

The background of the slide features a rustic wooden surface covered with dark brown coffee beans. In the upper left, two burlap sacks are filled with coffee beans, spilling some onto the surface. In the center-right, there is a white ceramic cup of coffee with a saucer and a spoon resting on it.

Configuration for Lab.

Bok, Jong Soon
javaexpert@nate.com

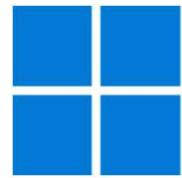
<https://github.com/swacademy/Core-Java>

Programming the First Java code

To write your first program, you need:

- The Java™ 17 Platform, Standard Edition.
 - Download the JDK, not the JRE.
 - Download API Specifications & Documentation.
 - Consult the [installation instructions](#).
- A Text Editor.
- IDE (Integrated Development Environment) tools - Option

Installation to Java 17 for Windows 11 64-bit Platform

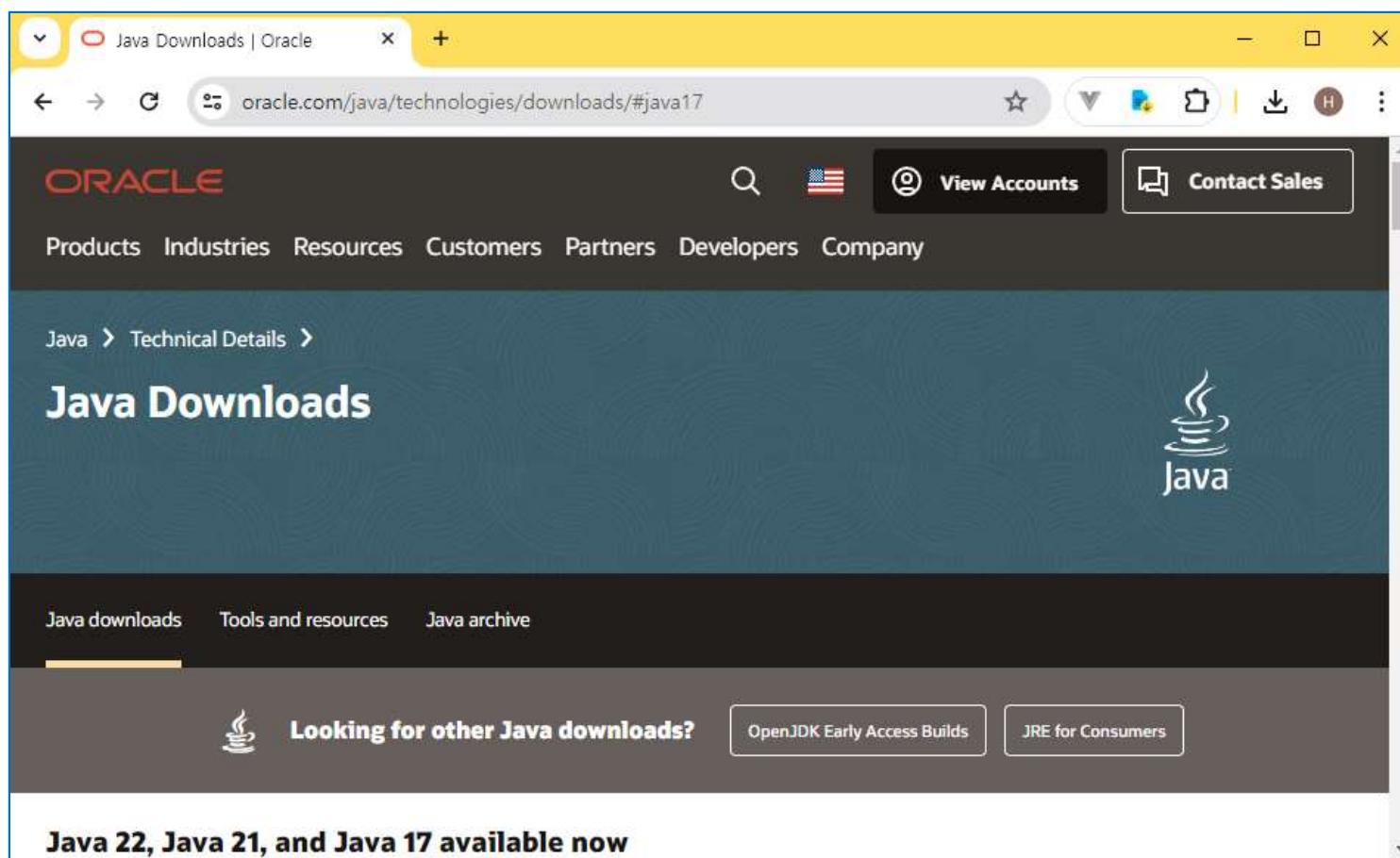


Windows 11



Downloading JDK 17 for Windows Platform

- Connect to <https://www.oracle.com/java/technologies/downloads/#java17>



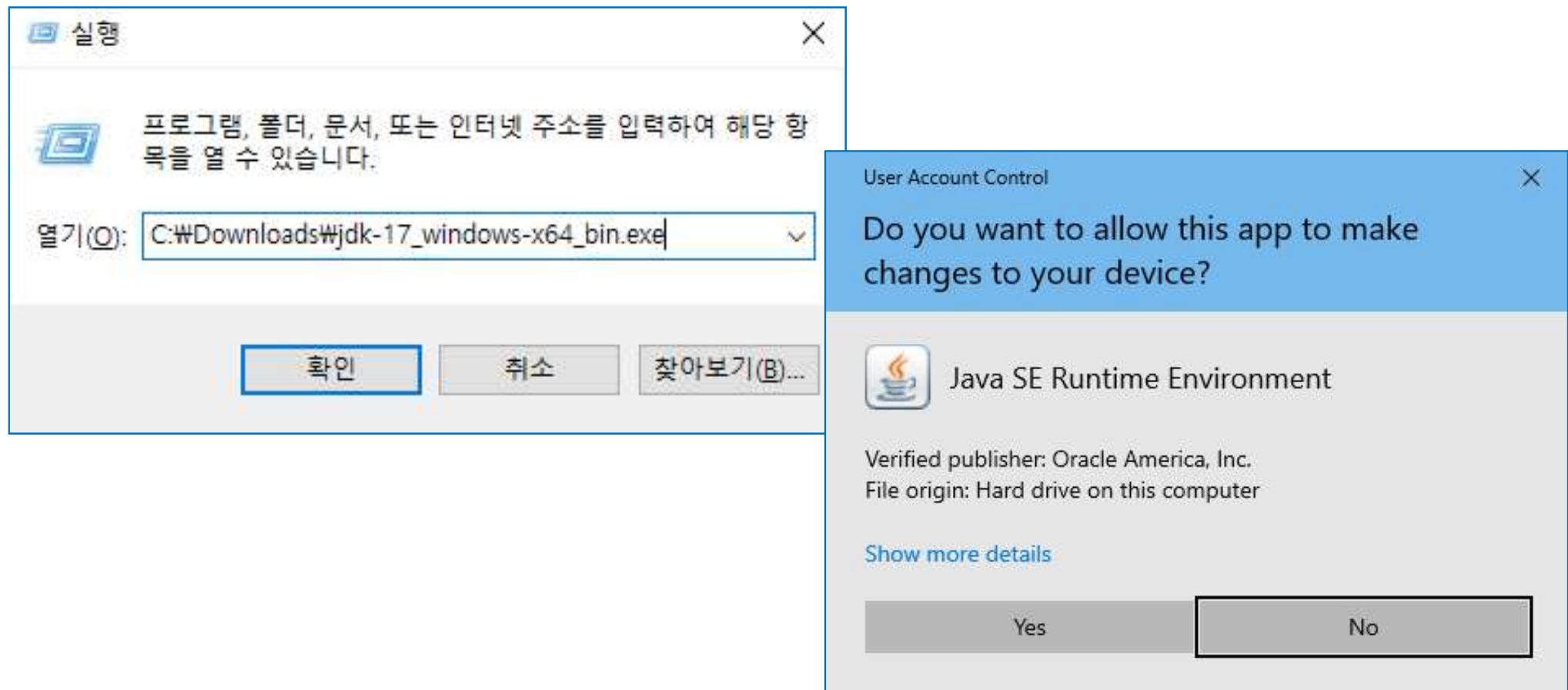
Downloading JDK 17 for Windows Platform (Cont.)

- https://download.oracle.com/java/17/latest/jdk-17_windows-x64_bin.exe

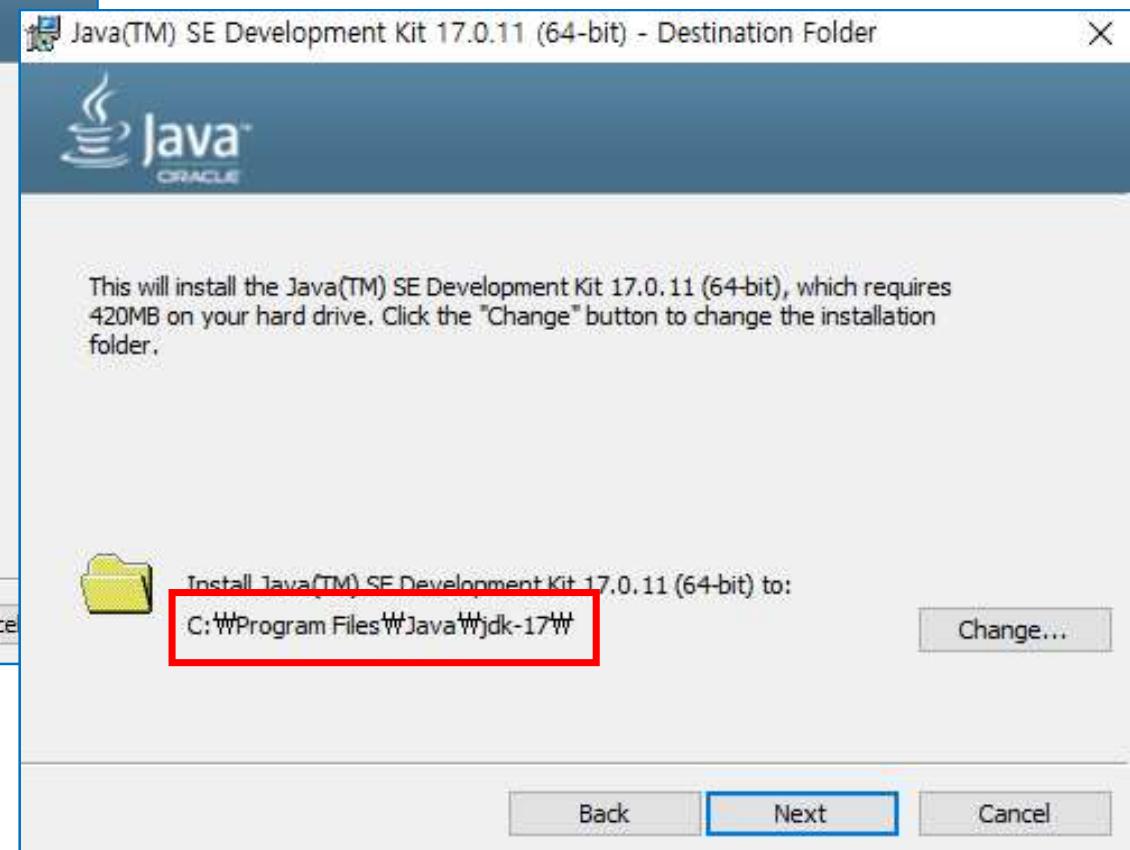
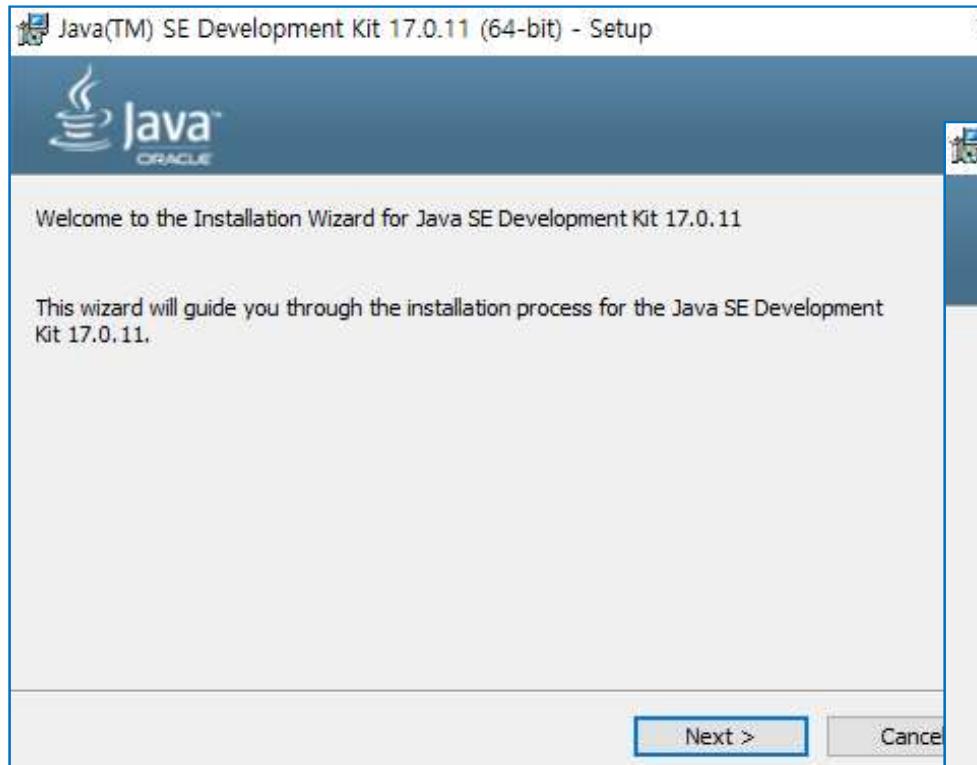
The screenshot shows the Oracle Java Download page for JDK 17.0.11. At the top, there is a navigation bar with links for JDK 22, JDK 21, JDK 17, GraalVM for JDK 22, GraalVM for JDK 21, and GraalVM for JDK 17. Below the navigation bar, a section titled "JDK Development Kit 17.0.11 downloads" is displayed. A note states that JDK 17 binaries are free to use in production and free to redistribute, at no cost, under the Oracle No-Fee Terms and Conditions (NFTC). It also mentions that JDK 17 will receive updates under the NFTC until September 2024, and subsequent updates will be licensed under the Java SE OTN License (OTN), with production use beyond the limited free grants requiring a fee. Below this, there are tabs for Linux, macOS, and Windows, with Windows being the active tab and highlighted with a red box. A table lists three download options: x64 Compressed Archive (172.83 MB), x64 Installer (153.91 MB), and x64 MSI Installer (152.66 MB). The x64 Installer row is also highlighted with a red box.

Product/file description	File size	Download
x64 Compressed Archive	172.83 MB	https://download.oracle.com/java/17/latest/jdk-17_windows-x64_bin.zip (sha256)
x64 Installer	153.91 MB	https://download.oracle.com/java/17/latest/jdk-17_windows-x64_bin.exe (sha256)
x64 MSI Installer	152.66 MB	https://download.oracle.com/java/17/latest/jdk-17_windows-x64_bin.msi (sha256)

Installing JDK 17



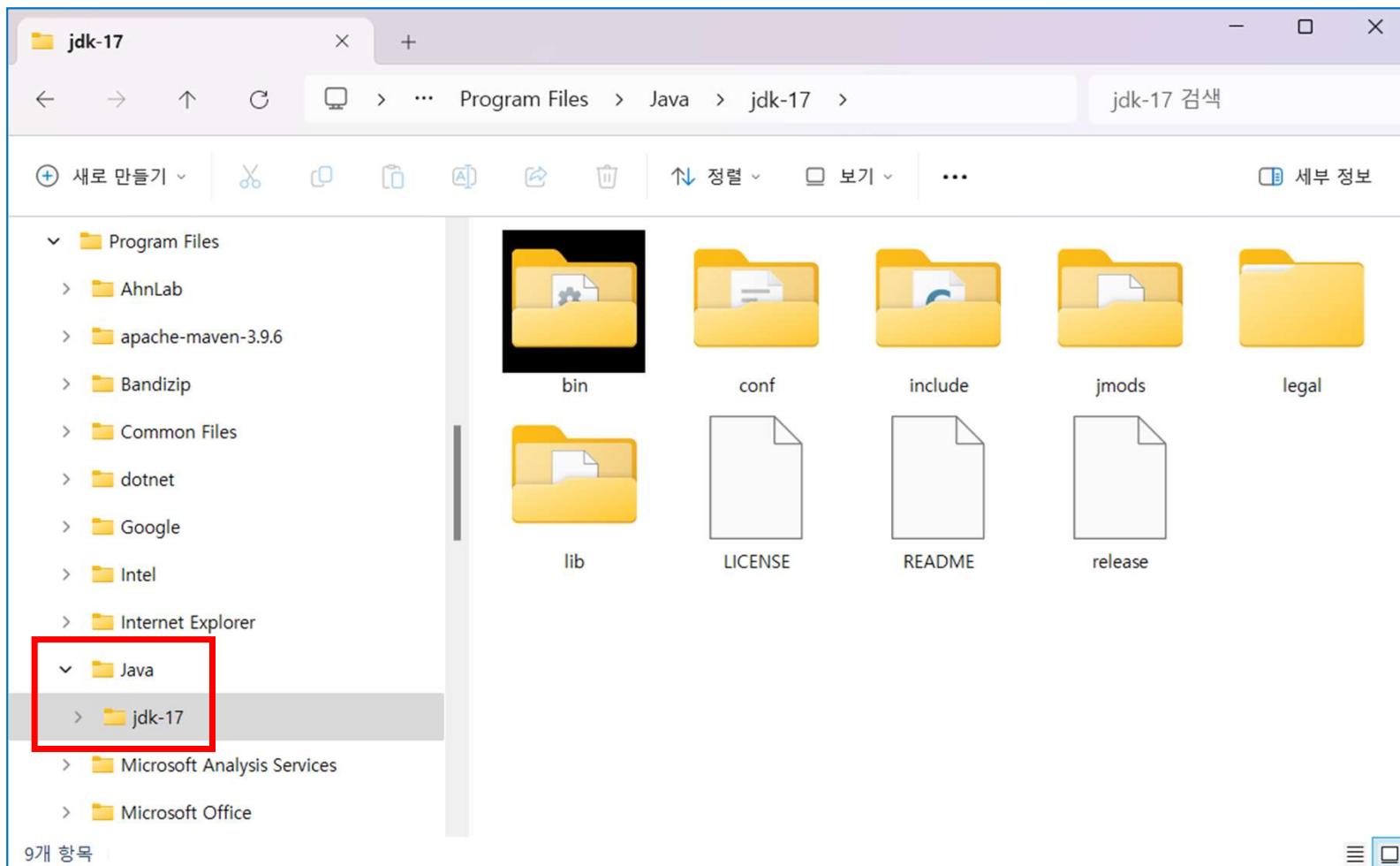
Installing JDK 17 (Cont.)



