

# 프로그래밍 기초

# ▶ 프로그래밍

## ✓ 프로그램(Program)

컴퓨터가 인식할 수 있는 명령어의 나열(집합)

## ✓ 프로그래밍(Programming)

프로그램을 작성하는 과정 = 코딩

## ✓ 프로그래머(Programmer)

프로그램을 작성하는 사람

# ▶ Java 프로그래밍 언어 특징



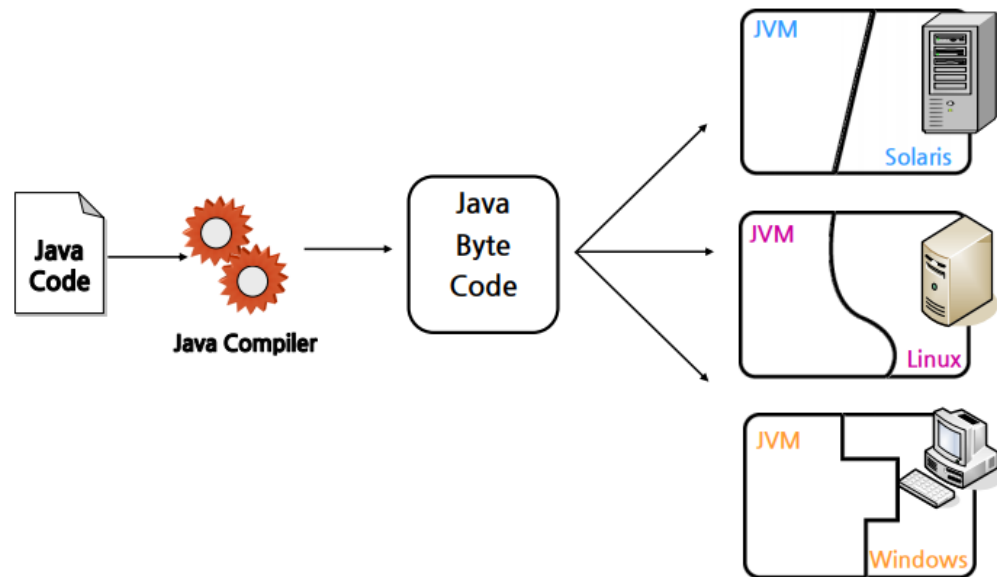
1. 운영체제(OS)에 독립적  
-> (OS 관계없이 동일 코드로 동작. 이식성이 높다고도 표현함.)
2. 객체 지향 프로그래밍(OOP) 언어
3. 사용하기 쉬운 언어
  - 능률적이고 명확한 코드 작성 가능
  - 다른 언어의 단점 보완(포인터)
4. 자동 메모리 관리(Garbage Collection)
5. 동적 로딩 지원
6. 멀티쓰레드 지원
7. 네트워크와 분산환경 지원

# ▶ JVM(Java Virtual Machine)

**Java를 실행하기 위한 가상 기계**로 OS(운영체제)에 관계없이 독립적으로 동작.

→ **C** : OS가 코드를 직접 해석하기 때문에 **C언어는 OS 따라 코드가 다른 부분이 존재.**

→ **Java** : OS에 맞는 JVM을 설치하여 OS 종류 **관계없이 JVM이라는 가상머신이 Java 코드를 동일하게 해석.**



## [JVM이 Java 코드를 해석하는 순서]

개발자가 작성한 Java 코드를

**Compiler(컴파일러)**가 byte code(.class 파일)로 번역

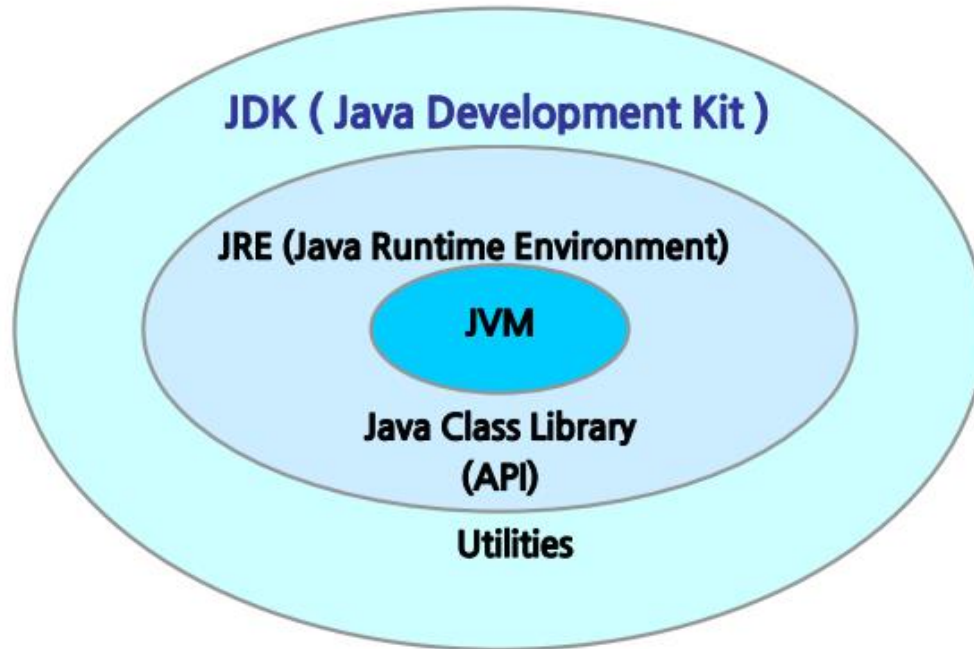
→ JVM에 전달

→ JVM이 **Interpreter(인터프리터)** 방식으로 한 줄 씩 해석함.

# ▶ Java 개발 환경

## ✓ 설치 범위

사용자/개발자 입장에 따라 설치하는 범위가 달라짐



Java SE : Java Standard Edition

Java EE : Java Enterprise Edition

Java ME : Java Micro Edition

# ▶ Open JDK 21 설치

OpenJDK 다운로드 페이지로 이동(<https://jdk.java.net/archive/>)

**jdk.java.net**  
**GA Releases**  
 JDK 19  
 JMC 8  
**Early-Access Releases**  
 JDK 21  
 JDK 20  
 Generational ZGC  
 JavaFX 20  
 JavaFX 21  
 Jextract  
 Loom  
 Metropolis  
 Panama  
 Valhalla  
**Reference Implementations**  
 Java SE 19  
 Java SE 18  
 Java SE 17  
 Java SE 16  
 Java SE 15  
 Java SE 14  
 Java SE 13  
 Java SE 12  
 Java SE 11  
 Java SE 10  
 Java SE 9  
 Java SE 8  
 Java SE 7

## Archived OpenJDK General-Availability Releases

This page is an archive of previously released builds of the JDK licensed under the GNU General Public License, version 2, with Classpath Exception.

**WARNING:** These older versions of the JDK are provided to help developers debug issues in older systems. They are not updated with the latest security patches and are not recommended for use in production.

