Announcements

• The deadline for First project (Hello World) has been extended to 9/12. If you’re stuck, come to office hours
Vague Definitions (for now...)

First, let’s loosely define these terms:
- Object
- Class
- Method
  - Main method
- Statements
Example: SimpleExample.java

Things to observe:

- We are looking at a class called “SimpleProgram”
- There is just one method, called main
- The main method contains a few statements
- There are two kinds of “comments”
- Most statements end with semi-colons
- System.out.print is a primitive tool for text output
  - Note the difference in print vs. println
Example: VariablesExample.java

Things to observe:
- Two “local” variables are declared (their type is “int”)
- The “assignment operator” stores values inside the variables
- Memory diagram (at the end):

```
socksLostInDryer  9
numberOfSocks     18
```

Call Stack
Variable Types

- Primitives (basic “atoms”)
- References to Objects (later)
Primitive Types (Whole Numbers First)

• An int variable takes up 4 bytes of memory. What range of values can be stored?

<table>
<thead>
<tr>
<th>Type</th>
<th>Memory used</th>
<th>Range of values that can be stored</th>
</tr>
</thead>
<tbody>
<tr>
<td>long</td>
<td>8 bytes</td>
<td>-9,223,372,036,854,775,808 to 9,223,372,036,854,775,807</td>
</tr>
<tr>
<td>int</td>
<td>4 bytes</td>
<td>-2,147,483,648 to 2,147,483,647</td>
</tr>
<tr>
<td>short</td>
<td>2 bytes</td>
<td>-32,768 to 32,767</td>
</tr>
<tr>
<td>byte</td>
<td>1 byte</td>
<td>-128 to 127</td>
</tr>
</tbody>
</table>

• Examples:
  int secondsPerYear = 31557600;
  long humansOnEarth = 7625913792L;  // note the L
  byte age = 19;
Primitive Types (Floating Point Values)

• Note: Most real numbers cannot be represented! Why not?

<table>
<thead>
<tr>
<th>Type</th>
<th>Memory used</th>
<th>Range and precision (for positive values)</th>
</tr>
</thead>
<tbody>
<tr>
<td>double</td>
<td>8 bytes</td>
<td>3.40282347 x , 1.40239846 x</td>
</tr>
<tr>
<td>float</td>
<td>4 bytes</td>
<td>1.7976931348623157 x , 4.9406564584124654 x</td>
</tr>
</tbody>
</table>

• Examples:

double velocity = 325.92732;

float distance = 52.25F;  // note the F
Primitive Types (Characters and Boolean)

• char

Example:

    char letterGrade = 'A';    // Note the single quotes

• boolean

Examples:

    boolean result = true;
    boolean state = false;
    boolean hasFever = (temperature > 98.6);