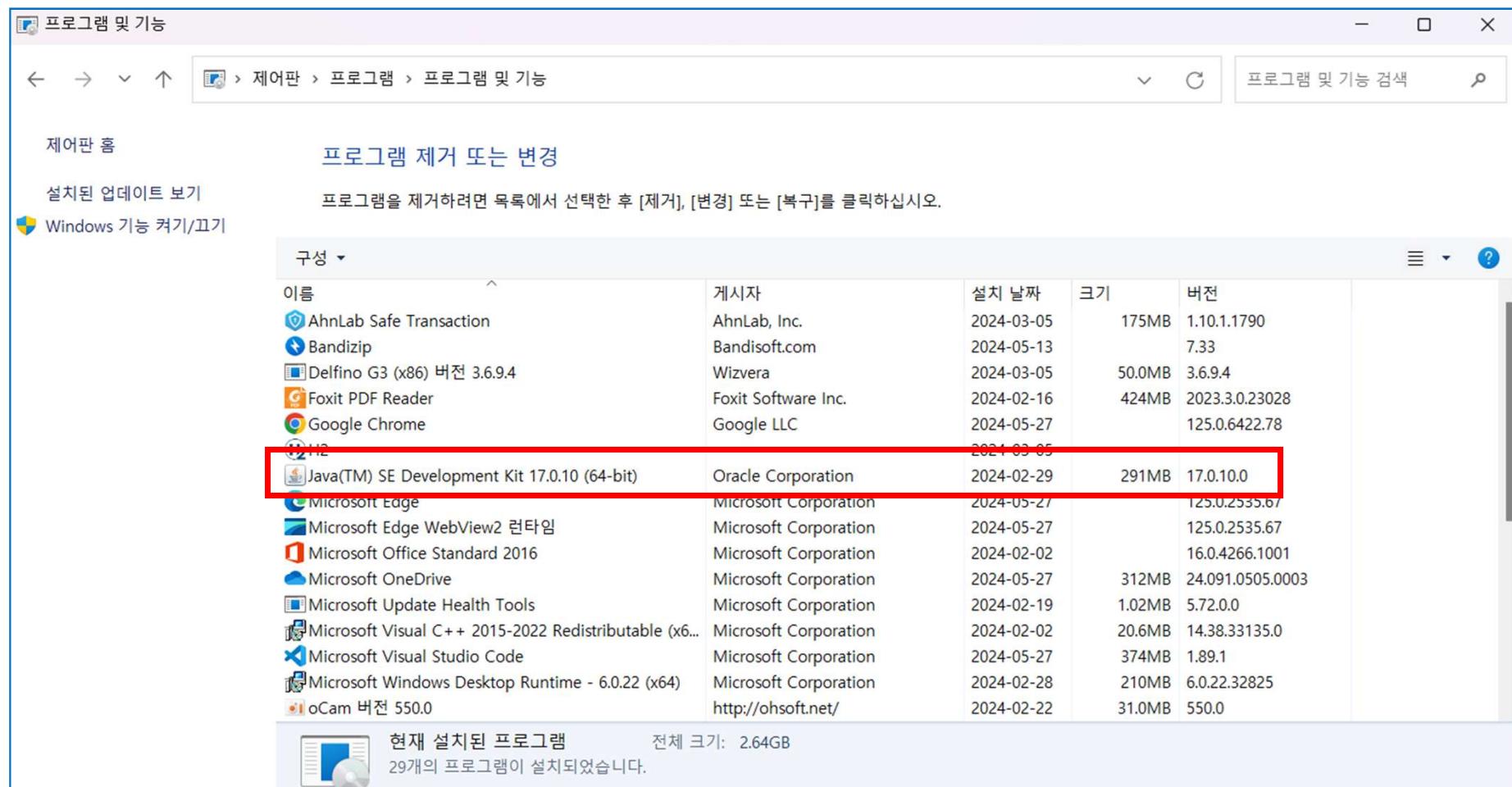
Installing JDK 17 (Cont.)



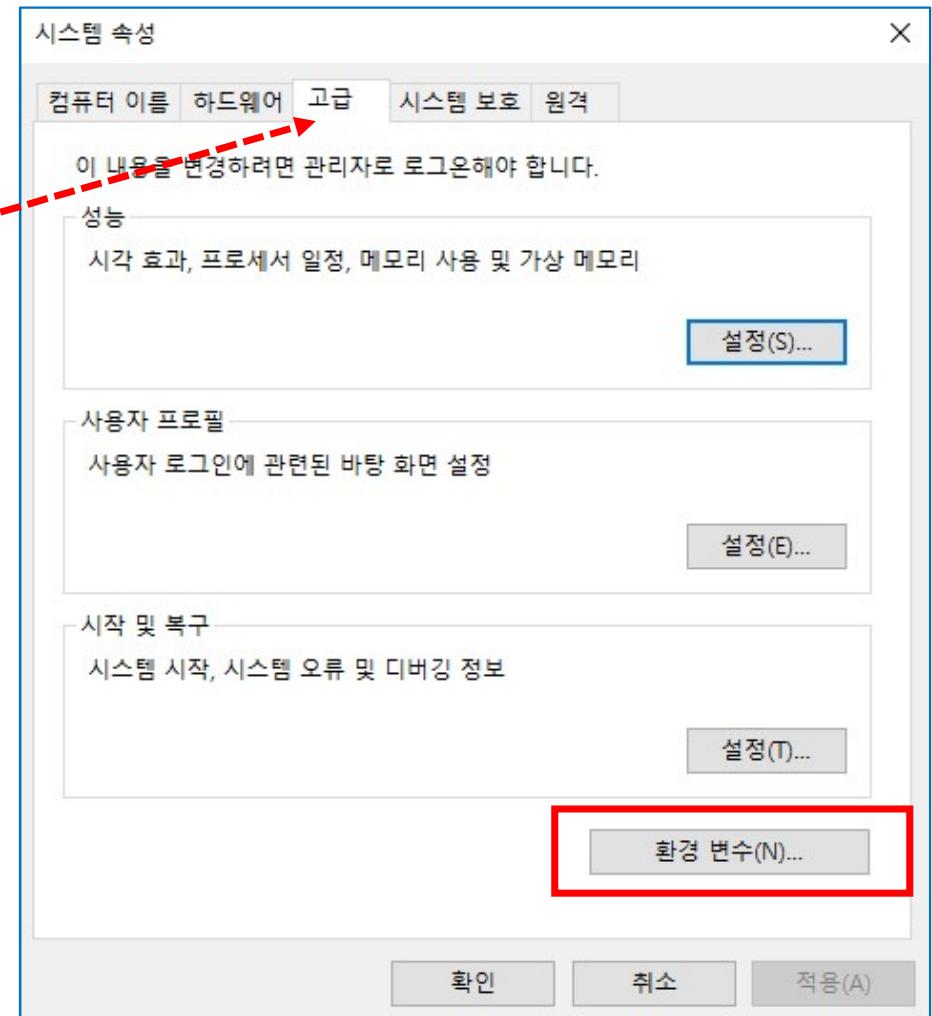
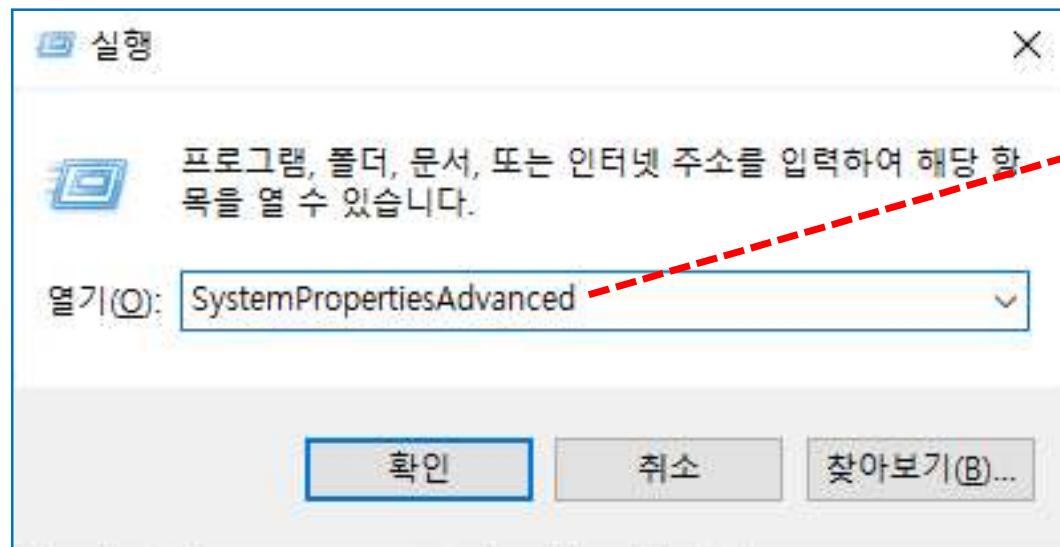
Checking Java 17



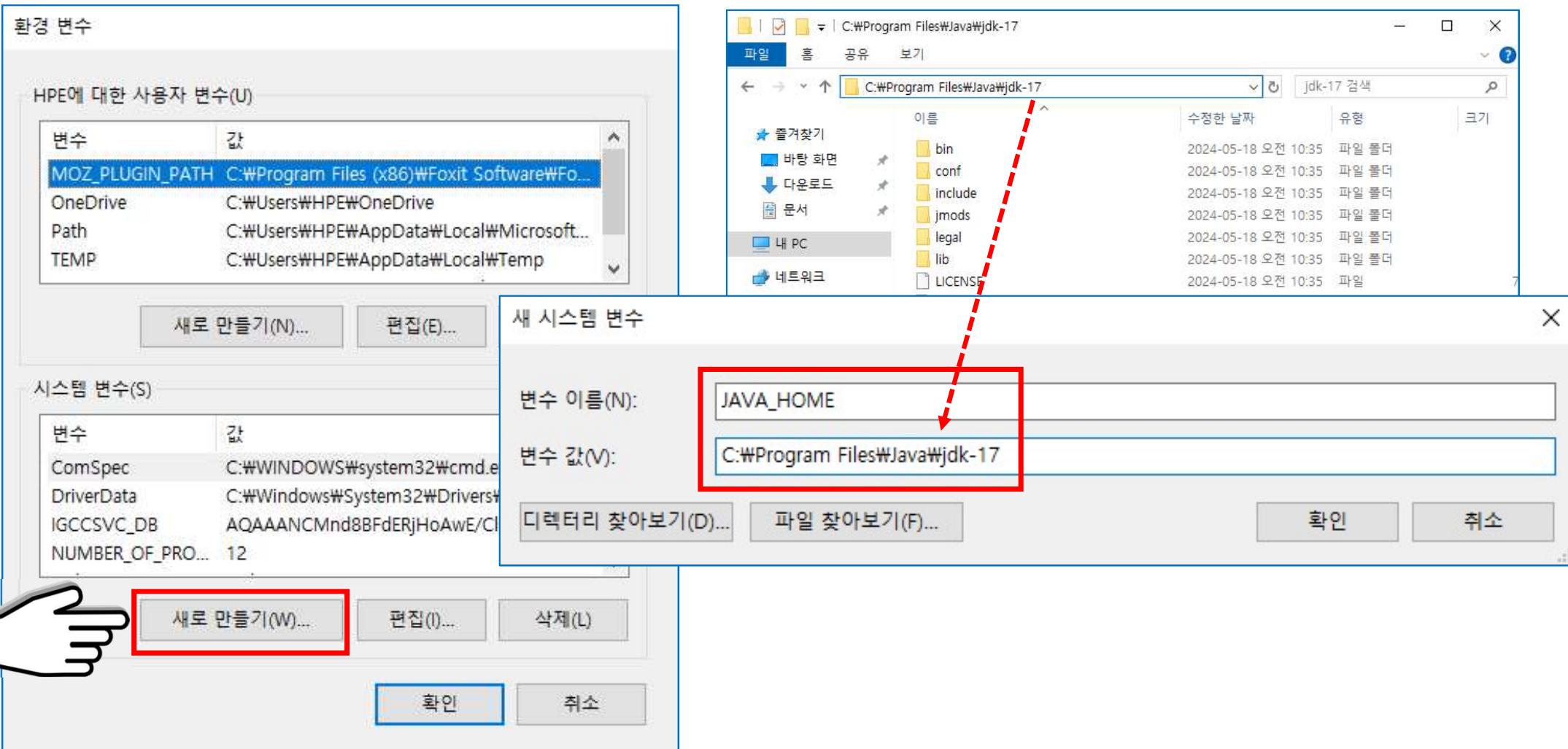
Checking Java 17 (Cont.)



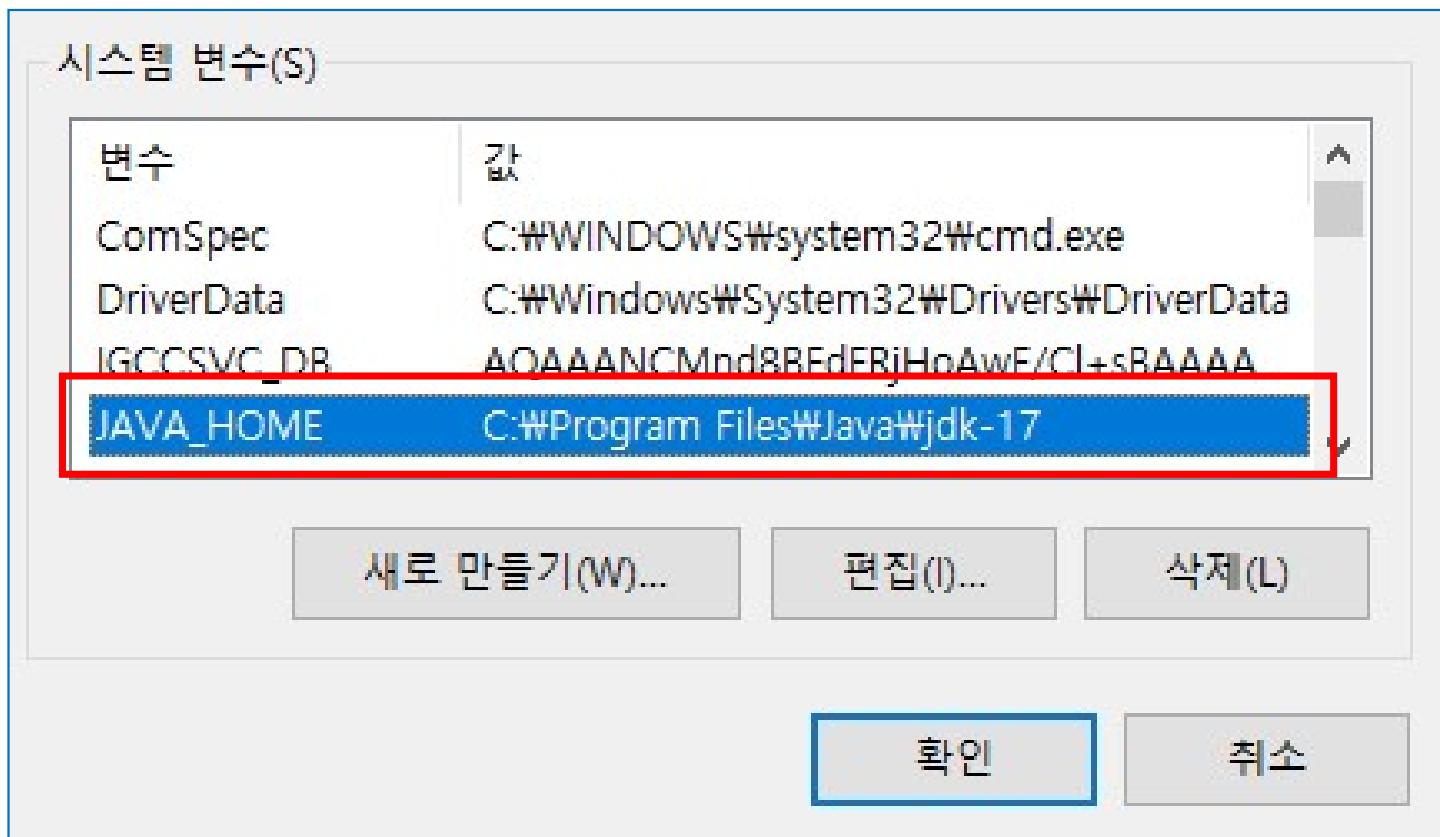
Configuring JDK Environment



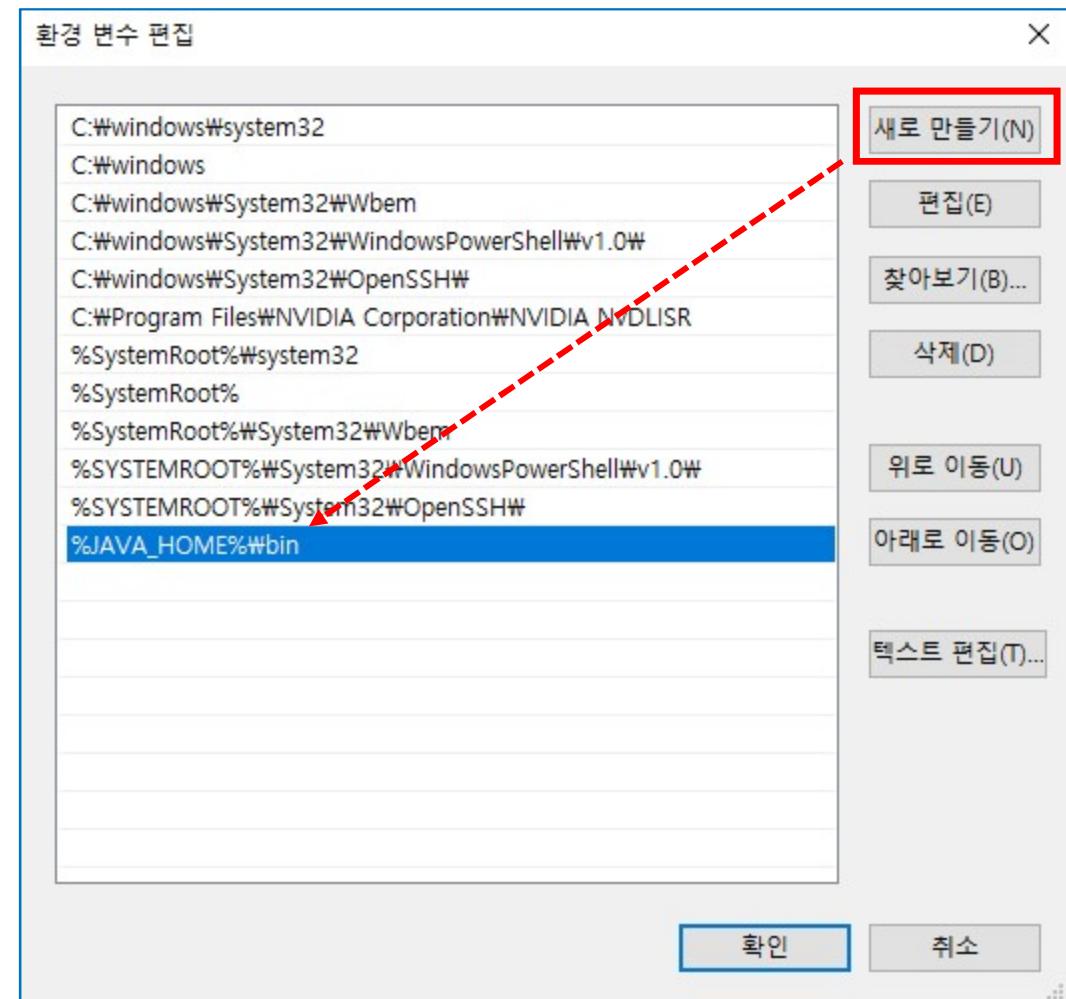
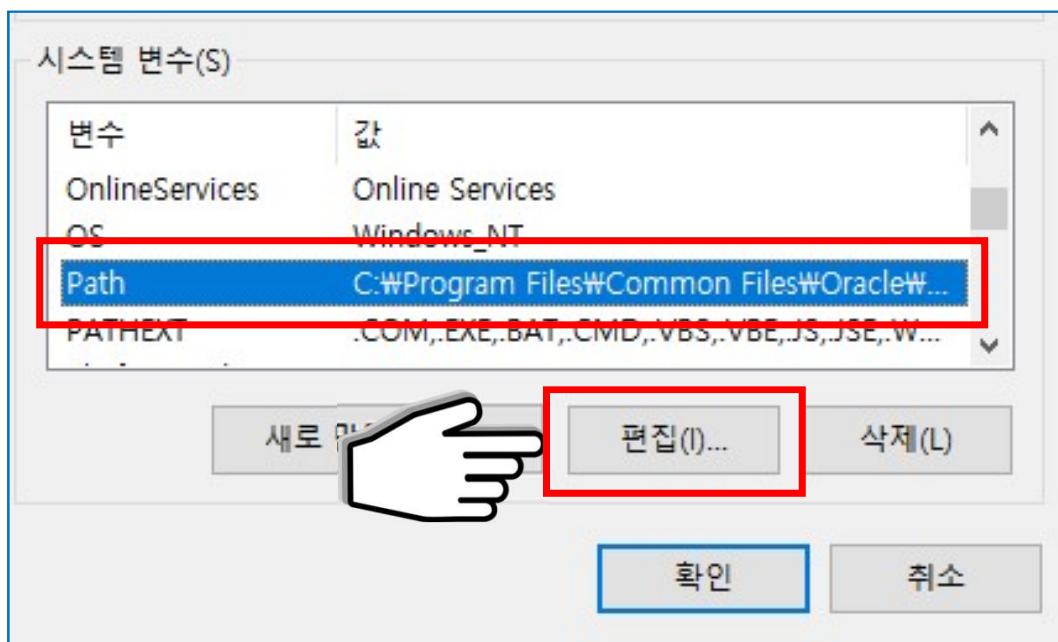
Configuring JDK Environment (Cont.)



