Introduction to Java

What is Java?

- Java supports object-oriented programming such as classes, inheritance, and polymorphism

- Our first Java Program – Hello World !

```
public class HelloWorld {

   public static void main(String[] args) {
      System.out.println("Hello, World!") ;
   }

}
```

```
Hello, World!
```

Java Program

- A Java program is really a **class definition** with a method named **main**.
- When the program is run, the method named **main** is invoked.

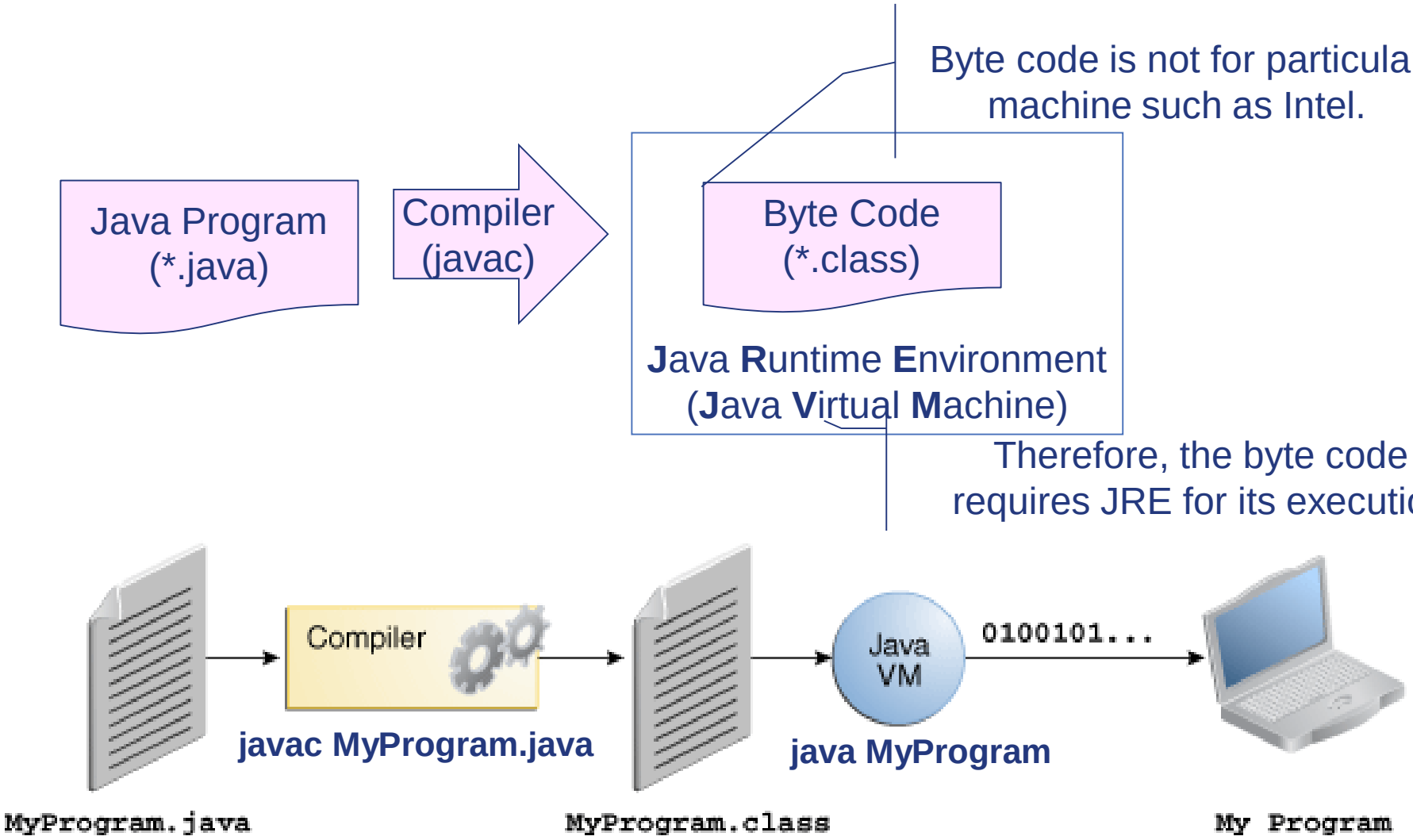
```
public class HelloWorld {
   public static void main(String[] args) {
      // You actual codes are here
      System.out.println("Hello, World!") ;
   }
}
```

Another Java Program

- Java is similar to C++ in many ways
  - Types: int, long, array
  - Control structures: for, while, do, return, break, continue
  - Function call and parameter passing