### Releases

<b>19.0.1 (build 19.0.1+10)</b>			
<b>Windows</b>	<b>64-bit</b>	zip (sha256) 186M	
<b>Mac/AArch64</b>	<b>64-bit</b>	tar.gz (sha256) 182M	
<b>Mac/x64</b>	<b>64-bit</b>	tar.gz (sha256) 184M	
<b>Linux/AArch64</b>	<b>64-bit</b>	tar.gz (sha256) 186M	
<b>Linux/x64</b>	<b>64-bit</b>	tar.gz (sha256) 187M	
	<b>Source</b>	Tags are jdk-19.0.1+10, jdk-19.0.1-ga	
<b>19 GA (build 19+36)</b>			
<b>Windows</b>	<b>64-bit</b>	zip (sha256) 186M	
<b>Mac/AArch64</b>	<b>64-bit</b>	tar.gz (sha256) 182M	
<b>Mac/x64</b>	<b>64-bit</b>	tar.gz (sha256) 184M	
<b>Linux/AArch64</b>	<b>64-bit</b>	tar.gz (sha256) 186M	
<b>Linux/x64</b>	<b>64-bit</b>	tar.gz (sha256) 187M	

원하는 버전을 찾아서 OS에 맞게 다운로드 진행

# ▶ Open JDK 21 설치

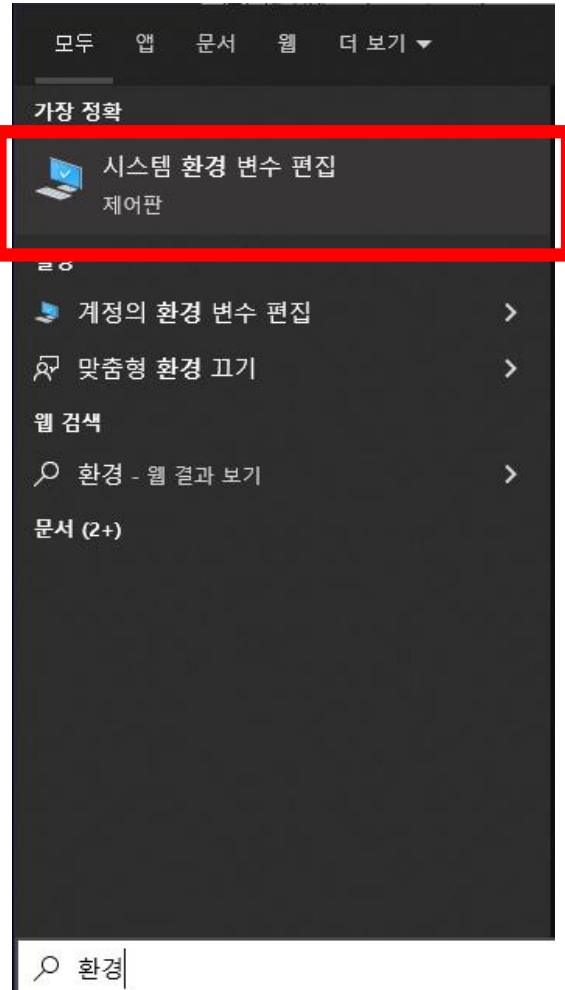
## OpenJDK 다운로드 페이지로 이동(Amazon-corretto)

Platform	Type	Download Link	Checksum (MD5)	Checksum (SHA256)
Linux x64	JDK	<a href="https://corretto.aws/downloads/latest/amazon-corretto-21-x64-linux-jdk.deb">https://corretto.aws/downloads/latest/amazon-corretto-21-x64-linux-jdk.deb</a>	<a href="https://corretto.aws/downloads/latest_checksum/amazon-corretto-21-x64-linux-jdk.deb">https://corretto.aws/downloads/latest_checksum/amazon-corretto-21-x64-linux-jdk.deb</a>	<a href="https://corretto.aws/downloads/latest_sha256/amazon-corretto-21-x64-linux-jdk.deb">https://corretto.aws/downloads/latest_sha256/amazon-corretto-21-x64-linux-jdk.deb</a>
		<a href="https://corretto.aws/downloads/latest/amazon-corretto-21-x64-linux-jdk.rpm">https://corretto.aws/downloads/latest/amazon-corretto-21-x64-linux-jdk.rpm</a>	<a href="https://corretto.aws/downloads/latest_checksum/amazon-corretto-21-x64-linux-jdk.rpm">https://corretto.aws/downloads/latest_checksum/amazon-corretto-21-x64-linux-jdk.rpm</a>	<a href="https://corretto.aws/downloads/latest_sha256/amazon-corretto-21-x64-linux-jdk.rpm">https://corretto.aws/downloads/latest_sha256/amazon-corretto-21-x64-linux-jdk.rpm</a>
		<a href="https://corretto.aws/downloads/latest/amazon-corretto-21-x64-linux-jdk.tar.gz">https://corretto.aws/downloads/latest/amazon-corretto-21-x64-linux-jdk.tar.gz</a>	<a href="https://corretto.aws/downloads/latest_checksum/amazon-corretto-21-x64-linux-jdk.tar.gz">https://corretto.aws/downloads/latest_checksum/amazon-corretto-21-x64-linux-jdk.tar.gz</a>	<a href="https://corretto.aws/downloads/latest_sha256/amazon-corretto-21-x64-linux-jdk.tar.gz">https://corretto.aws/downloads/latest_sha256/amazon-corretto-21-x64-linux-jdk.tar.gz</a>
Linux aarch64	JDK	<a href="https://corretto.aws/downloads/latest/amazon-corretto-21-aarch64-linux-jdk.deb">https://corretto.aws/downloads/latest/amazon-corretto-21-aarch64-linux-jdk.deb</a>	<a href="https://corretto.aws/downloads/latest_checksum/amazon-corretto-21-aarch64-linux-jdk.deb">https://corretto.aws/downloads/latest_checksum/amazon-corretto-21-aarch64-linux-jdk.deb</a>	<a href="https://corretto.aws/downloads/latest_sha256/amazon-corretto-21-aarch64-linux-jdk.deb">https://corretto.aws/downloads/latest_sha256/amazon-corretto-21-aarch64-linux-jdk.deb</a>
