

COMPUTER PROGRAMMING IN JAVA

COLUMBIA UNIVERSITY HIGH SCHOOL SCIENCE HONORS PROGRAM

Introduction
Lecture
2008 Feb 02 Sat

Logistics

- Attendance is important
 - Try not to skip, difficult to catch up
 - Look online for lecture notes
- You **MUST** have a note from your parents if you are going to come late, leave early, or skip class
- We will always start off in Pupin 222; after a 30-60 minute lecture, we will move to the Gussman Computer Lab in Mudd 251 for the rest of class
- Work in pairs! At least then you won't be stuck on your own...
- Have fun!

Overview

- CS is only 30-40 years old! Look at how deep CS has penetrated into our world. How cool is that?
- The point is to just get a taste of what computer programming is, what CS is, and what you can do with it
- Programming basics, a little bit of theory and algorithms, and applications

Introduction to computer science and Java

What is computer science?

- The study of algorithms

What is an algorithm?

- A step-by-step, unambiguous series of instructions to solve a particular task or solve a problem

What is Java?

- Model of computation
 - A conceptual picture of how a computer works, and what programs are and do. Basically, think of a world where everything is a variable, which is a location in memory. These locations in memory can hold only 0's and 1's (bits), and what they mean is completely arbitrary.
 - The boxes, names, data types diagram
- Data flow
 - Source file: .java
 - Bytecode file: .class

Data types

Remembering our model of computation, each box can hold a specific type of data. We have four basic kinds (there are actually more, but we'll only be using four):

1. Integers

- a. Called 'int'
- b. E.g.:

```
int x = 1;  
int y = 3;
```

2. Decimals

- a. Called 'double'
- b. E.g.:

```
double z = 1.3;  
double pi = 3.14;
```

3. Strings

- a. Called 'String' (note the upper-case!)
- b. E.g.:

```
String s = "Hello world";  
String name = "Matt";  
String className = "Computer Programming in Java";
```

We also discussed some basic arithmetic operators: + - * / %

Test: What is stored in each of the following variables?

```
int x = 1;  
int y = 2;  
int z = 9;
```

```
double a = 2.1;  
double b = -7.5;  
double c = 8.0;
```

```
String s = "hello";  
String t = "cake";  
String u = "happy";
```

```
x = x + y;  
b = b * b;  
b = b * c;
```

```
z = y / x;  
z = x / y;
```

```
s = s + s;  
t = u + " " + cake;
```