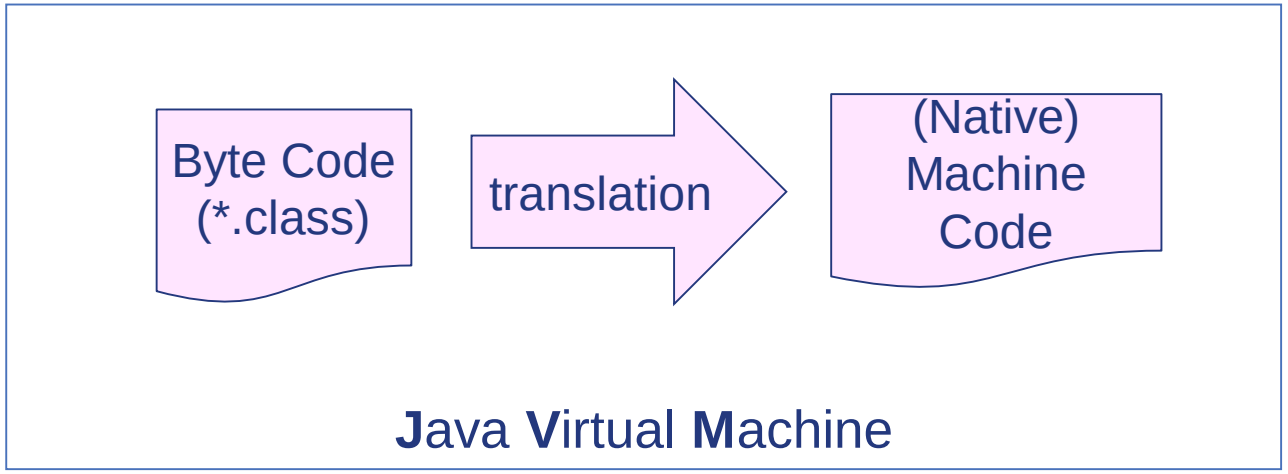
```
public class Factorial {
   public static void main(String[] args) {
      int values[] = {5, 10, 15} ;
      for ( int i: values )
         System.out.println("Factorial of " + i + ":₩t" + factorial(i) ) ;
   }
   private static long factorial(final int n) {
      long result = 1 ;
      for ( int i = 1 ; i <= n ; i ++ )
         result *= i ;
      return result ;
   }
}
```

Java Compilation and Execution



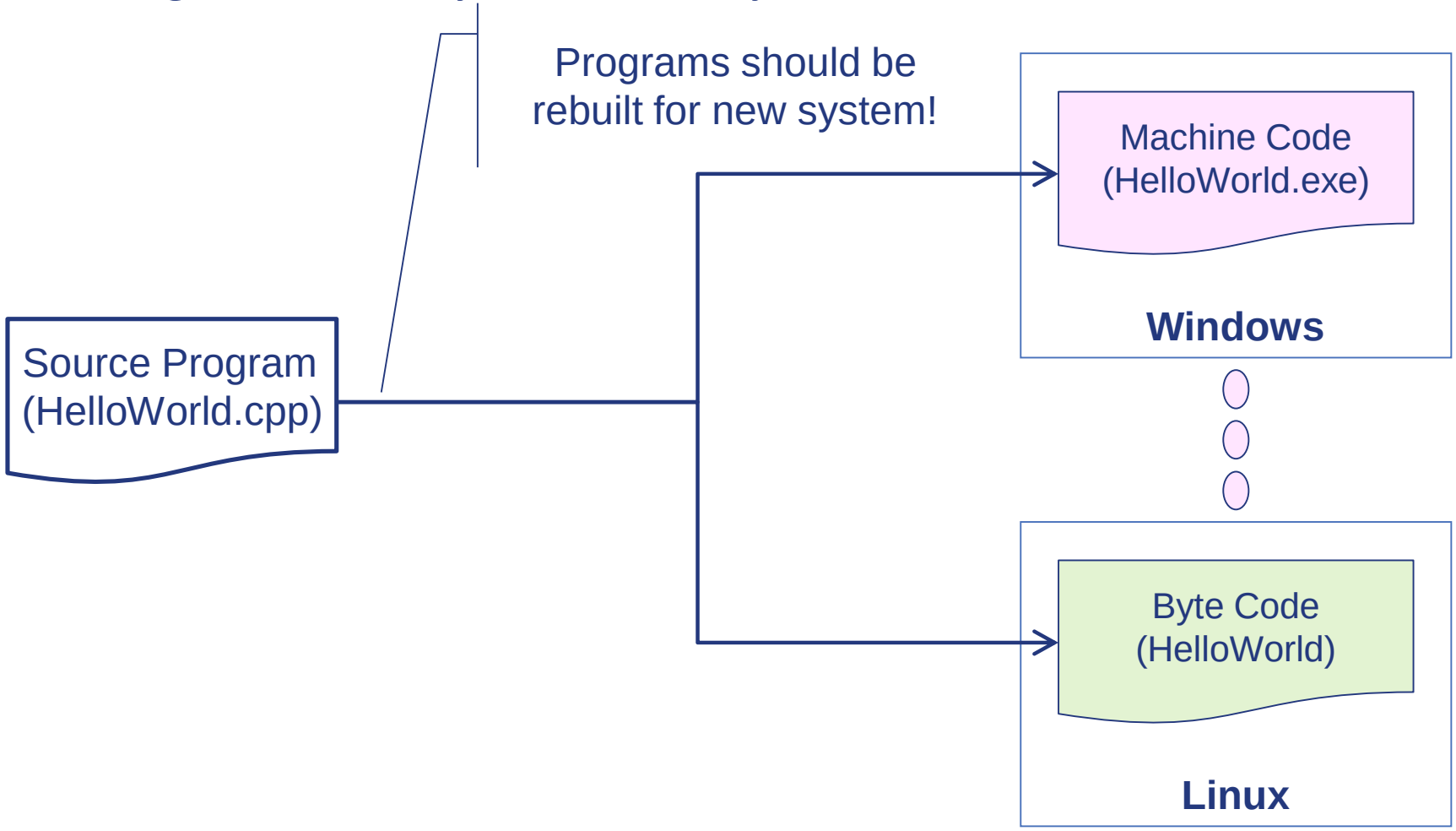
Java Virtual Machine: Disadvantage

- At run-time, It requires an additional translation from byte code to machine code
- So, Java programs may show poor performance



