Introduction to JAVA

What is OOP?

- Object-oriented programming (OOPs) is a methodology that simplifies software development and maintenance by providing some rules.

What is Java?

- Java is a **programming language** and a **platform**. Java is a high level, robust, object-oriented and secure programming language.
- Platform: Any hardware or software environment in which a program runs, is known as a platform. Since Java has a runtime environment (JRE) and API, it is called a platform.
- Java was developed by *Sun Microsystems* in the year 1995. *James Gosling* is known as the father of Java. Before Java, its name was *Oak*. Since Oak was already a registered company, so James Gosling and his team changed the Oak name to Java.

Applications of Java

- Desktop Applications
- Web Applications
- Enterprise Software
- Mobile Applications
- Games
- Robotics
- Embedded Systems etc.

Java Platform Editions

- Java SE (Standard Edition)
- Java EE (Enterprise Edition)
- Java ME (Micro Edition)
- JavaFX (for rich internet applications)

Features of JAVA

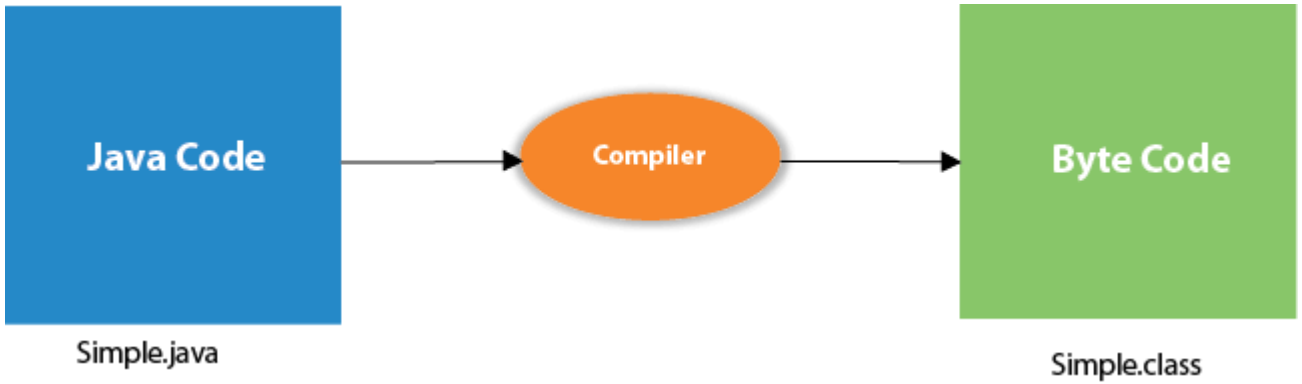
- Simple
- Object-Oriented
- Portable
- Platform independent
- Secured (has own runtime environment) (JVM)
- Robust (garbage collection, exception handling)
- Architecture neutral
- Interpreted
- High Performance
- Multithreaded
- Distributed
- Dynamic
- https://www.javatpoint.com/features-of-java

Simple Program

```
class Test{
    public static void main(String[]args){
     System.out.println("Hello Java");
    }
}
```

What happens to the code?

- At compile time, java file is compiled by Java Compiler (It does not interact with OS) and converts the java code into bytecode.



- The bytecode is then executed by the interpreter.

JVM

JVM (Java Virtual Machine) is an abstract machine. It is called a virtual machine because it doesn't physically exist. It is a specification that provides a runtime environment in which Java bytecode can be executed. It can also run those programs which are written in other languages and compiled to Java bytecode.

