
Introduction

- ❑ Overview
- ❑ Environment Setup

Overview

Introduction to Course

- ▶ Advanced Programming: ET4430(Q)
- ▶ Language: Java
- ▶ Textbooks:
 - ▶ *Core Java - Volume I—Fundamentals, 10th Ed.*, Cay S. Horstmann, 2015
 - ▶ *Core Java - Volume II—Advanced Features, 10th Ed.*, Cay S. Horstmann, 2015
- ▶ Grading:
 - ▶ Midterm: In-class Participation + Project
 - ▶ Final: Written Exam

Java History

- ▶ Created in 1991
 - ▶ by James Gosling in **Sun Microsystems**
- ▶ Initially called Oak
 - ▶ in honor of the tree outside Gosling's window
- ▶ Its name was changed to Java
 - ▶ because there was already a language called Oak
- ▶ **Sun Microsystems** released the first public implementation as Java 1.0 in 1995
- ▶ Java syntax is similar to C and (a little) C++



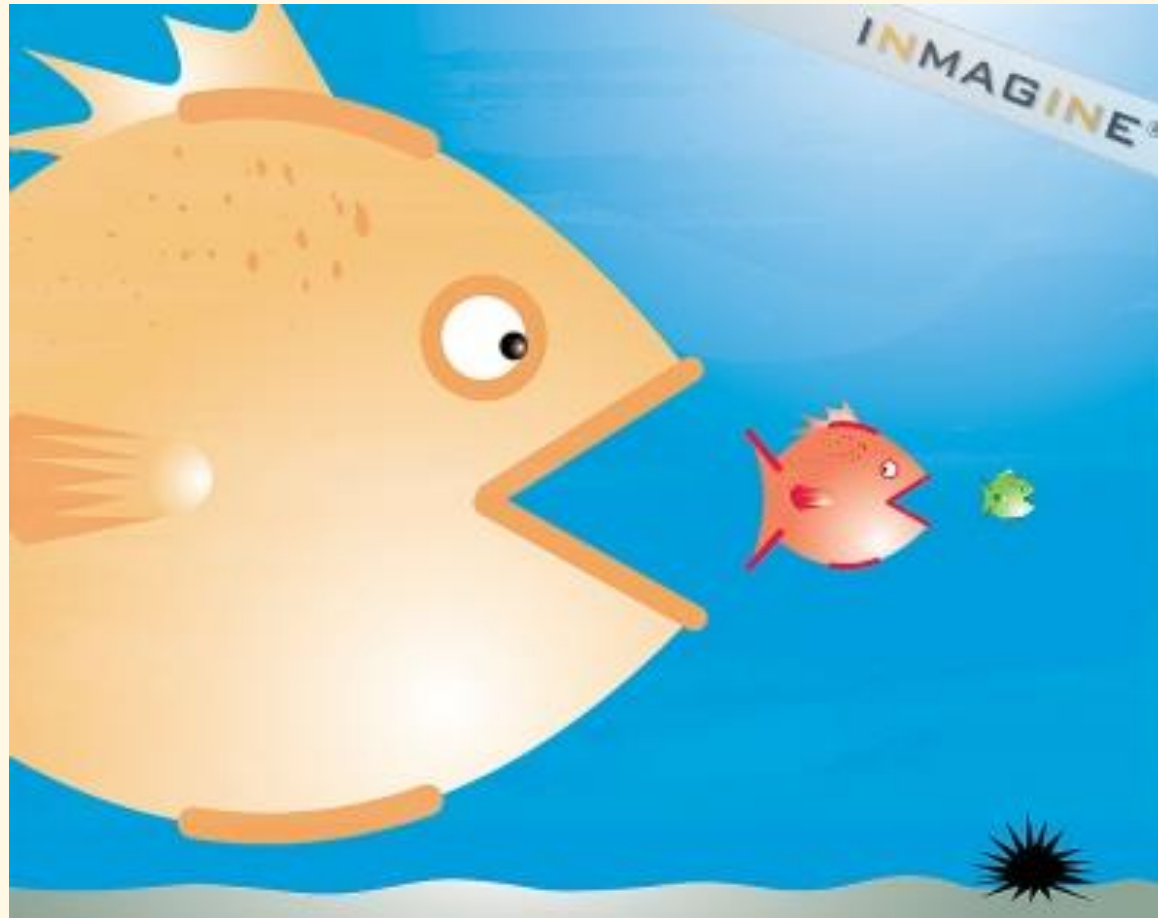
Java Motivation (1)

