Programming in Java

Compile and execute a program

Java Basics

- Purely object-oriented language
- Everything must be part of a class
- File name
    - ends with .java
    - matches class name defined in the file
- Class name starts with upper-case (common convention)
- Comments
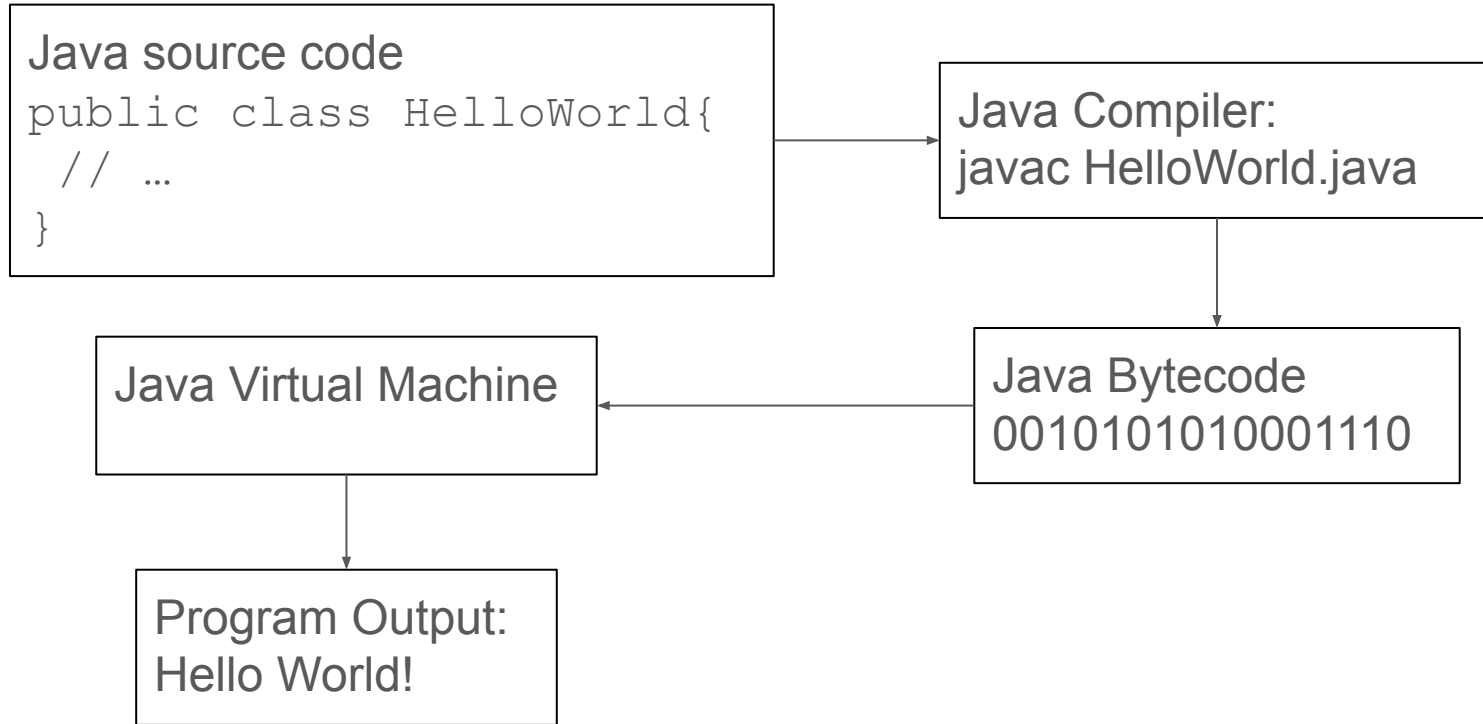- Starting point of the program
- Statements end with a semicolon

HelloWorld.java

```java
/**
 * My first Java program
 */

public class HelloWorld{

    // main method is the starting point
    // for your program
    public static void main(String []args){
        System.out.println("Hello World");
    }


}
```
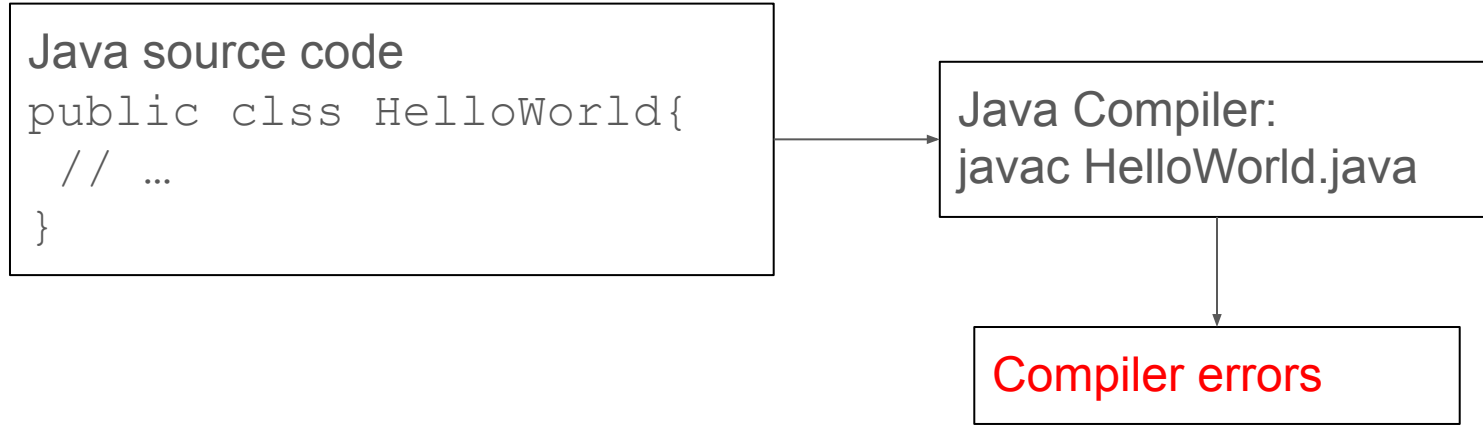
Java Programming Language

- High level language (readable by humans) - source code
- Needs to be translated to machine code (readable by computers)
- Compiler
  - Software tool
  - Translates from high level language to machine readable code
- Java compiler
  - From Java source code to bytecode
  - Bytecode is the input to the Java Virtual Machine
- Syntax problems in the source code result in compiler errors

Java: from source code to program output

Java source code
```
public class HelloWorld{
  // …
}
```

Java Compiler:
javac HelloWorld.java

Java Bytecode
0010101010001110

Java Virtual Machine

Program Output:
Hello World!

Java: Problems in the source code

```
Java source code
public clss HelloWorld{
  // …
}
```

Java Compiler:
javac HelloWorld.java

Compiler errors

Compiler errors are resolved by making changes to the source code and re-compiling it

Compiling Java code from command line

- We will use javac (java compiler) directly to compile your code
- Compile a specific file
    - javac HelloWorld.java
- Compile all .java files in a directory
    - javac *.java

Running compiled code from command line

- To execute a program, it must first be compiled (into bytecode)
- Run your program with: java HelloWorld
  - HelloWorld is the class containing the main method
  - We will soon look at programs made of multiple classes
  - Execution always starts with the main method

Lab 0 - Instructor Demonstration

- Navigate to your clone of the lab0 repository
  (you cloned this repository before class)
- Create a HelloWorld.java file with HelloWorld class (as defined in Unit 0 Lesson 1 Lab 0)
- Compile the code
- Run the code
- Review the output and answer the following question, based on your observations
  - What does `System.out.println("Hello World");` do in a Java program?