		<a href="https://corretto.aws/downloads/latest/amazon-corretto-21-aarch64-linux-jdk.rpm">https://corretto.aws/downloads/latest/amazon-corretto-21-aarch64-linux-jdk.rpm</a>	<a href="https://corretto.aws/downloads/latest_checksum/amazon-corretto-21-aarch64-linux-jdk.rpm">https://corretto.aws/downloads/latest_checksum/amazon-corretto-21-aarch64-linux-jdk.rpm</a>	<a href="https://corretto.aws/downloads/latest_sha256/amazon-corretto-21-aarch64-linux-jdk.rpm">https://corretto.aws/downloads/latest_sha256/amazon-corretto-21-aarch64-linux-jdk.rpm</a>
		<a href="https://corretto.aws/downloads/latest/amazon-corretto-21-aarch64-linux-jdk.tar.gz">https://corretto.aws/downloads/latest/amazon-corretto-21-aarch64-linux-jdk.tar.gz</a>	<a href="https://corretto.aws/downloads/latest_checksum/amazon-corretto-21-aarch64-linux-jdk.tar.gz">https://corretto.aws/downloads/latest_checksum/amazon-corretto-21-aarch64-linux-jdk.tar.gz</a>	<a href="https://corretto.aws/downloads/latest_sha256/amazon-corretto-21-aarch64-linux-jdk.tar.gz">https://corretto.aws/downloads/latest_sha256/amazon-corretto-21-aarch64-linux-jdk.tar.gz</a>
Windows x64	JDK	<a href="https://corretto.aws/downloads/latest/amazon-corretto-21-x64-windows-jdk.msi">https://corretto.aws/downloads/latest/amazon-corretto-21-x64-windows-jdk.msi</a>	<a href="https://corretto.aws/downloads/latest_checksum/amazon-corretto-21-x64-windows-jdk.msi">https://corretto.aws/downloads/latest_checksum/amazon-corretto-21-x64-windows-jdk.msi</a>	<a href="https://corretto.aws/downloads/latest_sha256/amazon-corretto-21-x64-windows-jdk.msi">https://corretto.aws/downloads/latest_sha256/amazon-corretto-21-x64-windows-jdk.msi</a>
		<a href="https://corretto.aws/downloads/latest/amazon-corretto-21-x64-windows-jdk.zip">https://corretto.aws/downloads/latest/amazon-corretto-21-x64-windows-jdk.zip</a>	<a href="https://corretto.aws/downloads/latest_checksum/amazon-corretto-21-x64-windows-jdk.zip">https://corretto.aws/downloads/latest_checksum/amazon-corretto-21-x64-windows-jdk.zip</a>	<a href="https://corretto.aws/downloads/latest_sha256/amazon-corretto-21-x64-windows-jdk.zip">https://corretto.aws/downloads/latest_sha256/amazon-corretto-21-x64-windows-jdk.zip</a>
macOS x64	JDK	<a href="https://corretto.aws/downloads/latest/amazon-corretto-21-x64-macos-jdk.pkg">https://corretto.aws/downloads/latest/amazon-corretto-21-x64-macos-jdk.pkg</a>	<a href="https://corretto.aws/downloads/latest_checksum/amazon-corretto-21-x64-macos-jdk.pkg">https://corretto.aws/downloads/latest_checksum/amazon-corretto-21-x64-macos-jdk.pkg</a>	<a href="https://corretto.aws/downloads/latest_sha256/amazon-corretto-21-x64-macos-jdk.pkg">https://corretto.aws/downloads/latest_sha256/amazon-corretto-21-x64-macos-jdk.pkg</a>
		<a href="https://corretto.aws/downloads/latest/amazon-corretto-21-x64-macos-jdk.pkg">https://corretto.aws/downloads/latest/amazon-corretto-21-x64-macos-jdk.pkg</a>	<a href="https://corretto.aws/downloads/latest_checksum/amazon-corretto-21-x64-macos-jdk.pkg">https://corretto.aws/downloads/latest_checksum/amazon-corretto-21-x64-macos-jdk.pkg</a>	<a href="https://corretto.aws/downloads/latest_sha256/amazon-corretto-21-x64-macos-jdk.pkg">https://corretto.aws/downloads/latest_sha256/amazon-corretto-21-x64-macos-jdk.pkg</a>

