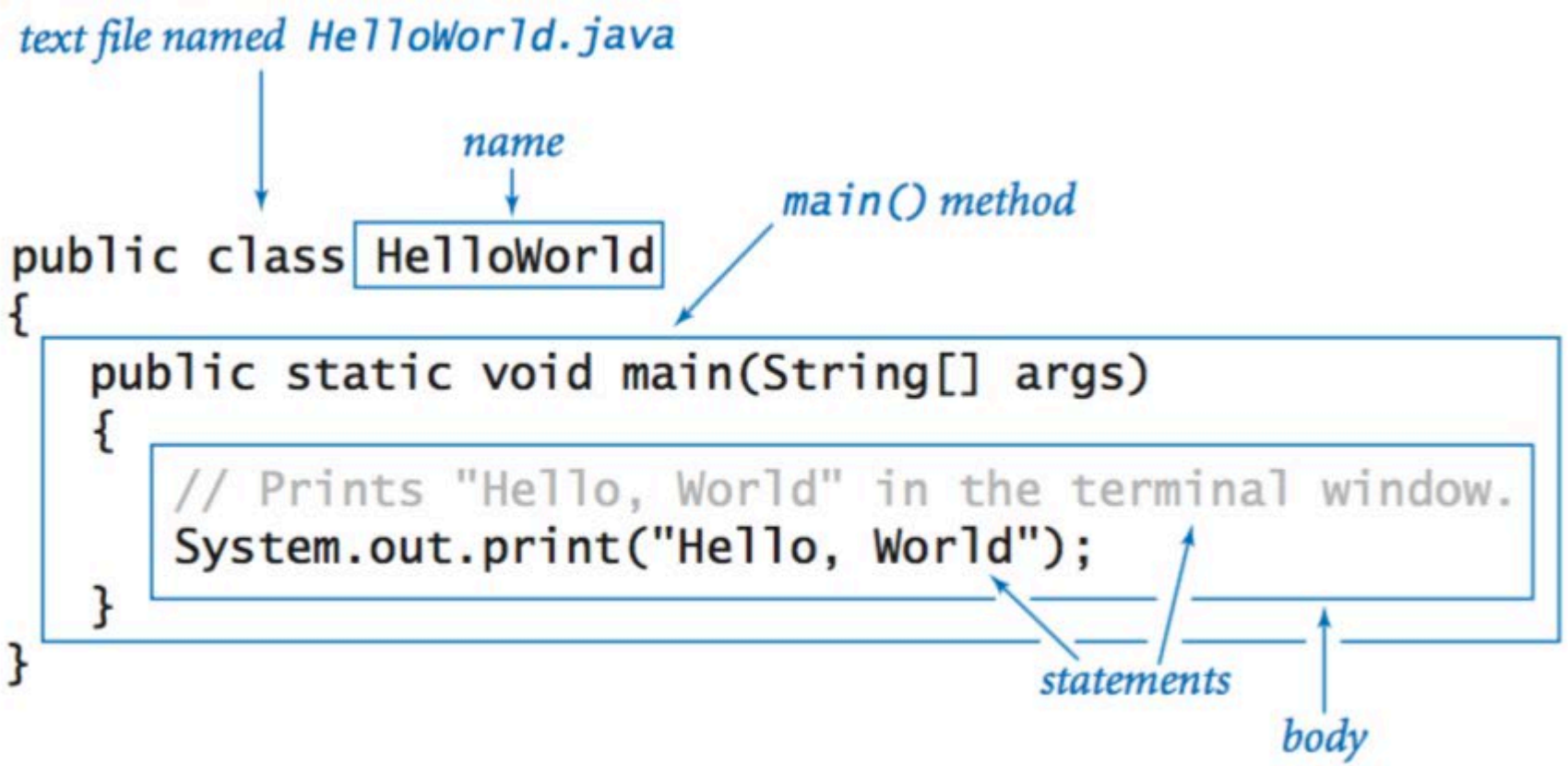
Java for Beginners

Level 0

Mr. Teasdale

Program Construction in Java



Level 0???????

- Get used to it.
- Computer scientists start counting at zero.
- This lesson will cover the very basics of what Java is and why it is so popular. We will look at some code examples and practice writing our first ever Java program

What is a program?

- A list of instructions telling the computer what to do.
- It must be *precise* and its **semantics** and **syntax**, (logic and grammar/spelling) must be correct if translation into **machine code** is to succeed.

Why Java?

- Java has these advantages over other languages:
  - it is a **high-level** programming language (closer to human language than machine code);
  - it is **event-driven** (it can respond to user mouse clicks and key presses);

Why Java?

- programs can come as two types: **applications** (run on their own) and **applets** (run in a web browser, making Java very web user-friendly);
- executables in other languages have too much access to the system and can't be trusted - the **sandboxing** in Java means it is difficult to write a virus or crash the whole system;

Why Java?

- it is effectively a platform in itself and so is **platform-independent** (programs will run on *Windows*, *Macs*, *Linux*, etc.) - the Java compiler actually creates **byte code** which is standard and will be converted to the machine's native machine code at run time;

Why Java?

- it is simpler than other languages, so easier to learn, so fewer bugs and bugs are easier to spot;
- it is **object-oriented** which makes it easier to conceive and work with **GUI** (window- based) interfaces;

Why Java?