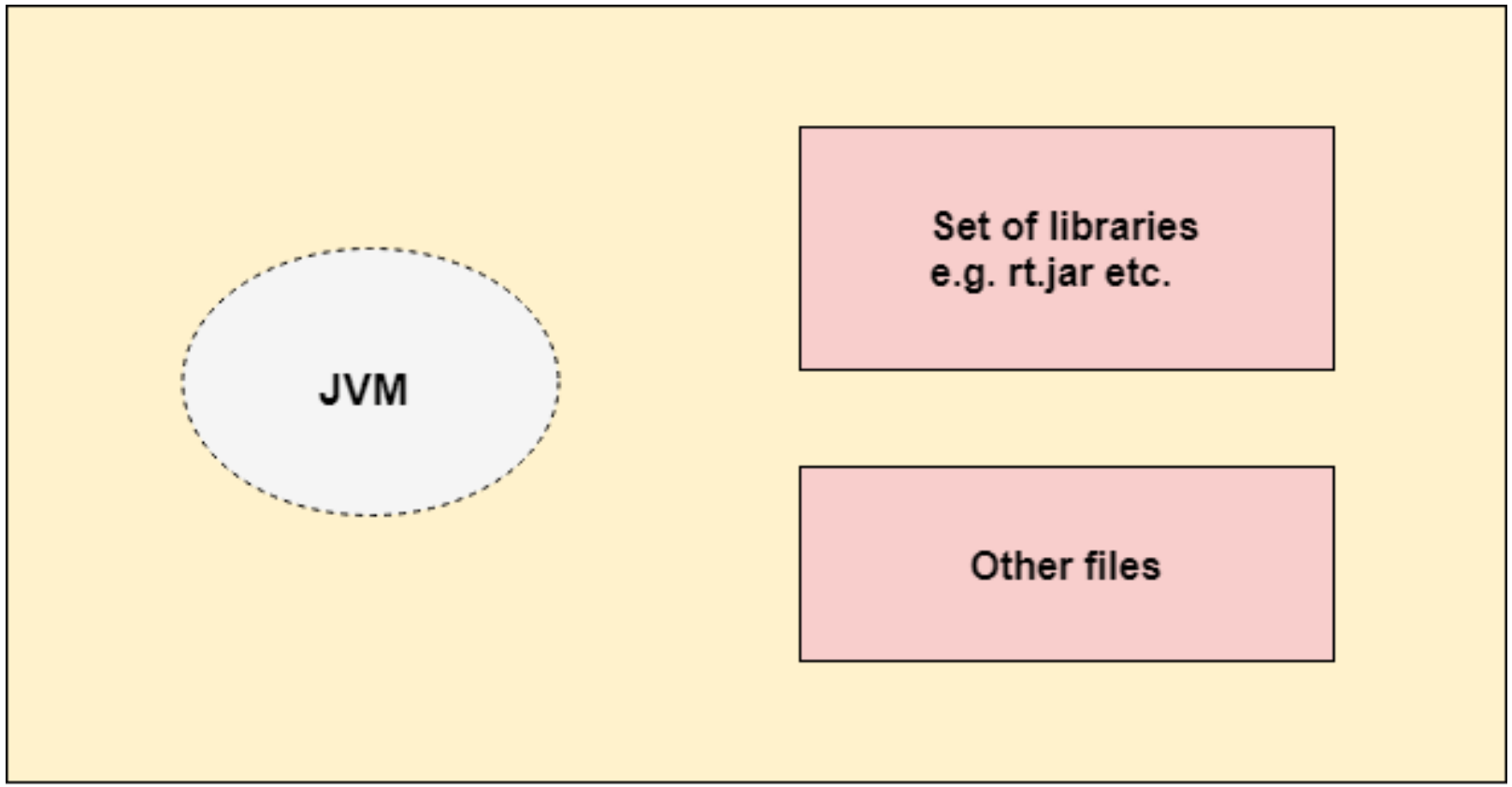
JVMs are available for many hardware and software platforms. JVM, JRE, and JDK are platform dependent because the configuration of each OS is different from each other. However, Java is platform independent.

- The JVM performs the following main tasks:
  - Loads code
  - Verifies code
  - Executes code
  - Provides runtime environment

JRE

- JRE is an acronym for Java Runtime Environment. It is also written as Java RTE. The Java Runtime Environment is a set of software tools which are used for developing Java applications. It is used to provide the runtime environment. It is the implementation of JVM. It physically exists. It contains a set of libraries + other files that JVM uses at runtime.
- The implementation of JVM is also actively released by other companies besides Sun Micro Systems.