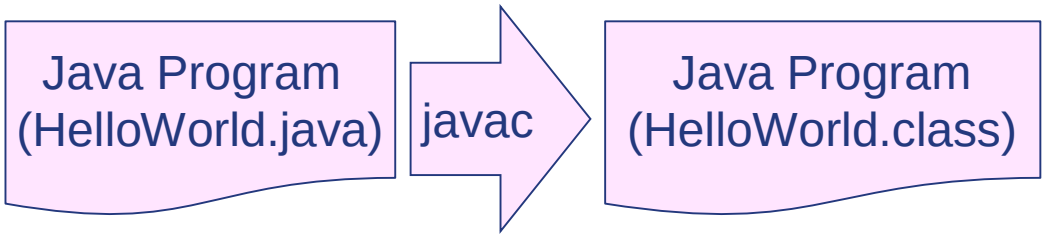
Java Virtual Machine: Advantage

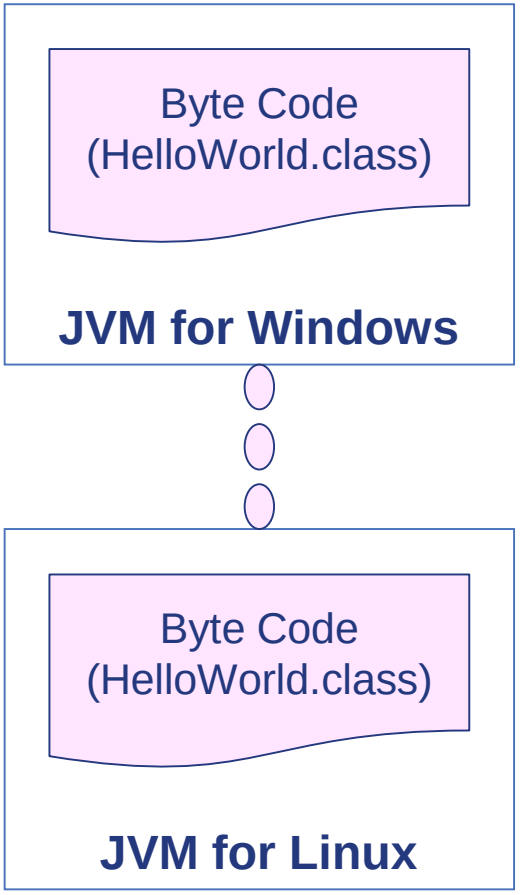
- Porting to other system is very difficult!



Java Virtual Machine: Advantage

- Java programs are portable:
- No compilation is required!
- This is called Write Once, Run Anywhere

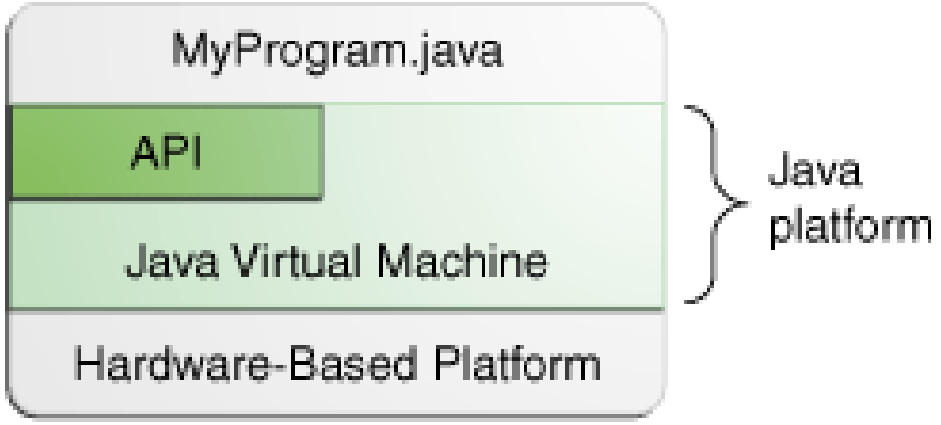




Where can we get JVM?

- We can get JVM from Oracle free of charge.
  - https://www.oracle.com/technetwork/java/javase/downloads/index.html
- JVMs for the following OSs are available
  - Windows x86, x64
  - Linux x86, x64
  - Solaris SPARC
  - Solaris x64
  - Mac OS X

  * Dalvik is a JVM for Android!



- We can also get specific VMs for specific platforms.

Java is very popular!

