Our first sip of Java.

1. Questions?

2. The first Java program, saved in first.java:

   // A first program.
   public class first {
      public static void main(String[] args) {
         System.out.println("Hello, world."); // adds nl at end, automatically
      }
   }

   The program is compiled into an object file, using the Java compiler, javac:

   javac first.java

   This is then executed (as opposed to interpreted) using the Java virtual environment:

   java first

3. Some features of Java programs (compared to Python):

   (a) All code is part of some class. Most code is found within a class's method. Running a program causes a main method to be executed.

   (b) Everything has a type. Primitive types include int, float, char, and boolean (true/false). Other types are classes of objects: String, arrays of other types, and Vectors. The non-reference indicator is null.

   (c) You must declare the type of a variable or constant before it is defined.

   (d) The primary for-like looping mechanism has a three expression form: the first expression is the loop variable initializer, the second is the condition, the third is a loop variable update that is executed between iterations.

   (e) Within class definitions, there is an implied reference to the object, this (as opposed to self). The value of this is an implied parameter.

   (f) There is no tuple type.

   (g) There is no parallel assignment.
4. Previously, we learned that Java allows you to write static methods to perform standalone computations. We also learned that all methods are declared as part of a class. This class serves as a wrapper for related methods. For example, Math is a class that hosts a number of static methods (\texttt{sin}, \texttt{cos}) as well as constant or final values (PI, E). You can get a profile of the Math class with:

```java
javap java.lang.Math
```

This is not as informative as pydoc3, but performs a similar service. Full documentation of Java's builtin libraries can be found at oracle.com.

5. Methods that are not declared static are dynamic: they represent methods that appear and act on objects of the class.

6. One of the most important methods is named after the class, itself. This method is the constructor for the class. This is the equivalent of Python's \texttt{init}, \texttt{__init__}. Unlike Python, Java allows the definition of multiple constructors that are distinguished by the types of their parameters, by their signatures. (This is because Java does not allow default values for parameters; think about this.)

7. Similarly, non-static constants and variables declared within the class are called instance variables. These variables appear only in the context of an object. They are responsible for holding the object's state. These variables correspond, roughly, to the slots declared in Python objects.

8. The constructor is responsible for initializing the instance variables.

9. The \texttt{toString} method provides a mechanism for constructing a string representation of an object. It's the equivalent of \texttt{__str__} in Python.

10. The equals method provides a method for comparing objects, like \texttt{__eq__} in Python.

11. Example: The Color class.

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