Introduction to Java

By Rahul Barve

Objectives

- Introduction to Java
- Object Oriented Concepts
- A First Java Program
- Understanding JRE
- Data Types in Java

Introduction to Java

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Introduction to Java

- Java is an object oriented programming language designed to build real time business applications.
- It is a language that follows a notion:

  Write Once Run Anywhere

Introduction to Java

- Suitable for building applications like:
  - Standalone or Desktop
  - Network Based
  - Web Based (Internet or Intranet)
  - Mobile Based (Android)

Brief History

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Brief History

- Java was invented by James Gosling in coordination with Patrick Naughton, Chris Warth, Ed Frank and Mike Sheridan at Sun Microsystems in 1991.
- Initially was called `OAK` but renamed to `JAVA` in 1995.

Java Buzzwords

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Java Buzzwords

- Simple
- Object Oriented
- Portable
- Robust
- Secure
- Multithreaded
- Architecture Neutral
- Interpreted
- Distributed

Object Oriented Programming

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Object Oriented Programming

- Object Oriented Programming is a set of principles used to design the software with the help of business domain specific entities known as Objects.
- E.g. Account in a Banking system, Employee in a HR system, Patient in a Hospital system, Book in a Library system and so on.

Object Oriented Programming

- An Object is an entity having a well defined structure.
- Typically an object has a state and behaviors.

OOP Principles

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OOP Principles

- Abstraction
- Encapsulation
- Modularity
- Inheritance
- Polymorphism

Abstraction

- The process of identifying key aspects and ignoring rest is known as abstraction.
- Only domain expertise can do right abstraction.

Encapsulation

- It provides a separation between an abstraction and its implementation.
- Ensures that the data manipulation does not take place directly.

Modularity

- It is the process of breaking up the system into small units of work, referred as modules.
- Promotes loose coupling.
- Brings flexibility and Reusability.

Inheritance

- It is the process of building a new structure based upon the existing one.
- Already built structure can be extended in any direction as and when required.
- It represents IS-A relationship.

Polymorphism

- It refers to many forms.
- Objects responding to same message in different ways is known as polymorphism.

A First Java Program

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A First Java Program

```
//HelloWorld.java
public class HelloWorld {
     public static void main(String args[]){
          System.out.println(“Hello World”);
     }
}
```

Basic Rules and Concepts

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Basic Rules and Concepts

- All Java source files have `.java` extension.
- If a class is declared as `public`, the source file name must match the name of the class.

Basic Rules and Concepts

- A source file may have multiple classes defined provided, not more than one classes are declared as `public`.
- When a source file is compiled, a `.class` file is generated for every class.

Java's Magic: The Bytecode

- When a source file is compiled, a `.class` file is created which contains a bytecode.
- A bytecode is a highly optimized set of instructions designed to be executed by the Java runtime system.

Java Runtime Environment

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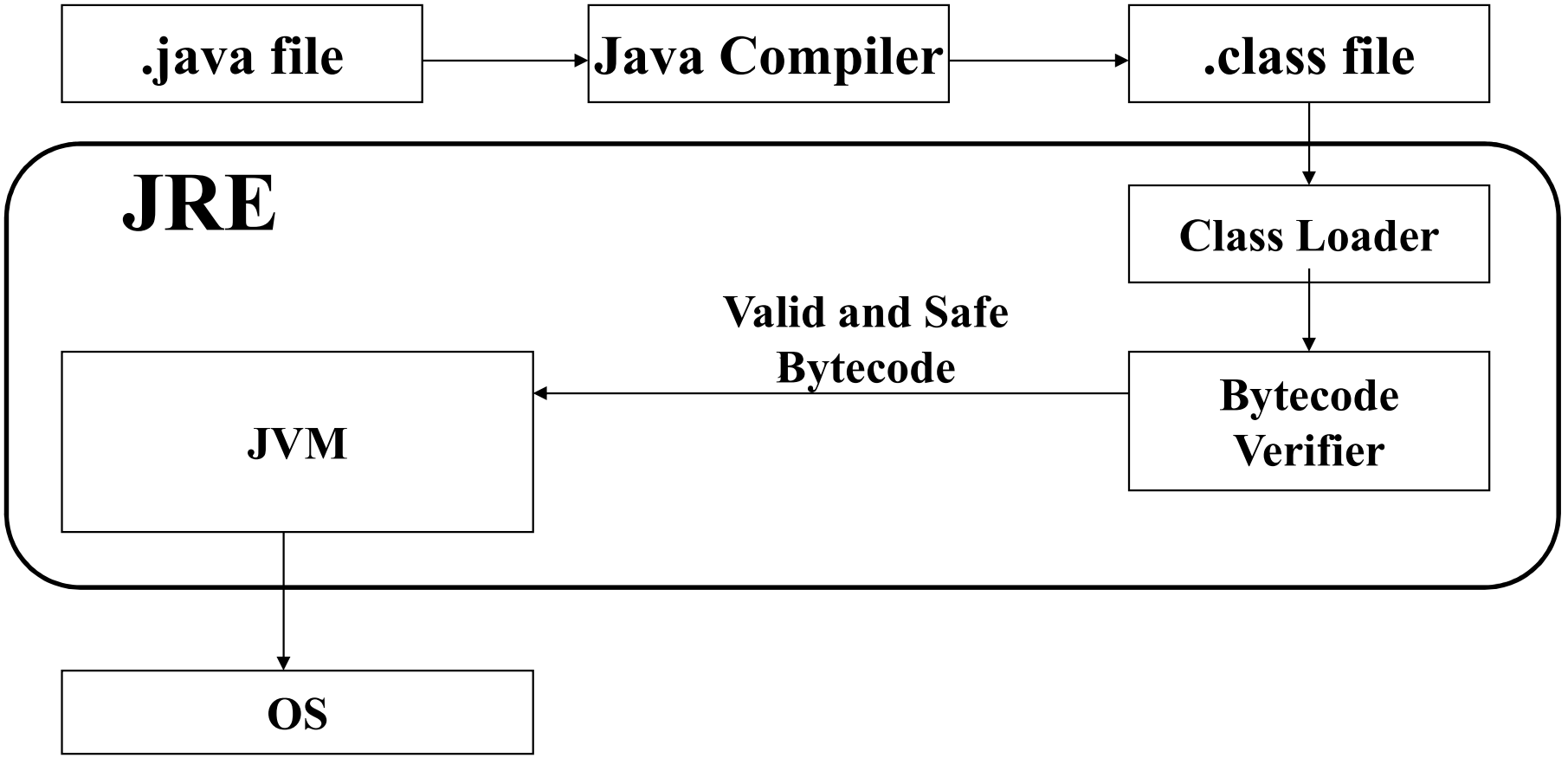
Java Runtime Environment

- It is a basic environment required to execute a Java program.
- JRE mainly consists of:
  - Class Loader
  - Bytecode Verifier
  - Java Virtual Machine

Java Runtime Environment



Java Primitive Types

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Java Primitive Types

- Java is a strongly typed language.
- Every variable, expression has a type.
- All assignments, whether explicit or via parameter passing, are checked for type compatibility.

Java Primitive Types

- Integers
  - `byte` (1), `short` (2), `int` (4), `long` (8)
- Decimals
  - `float` (4), `double` (8)
- Characters
  - `char` (2)
- Booleans
  - `boolean` (1 bit)

Lets Summarize

- Introduction to Java
- Object Oriented Concepts
- A First Java Program
- Understanding JRE
- Data Types in Java