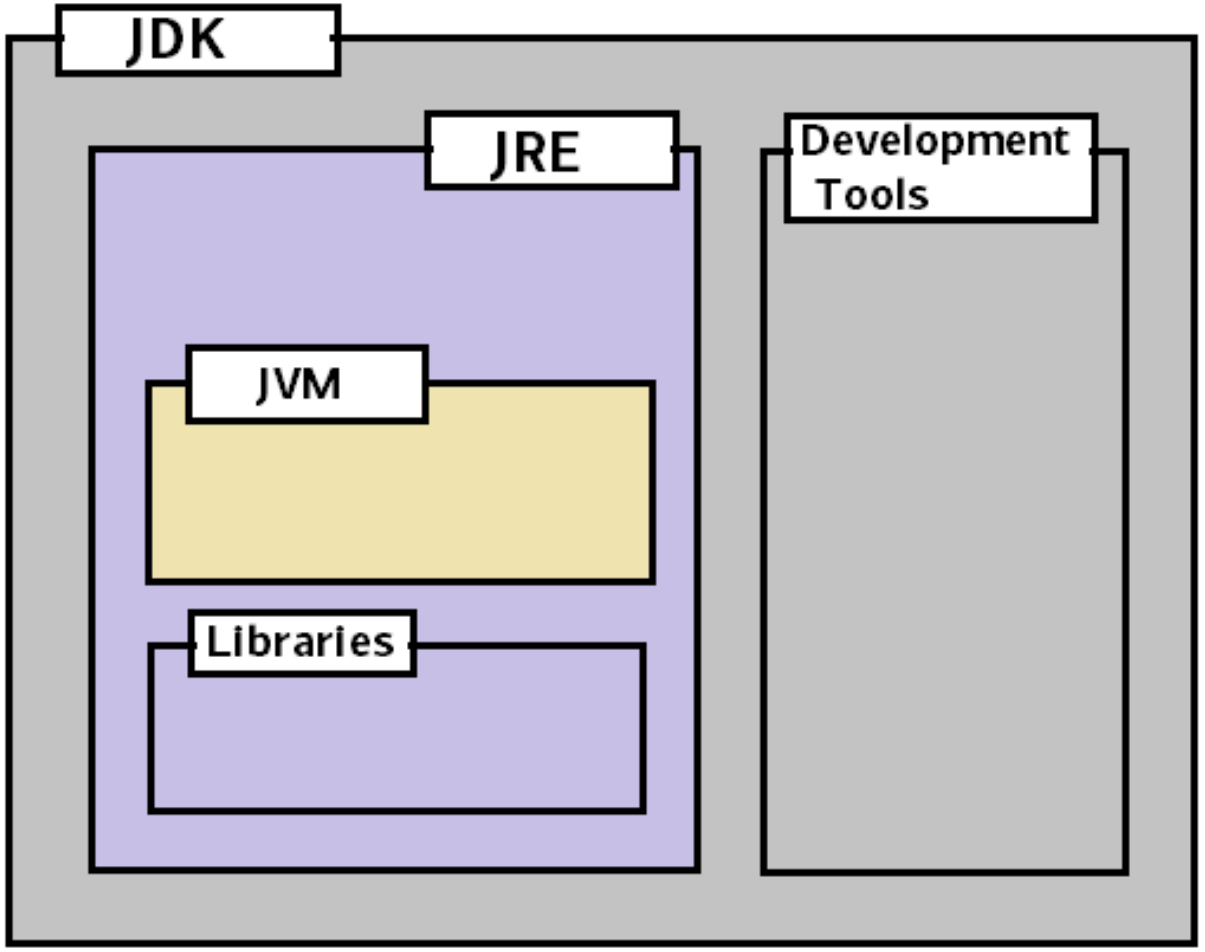
- Java has been used for various applications.
- Java offeres three editions for different applications
  - Java **EE** (Enterprise Edition)
  - Java **SE** (Standard Edition)
  - Java **ME** (Micro Edition)

Java is a system

- Java provides a huge number of useful APIs.

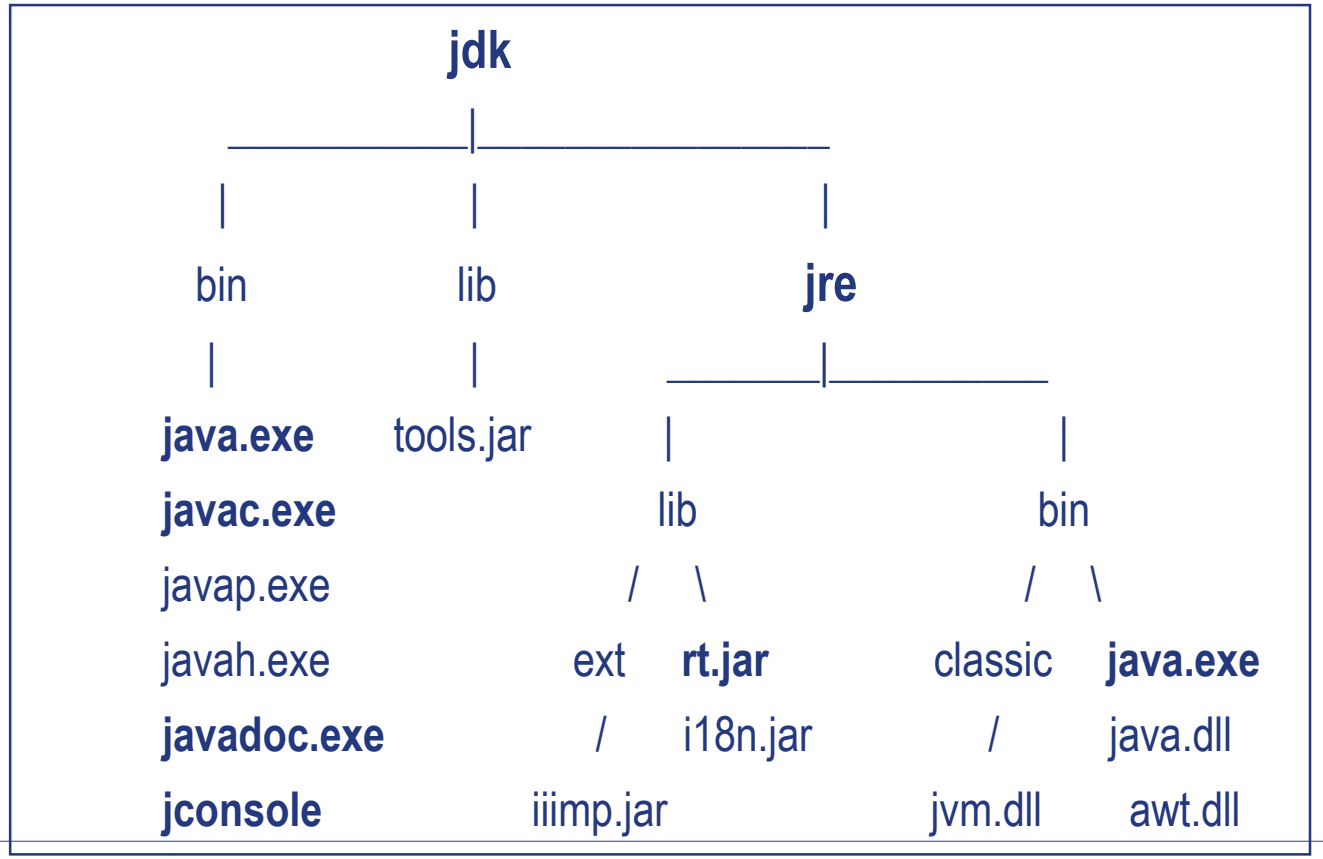
- Typical APIs are
  - **Swing, JavaFX** for GUI programming
  - **Applet** and **Servlet** for Web programming
  - **Socket** for Network programming
  - **JDBC** (Java Database Connectivity) for Database programming
  - **RMI** (Remote Method Invocation) for Distributed programming
  - **JNI** (Java Native Interface) for Native programming