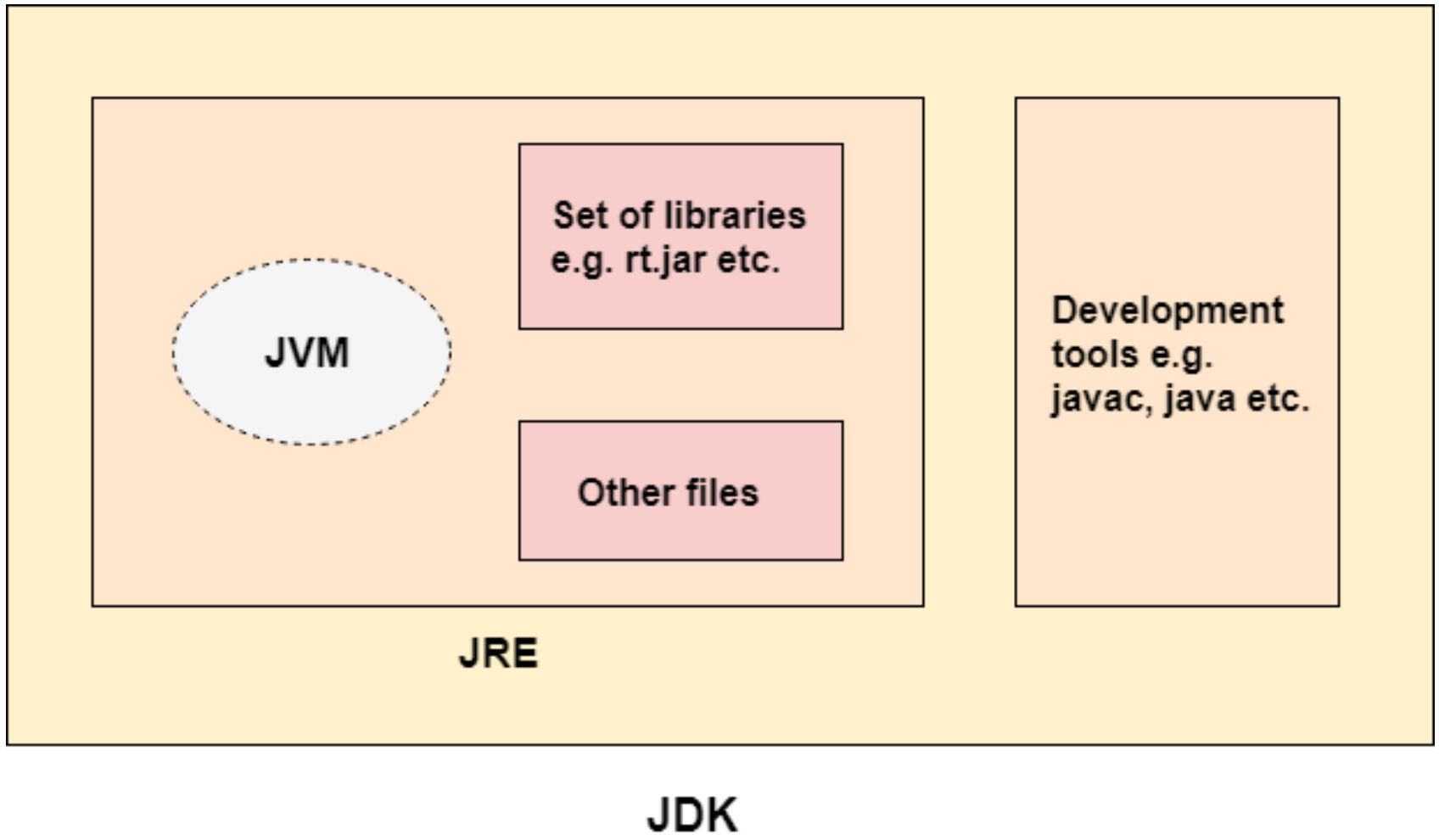
JRE



JDK

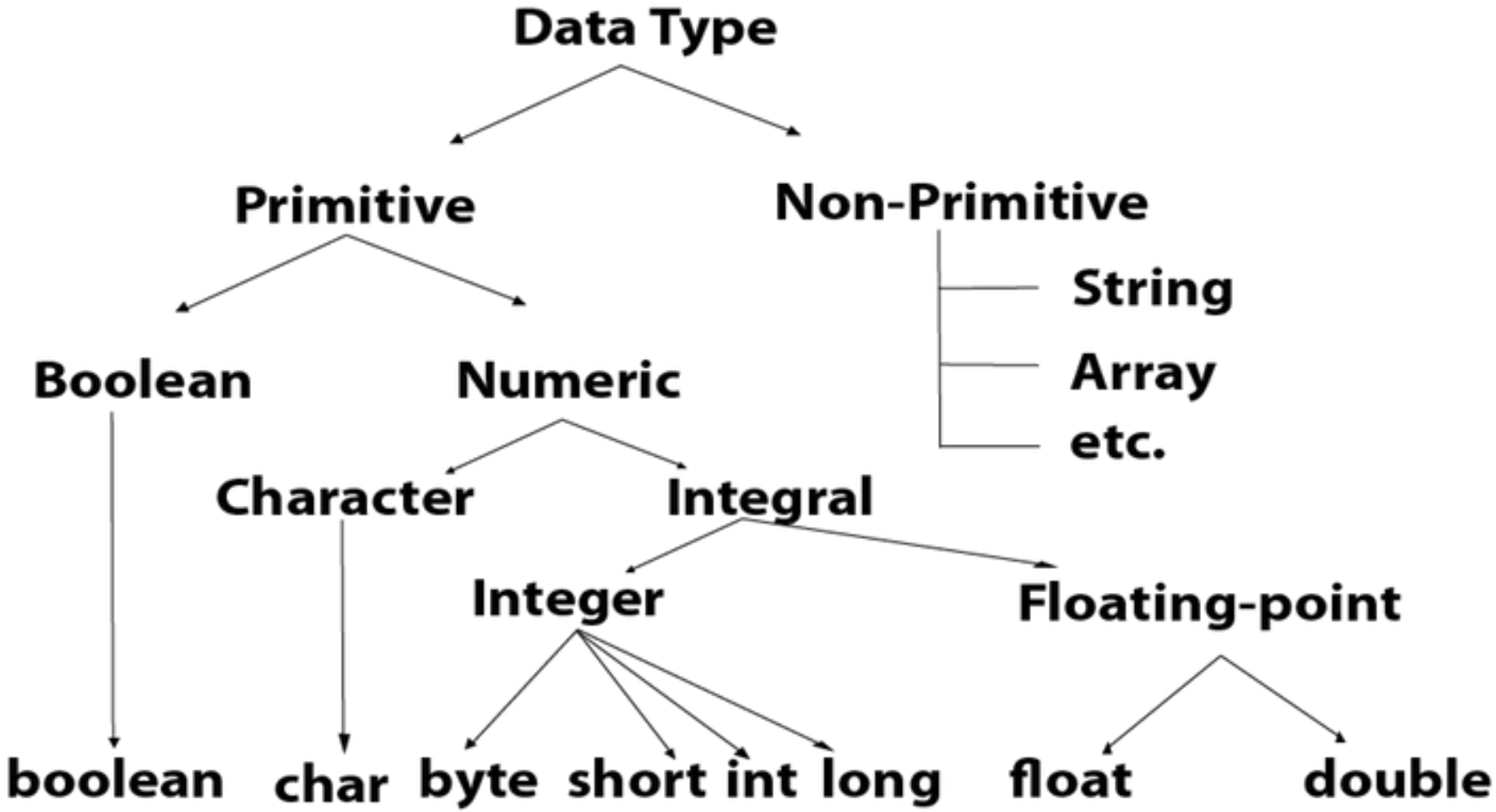
- JDK is an acronym for Java Development Kit. The Java Development Kit (JDK) is a software development environment which is used to develop Java applications. It physically exists. It contains JRE + development tools.
- JDK is an implementation of any one of the below given Java Platforms released by Oracle Corporation:
  - Standard Edition Java Platform
  - Enterprise Edition Java Platform
  - Micro Edition Java Platform
- The JDK contains a private Java Virtual Machine (JVM) and a few other resources such as an interpreter/loader (java), a compiler (javac), an archiver (jar), a documentation generator (Javadoc), etc. to complete the development of a Java Application.

JDK


Set of libraries
e.g. rt.jar etc.
JVM
Other files
Development
tools e.g.
javac, java etc.
JRE
JDK

Data types in JAVA

- Data types specify the different sizes and values that can be stored in the variable. There are two types of data types in Java:
- **Primitive data types:** The primitive data types include boolean, char, byte, short, int, long, float and double.
- **Non-primitive data types:** The non-primitive data types include Classes, Interfaces, and Arrays.


Data Type
Primitive
Non-Primitive
String
Array
etc.
Boolean
Numeric
Character
Integral
Integer
Floating-point
boolean
char
byte
short
int
long
float
double

Primitive Data types

- There are 8 types of primitive data types:
- bollean data type
- byte data type
- char data type
- short data type
- int data type
- long data type
- float data type
- double data type

Data Type	Default Value	Default size	Range
boolean	false	1 bit	True/false
char	'\u0000'	2 byte	0 to 65,535
byte	0	1 byte	-128 to 127
short	0	2 byte	-32,768 to 32767
int	0	4 byte	-2^31 to 2^31-1
long	0L	8 byte	-2^63 to 2^63-1
float	0.0f	4 byte	6 to 7 decimal points
double	0.0d	8 byte	15 to 16 decimal points

- The operators, if-else, switch, loops, break and continue statements and arrays are same for java as for c.

Download Eclipse

- JDK 1.8 (Standard Edition)
- https://www.eclipse.org/downloads/