원하는 버전을 찾아서 OS에 맞게 다운로드 진행

# ▶ 자바 설정

## ✓ 환경 변수 설정



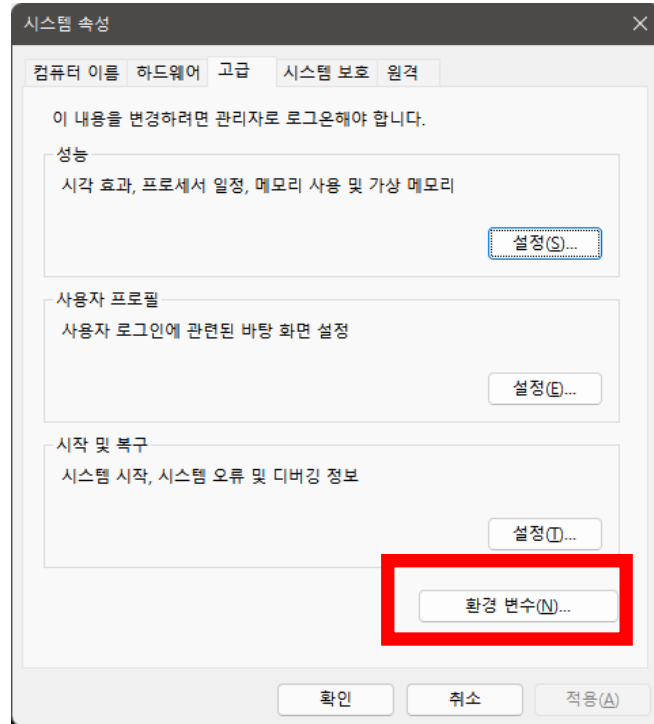
1) 윈도우 키(시작 버튼) 클릭 후 "환경" 검색

2) 시스템 환경 변수 편집 선택

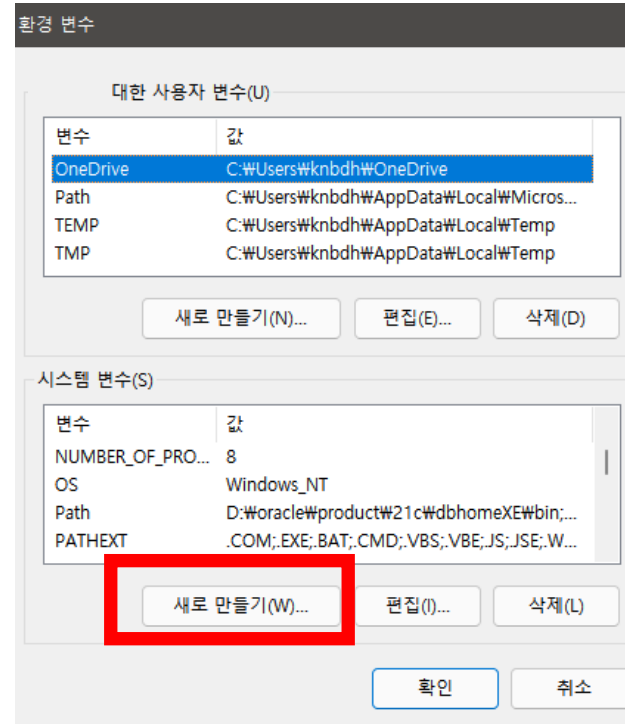


# ▶ 자바 설정

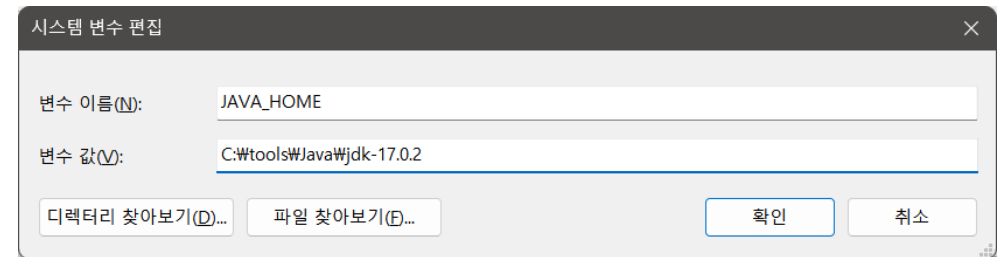
## ✓ 환경 변수 설정



3) 환경 변수 클릭



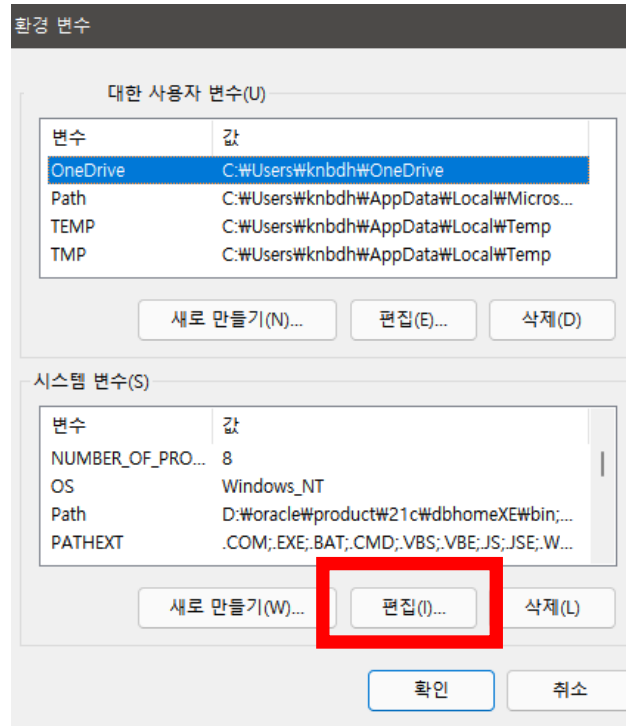
4) 시스템 변수 → 새로 만들기 클릭



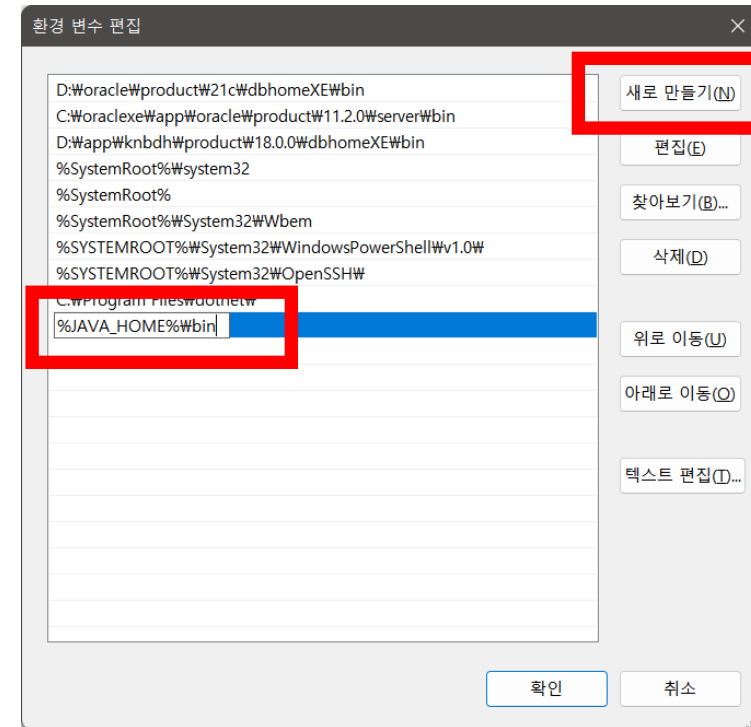
5) 내용 작성 후 확인  
 변수 이름 : JAVA\_HOME  
 변수 값 : 다운로드 받은 JDK 압축 해제 폴더

# ▶ 자바 설정

## ✓ 환경 변수 설정



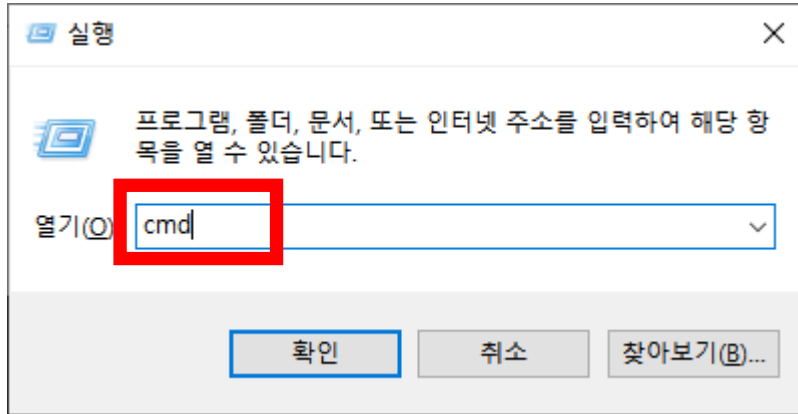
6) 시스템 변수  
→ 편집 클릭



7) 새로 만들기 클릭  
→ %JAVA\_HOME%\bin 입력 후 확인

# ▶ 자바 설정

## ✓ 환경변수 테스트



윈도우키 + R 버튼 누르고 실행창에서 cmd 입력 후 확인

```
C:\Users\knbdh>java -version
openjdk version "17.0.11" 2024-04-16 LTS
OpenJDK Runtime Environment Corretto-17.0.11.9.1 (build 17.0.11+9-LTS)
OpenJDK 64-Bit Server VM Corretto-17.0.11.9.1 (build 17.0.11+9-LTS, mixed mode, sharing)

C:\Users\knbdh>javac -version
javac 17.0.11

C:\Users\knbdh>
```

