Beginning Java

Java Language History

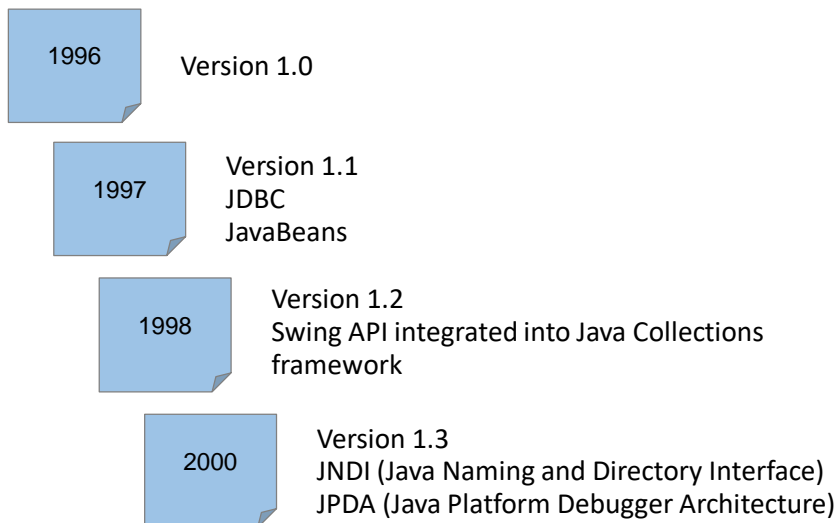|	
1996	Version 1.0
1997	Version 1.1 JDBC JavaBeans
1998	Version 1.2 Swing API integrated into Java Collections framework
2000	Version 1.3 JNDI (Java Naming and Directory Interface) JPDA (Java Platform Debugger Architecture)

Java Language History

2002
Version 1.4
XML support
Regular expressions

2004
Version 5
Generics
The *for-each* extension to *for* added.

2006
Version 6
JDBC 4.0
Scripting Language Support

2011
Version 7
Diamond operator <>
Try with resources

Java Language History

2014
Version 8
Lambda expressions
Default methods

2017?
Version 9
New module system
Language improvements

Read more on
https://en.wikipedia.org/wiki/Java_version_history

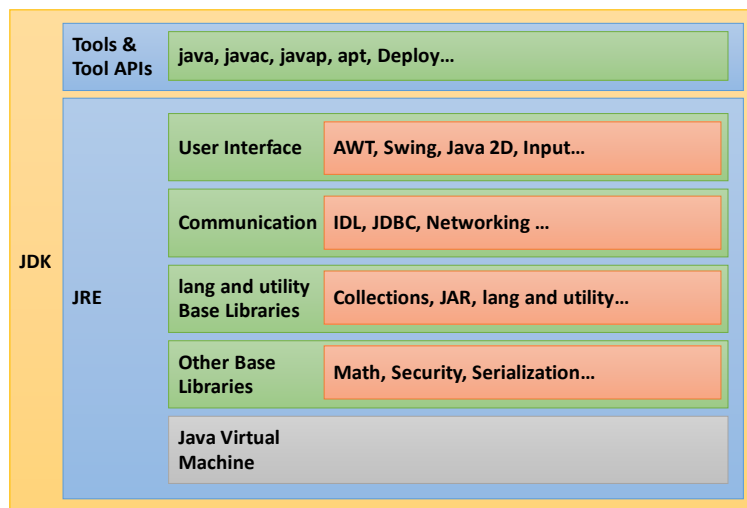In this course, we will be teaching Java 8

What is Java?

Java is an object oriented programming language that works on a wide range of platforms.

- Write Once, Run Anywhere.

- One of the world's most popular languages

- First release in 1996

- Automatic memory management

- Used for Android mobile application development

Java Development Kit (JDK)

Java Development Kit (JDK) gives you all tools you need to develop your own applications

JDK			
	Tools & Tool APIs	java, javac, javap, apt, Deploy…	
	JRE	**User Interface**	AWT, Swing, Java 2D, Input…
		Communication	IDL, JDBC, Networking …
		lang and utility Base Libraries	Collections, JAR, lang and utility…
		Other Base Libraries	Math, Security, Serialization…
		Java Virtual Machine	

JDK editions

There are many different types of the JDK. The version you should use depends upon what you're developing.