- it is **multithreaded** , meaning programs can run several tasks simultaneously, (as can *Windows* of course), unlike older style procedural programs;
- the different files (**classes**) of a Java project are independent but **dynamically linked** so they can use each other automatically when required;

Why Java?

- memory allocation is more efficient than in other languages (Java uses what is called **garbage collection** to liberate memory that is no longer needed); and
- the IBO says we must!

Pseudocode

- An artificial simplified programming ‘language’ used to describe **algorithms** without using the rules of any particular programming language.
- During the development of an algorithm, pseudocode often contains sections of natural language that will be replaced later.

What do I need for Java?

JDK (Java Development Kit) –
download from Oracle

IDE (Integrated Development Environment)
Many options:

Eclipse (eclipse.org) – *PC and Mac version*

BlueJ (bluej.org)

Netbeans (netbeans.org) ALL FREE!

3 Laws of Java

1. Every line ends with a **;** unless the next symbol is a **{**
2. Every **{** has a **}**
3. Classes start with capital letters, methods and variables start with lower case letters

Syntax rules

- **Classes** start **capital letters** and have no ( )
- **Methods** start **lowercase letters** and have a **( )**
- **Variables** always start with a **lowercase letter**
- **=** means '**gets the value of**'
- **==** means 'equals' when comparing numbers
- **.equals()** means 'equals' when comparing words

Java's reserved words

- Some words, called **keywords**, e.g. `class`, `true` are reserved by Java.
- This means you cannot use them for your own purposes e.g as a **variable** name.

Java's structure

Java programs are called '**classes**'

They exist inside a container called a **project**

All classes have at least one method called **main()**

Java class example

```
public class MyFirstTime
{
    public static void main (String args[])
    {
        System.out.println("x");
        System.out.println("xxx");
        System.out.println("xxxxx");
    }
}
```

Don’t worry!

The IDE (Eclipse) automatically makes all the ‘gunk’ at the top public this, void main that…

Java class example

```
public class MyFirstTime
{
    public static void main (Stri ])
    {
        System.out.println("x");
        System.out.println("xxx");
        System.out.println("xxxxx");
    }
}
```

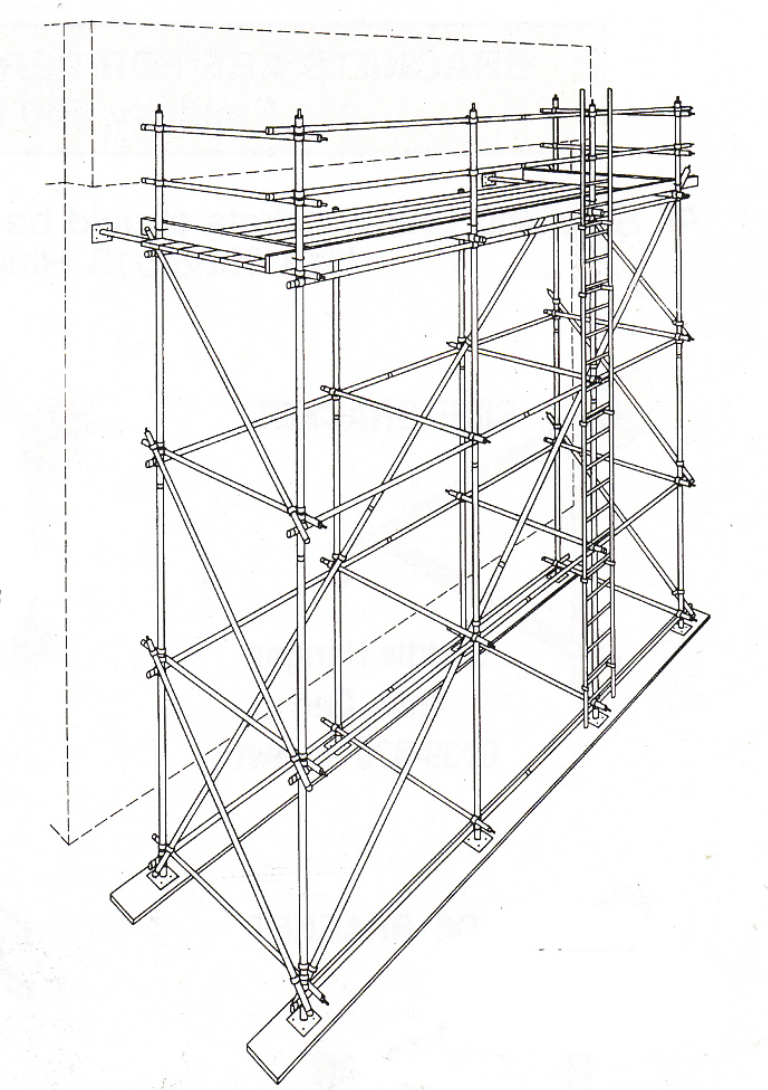
Class name

Main method

Your first task is to replicate this code in your browser – user relpit.com for this.

As an **extension**, can you get the program to output your full name on another line

Levels of coding



Learning to program can be difficult if you don’t learn things in the right order.

Each level depends on a firm understanding of the previous level.

It works!

Levels of Java coding

- 1: Syntax, laws, variables, output
- 2: Input, calculations, String manipulation
- 3: Selection (IF-ELSE)
- 4: Iteration/Loops (FOR/WHILE)
- 5: Complex algorithms
- 6: Arrays
- 7: File management
- 8: Methods
- 9: Objects and classes
- 10: Graphical user interface elements