- ▶ The need for a general-purpose and platform-independent language
- ▶ To be embedded in various consumer electronic products
 - ▶ Like toasters and refrigerators
- ▶ General purpose
 - ▶ Desktop/embedded apps
 - ▶ Data management, communication, processing
 - ▶ Scientific, systems, commercial apps
- ▶ Platform independence = Portability: Write once, run everywhere (WORA)
 - ▶ Hardware
 - ▶ Operating system

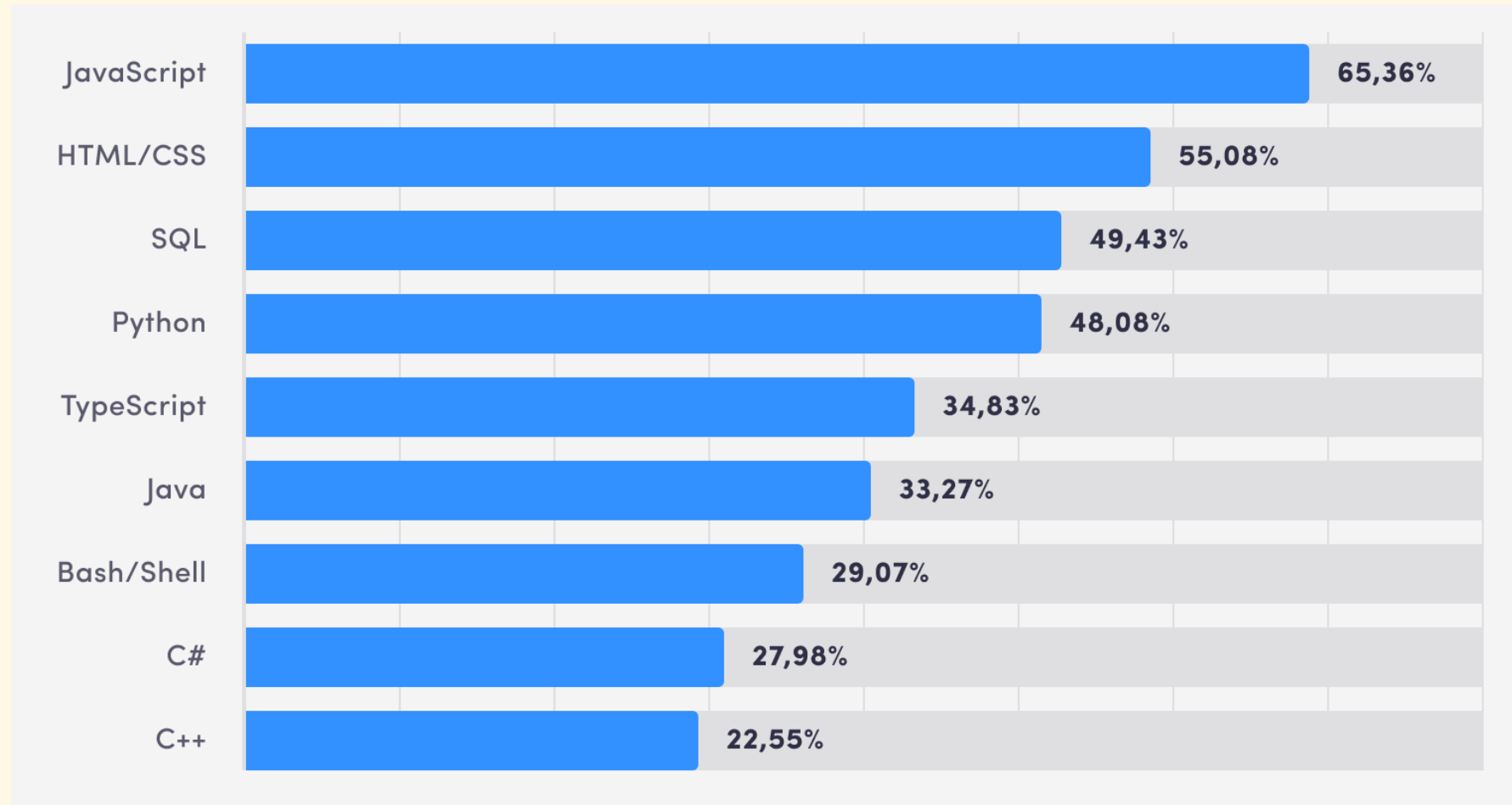
Java Motivation (2)

- ▶ At the same time, the World Wide Web and the Internet were gaining popularity
- ▶ Java could be used for Internet programming
- ▶ Why?
 - ▶ “General purpose”-ness
 - ▶ Platform independence
- ▶ Web-related Java technologies:
 - ▶ Applets (now dead)
 - ▶ Servlet
 - ▶ Java Server Pages (JSP)
 - ▶ Spring Boot

Oracle, Sun,...



