Today

Announcement
Friday 8:30 lab section (#214) will be cancelled
  ▶ Come see me after class
  ▶ Change to a different Friday lab

Logistics
  ▶ Lab 1 due last Sunday night
  ▶ Schedule Posted
  ▶ Project 1 due this Sunday
  ▶ Reading: BJP Ch 1-7

Goals
Java Syntax Tour
By Now Make sure you . . .

- Have a development environment
- Can create new .java files
- Experimented with hello world type programs
- Finished/close to finishing Lab 1, submit to Blackboard
Every Programming Language

Start by looking for the following

- □ Comments
- □ Statements/Expressions
- □ Variable Types
- □ Assignment
- □ Basic Input/Output
- □ Conditionals (if-else)
- □ Iteration (loops)
- □ Aggregate data (arrays, structs, objects, etc)
- □ Function Declarations
- □ Library System
Syntax Demo Program

- Demo.java in w02-1-code.zip contains examples for today
- Also several other programs in the zip
Comments

// Commented to the end of line

/* Comment spans multiple lines
   so that longer explanations can be given */
Variables, Statements/Expressions, Assignment

**Assignment**  With equals symbol \( x = \text{expr}; \) assigns \( x \) result of evaluating \( \text{expr} \)

**Statements**  Always end with a semicolon

**Whitespace**  Doesn’t matter much

<table>
<thead>
<tr>
<th>Type</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integer</td>
<td>\text{int} i = 1;</td>
</tr>
<tr>
<td>Real</td>
<td>\text{double} d = 1.2345;</td>
</tr>
<tr>
<td>Boolean</td>
<td>\text{boolean} b = true;</td>
</tr>
<tr>
<td>Character</td>
<td>\text{char} c = 'H';</td>
</tr>
<tr>
<td>Strings</td>
<td>\text{String} s = &quot;Hello world&quot;;</td>
</tr>
</tbody>
</table>

See \texttt{Demo.java} for a few examples of the above
For now the incantation

```java
System.out.println(stuff);
```

In a nutshell

- Convert stuff to a String
- Grab the out object from the System class
- Call its println method on the stringified stuff
- Prints to the screen
- Appends a newline
Stringification

- What’s a String?
- Everything in Java can be stringified
- `System.out.println(stuff)` will always print something
- May not be at all helpful
Output Alternatives

No Newline

System.out.print(stuff);

Same without a newline

Formatted Output

System.out.printf(format, arg1, arg2, ...);
System.out.printf("An int %d\nA double %f\nA String %s\n", 22, 1.2345, "Hello");

Formatted output

- Inherited from C
- Very easy for displaying some kinds of text
- More on this later (I’m a fan)
Conditionals

- if/else
  - Demo.java
  - Act on a boolean
  - Comparisons: ==, !=, <, >, <=, >=
  - Nesting
  - Chaining

- switch/case
  - Useful in some special cases, but not generally
  - Discussed in lab this week
  - Maybe we’ll talk about it some time
4 flavors
   ▶ Now - Iteration.java
      ▶ while
      ▶ Traditional for
   ▶ Maybe Later
      ▶ do while
      ▶ for each (collections)
while (condition)
   this gets done repeatedly;
this gets done once;

while (condition) {
   this gets done repeatedly;
   as does this;
   and this;
}
this gets done once;

Look at Iteration.java
for

for(initialize; condition; update)
  do some stuff repeatedly;
then do this;

for(initialize; condition; update){
  do some stuff repeatedly;
  and some other stuff repeatedly;
}
then do this;
Do you need both for and while?
Easy Exam Questions to Write

Convert to for

double tol = 1e-4;
double S = 45.0;
double x = 45.0/2;
double err;

err = (S - x*x)*(S - x*x);
while(err > tol){
    x = (x + S/x) / 2.0;
    err = (S - x*x)*(S - x*x);
}

Answers in code pack

Convert to while

int x = 48;
int f = -1;
boolean found = false;

for(int i=x-1;
    i>1 && !found;
    i--)
{
    if(x % i == 0){
        f = i;
        found = true;
    }
}
int guess, correct = 22;
while(true){
    guess = input.nextInt();
    if(guess == correct){
        System.out.println("You guessed right");
        break;
    }
    System.out.println("You guessed wrong");
}
System.out.println("Game over");
continue goes to the next iteration

```java
for(int i=1; i<=20; i++){
    if(i % 3 != 0){
        continue;
    }
    System.out.println(i);
}
```

Can also use labelled continues which are even screwier

**Why not just give us goto?**

James Gosling Explains and discusses his 2nd favorite language