java -version / javac -version 입력 시  
이미지와 같은 버전 정보 나오면 설정완료

## ▶ Eclipse IDE(통합 개발 환경) 설치

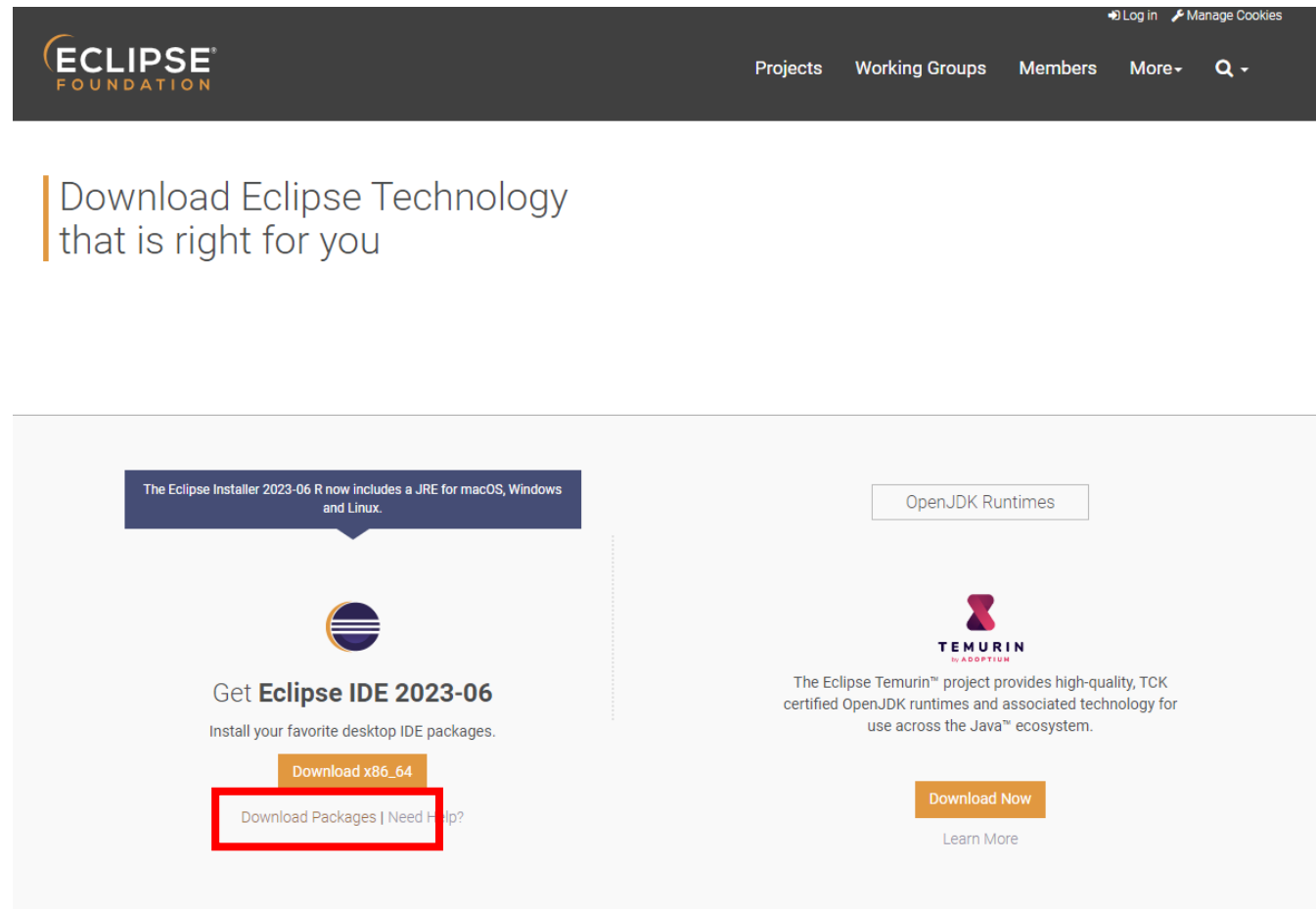
### \* IDE(Integrated Development Environment, 통합 개발 환경)

- 애플리케이션 개발에 사용되는 공통된 개발자 도구를 하나의 GUI에 결합한 소프트웨어
- 소스 코드 편집기(작성 중 오류 검사, 자동완성, 구문 강조), 로컬 빌드 자동화(자동 컴파일, 패키징, 테스트), 디버거(버그 위치 표시) 를 내장하고 있음.
- Eclipse, Visual Studio Code, IntelliJ 등 여러 IDE가 존재함.

### \* Eclipse다운로드 페이지(<https://www.eclipse.org/downloads/>)

# ▶ Eclipse설치

## - Download Packages 클릭



The screenshot shows the Eclipse Foundation website. At the top, there is a dark navigation bar with the Eclipse Foundation logo on the left and links for "Log in", "Manage Cookies", "Projects", "Working Groups", "Members", and "More" on the right. Below the navigation bar, the main heading reads "Download Eclipse Technology that is right for you". The page is divided into two main sections. The left section is titled "Get Eclipse IDE 2023-06" and includes a sub-header "Install your favorite desktop IDE packages." Below this, there is a "Download x86\_64" button and a link "Download Packages | Need Help?" which is highlighted with a red rectangle. The right section is titled "OpenJDK Runtimes" and features the Temurin logo. Below the logo, it states "The Eclipse Temurin™ project provides high-quality, TCK certified OpenJDK runtimes and associated technology for use across the Java™ ecosystem." At the bottom of this section, there is a "Download Now" button and a "Learn More" link.

ECLIPSE FOUNDATION

Log in Manage Cookies

Projects Working Groups Members More

Download Eclipse Technology that is right for you

The Eclipse Installer 2023-06 R now includes a JRE for macOS, Windows and Linux.

Get **Eclipse IDE 2023-06**

Install your favorite desktop IDE packages.

Download x86\_64

Download Packages | Need Help?

OpenJDK Runtimes

TEMURIN by ADOPTIUM

The Eclipse Temurin™ project provides high-quality, TCK certified OpenJDK runtimes and associated technology for use across the Java™ ecosystem.

Download Now

Learn More

# ▶ Eclipse설치

## Eclipse IDE for Enterprise Java and Web Developers - 해당되는 운영체제 클릭 - Download 클릭

### Eclipse IDE 2023-06 R Packages



#### Eclipse IDE for Java Developers

328 MB 391,104 DOWNLOADS

The essential tools for any Java developer, including a Java IDE, a Git client, XML Editor, Maven and Gradle integration



Windows x86\_64  
macOS x86\_64 | AArch64  
Linux x86\_64 | AArch64



#### Eclipse IDE for Enterprise Java and Web Developers

523 MB 235,048 DOWNLOADS

Tools for developers working with Java and Web applications, including a Java IDE, tools for JavaScript, TypeScript, JavaServer Pages and Faces, Yaml, Markdown, Web Services, JPA and Data Tools, Maven and Gradle, Git, and more.

[Click here to open a bug report with the Eclipse Web Tools Platform.](#)  
[Click here to raise an issue with the Eclipse Platform.](#)  
[Click here to raise an issue with Maven integration for web projects.](#)  
[Click here to raise an issue with Eclipse Wild Web Developer \(incubating\).](#)



Windows x86\_64  
macOS x86\_64 | AArch64  
Linux x86\_64 | AArch64

ECLIPSE  
FOUNDATION

Projects Working Group

Home / Downloads / Eclipse downloads - Select a mirror

All downloads are provided under the terms and conditions of the Eclipse Foundation Software User Agreement unless otherwise specified.