JDK vs JRE vs JVM



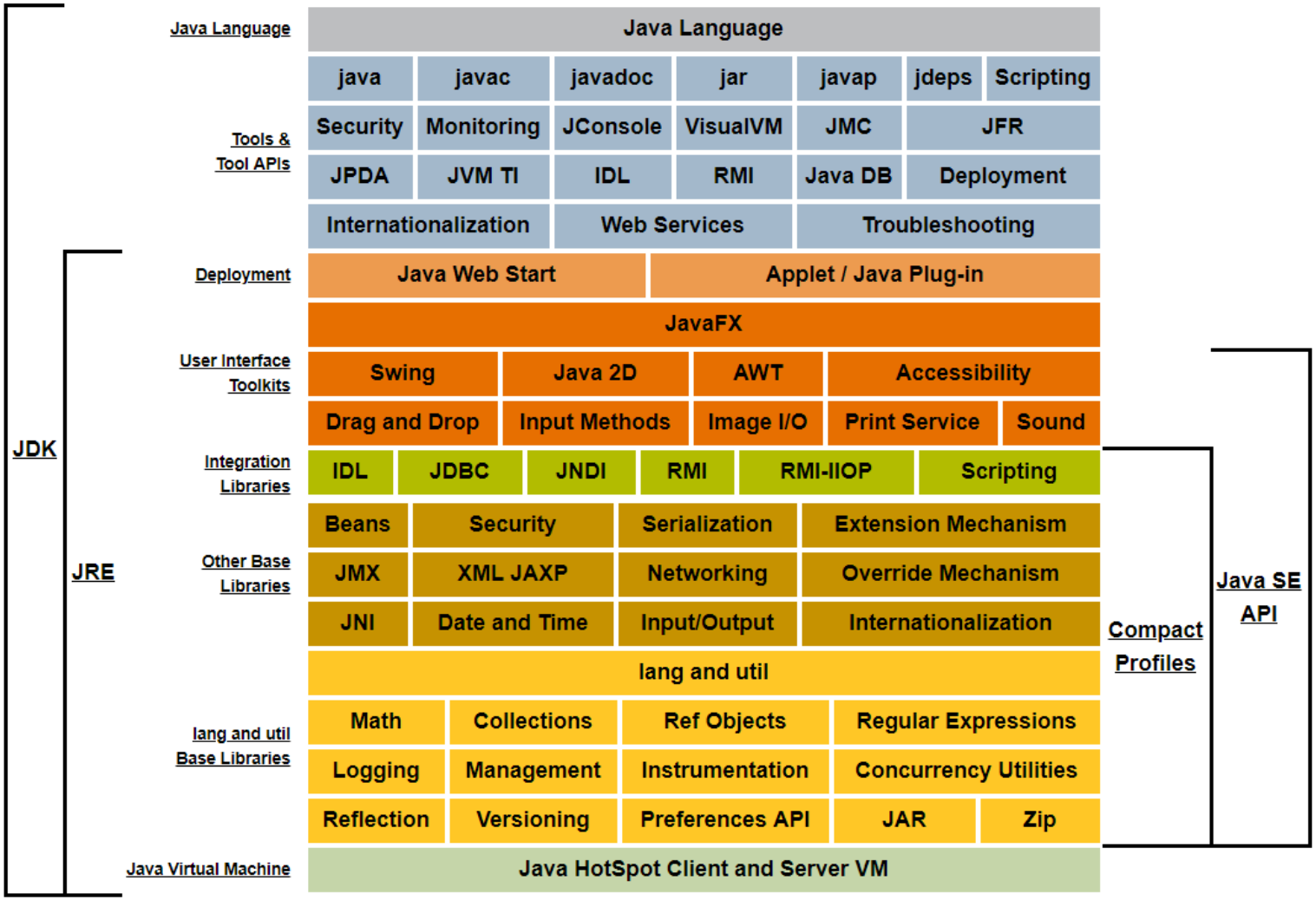
Programming Environment for Java

- JDK (Java Development Kit)
  - the basic tools and libraries for developing Java applications
  - http://www.oracle.com/technetwork/java/javase/downloads/index.html