Some of them are:

- Java SE (Standard Edition, desktop, server)

- Java EE (Enterprise Edition, web, network)

- Java ME (Micro Edition, embedded)

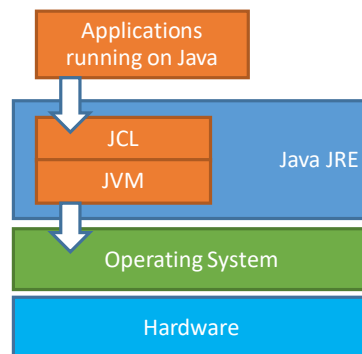- Java FX (Client-side development)

- Java Card (Smart card development)
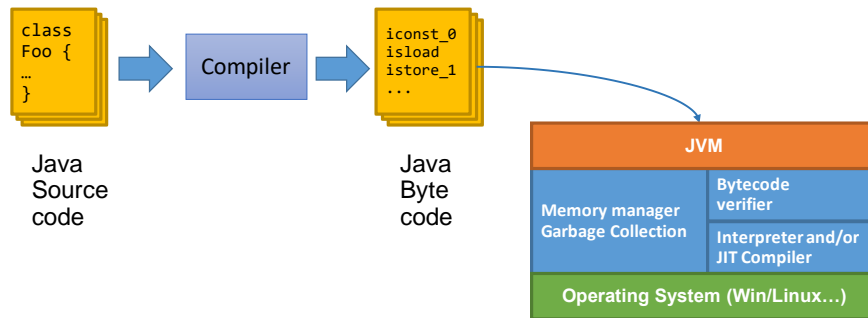
They can be downloaded for free from Oracle
https://www.oracle.com/java/index.html

Java

Java runtime consists of these core pieces:
- Java Runtime Environment (JRE)
    - Java Virtual Machine (JVM)
    - Java Class Library (JCL)

The Java Virtual Machine

The **Java virtual machine** executes the byte code
generated by the compiler.
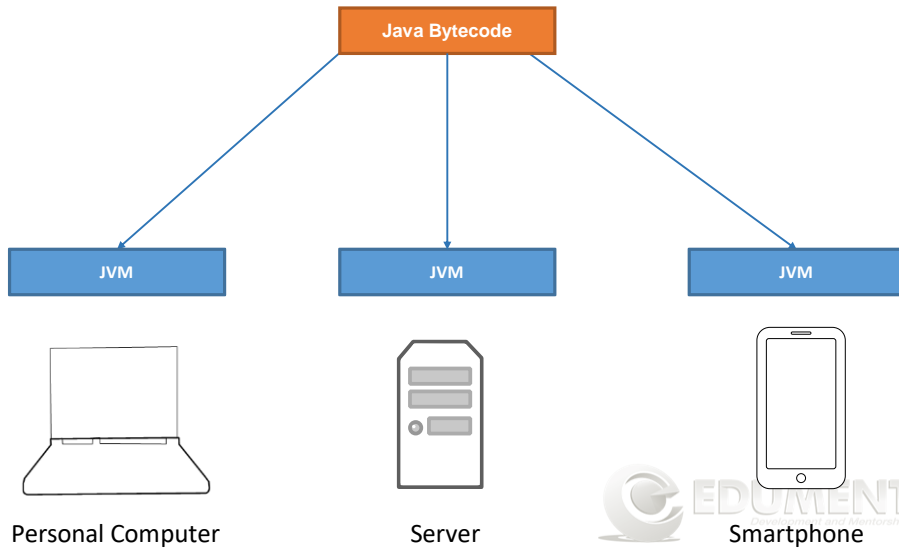

Bytecode

What is bytecode?

- Your source code is compiled bytecode.

- Bytecode is a set of instructions.

- Unlike some other programming languages, your computer
  doesn't understand compiled Java.

- Instead, the JVM turns Java bytecode into machine code as
  you run the application.

- This means that bytecode is platform independent.

Bytecode

The bytecode is platform independent allowing it to run anywhere

Java Bytecode

JVM — JVM — JVM

Personal Computer — Server — Smartphone

Java Files

In Java, there are a few file formats you should become acquainted with:

Java File Extension	Description
.java	Java source code that you write.
.class	Compiled java source code, contains the byte code
.jar	An archive of .class files and resources.