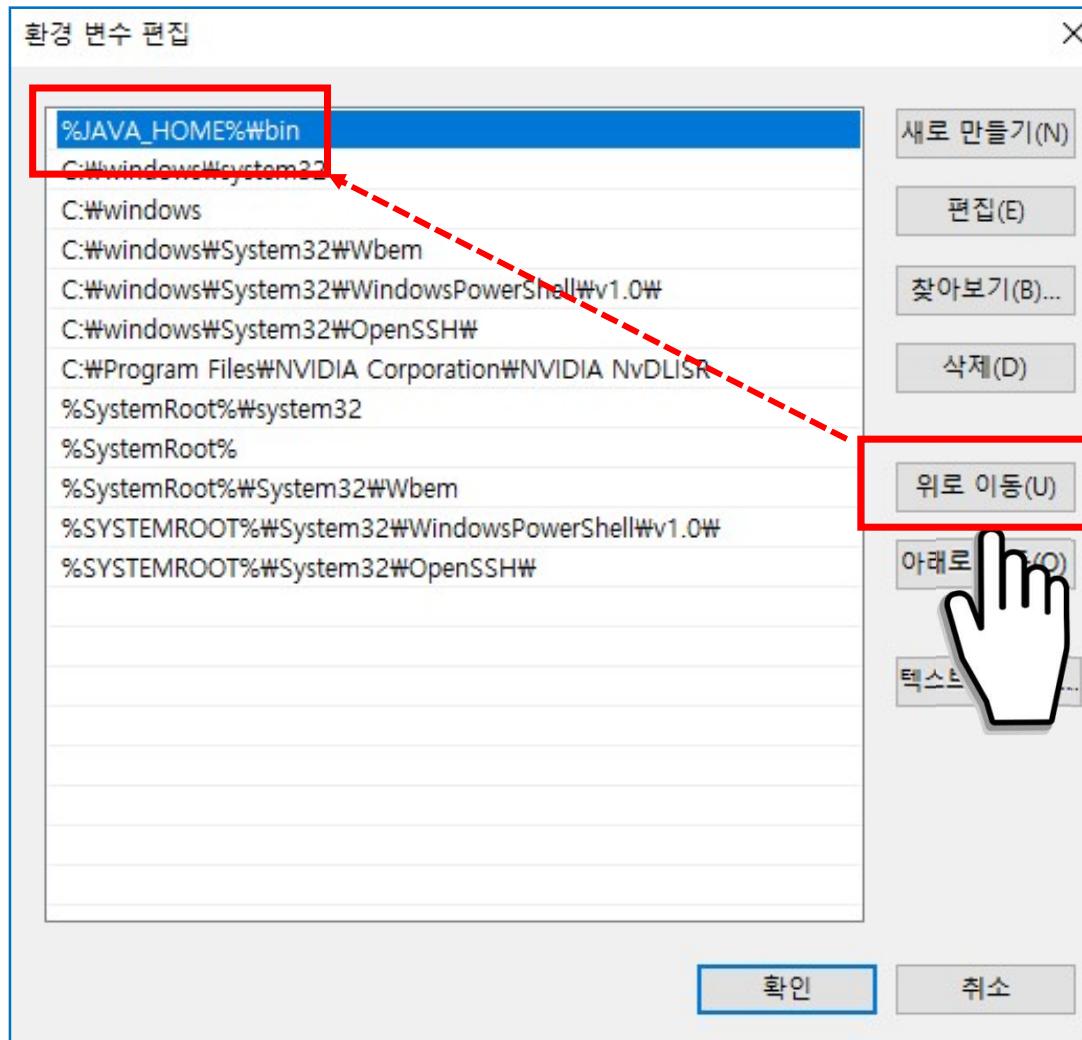
Configuring JDK Environment (Cont.)



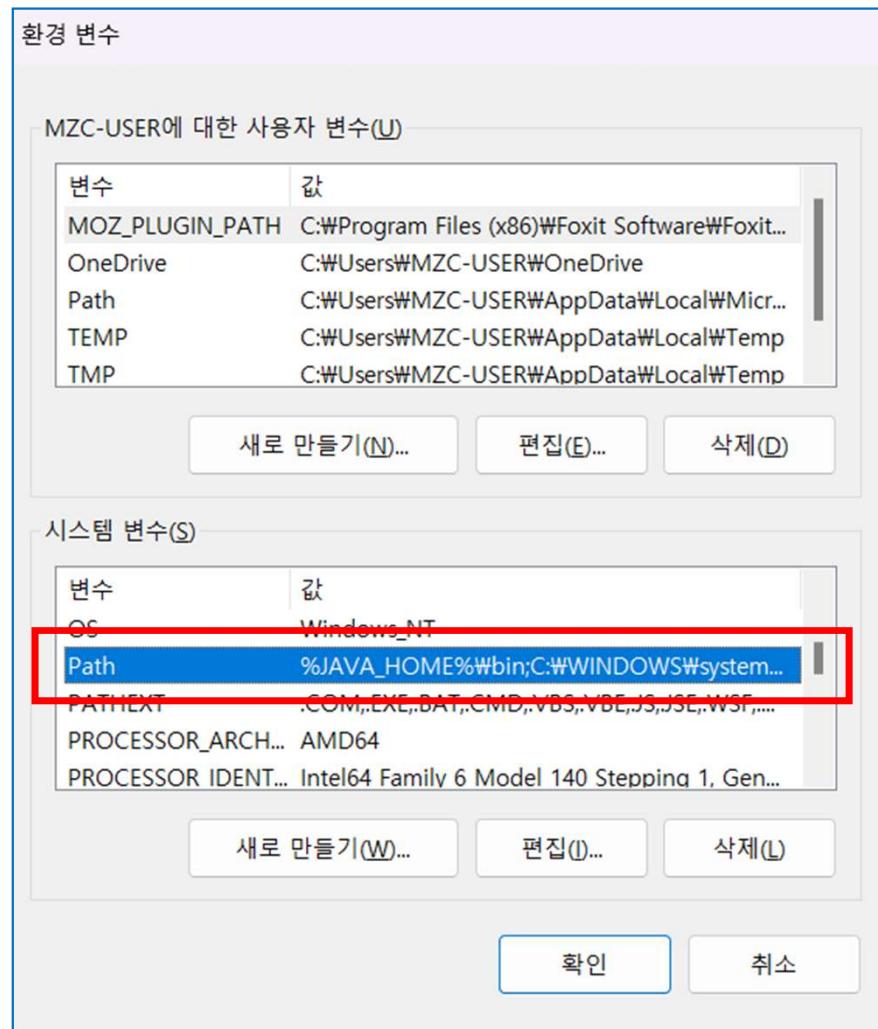
Configuring JDK Environment (Cont.)



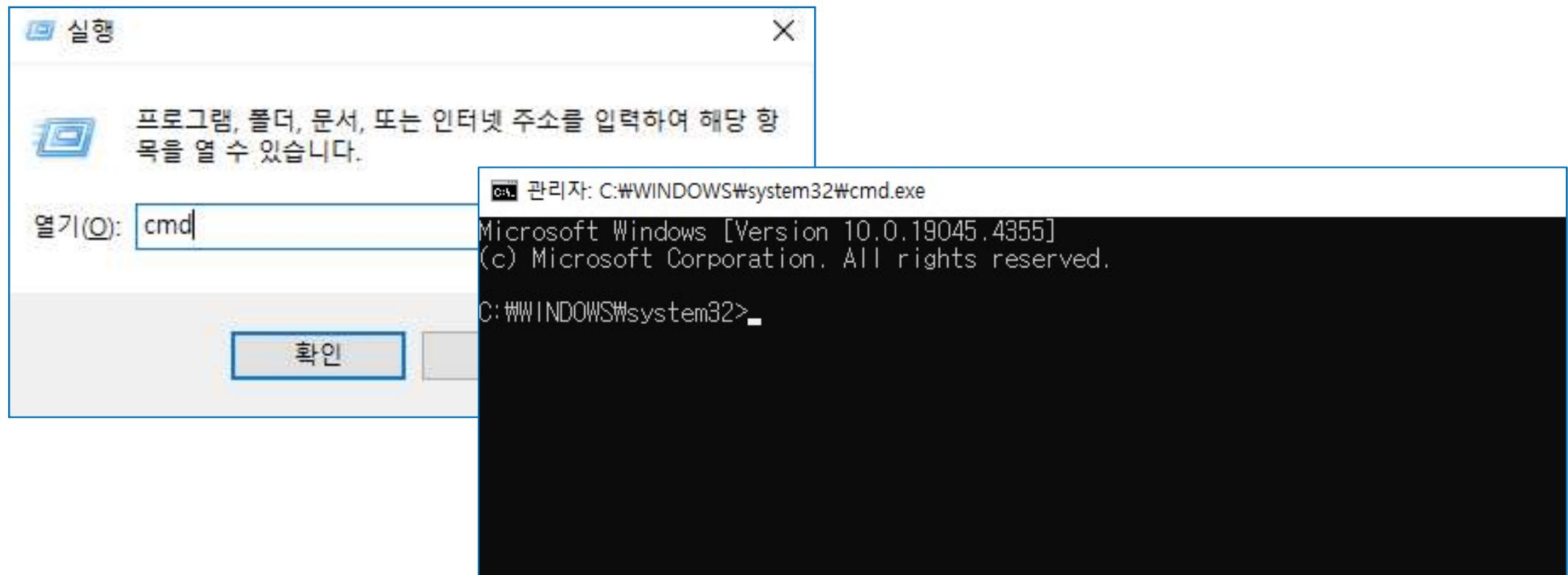
Configuring JDK Environment (Cont.)



Configuring JDK Environment (Cont.)



Configuring JDK Environment (Cont.)



Configuring JDK Environment (Cont.)

```
관리자: C:\WINDOWS\system32\cmd.exe
```

```
Microsoft Windows [Version 10.0.19045.4355]
(c) Microsoft Corporation. All rights reserved.
```

```
C:\WINDOWS\system32>set JAVA_HOME
JAVA_HOME=C:\Program Files\Java\jdk-17

C:\WINDOWS\system32>echo %JAVA_HOME%
C:\Program Files\Java\jdk-17
```

```
C:\WIN 관리자: C:\WINDOWS\system32\cmd.exe
```

```
C:\WINDOWS\system32>set PATH
Path=C:\Program Files\Java\jdk-17\bin;C:\windows\system32;C:\windows;C:\windows\System32\WBem;C:\windows\System32\WindowsPowerShell\v1.0\;C:\windows\System32\OpenSSH\;C:\Program Files\NVIDIA Corporation\NVIDIA NvDLISR;C:\WINDOWS\system32;C:\WINDOWS;C:\WINDOWS\System32\WBem;C:\WINDOWS\System32\WindowsPowerShell\v1.0\;C:\WINDOWS\System32\OpenSSH\;C:\Users\HPE\AppData\Local\Microsoft\WindowsApps
PATHEXT=.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.MSC
```

```
C:\WINDOWS\system32>echo %PATH%
C:\Program Files\Java\jdk-17\bin;C:\windows\system32;C:\windows;C:\windows\System32\WBem;C:\windows\System32\WindowsPowerShell\v1.0\;C:\windows\System32\OpenSSH\;C:\Program Files\NVIDIA Corporation\NVIDIA NvDLISR;C:\WINDOWS\system32;C:\WINDOWS;C:\WINDOWS\System32\WBem;C:\WINDOWS\System32\WindowsPowerShell\v1.0\;C:\WINDOWS\System32\OpenSSH\;C:\Users\HPE\AppData\Local\Microsoft\WindowsApps
```

```
C:\WINDOWS\system32>
```

Testing JDK Environment

```
관리자: C:\WINDOWS\system32\cmd.exe

C:\WINDOWS\system32>java --version
java 17.0.11 2024-04-16 LTS
Java(TM) SE Runtime Environment (build 17.0.11+7-LTS-207)
Java HotSpot(TM) 64-Bit Server VM (build 17.0.11+7-LTS-207, mixed mode, sharing)

C:\WINDOWS\system32>javac --version
javac 17.0.11

C:\WINDOWS\system32>
```

Installation to Oracle Java 17 for Ubuntu 64-bit Platform

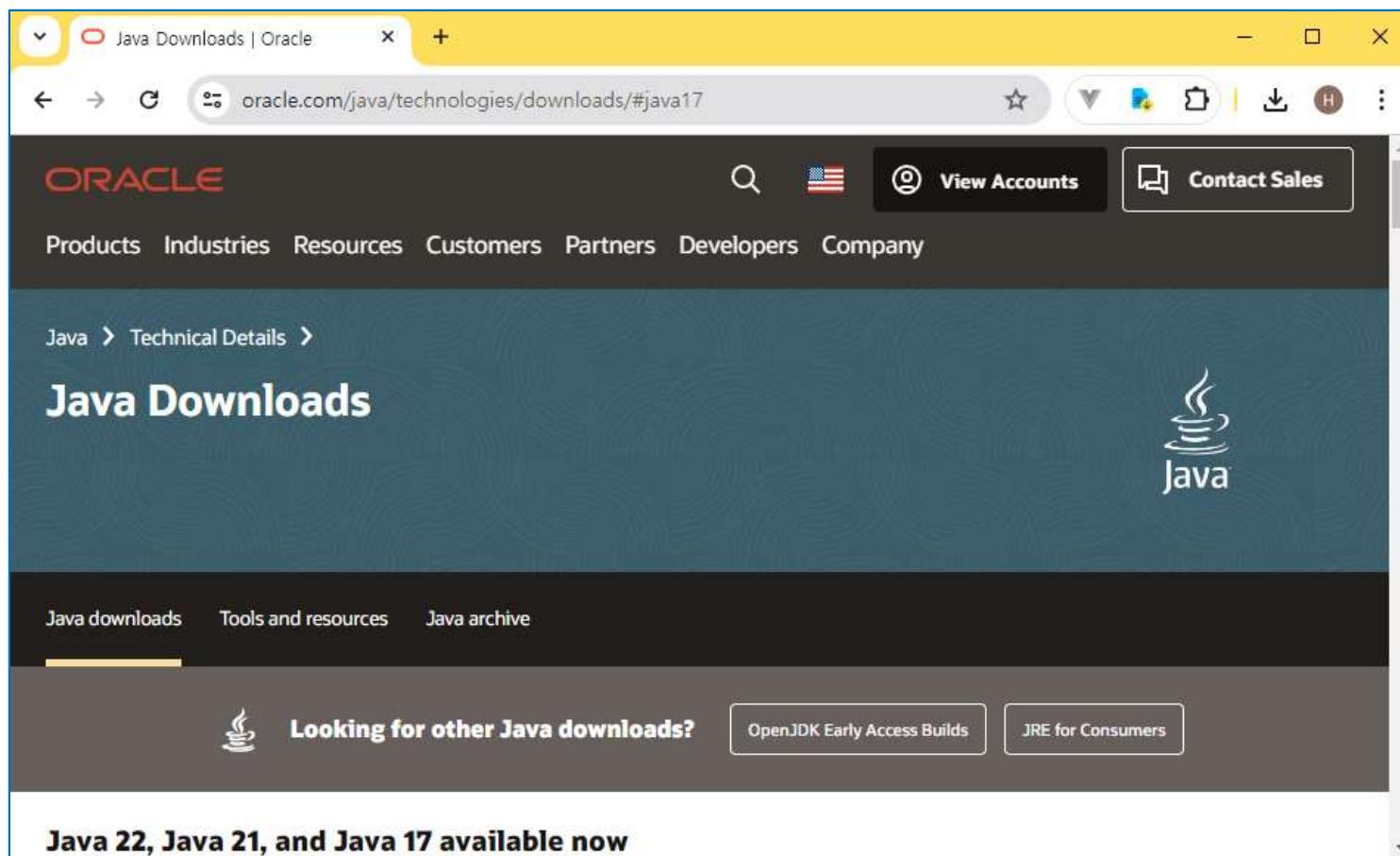


Installation JDK 17 for Ubuntu 22.04 LTS Platform

```
henry@ubuntu-base:~$ java --version
Command 'java' not found, but can be installed with:
sudo apt install openjdk-11-jre-headless # version 11.0.20.1+1-0ubuntu1~22.04, or
sudo apt install default-jre           # version 2:1.11-72build2
sudo apt install openjdk-17-jre-headless # version 17.0.8.1+1~us1-0ubuntu1~22.04
sudo apt install openjdk-18-jre-headless # version 18.0.2+9-2~22.04
sudo apt install openjdk-19-jre-headless # version 19.0.2+7-0ubuntu3~22.04
sudo apt install openjdk-8-jre-headless # version 8u382-ga-1~22.04.1
```

Downloading JDK 17 for Windows Platform

- Connect to <https://www.oracle.com/java/technologies/downloads/#java17>



Downloading JDK 17

■ Connect to

<https://www.oracle.com/java/technologies/downloads/#jdk17-linux>

Java downloads Tools and resources Java archive

JDK 17 will receive updates under the NFTC, until September 2024. Subsequent JDK 17 updates will be licensed under the [Java SE OTN License \(OTN\)](#) and production use beyond the [limited free grants](#) of the OTN license will [require a fee](#).

Linux macOS Windows

Product/file description	File size	Download
ARM64 Compressed Archive	172.88 MB	https://download.oracle.com/java/17/latest/jdk-17_linux-aarch64_bin.tar.gz (sha256)
ARM64 RPM Package	172.62 MB	https://download.oracle.com/java/17/latest/jdk-17_linux-aarch64_bin.rpm (sha256) (OL 8 GPG Key)
x64 Compressed Archive	174.29 MB	https://download.oracle.com/java/17/latest/jdk-17_linux-x64_bin.tar.gz (sha256)
x64 Debian Package	149.67 MB	https://download.oracle.com/java/17/latest/jdk-17_linux-x64_bin.deb (sha256)
x64 RPM Package	174.03 MB	https://download.oracle.com/java/17/latest/jdk-17_linux-x64_bin.rpm (sha256) (OL 8 GPG Key)



Downloading JDK 17

```
$ wget  
https://download.oracle.com/java/17/latest/jdk-  
17_linux-x64_bin.tar.gz
```

```
henry@ubuntu-base:~$ wget https://download.oracle.com/java/17/latest/jdk-17_linux-x64_bin.tar.gz  
--2024-05-27 06:38:08-- https://download.oracle.com/java/17/latest/jdk-17_linux-x64_bin.tar.gz  
Resolving download.oracle.com (download.oracle.com)... 23.219.72.96  
Connecting to download.oracle.com (download.oracle.com)|23.219.72.96|:443... connected.  
HTTP request sent, awaiting response... 200 OK  
Length: 182753781 (174M) [application/x-gzip]  
Saving to: 'jdk-17_linux-x64_bin.tar.gz'  
  
jdk-17_linux-x64_bin.tar.gz      100%[=====>] 174.29  
M 42.0MB/s    in 4.2s  
  
2024-05-27 06:38:12 (41.3 MB/s) - 'jdk-17_linux-x64_bin.tar.gz' saved [182753781/182753781]
```

Installation JDK 17 on Ubuntu

1. Unpacking `$ tar xvfvz jdk*.tar.gz`

```
henry@ubuntu-base:~$ ls  
jdk-17_linux-x64_bin.tar.gz  
henry@ubuntu-base:~$ tar xvfvz jdk-17_linux-x64_bin.tar.gz
```

```
henry@ubuntu-base:~$ ls  
jdk-17.0.11  jdk-17_linux-x64_bin.tar.gz  
henry@ubuntu-base:~$ █
```

Installation JDK 17 on Ubuntu (Cont.)

