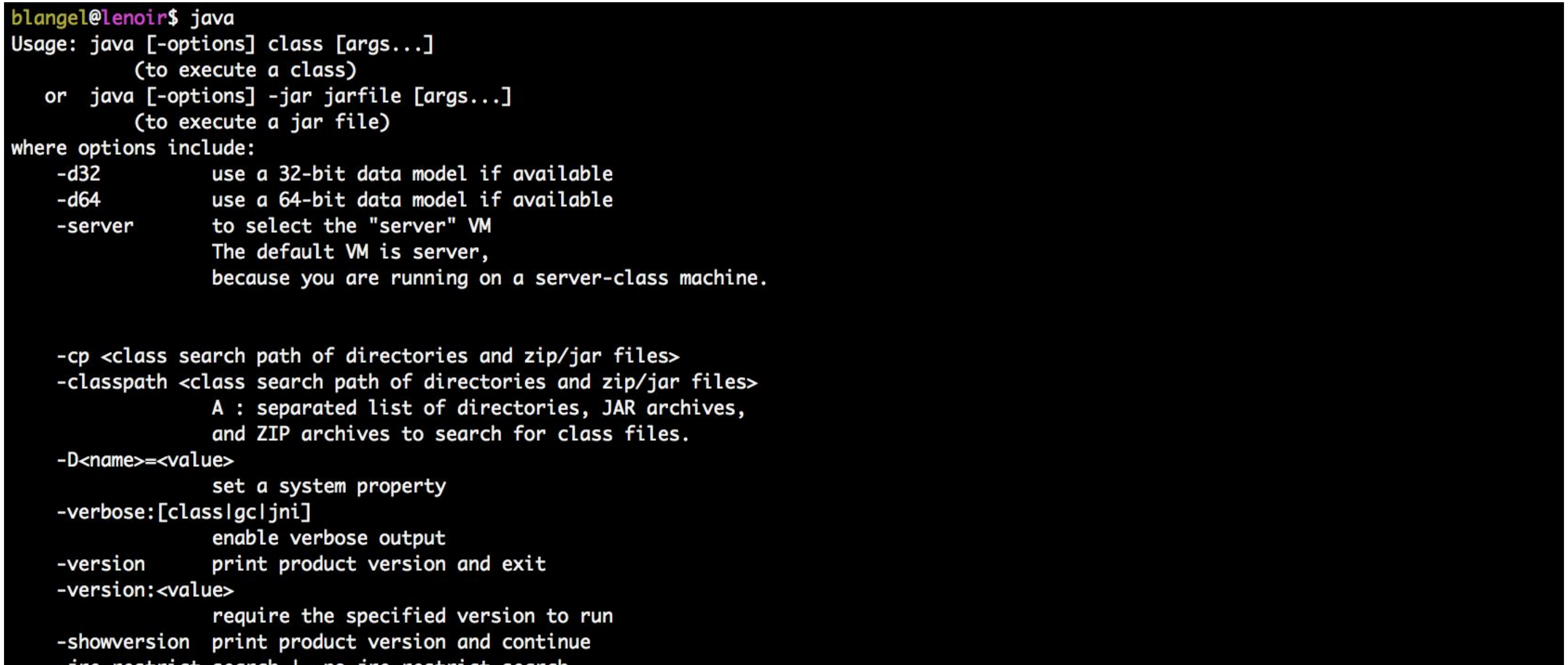
javac - to compile. Learn its arguments, you will be tested on them.



```
blangel@lenoir$ javac
Usage: javac <options> <source files>
where possible options include:
  -g                         Generate all debugging info
  -g:none                    Generate no debugging info
  -g:{lines,vars,source}     Generate only some debugging info
  -nowarn                    Generate no warnings
  -verbose                   Output messages about what the compiler is doing
  -deprecation               Output source locations where deprecated APIs are used
  -classpath <path>          Specify where to find user class files and annotation processors
  -cp <path>                 Specify where to find user class files and annotation processors
  -sourcepath <path>         Specify where to find input source files
  -bootclasspath <path>      Override location of bootstrap class files
  -extdirs <dirs>            Override location of installed extensions
  -endorseddirs <dirs>       Override location of endorsed standards path
  -proc:{none,only}          Control whether annotation processing and/or compilation is done.
  -processor <class1>[,<class2>,<class3>...] Names of the annotation processors to run; bypasses default discovery process
  -processorpath <path>      Specify where to find annotation processors
  -d <directory>             Specify where to place generated class files
  -s <directory>             Specify where to place generated source files
  -implicit:{none,class}     Specify whether or not to generate class files for implicitly referenced files
  -encoding <encoding>       Specify character encoding used by source files
  -source <release>          Provide source compatibility with specified release
  -target <release>          Generate class files for specific VM version
  -version                   Version information
  -help                      Print a synopsis of standard options
  -Akey[=value]              Options to pass to annotation processors
  -X                         Print a synopsis of nonstandard options
  -J<flag>                   Pass <flag> directly to the runtime system
```

No IDE -> what then? (cont)

java - to run. Learn its arguments, you will be tested on them (at least classpath, system arguments and program arguments).



```
blangel@lenoir$ java
Usage: java [-options] class [args...]
           (to execute a class)
   or  java [-options] -jar jarfile [args...]
           (to execute a jar file)
where options include:
    -d32          use a 32-bit data model if available
    -d64          use a 64-bit data model if available
    -server       to select the "server" VM
                  The default VM is server,
                  because you are running on a server-class machine.


    -cp <class search path of directories and zip/jar files>
    -classpath <class search path of directories and zip/jar files>
                  A : separated list of directories, JAR archives,
                  and ZIP archives to search for class files.
    -D<name>=<value>
                  set a system property
    -verbose:[class|gc|jni]
                  enable verbose output
    -version      print product version and exit
    -version:<value>
                  require the specified version to run
    -showversion  print product version and continue
```

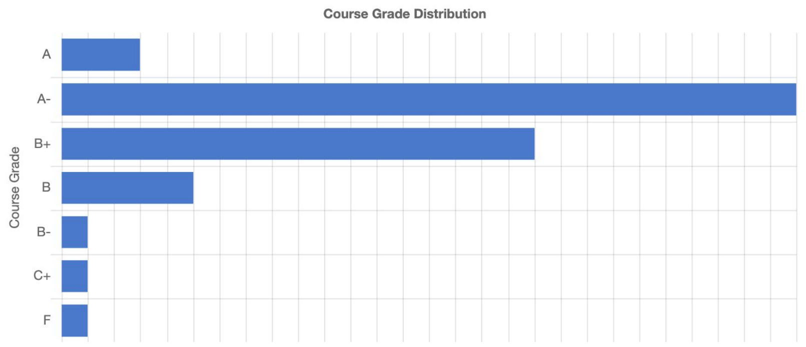
Enough Slides - Let's Code!

Homework for CS9053

- Using GitHub Classroom
  - https://classroom.github.com/classrooms/8402142-nyu-cs9053-fall-2019-section-ii
- Homework Grading Policy
  - Style (1 - 5) - 10%
  - Immutability (0 or 5) - 10%
  - Repeating Past Mistakes (0 or 5) - 10%
  - Git Usage (0 or 5) - 10%
  - Organization (1 - 5) - 20%
  - Correctness (1 - 5) - 40%

Course Grade Expectations

- Must put in effort to be successful
    - Follow instructions on homework and learn from past mistakes on previous homeworks
    - If you don't have a CS background, you'll need to put more effort in than others



Read Chapter 3

All sections will be covered in next lecture

Homework - Week 1

https://github.com/NYU-CS9053/Fall-2019-II/homework/week1