.java

- Java source code files.
- These files contain the code you write
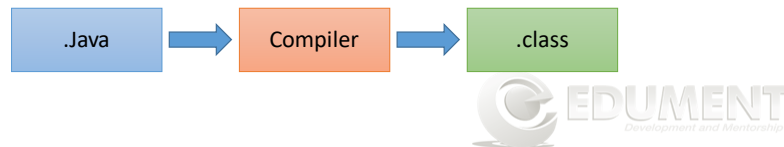- On their own, they are no more than simple text files.

.class files

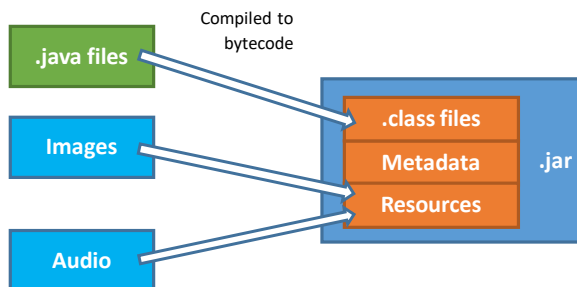**.class** files are Java bytecode files.

These contain compiled **bytecode**, almost always generated from .java files.

These must be **interpreted** by the JVM which translates them to machine code so that the computer can execute the code.

.jar files

.jar files is the file you distribute to your users as a complete application.

The .jar file is later executed by the java virtual runtime.

Language support

We'll be using Java exclusively in this course, but there are other languages that the JVM can execute.

Language	JVM Name	Languages designed for the JVM
Erlang	Erjang	BBj
JavaScript	Rhino	Clojure
Pascal	Free Pascal	Fantom
PHP	Quercus	Groovy
Python	Jython	Kotlin
REXX	NetRexx	MIDletPascal
Ruby	JRuby	Scala
Tcl	Tacl	Kawa

… and many more.

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JIT (Just in Time)

At runtime, the Java **byte code** is **JIT** compiled to native code and executed

EDUMENT
Development and Mentorship
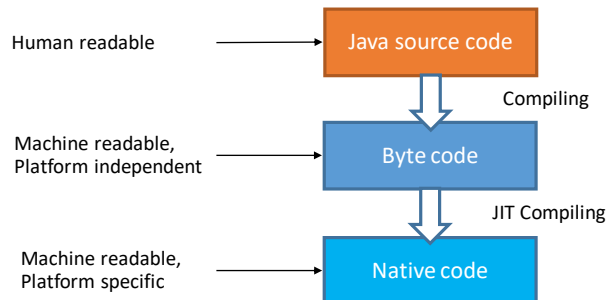
Android

Android is an operating system for smartphones and tablets, by Google, which has an 80% market share.

The main programming language for Android is Java.
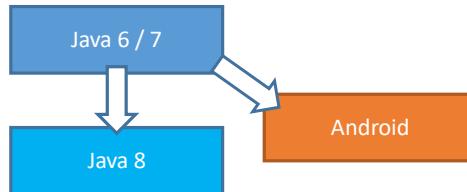
Most Android devices run Java 6 or 7 and because Android's Java is a fork by Google, it doesn't always have the same language features as normal Java.

Security

Security

When discussing Java, the topic of security frequently comes up and we have a few pointers for you.

Java is often called insecure, and there is some truth in that. Up to **50%** of all cyber attacks each year are through Java.

These attacks usually come through the web browser.

Java running in the browser is called an **java applet** and is not supposed to have access to system resources.
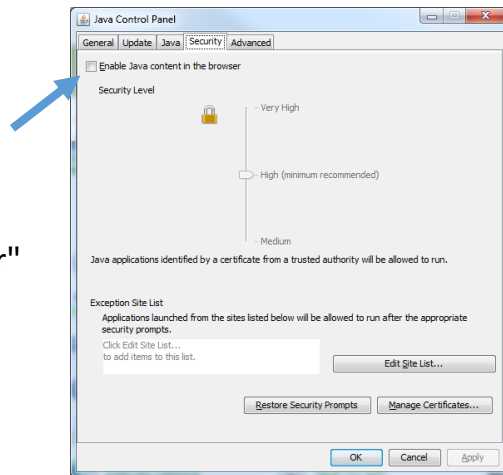
Security

Disabling Java content in the web browsers blocks almost all of these cyber attacks.

To do this, open the Java Control Panel.

Uncheck "enable Java content in the browser"

Exercise 1

Let's do exercise 1