2. Making JDK Directory & Moving JDK Directory

```
henry@ubuntu-base:~$ sudo mkdir /usr/lib/jvm  
henry@ubuntu-base:~$ sudo mv jdk-17.0.11 /usr/lib/jvm/
```

```
henry@ubuntu-base:~$ cd /usr/lib/jvm  
henry@ubuntu-base:/usr/lib/jvm$ pwd  
/usr/lib/jvm  
henry@ubuntu-base:/usr/lib/jvm$ ls  
jdk-17.0.11  
henry@ubuntu-base:/usr/lib/jvm$ █
```

Installation JDK 17 on Ubuntu (Cont.)

3. Adding your new Java 8 installation into alternatives list.

```
$ sudo update-alternatives --install \
/usr/bin/java java \
/usr/lib/jvm/jdk-17.0.11/bin/java \ 1
```

```
henry@ubuntu-base:/usr/lib/jvm$ sudo update-alternatives --install \
> /usr/bin/java java /usr/lib/jvm/jdk-17.0.11/bin/java 1
update-alternatives: using /usr/lib/jvm/jdk-17.0.11/bin/java to provide /usr/bin/java (java) in auto mode
henry@ubuntu-base:/usr/lib/jvm$
```

Installation JDK 17 on Ubuntu (Cont.)

4. Adding your new Java 17 installation into alternatives list.

```
$ sudo update-alternatives --install \
/usr/bin/javac javac \
/usr/lib/jvm/jdk-17.0.11/bin/javac 1
```

```
henry@ubuntu-base:/usr/lib/jvm$ sudo update-alternatives --install \
> /usr/bin/javac javac \
> /usr/lib/jvm/jdk-17.0.11/bin/javac 1
update-alternatives: using /usr/lib/jvm/jdk-17.0.11/bin/javac to provide /usr/bin/javac (javac) in auto mode
```

Installation JDK 17 on Ubuntu (Cont.)

5. Change permission.

```
$ sudo chmod a+x /usr/bin/java  
$ sudo chmod a+x /usr/bin/javac
```

```
henry@ubuntu-base:/usr/lib/jvm$ sudo chmod a+x /usr/bin/java  
henry@ubuntu-base:/usr/lib/jvm$ sudo chmod a+x /usr/bin/javac
```

Installation JDK 17 on Ubuntu (Cont.)

6. Check java version & javac version

```
$ java --version
```

```
$ javac --version
```

```
henry@ubuntu-base:/usr/lib/jvm$ java --version
java 17.0.11 2024-04-16 LTS
Java(TM) SE Runtime Environment (build 17.0.11+7-LTS-207)
Java HotSpot(TM) 64-Bit Server VM (build 17.0.11+7-LTS-207, mixed mode, sharing)
henry@ubuntu-base:/usr/lib/jvm$ javac --version
javac 17.0.11
```

Registering OS Environment Variables on Ubuntu

```
$ sudo vi /etc/profile
```

```
    . $i
fi
done
unset i
fi

#-----
# Java Settings
#-----
JAVA_HOME=/usr/lib/jvm/jdk-17.0.11
PATH=$JAVA_HOME/bin:$PATH

export JAVA_HOME
export PATH
```

Registering OS Environment Variables on Ubuntu (Cont.)

\$ **source /etc/profile**

- Restart System
 - \$ **sudo reboot**

```
henry@ubuntu-base:~$ echo $JAVA_HOME  
/usr/lib/jvm/jdk-17.0.11  
henry@ubuntu-base:~$ echo $PATH  
/usr/lib/jvm/jdk-17.0.11/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/  
local/games:/snap/bin
```

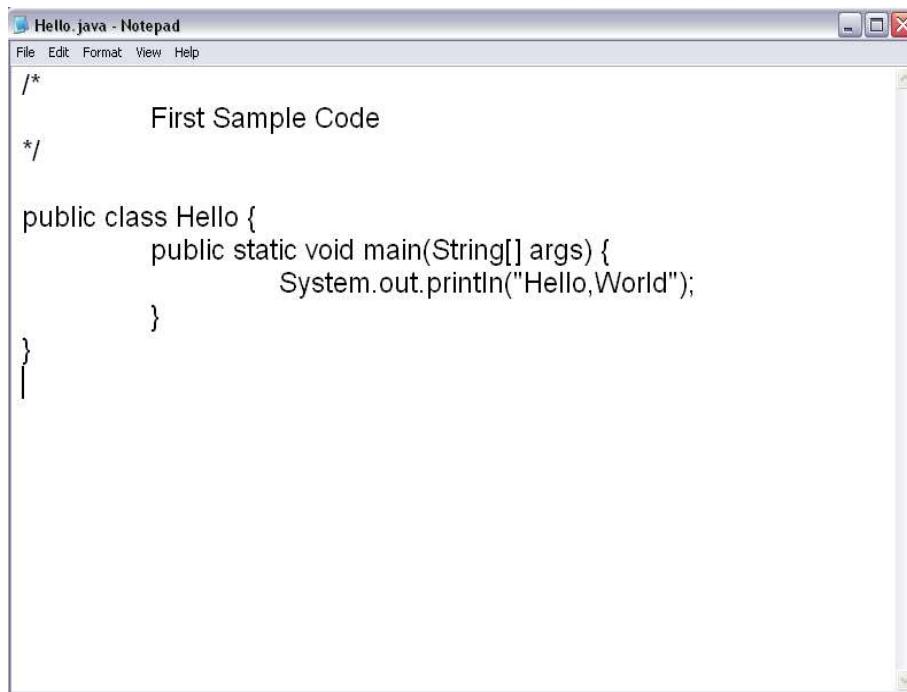
Text Editors

Text Editor

■ vi

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

■ Notepad



Text Editor – Sublime Text 3

- Sublime Text 3 (<http://www.sublimetext.com/3>) – Half Freeware

The screenshot shows a Sublime Text 3 window with a dark theme. The menu bar includes File, Edit, Selection, Find, View, Goto, Tools, Project, Preferences, and Help. The title bar indicates "C:\JavaRoom\HelloWorld.java - Sublime Text (UNREGISTERED)". The left sidebar shows "OPEN FILES" with "HelloWorld.java" listed. The main editor area contains the following Java code:

```
1 public class HelloWorld {  
2     public static void main(String[] args) {  
3         System.out.println("Hello, World");  
4     }  
5 }
```

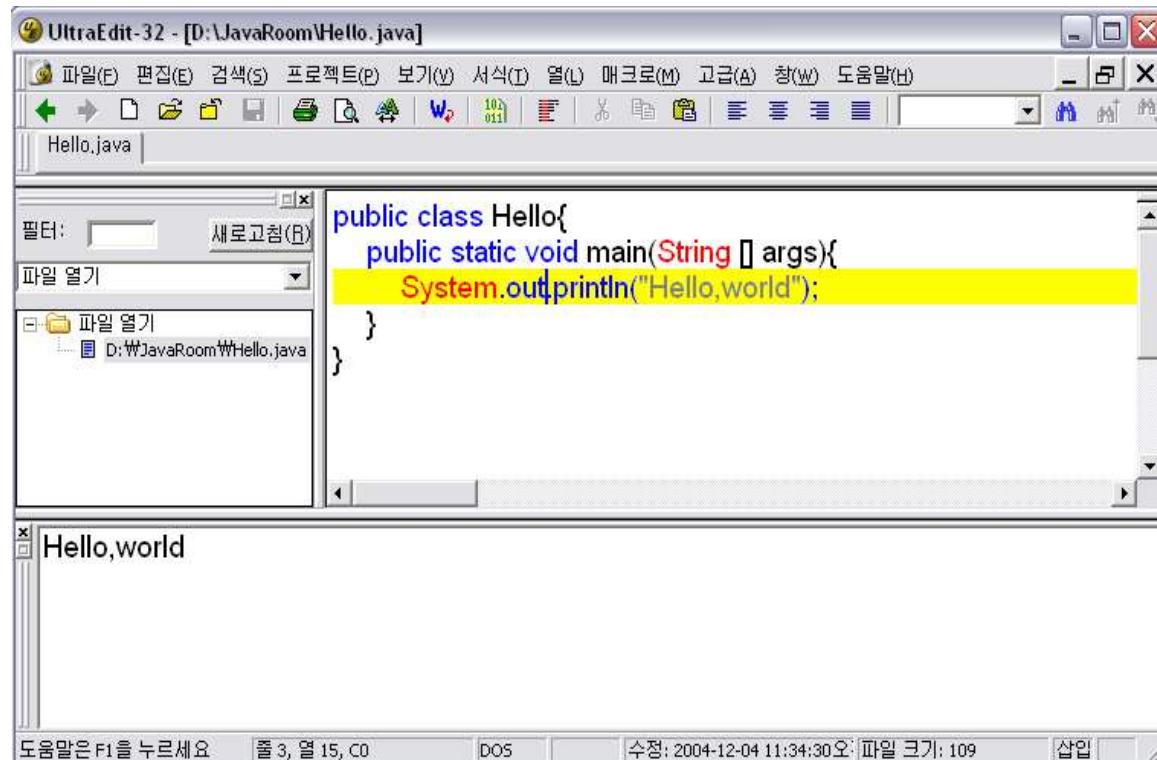
Below the editor, a terminal-like interface displays the output:

```
Hello, World  
[Finished in 1.3s]
```

At the bottom of the window, status bars show "Line 5, Column 2", "Tab Size: 4", and "Java".