Popularity (2023)

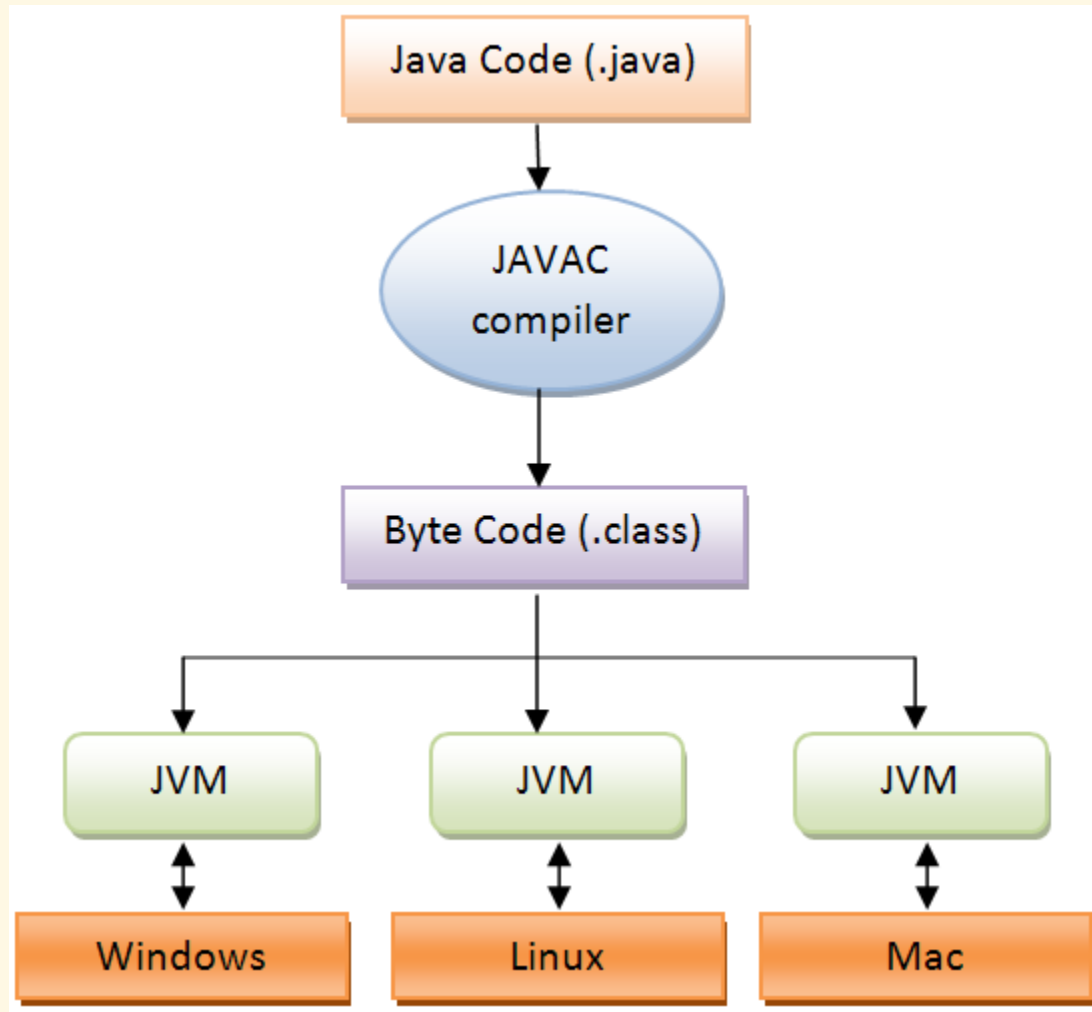


<https://www.statista.com/statistics/793628/worldwide-developer-survey-most-used-languages/>