Download

Download from: Japan - Yamagata University (https)

File: eclipse-jee-2023-06-R-win32-x86\_64.zip SHA-512

>> Select Another Mirror

# ▶ Eclipse설치

C드라이브에 **tools** 폴더를 생성하여 다운로드된 파일을 이동  
- 압축 해제(여기에 풀기) - eclipse.exe 실행

> 로컬 디스크 (C:) > tools > eclipse



🔍 eclipse 검색



configuration



dropins



features



p2



plugins



readme



.eclipseproduct



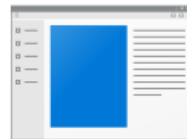
artifacts



eclipse



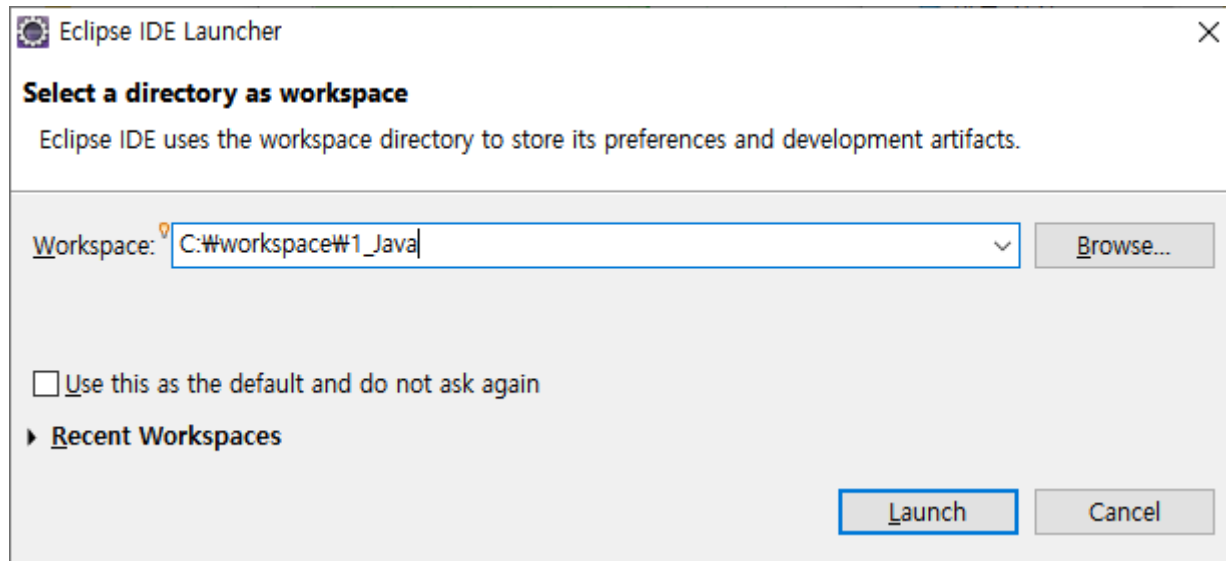
eclipse



eclipsesec

## ▶ 이클립스 설치

Workspace 입력란에 C:\workspace\1\_Java 작성 후 Launch 클릭

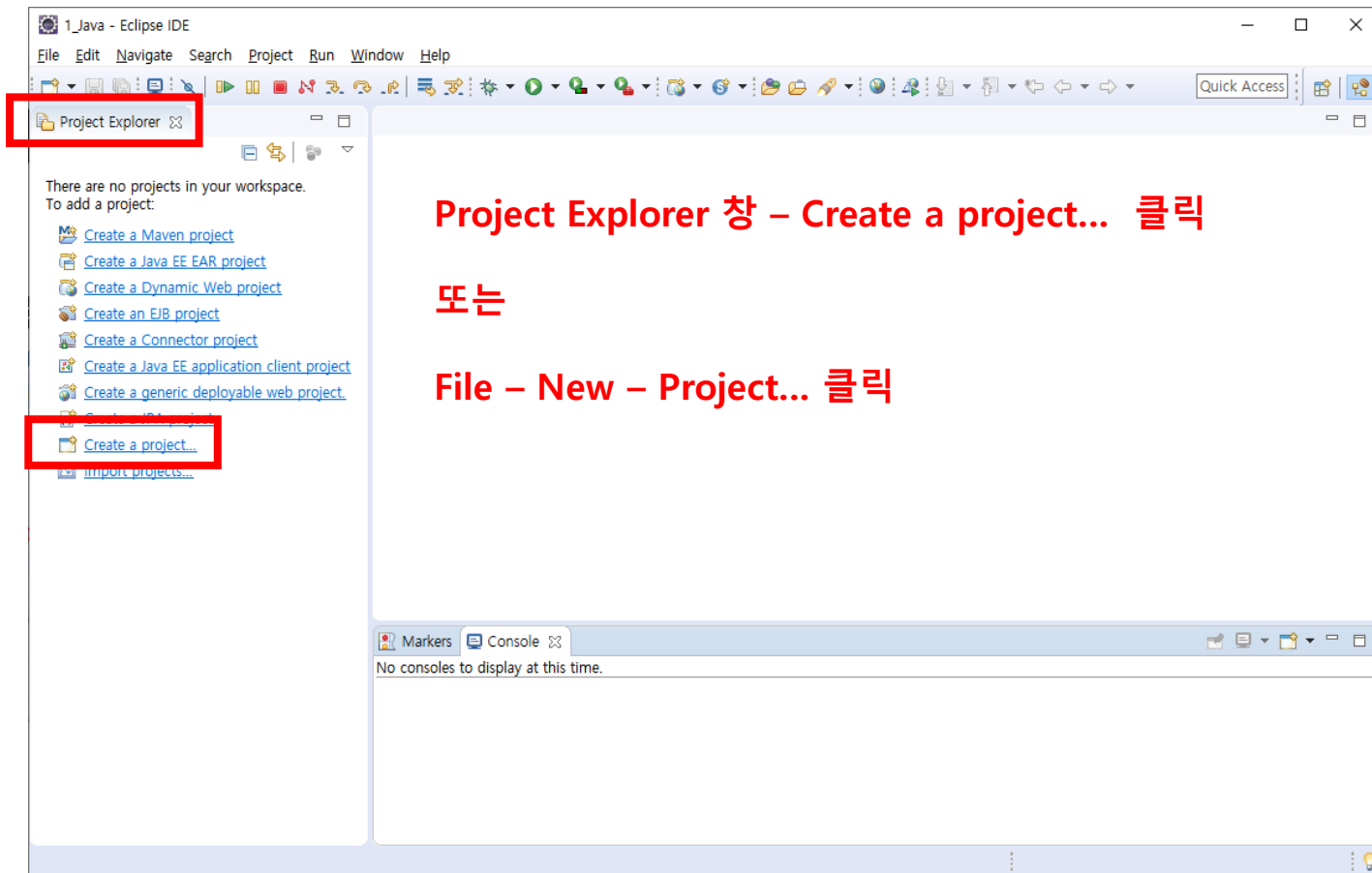




# ▶ 자바 프로그래밍 순서

## ✓ Eclipse 환경

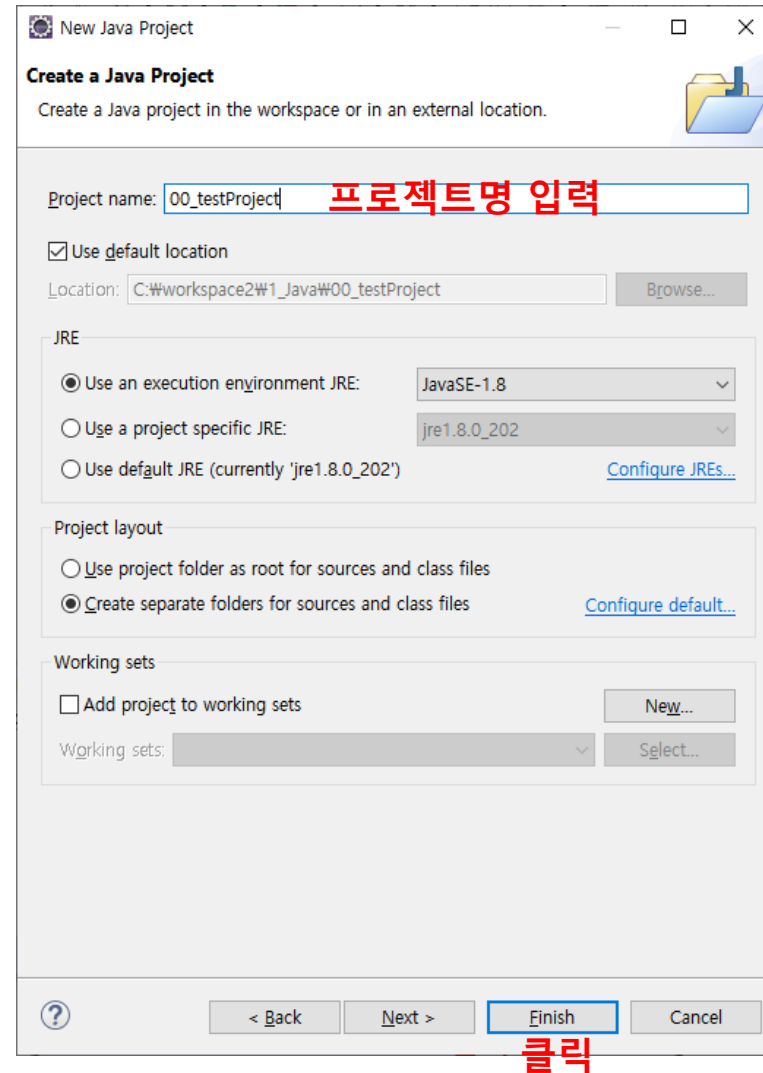
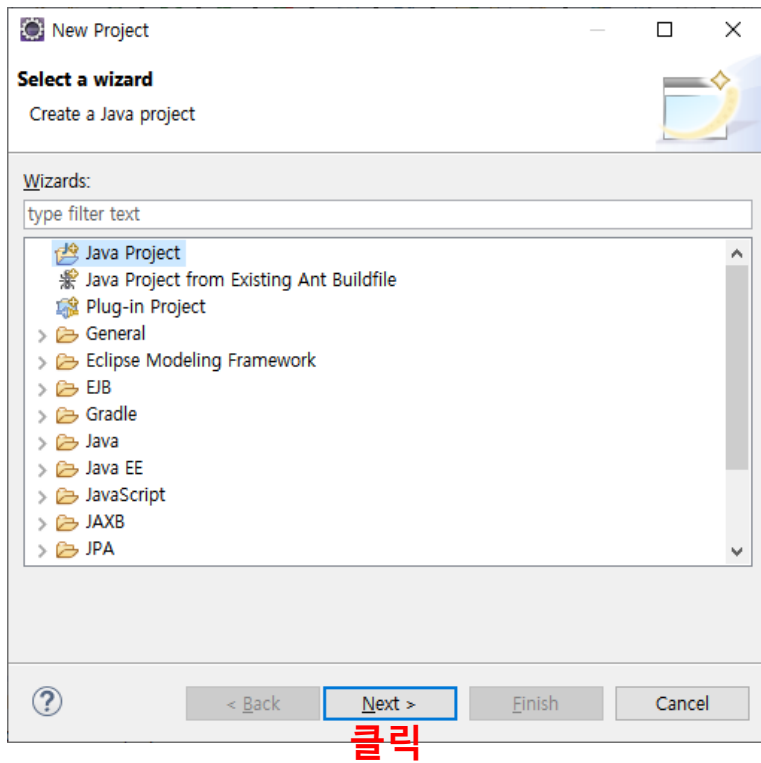
### 1. project 만들기