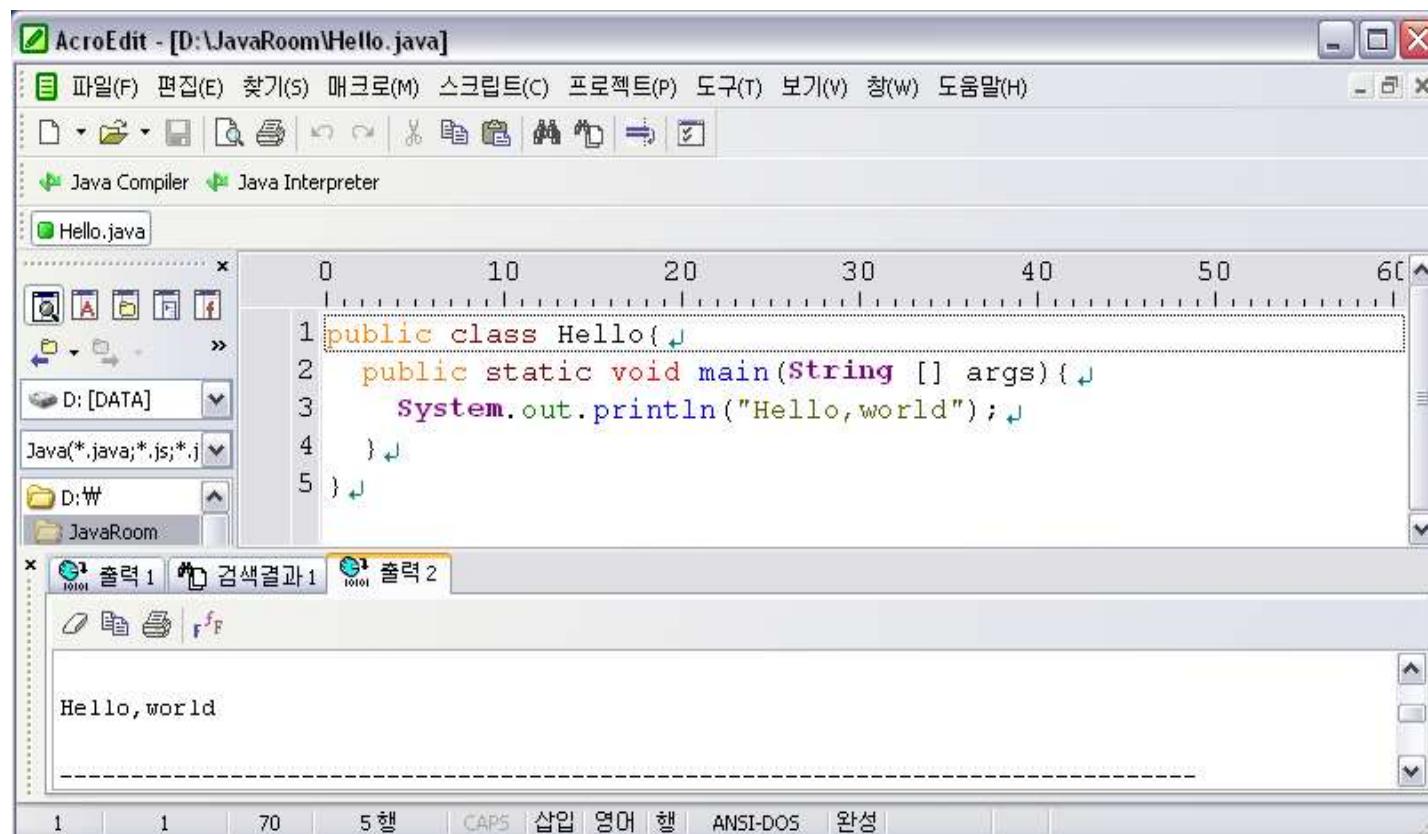
Text Editor - UltraEdit

- UltraEdit-64 (<http://www.ultraedit.com/>) – Shareware



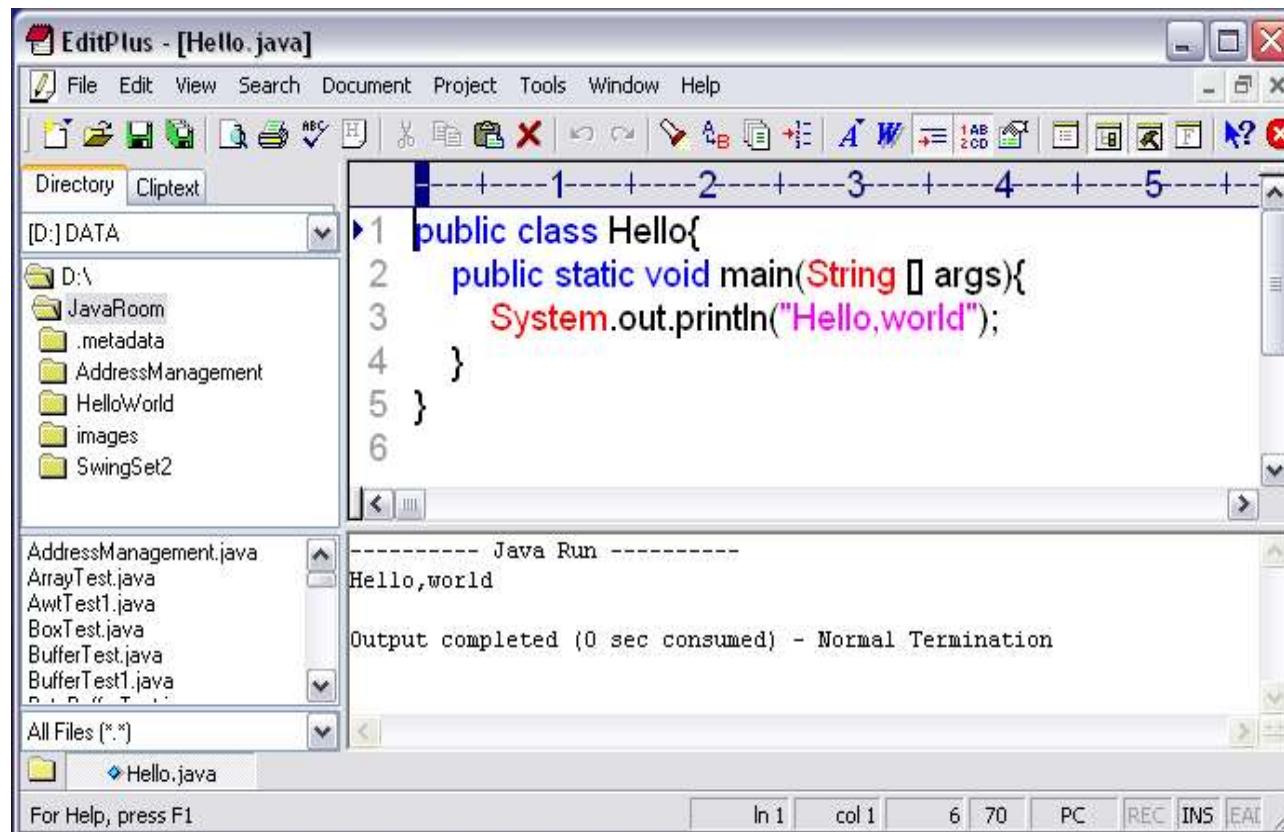
Text Editor - AcroEdit

- AcroEdit – (<http://www.acrosoft.pe.kr/>) – Freeware



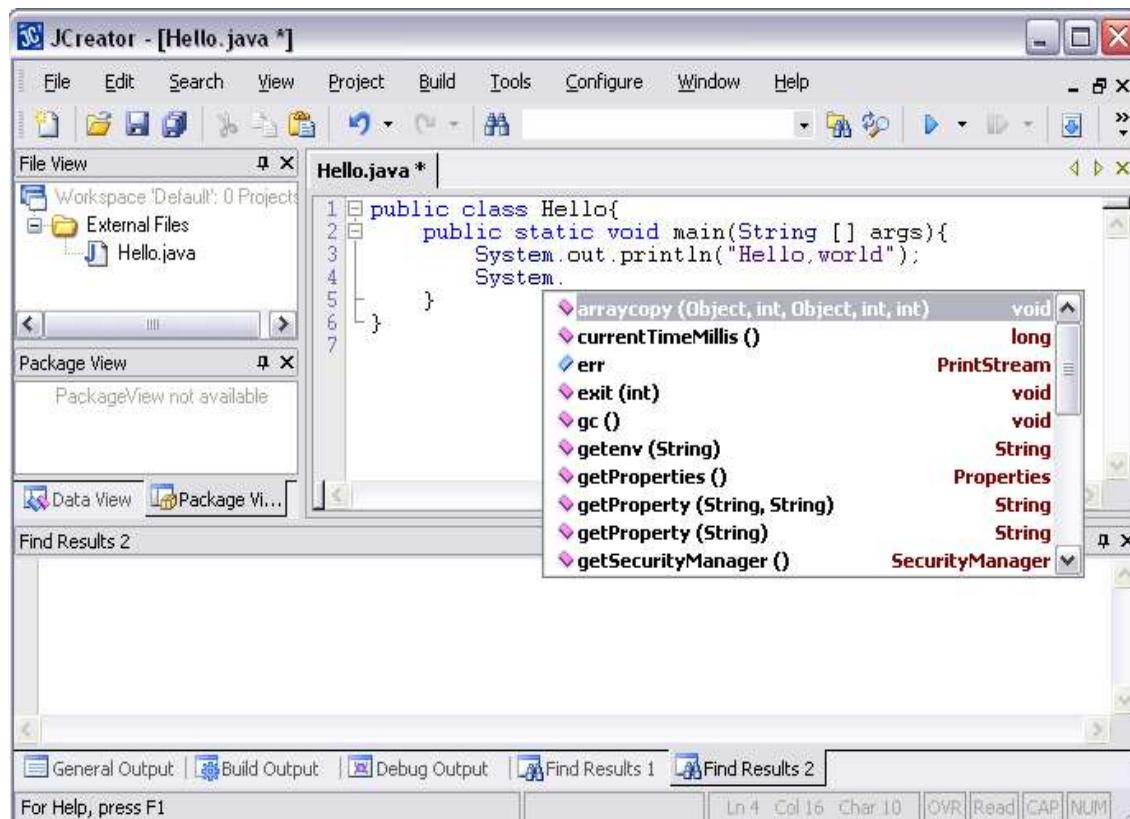
Text Editor - EditPlus

- EditPlus – (<http://www.editplus.com/>) – Shareware



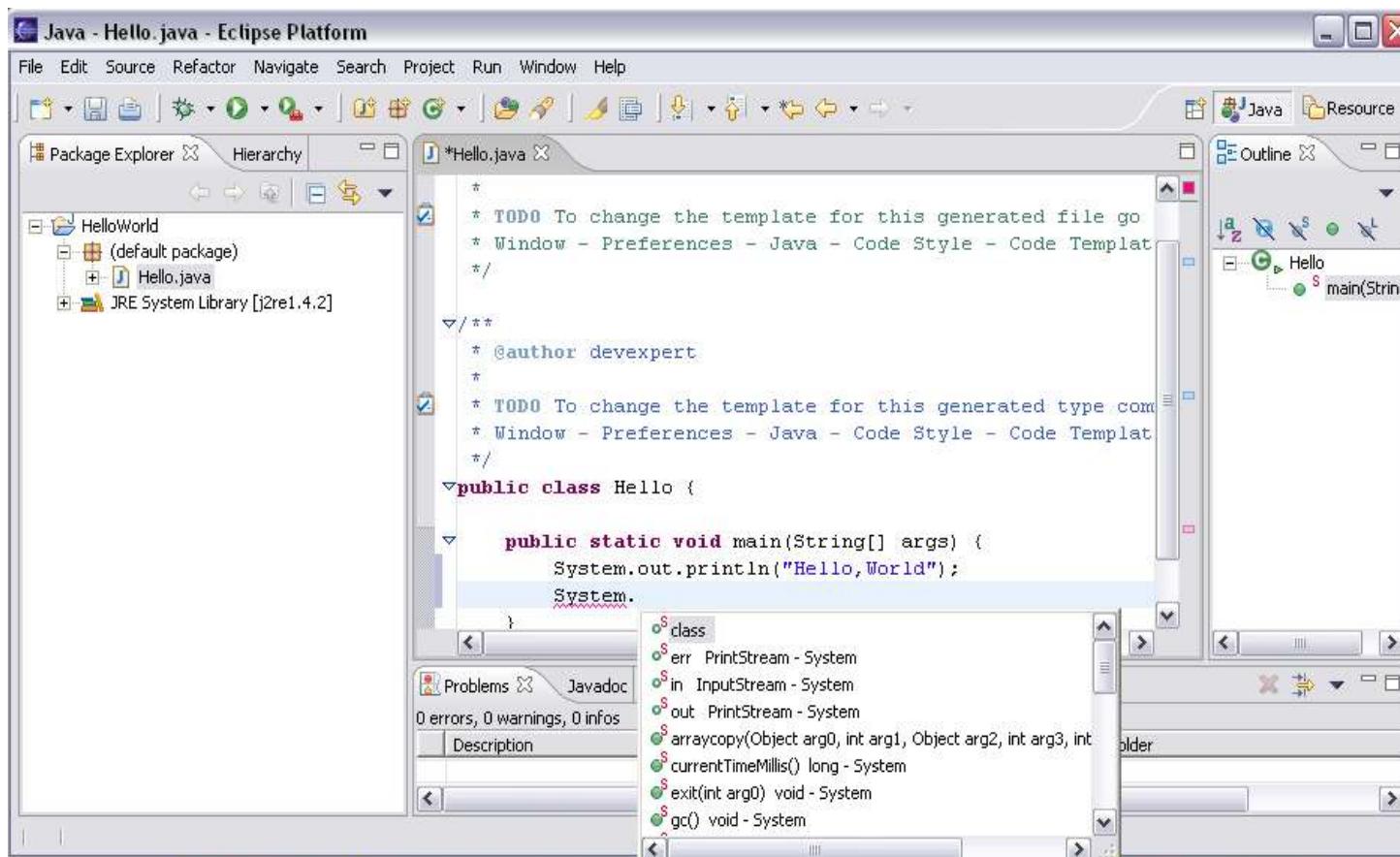
Java Text Editor – JCreator

- JCreator Pro (<http://www.jcreator.com/>)



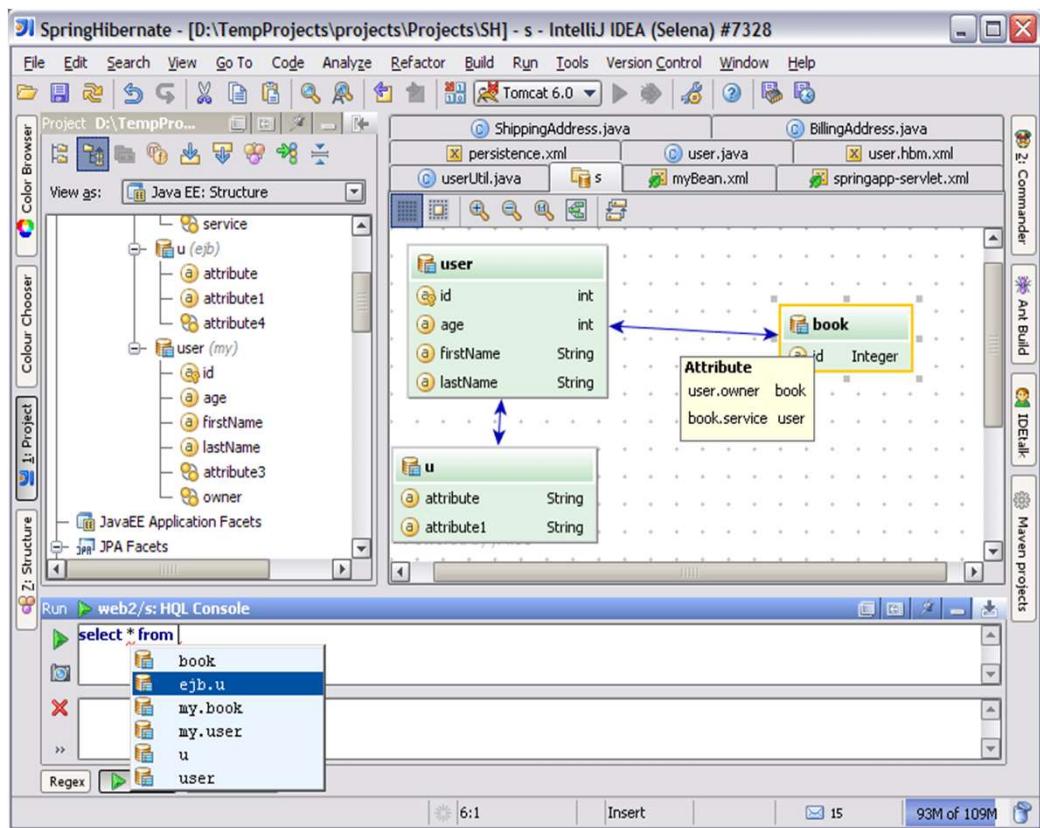
Java Text Editor - eclipse

- Eclipse (<https://www.eclipse.org/>)



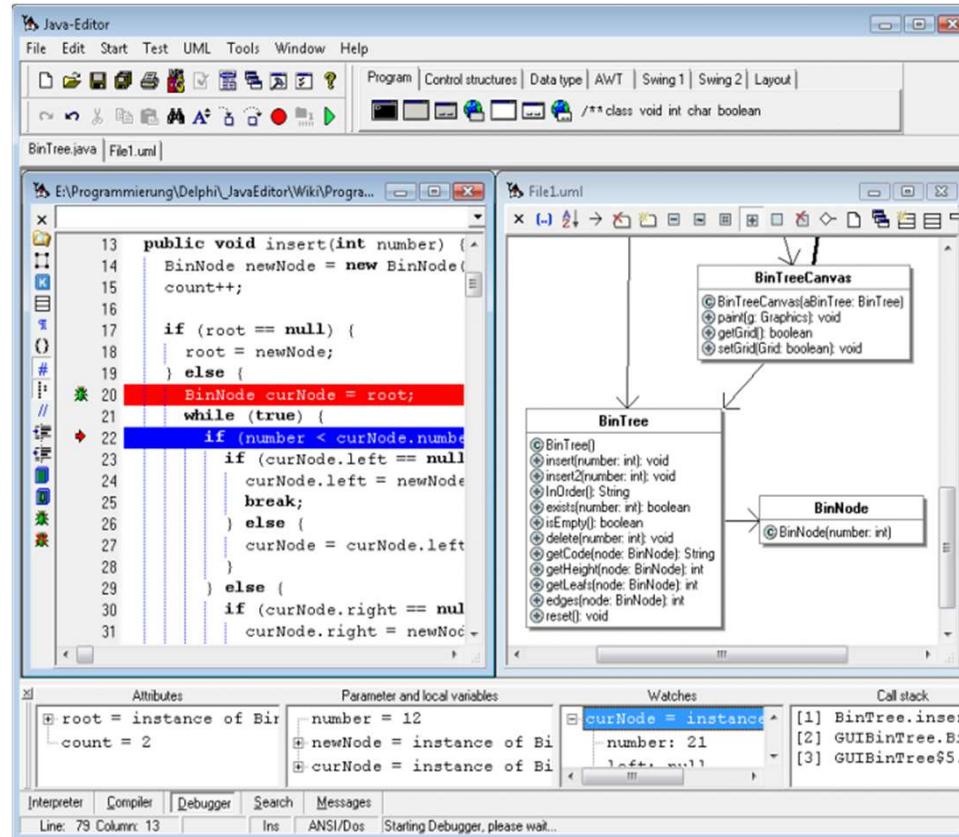
Java Text Editor - IntelliJ

■ IntelliJ IDEA (<http://www.jetbrains.com/>)



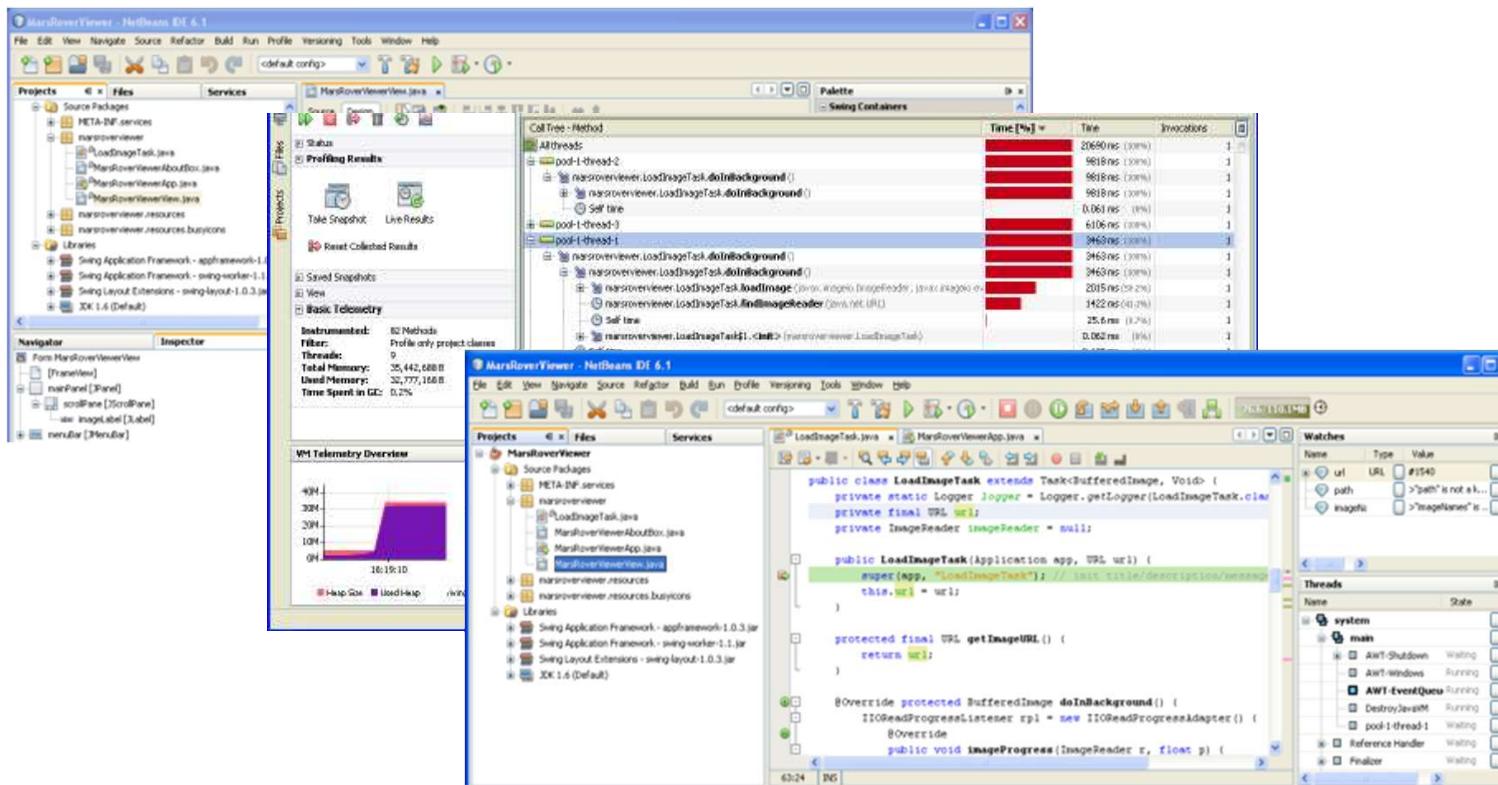
IDE Tools – Java-Editor

- Java-Editor (http://www.javaeditor.org/index.php/Main_Page)



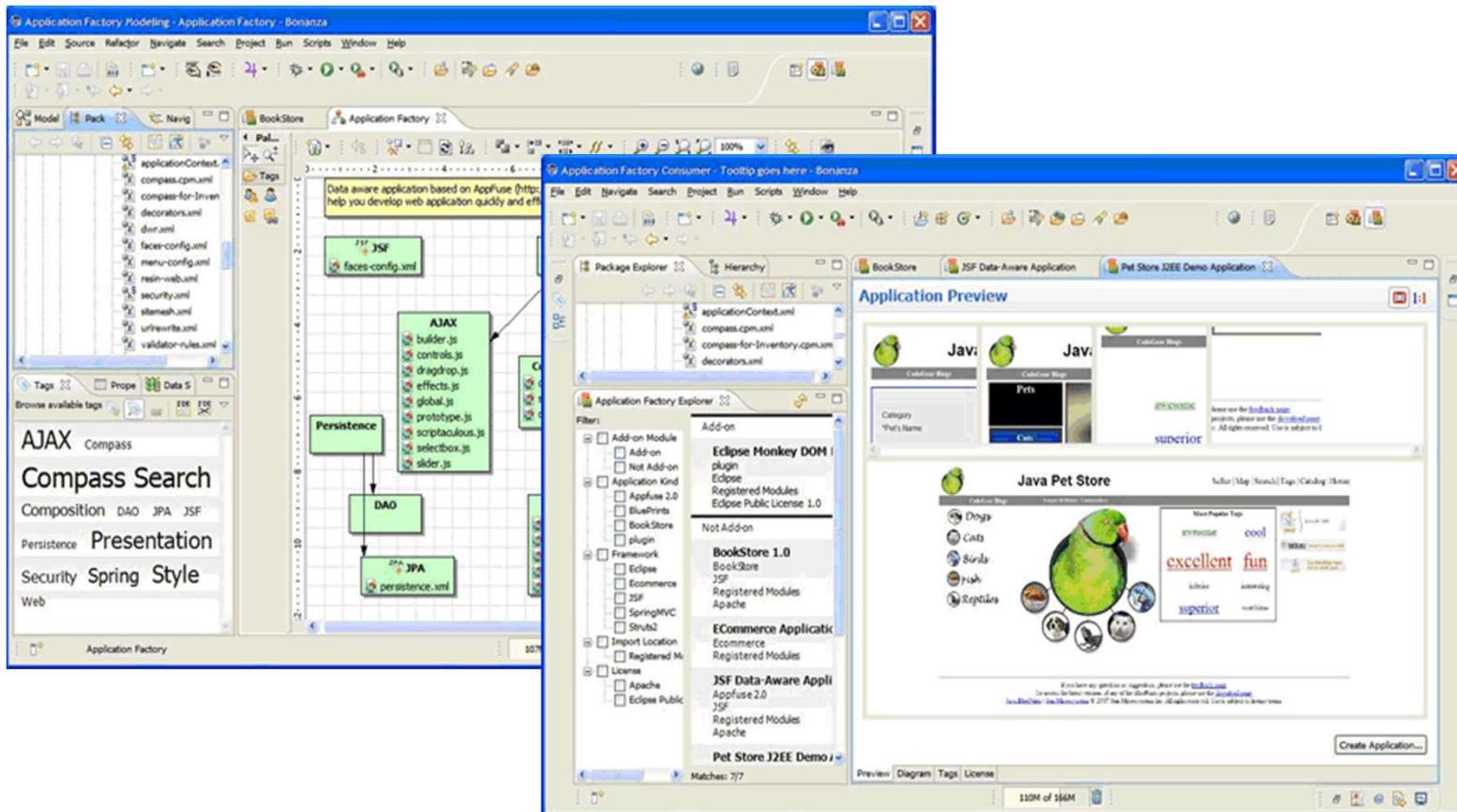
IDE Tools - NetBeans

■ NetBeans IDE (<http://www.netbeans.org/>)



IDE Tools - JBuilder

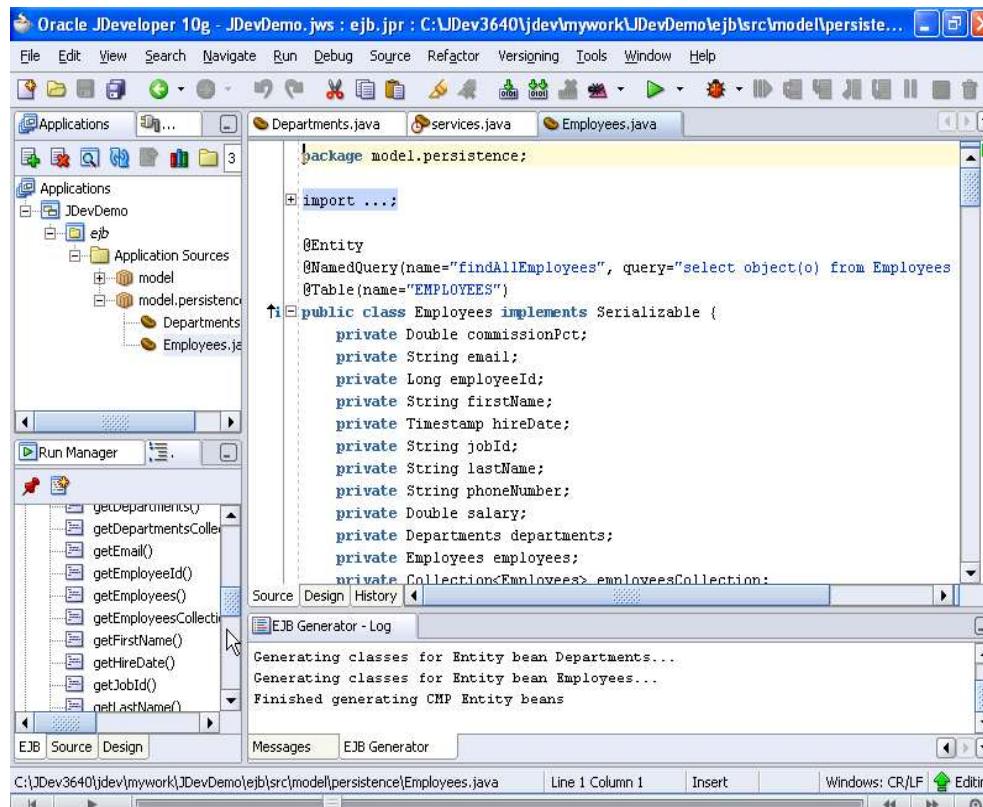
■ JBuilder (<https://www.embarcadero.com>)