Before Java 9

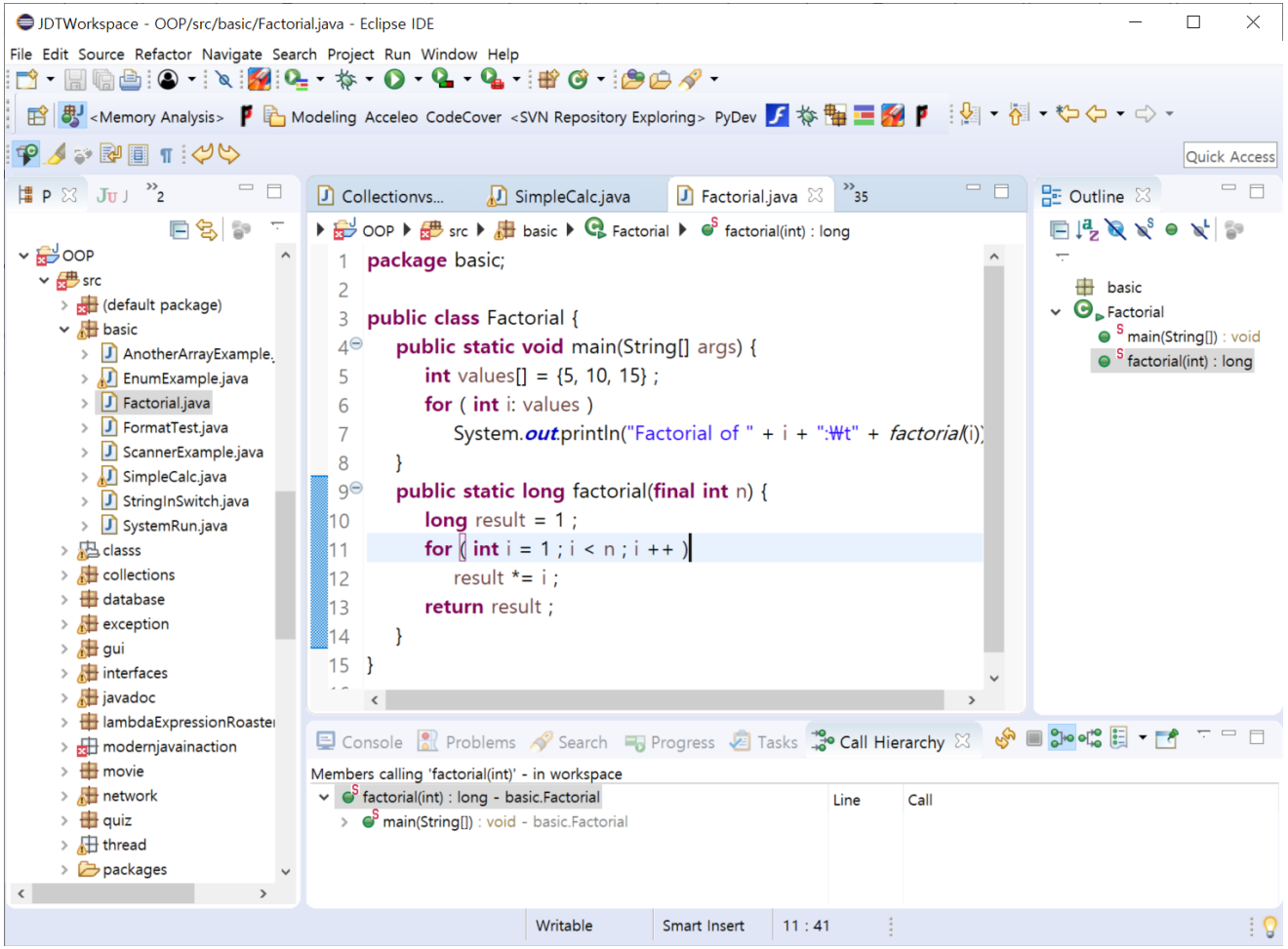
Java SE 8 Platform



https://docs.oracle.com/javase/8/docs/

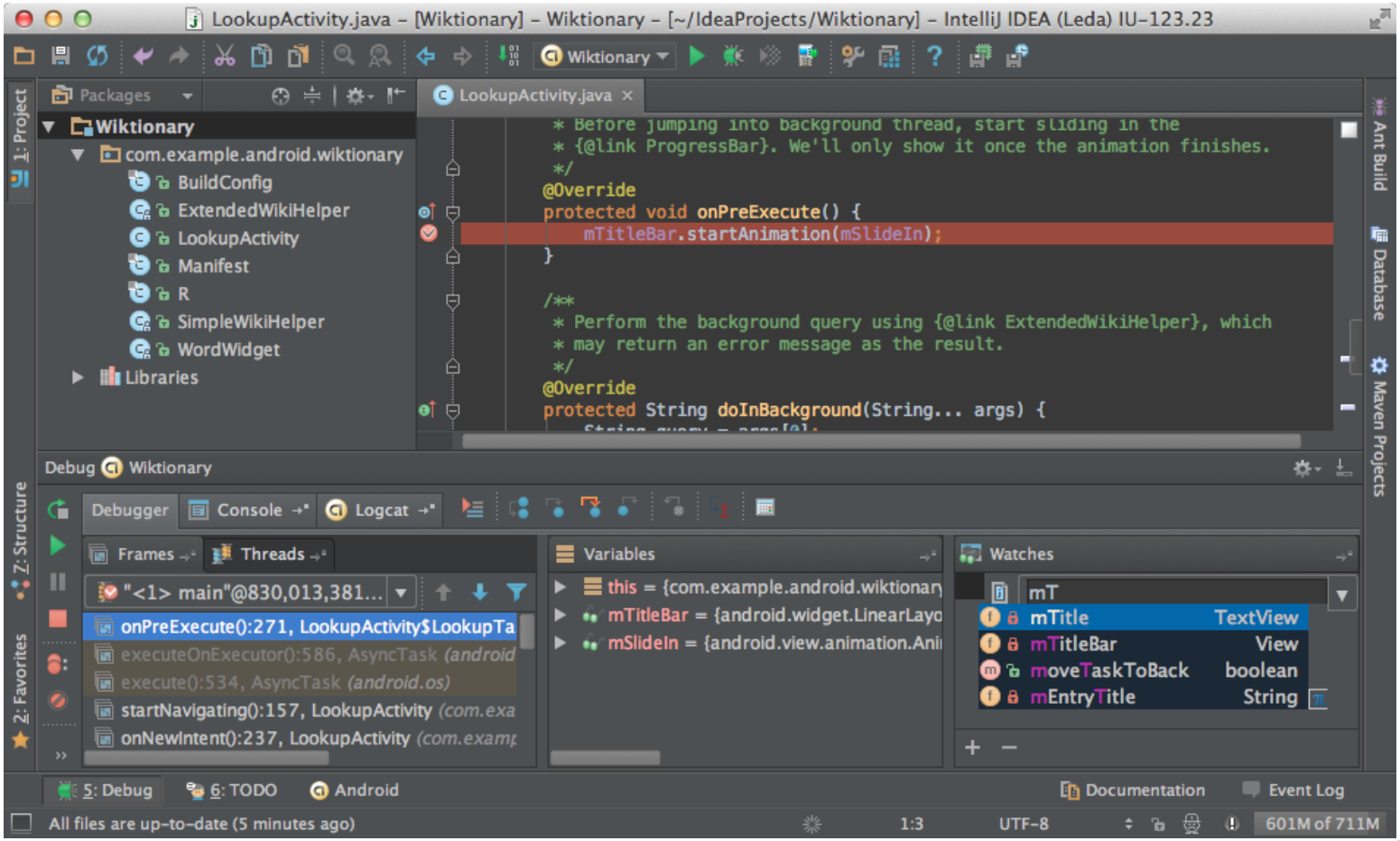
Programming Environment for Java

- Eclipse: http://www.eclipse.org/



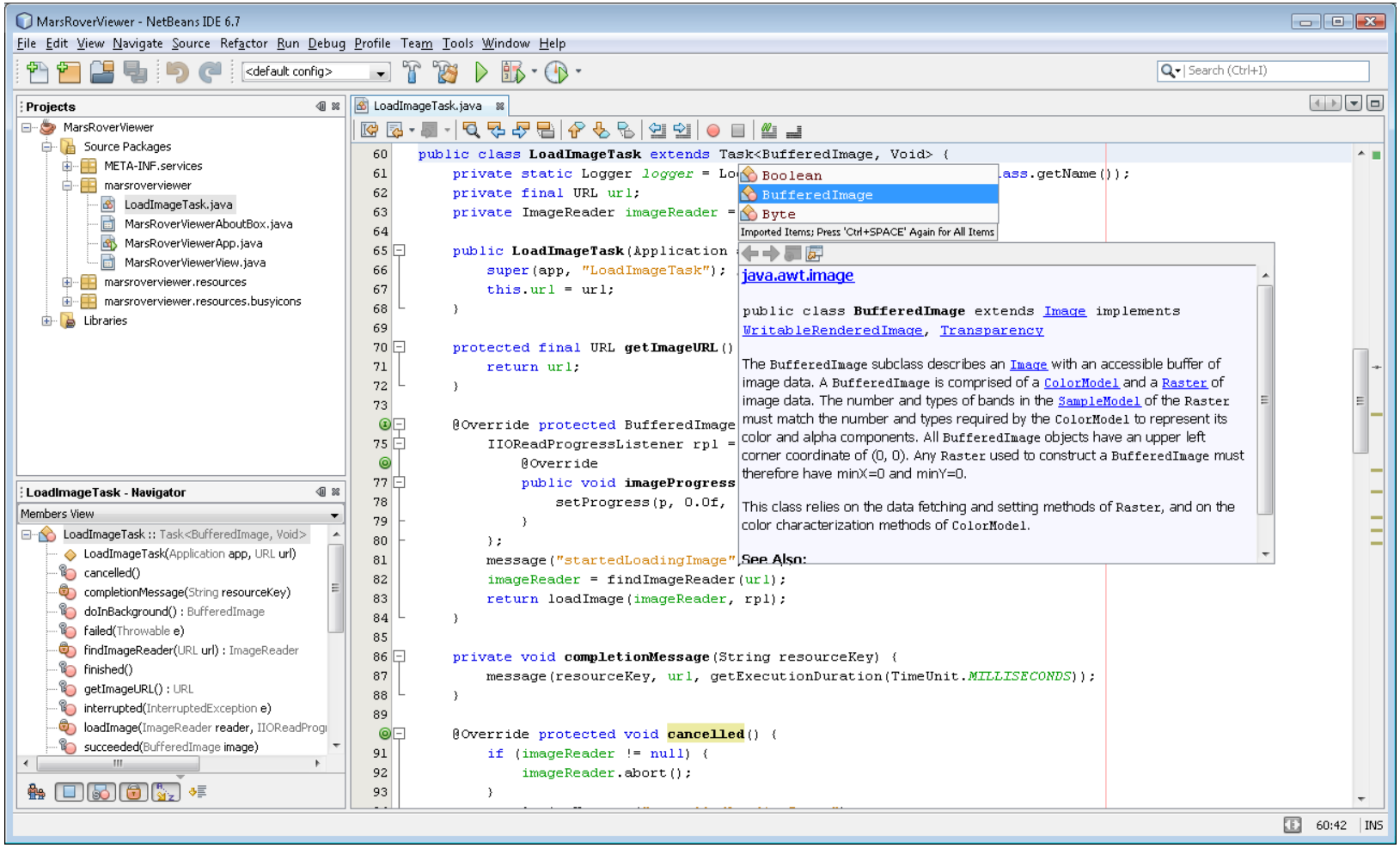
