

Chapter 01

Programming Principles

Java Practice Environment

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Java Terminologies

- **JVM = Java Virtual Machine**

a virtual machine capable of executing Java bytecode. When we compile a Java file, output is not an 'exe' but it's a '.class' file. '.class' file consists of Java byte codes which are understandable by JVM.

- **JRE = Java Runtime Environment**

contains JVM, class libraries, and other supporting files. It does not contain any development tools such as compiler, debugger, etc.

- **JDK = Java Development Kits**

contains tools needed to develop the Java programs, and JRE to run the programs.

Java today

- Currently the Java is under Oracle (bought from Sun Microsystems)
- JDK 21.0.8 – Latest Long-Term Support (LTS) release from September 19, 2023
- JDK 24.0.2 – Most recent feature release, officially released on July 15, 2025
- The most used version is still Java 8 (1.8), Java 11, Java 17, Java 21
- Java 17 is a long term support by Oracle
- You can download at: <https://www.oracle.com/java/technologies/javase-downloads.html>
- Java JDK or Run-time is not only built by Oracle now, there are others:
 - OpenJDK: <https://openjdk.java.net/>
 - AdoptOpenJDK: <https://adoptium.net/>
 - IBM/Eclipse OpenJ9: <https://developer.ibm.com/languages/java/semeru-runtimes/downloads/>
 - Amazon Corretto: <https://aws.amazon.com/corretto/> (JDK 8, 11, 17)

JAVA – JDK 21

- Download:

<https://developer.ibm.com/languages/java/semeru-runtimes/downloads/>

- Set Environment Variable:

JAVA_HOME=D:\Apps\Java\jdk-21.0.6-openj9

PATH=%JAVA_HOME%\bin;%PATH%

- Open DOS Prompt, type:

D:\>java -version

```
D:\>set JAVA_HOME=D:\Apps\Java\jdk-21.0.6-openj9
```

```
D:\>set PATH=%JAVA_HOME%\bin;%PATH%
```

```
D:\>java -version
```

```
openjdk version "21.0.6" 2025-01-21 LTS
```

```
IBM Semeru Runtime Open Edition 21.0.6.0 (build 21.0.6+7-LTS)
```

```
Eclipse OpenJ9 VM 21.0.6.0 (build openj9-0.49.0, JRE 21 Windows 11 amd64
```

```
-64-Bit Compressed References 20250121_374 (JIT enabled, AOT enabled)
```

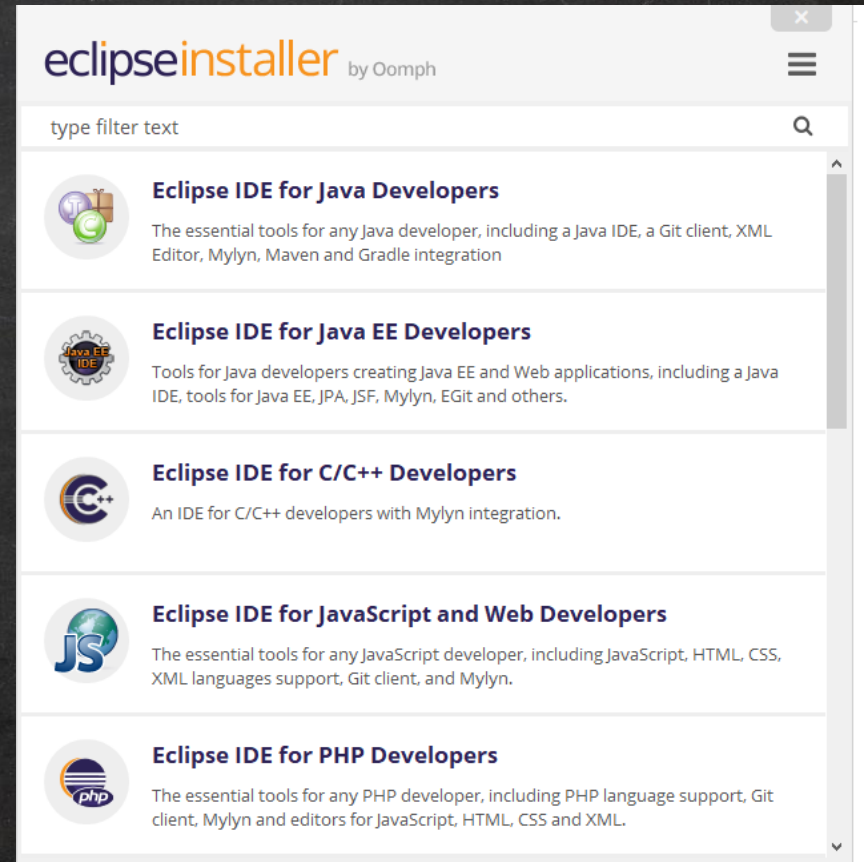
```
OpenJ9      - 3c3d179854
```

```
OMR         - e49875871
```








```
JCL         - e01368f00df based on jdk-21.0.6+7)
```


IDE – Integrated Development Env

- Download Eclipse Latest
- Or Use: IDEA IntelliJ
- Any run issue, check: eclipse.ini



VS Code Extension

-  **Step 2: Install Required Extensions (One-Click Pack)**
-  Install this **Java Extension Pack** (includes everything for Java):
 -  [Java Extension Pack – One Click](#)
-  Install **Spring Boot Support** (optional for web apps):
 -  [Spring Boot Extension Pack](#)
-  Install **Copilot**:
 -  [GitHub Copilot – One Click](#)

Basic Java Memory Setting

- Example:

*-Xms256m -Xmx1024m -XX:MaxNewSize=256m -
XX:MetaspaceSize=256m -XX:MaxMetaspaceSize=256m*

- *Heap size*

- *Xms = Minimum*
- *Xmx = Maximum*

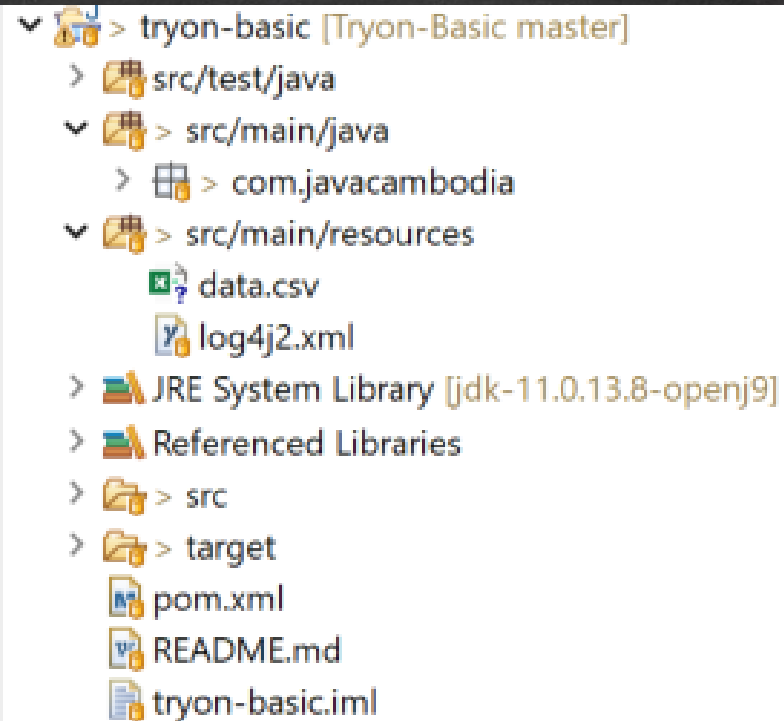
Folder Structure

Resource Folder

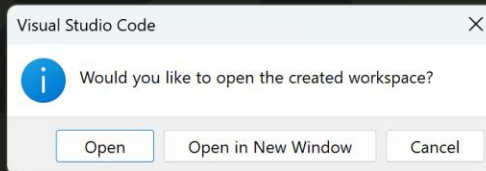
> Package Folder

Source Folder

- src/main/java



```
▼ tryon-basic [Tryon-Basic master]
  > src/test/java
  ▼ src/main/java
    > com.javacambodia
  ▼ src/main/resources
    data.csv
    log4j2.xml
  > JRE System Library [jdk-11.0.13.8-openj9]
  > Referenced Libraries
  > src
  > target
  pom.xml
  README.md
  tryon-basic.iml
```

Show All Commands `Ctrl + Shift + P`

Go to File `Ctrl + P`

Open Chat `Ctrl + Alt + I`

Start Debugging `F5`

Open Settings `Ctrl + ,`

Create Workspace...

Can you please put in folder: javabasic-v2

`</>` Workspace used /new (rerun without)

- ▼ javabasic-v2
 - ▼ src
 - ▼ main
 - ▼ java / com / example / basic
 - App.java
 - resources
 - config.properties
 - test / java / com / example / basic
 - AppTest.java
 - pom.xml
 - README.md

Create Workspace...



Add Context...

Ask Copilot

JAVABASIC-V2-1

src

main

java \com \example \basic

App.java

resources

test

target

pom.xml

README.md

src > main > java > com > example > basic > App.java > App > main(String[])

1 package com.example.basic;

2

3 public class App {

Run | Debug

4 public static void main(String[] args) {

5 System.out.println(x:"Hello, Java Basic Application

6 }

7 }

Keep

Undo

1 of 1

↑

↓

PROBLEMS 6 OUTPUT TERMINAL

PS E:\Lecturing\JAVA\javabasic-v2-1> & 'D:\Apps\Java\jdk-11.0.13.8-openj9\bin\java.exe' '-cp' 'E:\Lecturing\JAVA\javabasic-v2-1\target\classes' 'com.example.basic.App'

Exception in thread "main" java.lang.Error: Unresolved compilation problem:

at com.example.basic.App.main(App.java:2)

PS E:\Lecturing\JAVA\javabasic-v2-1>

> CLINE (38+):

> CHAT

mvn exec:java -Dexec.mainClass="com.example.basic.App"

class App doesn't have import package

App.java:1-5

> Used 1 reference

Let me help add the package declaration to the App.java file:

package com.example.basic;

public class App {

public static void main(String[] args) {

System.out.println("Hello, Java Basic Applicat

}

}

The package declaration package com.example.basic; has been added at the top of the file. This matches the directory structure of your project. No additional imports are needed for this simple Hello World application since we're only using System.out.println() which is available in the java.lang package (automatically imported in Java).

To compile and run the program, you can use:

javac -d target/classes src/main/java/com/example/basi

java -cp target/classes com.example.basic.App

Test Your IDE

- Fibonacci

```
class Fibonacci {  
    /** Print out the Fibonacci sequence for values < 50 */  
    public static void main(String[] args) {  
        int lo = 1;  
  
        int hi = 1;  
  
        System.out.println(lo);  
        while (hi < 50) {  
            System.out.println(hi);  
            hi = lo + hi;           // new hi  
            lo = hi - lo;          /* new lo is (sum - old lo)  
                                   that is, the old hi */  
        }  
    }  
}
```