IDE Tools - JDeveloper

JDeveloper

(<http://www.oracle.com/technology/products/jdev/index.html/>)



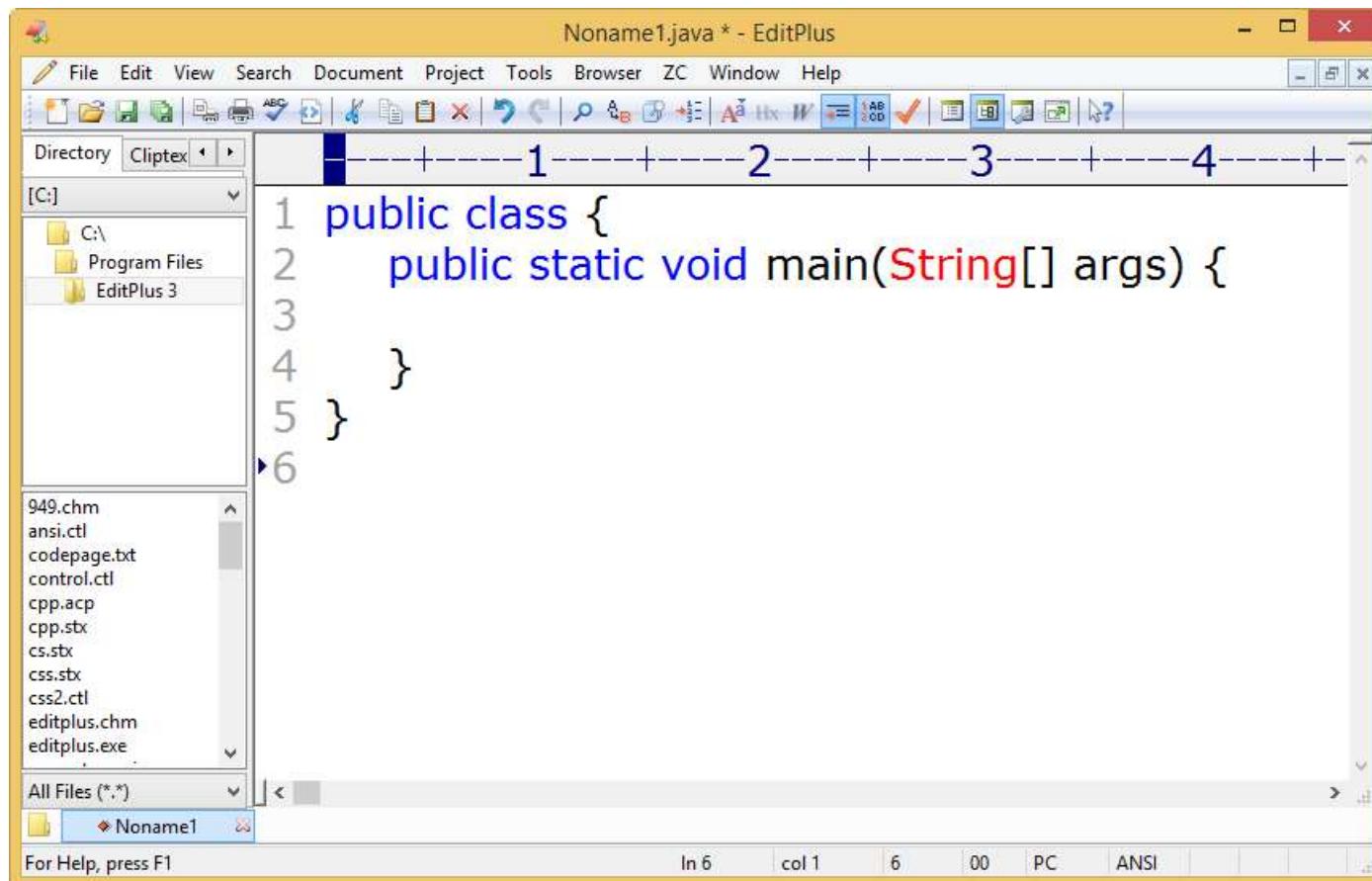
Etc Tools

- Code Warrior by Metrowerks : <http://www.metrowerks.com>
- TextPad Editor : <http://www.textpad.com>
- JEdit : <http://www.jedit.org>
- JGrasp : <http://www.jgrasp.org>
- BlueJ : <http://www.bluej.org>
- DrJava : <http://drjava.sourceforge.net>

EditPlus Setting on Windows Platform



Template Configuration



The screenshot shows the EditPlus 3.0 interface with the file "Noname1.java" open. The code is:

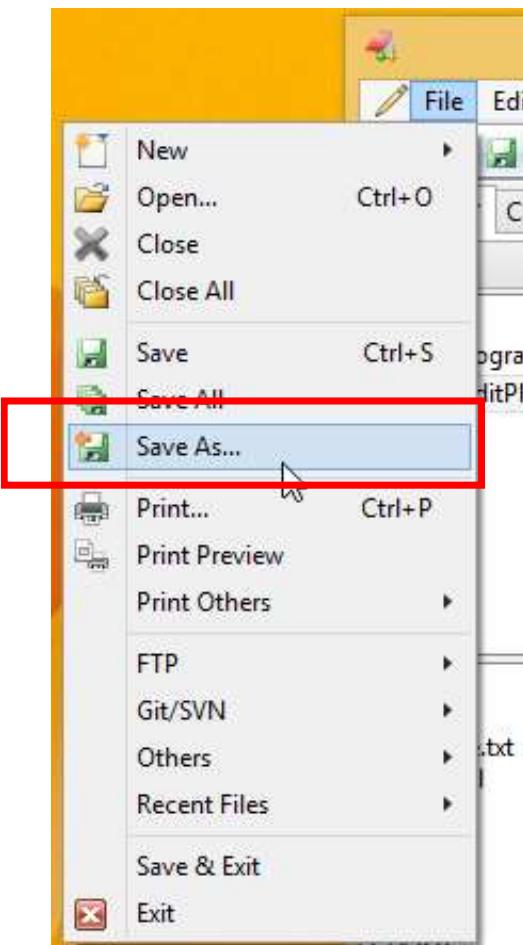
```
1 public class {
2     public static void main(String[] args) {
3
4     }
5 }
6
```

Numbered highlights are placed above the code:

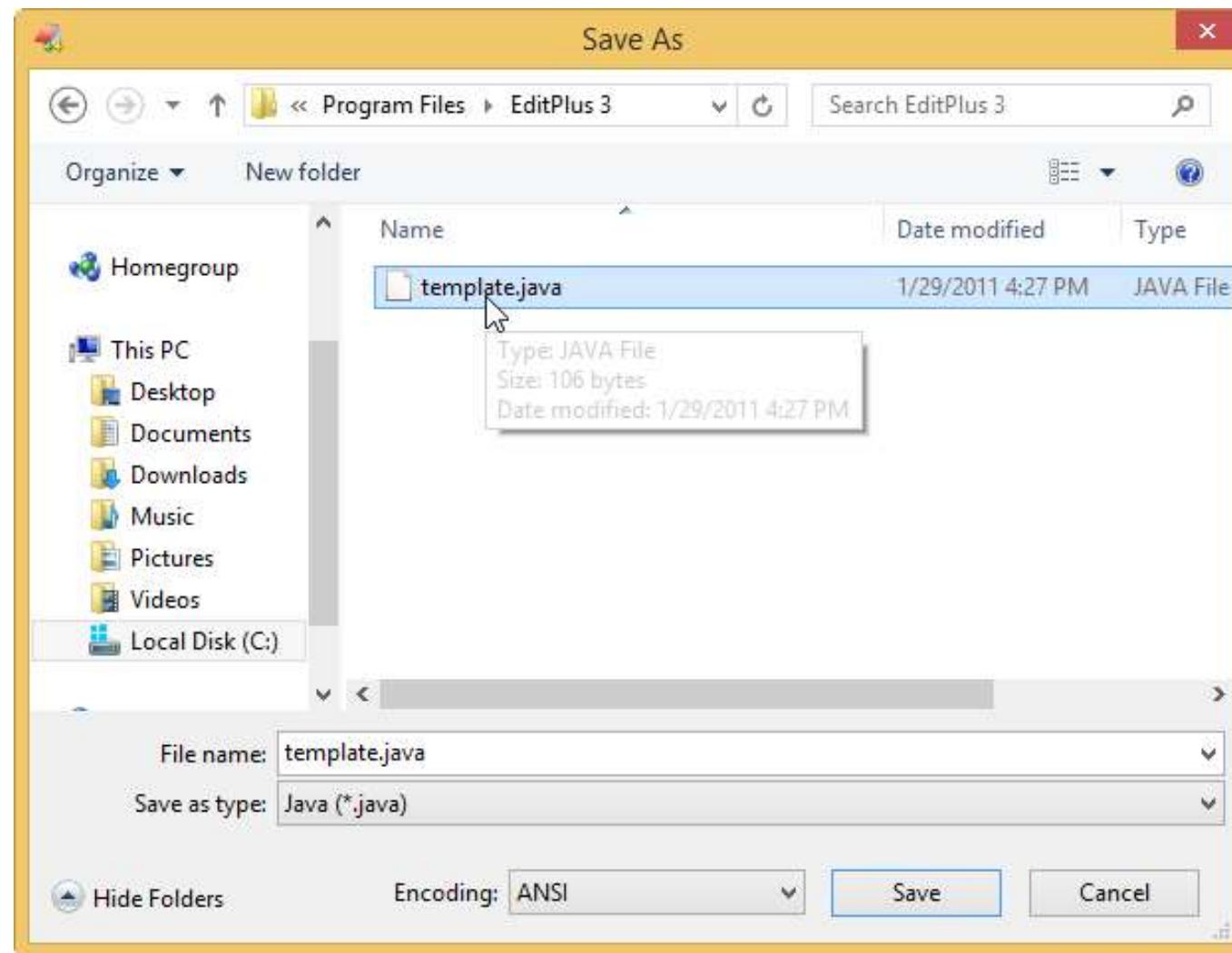
- 1: Above the first opening brace of the class definition.
- 2: Above the first opening brace of the main method.
- 3: Above the first blank line after the main method's opening brace.
- 4: Above the closing brace of the main method.

The interface includes a toolbar, menu bar, status bar at the bottom, and a file browser on the left.

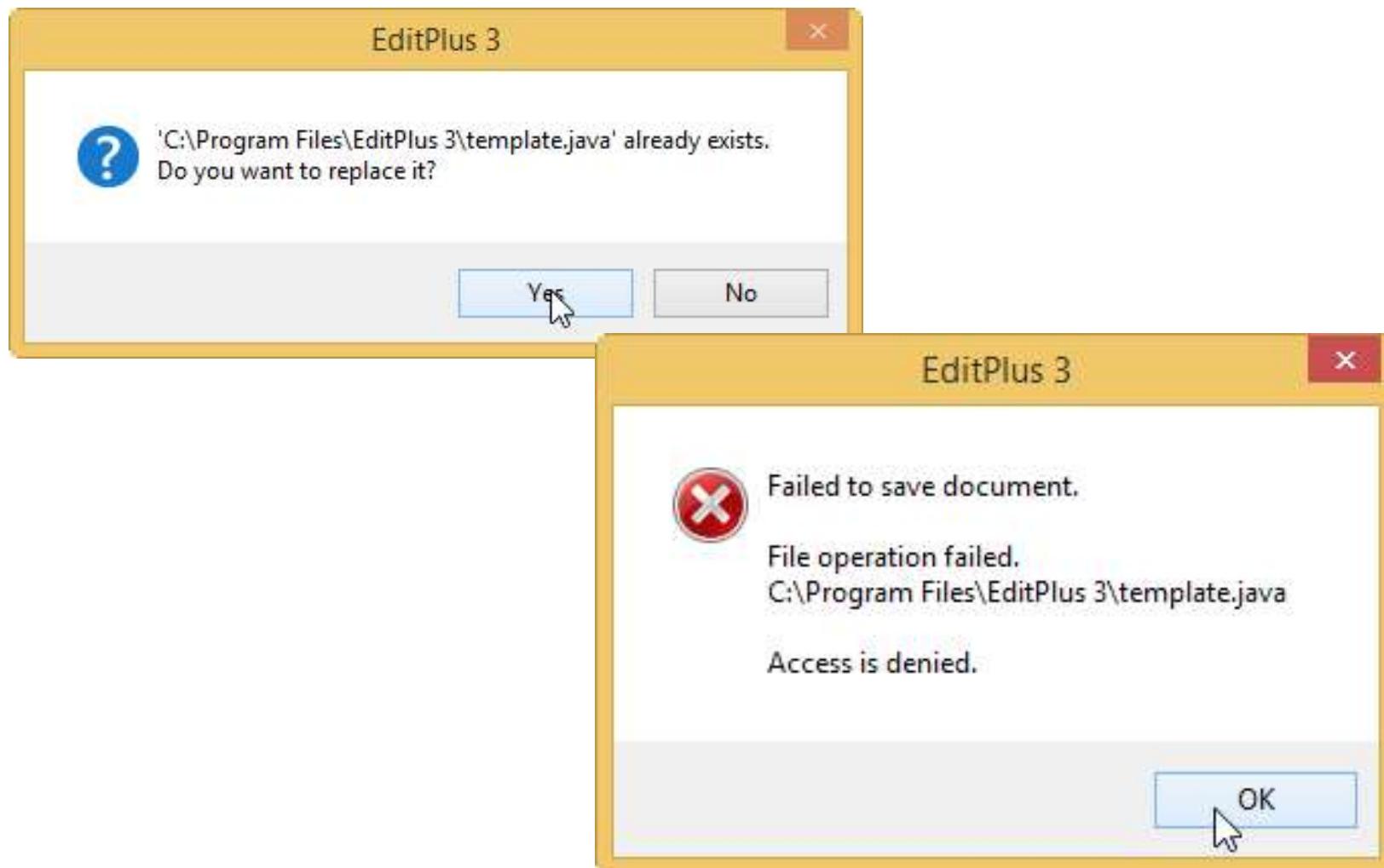
Template Configuration (Cont.)



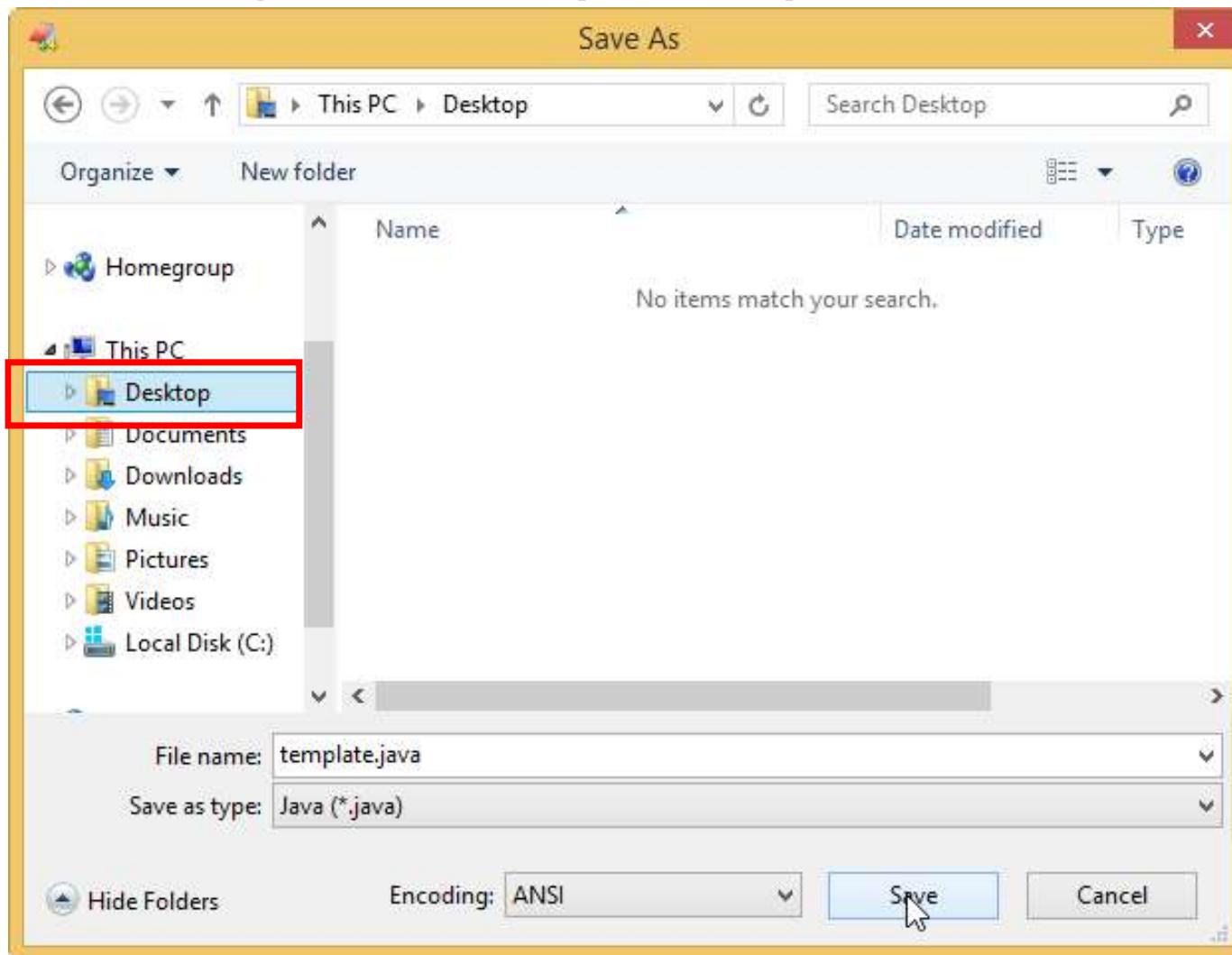
Template Configuration (Cont.)