Programming Environment for Java

- IntelliJ IDEA: https://www.jetbrains.com/idea/



Programming Environment for Java

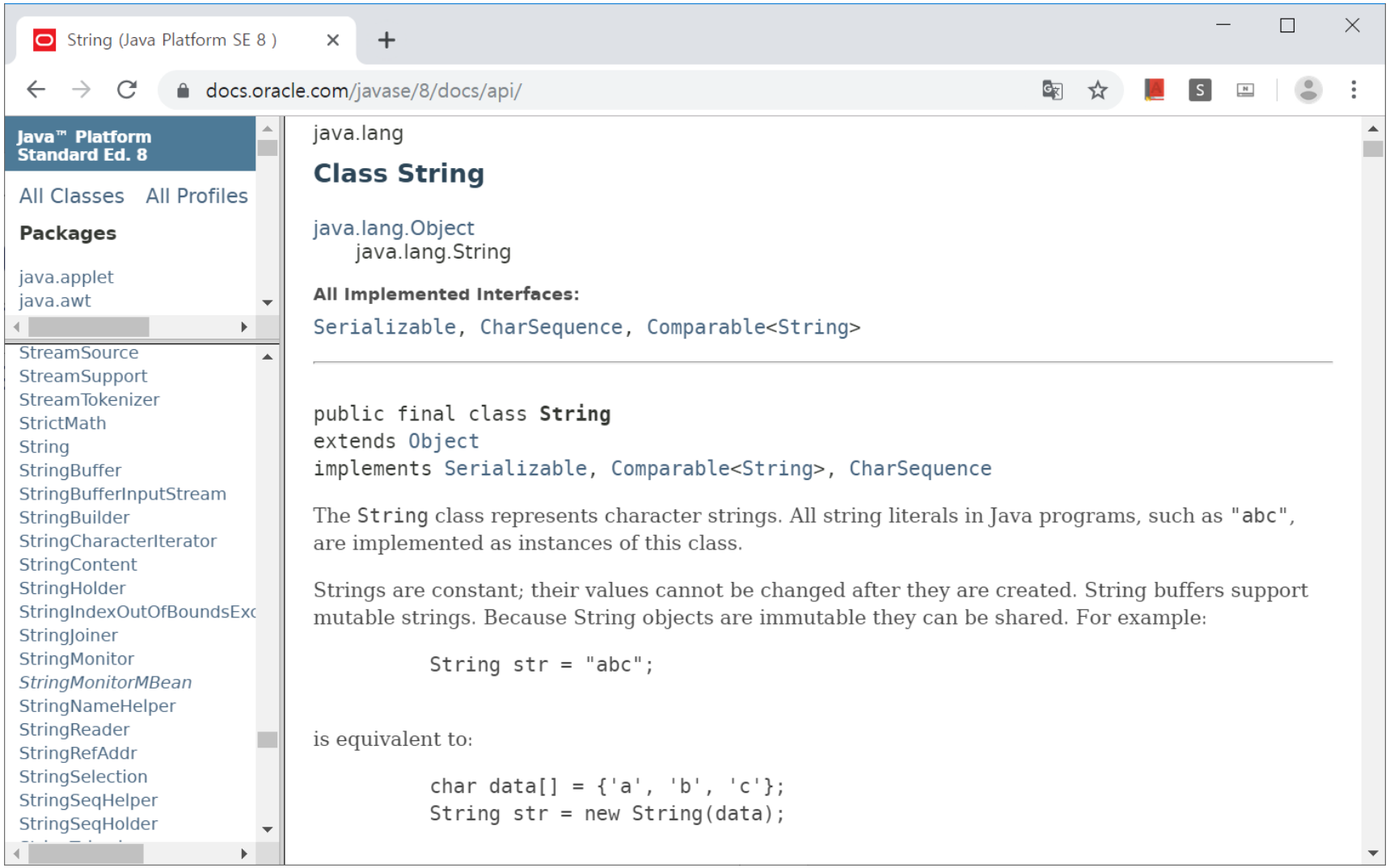
- NetBeans: http://netbeans.org/



Information Sources on Java

- The entry to Java: http://java.oracle.com/
- Tutorials: http://docs.oracle.com/javase/tutorial/
- Java SE 8 documentation:
  - https://docs.oracle.com/javase/8/docs/
- Java SE 8 API documentation: http://docs.oracle.com/javase/8/docs/api/

Java SE 8 API Documentation



Q & A