# ▶ 자바 프로그래밍 순서

## ✓ Eclipse 환경

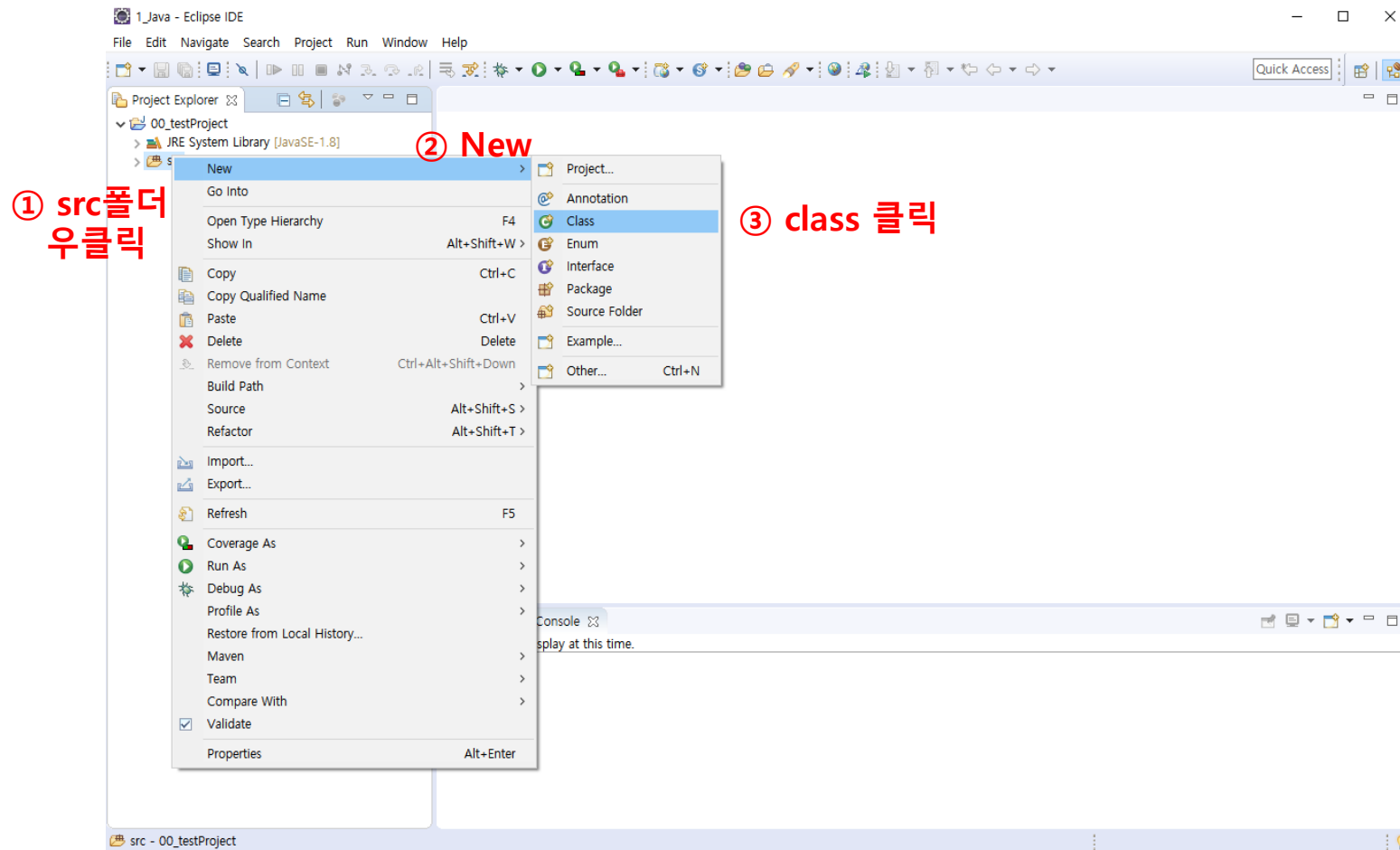
### 1. project 만들기



# ▶ 자바 프로그래밍 순서

## ✓ Eclipse 환경

### 2. Class 만들기



# ▶ 자바 프로그래밍 순서

## ✓ Eclipse 환경

### 2. Class 만들기

The image shows the 'New Java Class' dialog box in Eclipse. It is titled 'New Java Class' and has a subtitle 'Java Class' with the instruction 'Create a new Java class.' and a green 'C' icon.

Fields and options in the dialog:


- Source folder: 00\_testProject/src (with a 'Browse...' button)
- Package: testProject (with a 'Browse...' button). A red annotation '패키지명 입력(소문자로 시작)' (Enter package name (start with lowercase)) is next to it.
- Enclosing type: (empty field with a 'Browse...' button)
- Name: HellowWorld (with a 'Browse...' button). A red annotation 'Class명 입력(대문자로 시작)' (Enter class name (start with uppercase)) is next to it.
- Modifiers: ☒ public, ☐ package, ☐ private, ☐ protected, ☐ abstract, ☐ final, ☐ static
- Superclass: java.lang.Object (with a 'Browse...' button)
- Interfaces: (empty list with 'Add...' and 'Remove' buttons)
- Which method stubs would you like to create?
  - ☐ public static void main(String[] args)
  - ☐ Constructors from superclass
  - ☒ Inherited abstract methods
- Do you want to add comments? (Configure templates and default value [here](#))
  - ☐ Generate comments

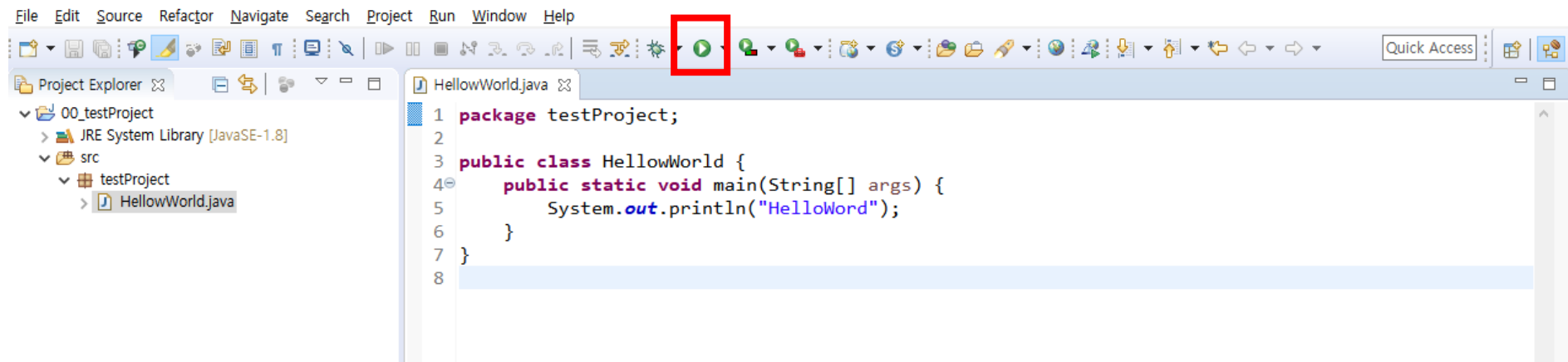
At the bottom, there is a '?' icon, a 'Finish' button (highlighted with a red box and a red annotation '클릭' (click)), and a 'Cancel' button.

# ▶ 자바 프로그래밍 순서

## ✓ Eclipse 환경

### 3. Class 작성 후 실행

Class 작성 완료 후  클릭 또는 Ctrl + F11을 눌러 실행



# ▶ 자바 프로그래밍 기본

## ✓ class

객체를 만들기 위한 일종의 **설계도**.

자바에서 **모든 코드는 반드시 클래스 안에 존재**해야 하며,

서로 관련된 코드들을 그룹으로 나누어 별도의 클래스를 구성

**클래스들이 모여 하나의 Java 애플리케이션 구성**

```
public class 클래스명 {  
  
    /*  
     * 주석을 제외한 모든 코드는 블록 클래스 { } 내에 작성  
     */  
  
}
```

## ▶ 자바 프로그래밍 기본

### ✓ 주석(comment)

코드에 대한 설명이나 그 외 다른 정보를 넣을 때 사용하는 것으로  
컴파일 시 컴파일러가 주석 부분은 건너 뛴다

`/* */` : 범위 주석, `/*` 와 `*/` 사이 내용은 주석으로 간주

`//` : 한 줄 주석, `//` 뒤의 내용은 주석으로 간주

# ▶ 자바 프로그래밍 기본

## ✓ main (main method)

`public static void main(String[] args)`는 **고정된 형태**의 메서드 선언부로  
**Java Application을 실행하는데 필요한 메서드** (프로그램 실행 시 java.exe에 의해 호출됨)  
모든 클래스가 main메서드를 가지고 있어야 하는 것은 아니지만  
하나의 Java애플리케이션에는 main메서드를 포함한 클래스가 반드시 하나 이상 존재해야 함.

```
public class 클래스명 {  
  
    public static void main(String[] args) { //메인 메서드의 선언부  
  
        // 실행될 코드를 작성  
  
    }  
  
}
```



# ▶ 자바 프로그래밍 순서

## ✓ Class 작성 예시

`package member.model.vo;` ① 패키지(package) 선언

`import java.util.Date;` ② 임포트(import) 선언

`public class Member {` ③ 클래스(class) 작성부

`private String name;`  
`private int age;`  
`private Date enrollDate;` } 필드 (또는 멤버 변수)

생성자

`public Member() {}`  
`public Member(String name, int age, Date enrollDate) {`  
 `super();`  
 `this.name = name;`  
 `this.age = age;`  
 `this.enrollDate = enrollDate;`  
`}`

`public String getName() {`  
 `return name;`  
`}`  
`public void setName(String name) {`  
 `this.name = name;`  
`}` } (멤버) 메서드

... 이하 생략...

}