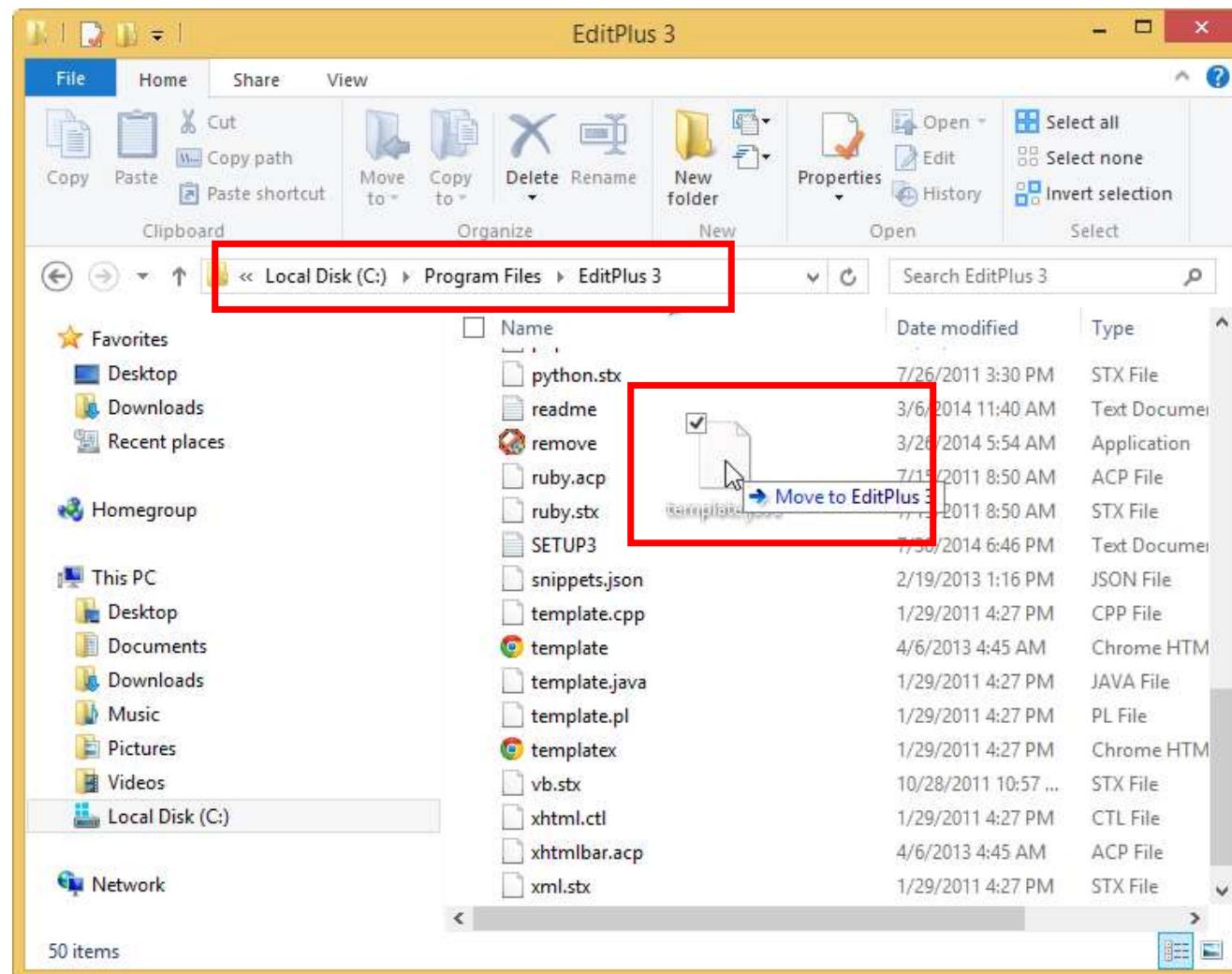
Template Configuration (Cont.)



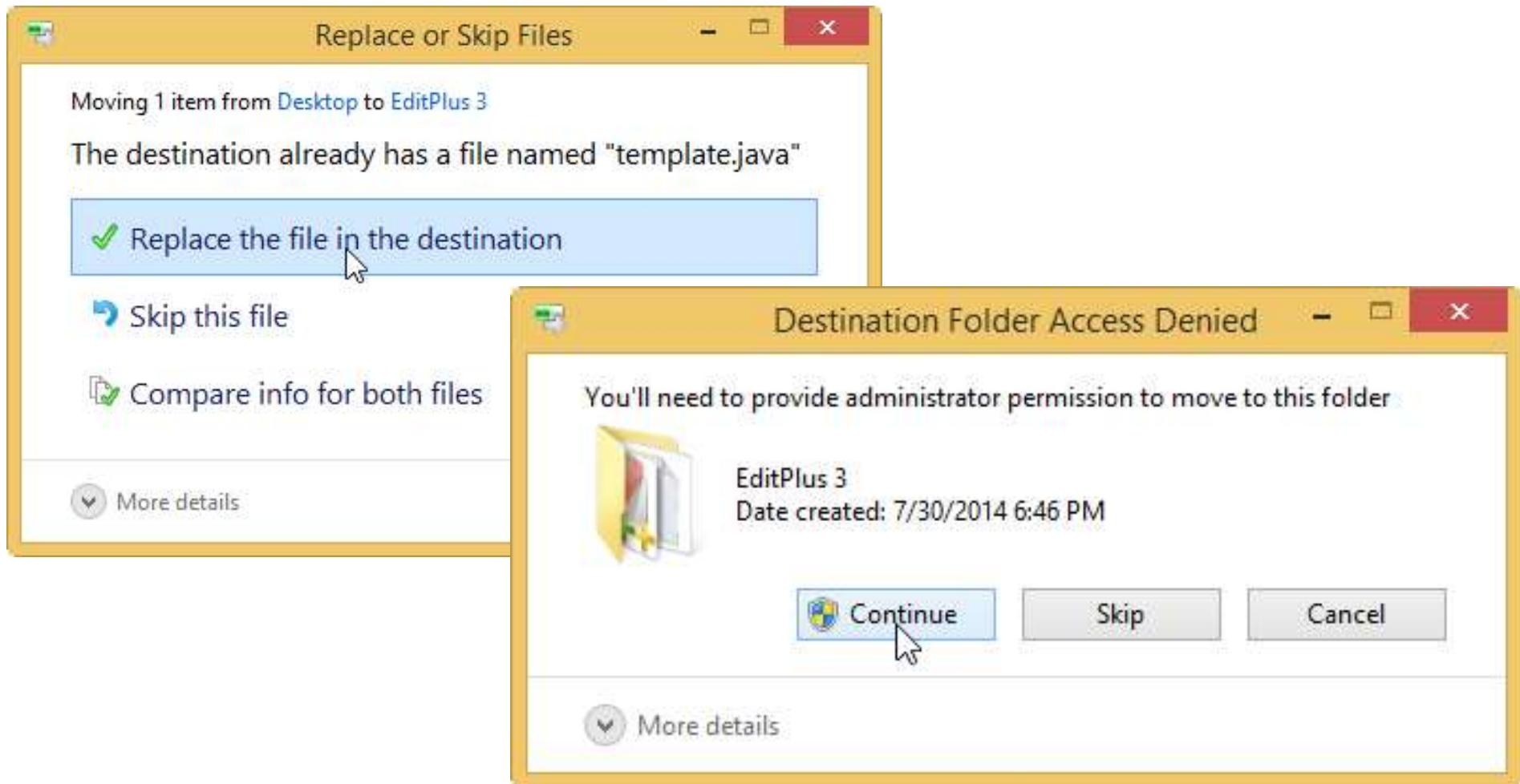
Template Configuration (Cont.)



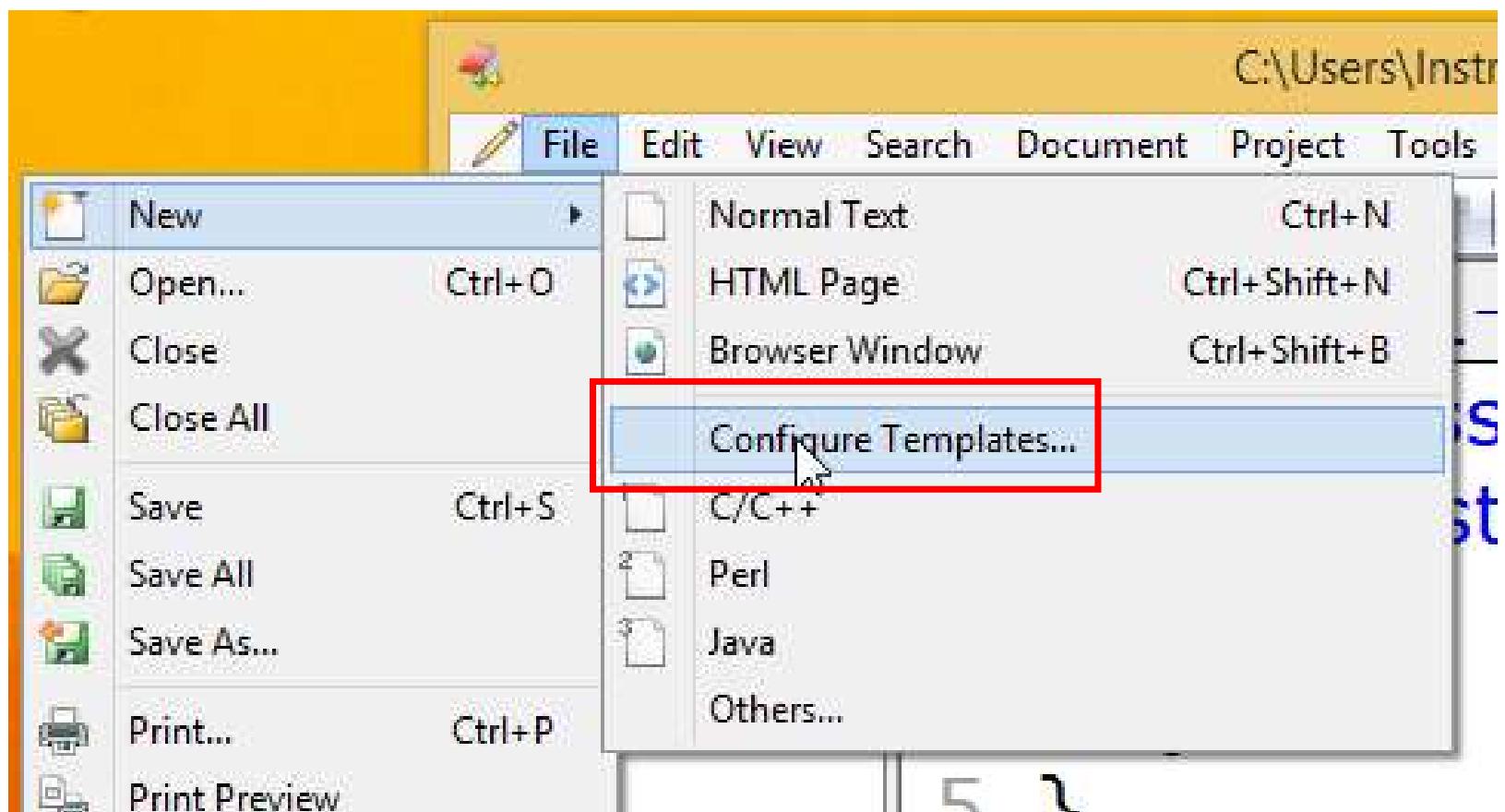
Template Configuration (Cont.)



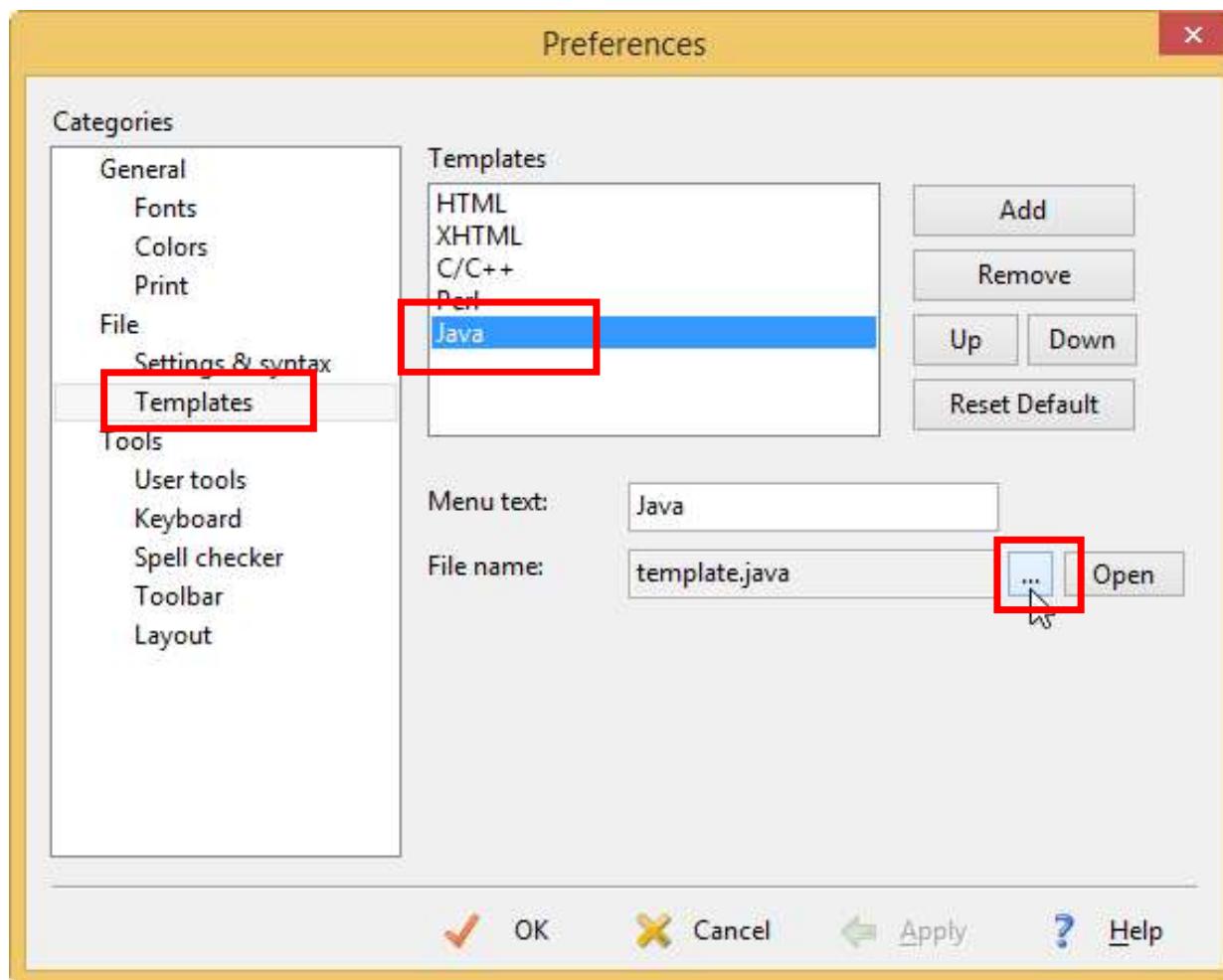
Template Configuration (Cont.)



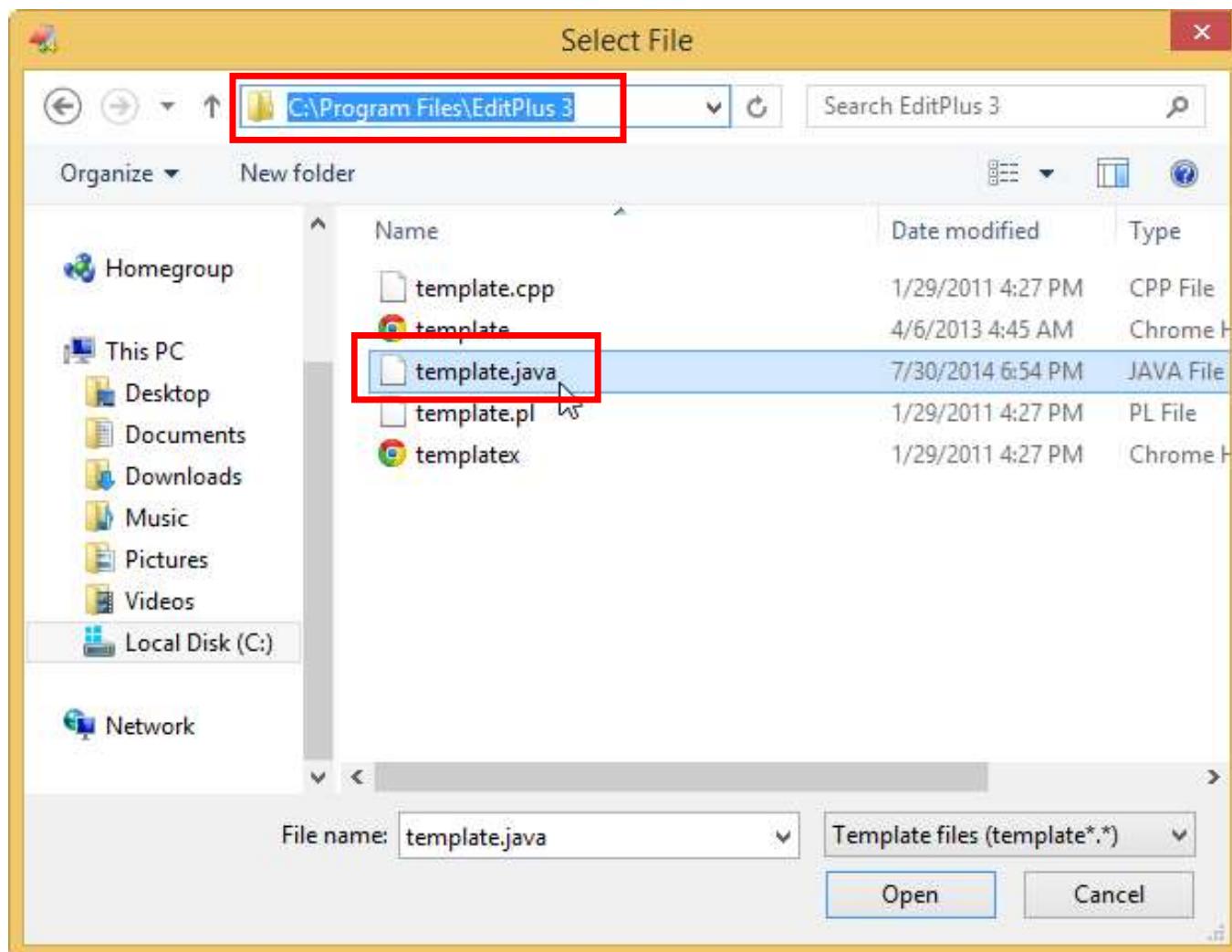
Template Configuration (Cont.)



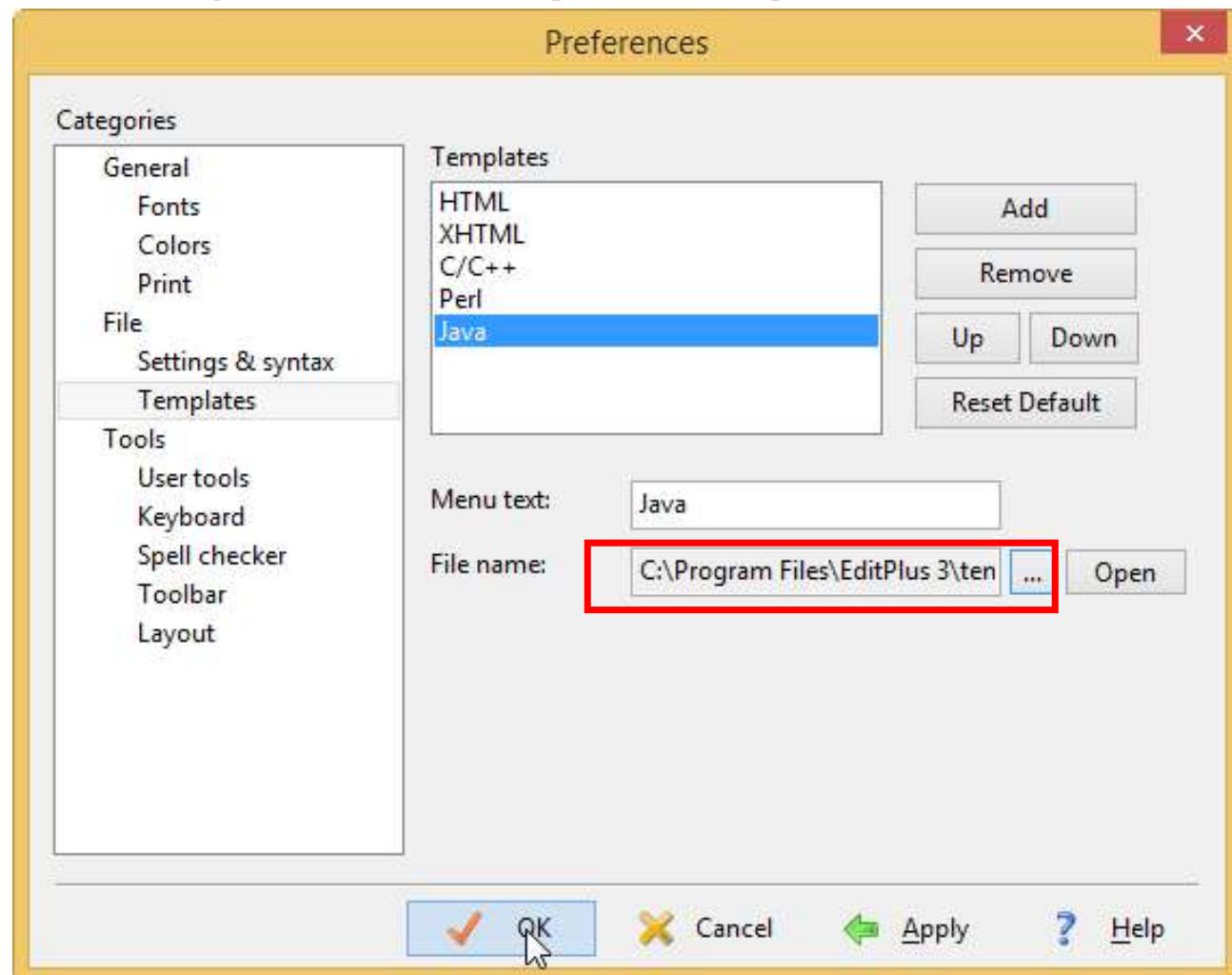
Template Configuration (Cont.)