Java Technology

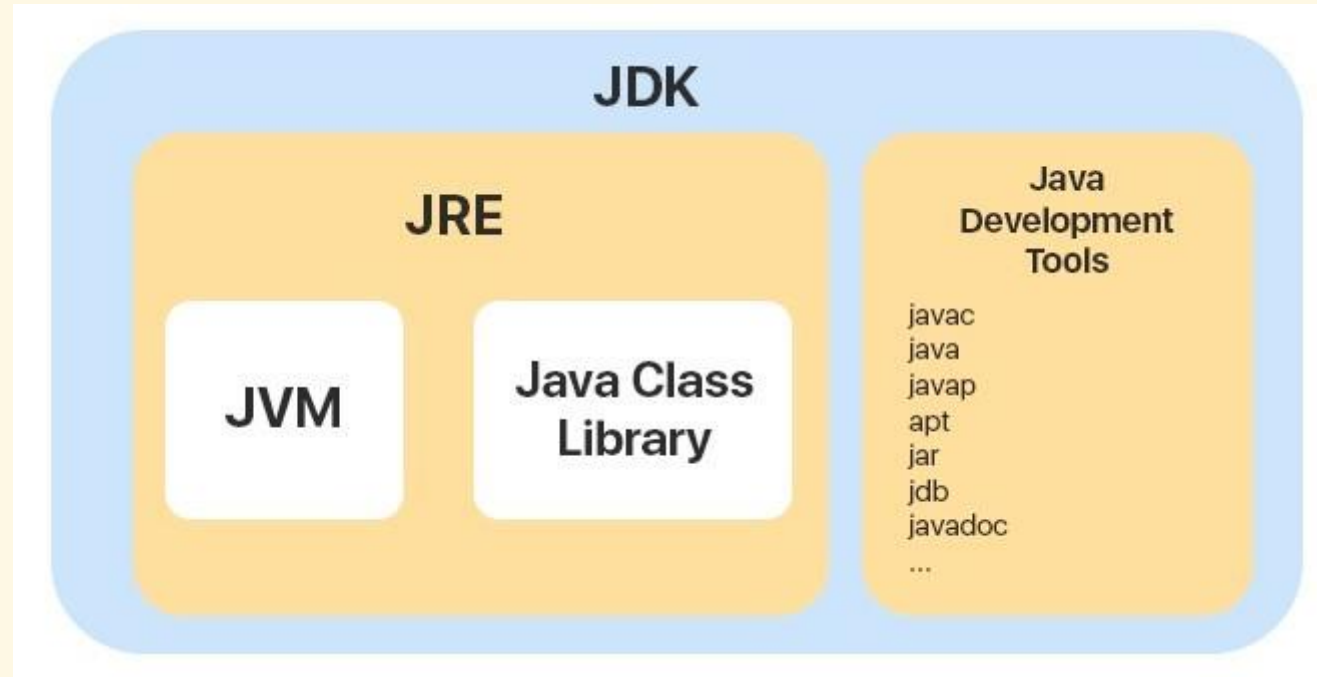
- ▶ Includes
 - ▶ A programming language
 - ▶ Java can create all kinds of applications
 - ▶ A development environment
 - ▶ A compiler (`javac`)
 - ▶ A documentation generator (`javadoc`)
 - ▶ A runtime environment
 - ▶ An interpreter (`java`)
 - ▶ ...
- ▶ Compare it to C++

Compile and Execution Stages



- ▶ Compare to:
 - ▶ C++ and Assembly
 - ▶ .NET Framework
 - ▶ Scripting languages

The Ecology



- ▶ **JDK:** Java Development Kit
- ▶ **JRE:** Java Runtime Environment
- ▶ **JVM:** Java Virtual Machine

Characteristics of Java

- ▶ Java is simple: partially modeled on C but with fewer negative aspects
- ▶ Java is object-oriented: provides great flexibility, modularity, clarity, and reusability through encapsulation, inheritance, and polymorphism
- ▶ Java is architecture-neutral: write once, run anywhere
- ▶ Java is portable: runs on any platform without being recompiled
- ▶ Java is interpreted: runs on any machine that has a Java interpreter, which is part of the JVM
- ▶ Java is multithreaded: multithreading is smoothly integrated in Java
- ▶ Java is secure: eliminated certain types of error-prone programming constructs found in other languages
- ▶ Java is robust: exception-handling feature provides support for robustness

Environment Setup

JDK

- ▶ Go to: <https://www.oracle.com/java/technologies/downloads/>
- ▶ Download the right version
 - ▶ Operating system
 - ▶ LTS (long-term support) release – currently JDK 17 (2023)
- ▶ Install
 - ▶ Set environment variables:
 - ▶ `JAVA_HOME` to `<JDK-folder>`
 - ▶ `PATH` to include `<JDK-folder>\bin`

IDE

- ▶ Some options
 - ▶ NetBeans: <https://netbeans.apache.org/>
 - ▶ Eclipse: <https://www.eclipse.org/>
 - ▶ IntelliJ IDEA: <https://www.jetbrains.com/idea/>
 - ▶ VS Code: <https://code.visualstudio.com/download>
- ▶ For VS Code
 - ▶ Install: Extension Pack for Java

Build Tool

- ▶ Needed to manage complex projects
 - ▶ May be considered later!
- ▶ Options
 - ▶ Gradle: <https://gradle.org/>
 - ▶ Maven: <https://maven.apache.org/download.cgi>
- ▶ Install Maven:
 - ▶ Download and unpack to a folder
 - ▶ Set environment variable **PATH** to include the target folder
 - ▶ Install VS Code extension: Maven for Java