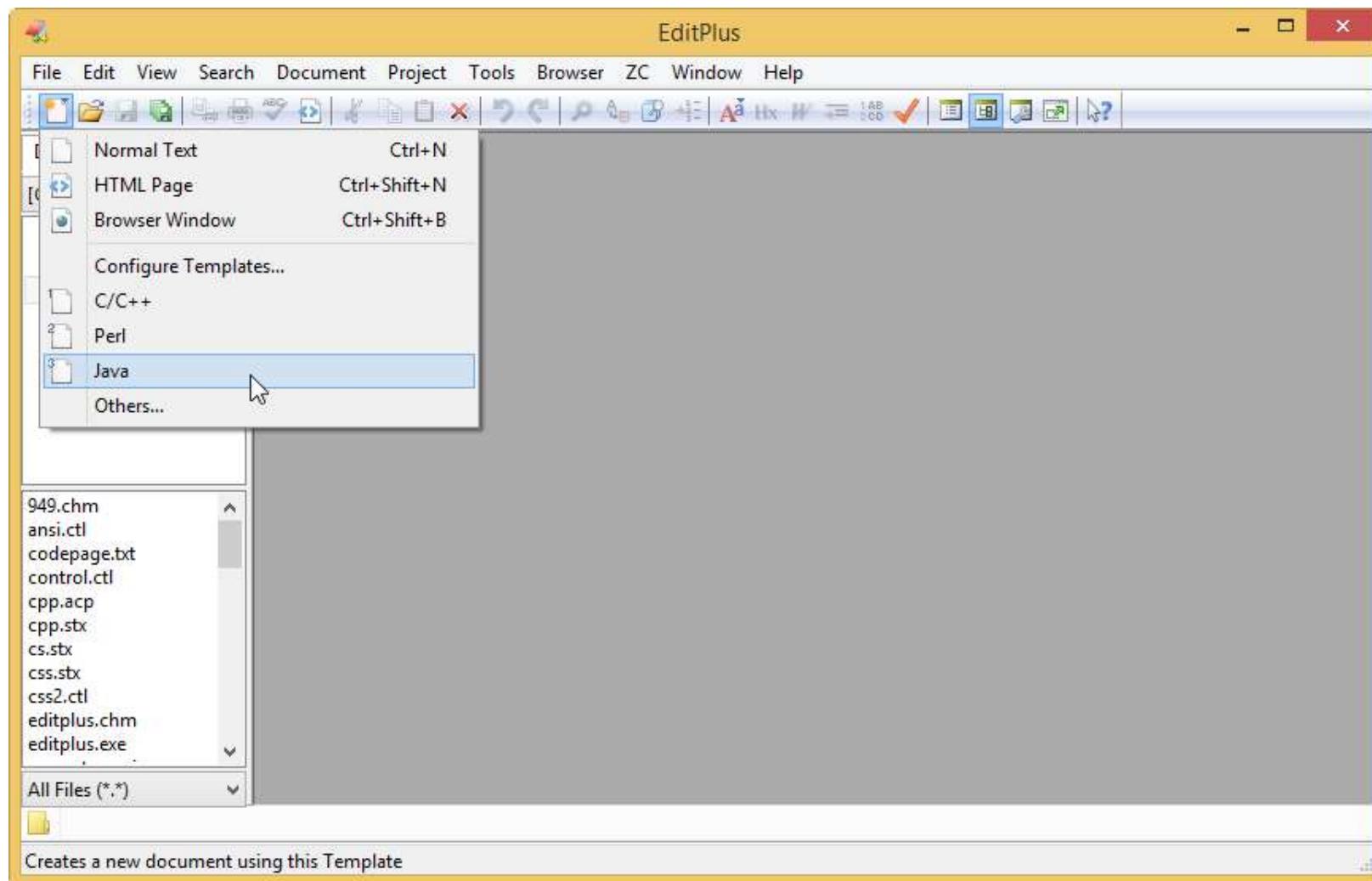
Template Configuration (Cont.)



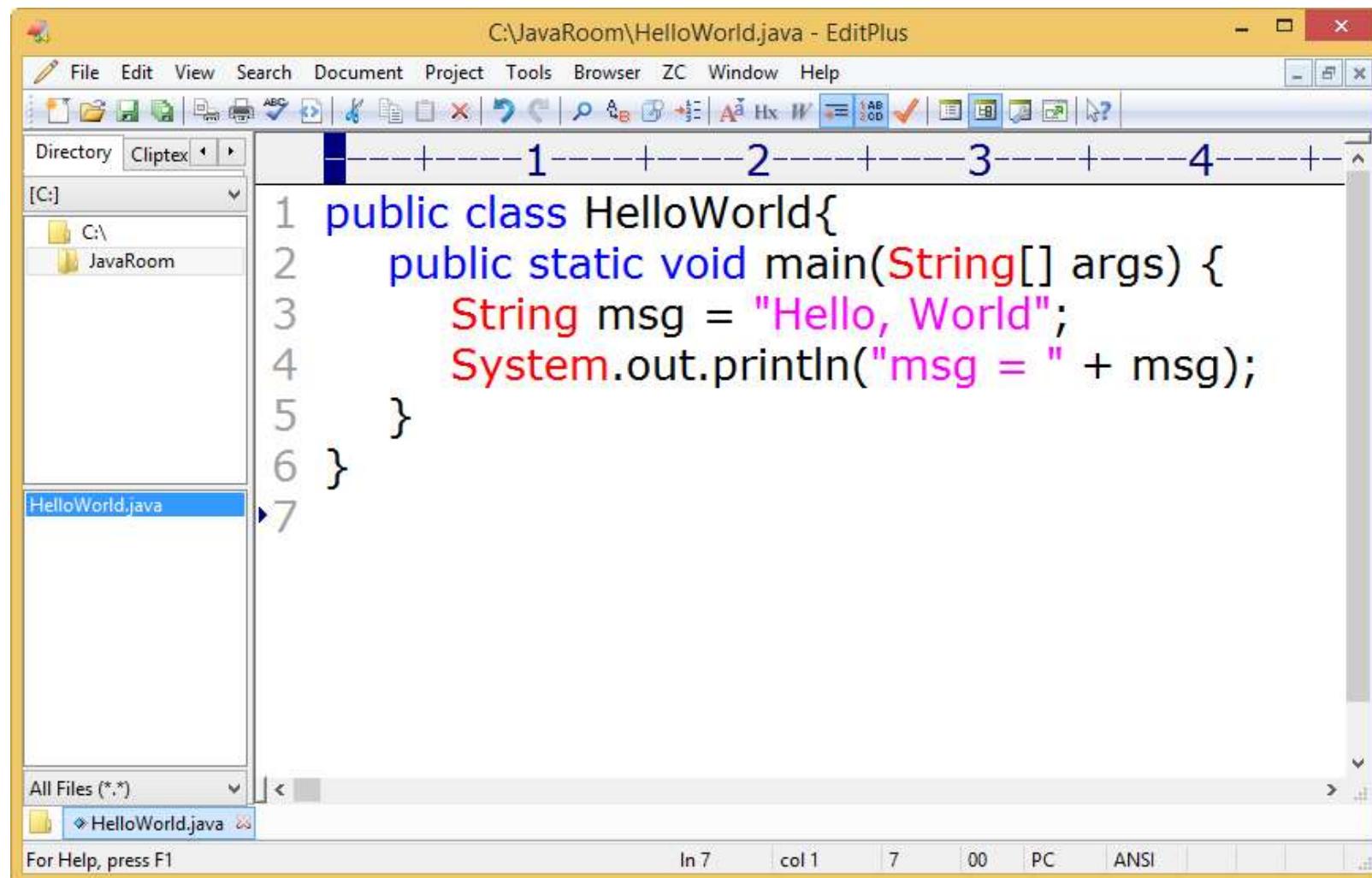
Template Configuration (Cont.)



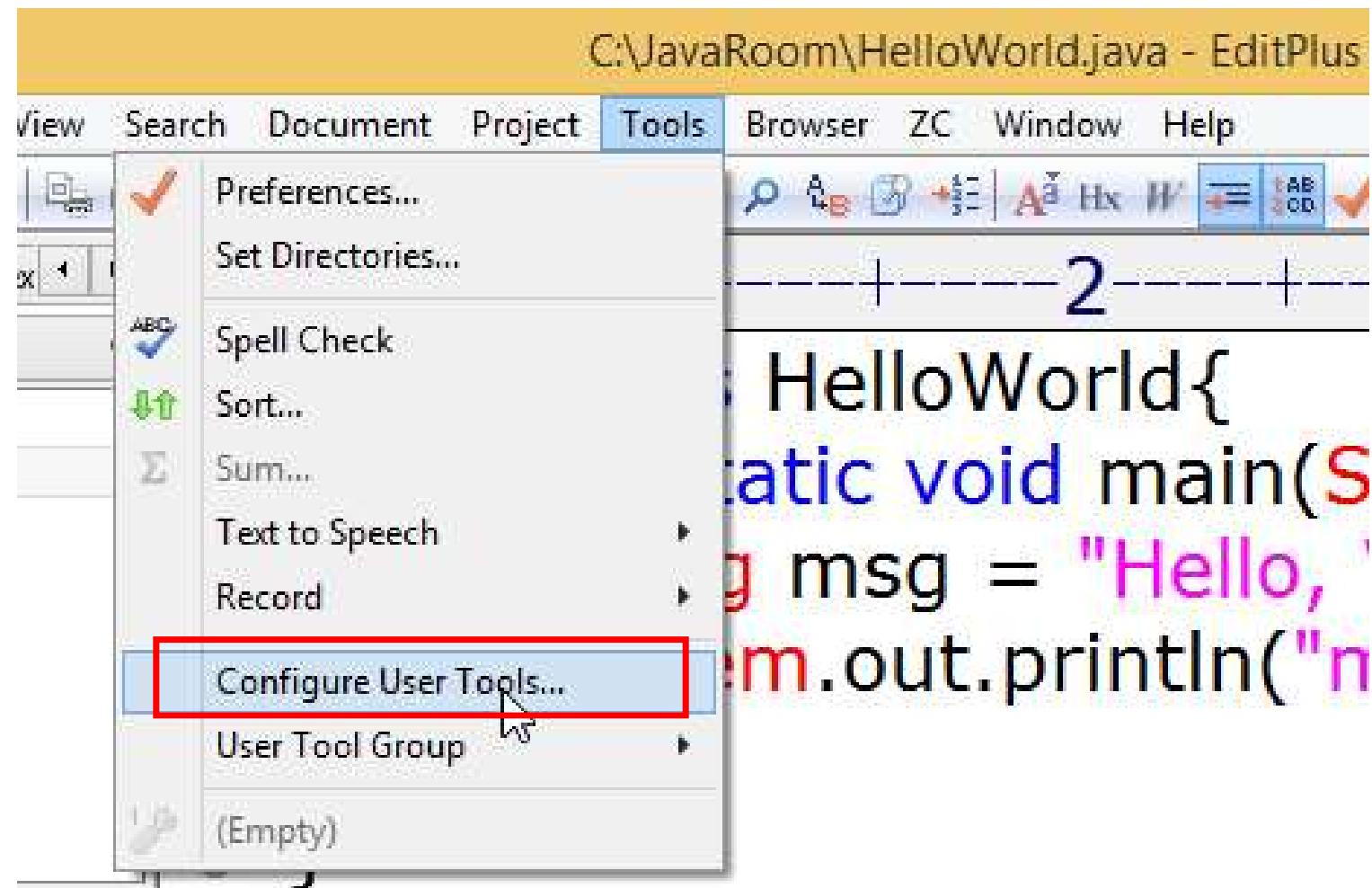
Template Configuration (Cont.)



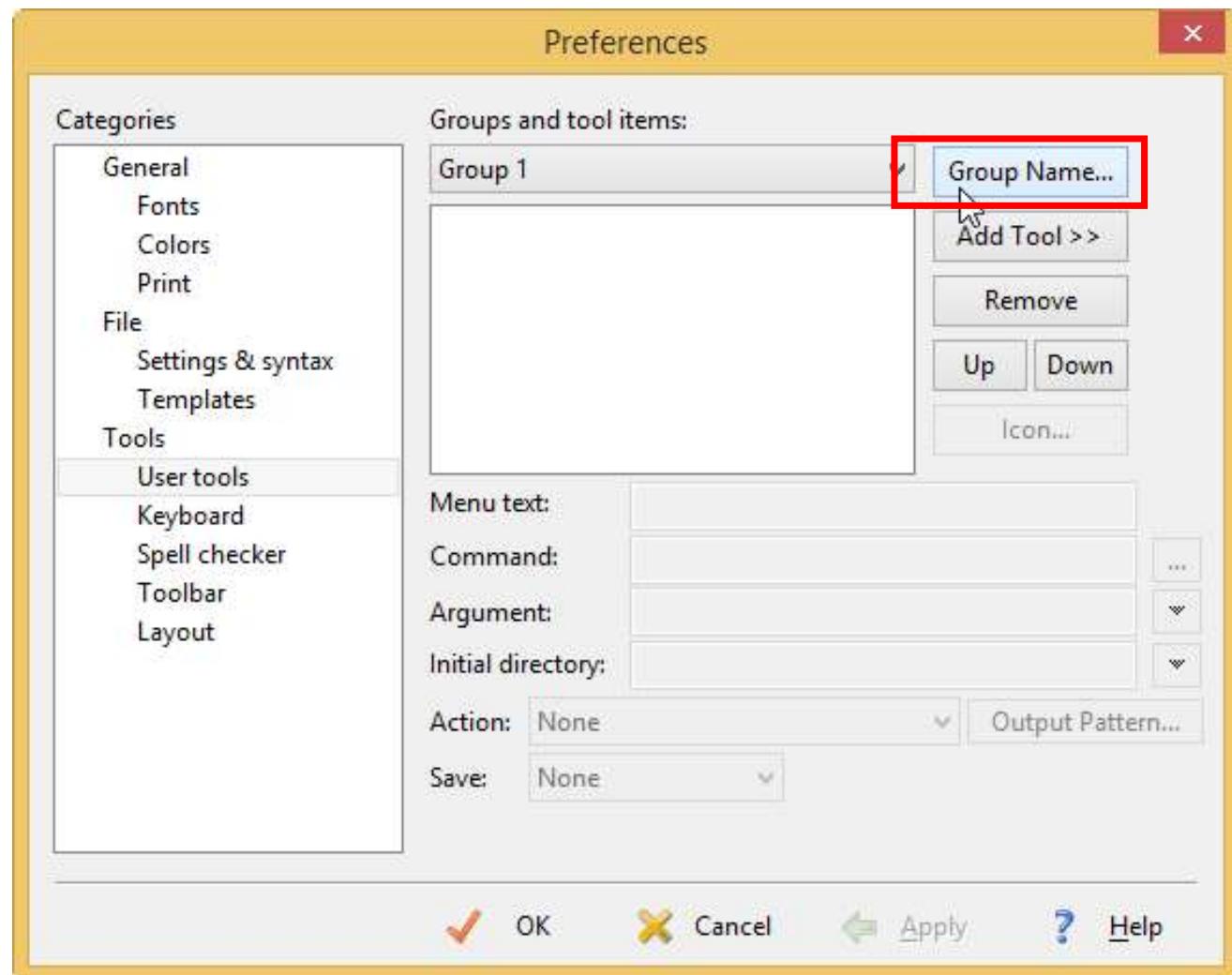
Configure User Tools



Configure User Tools



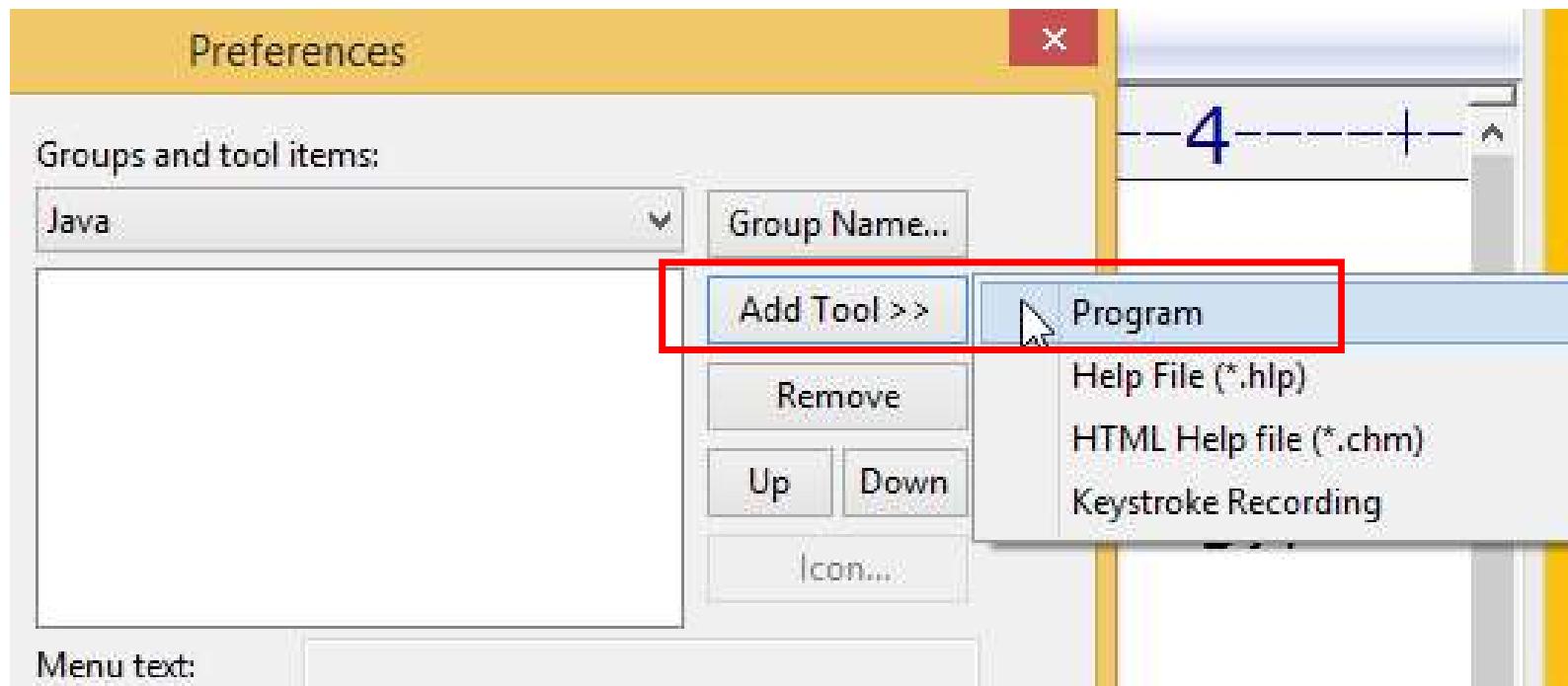
Change Group Name



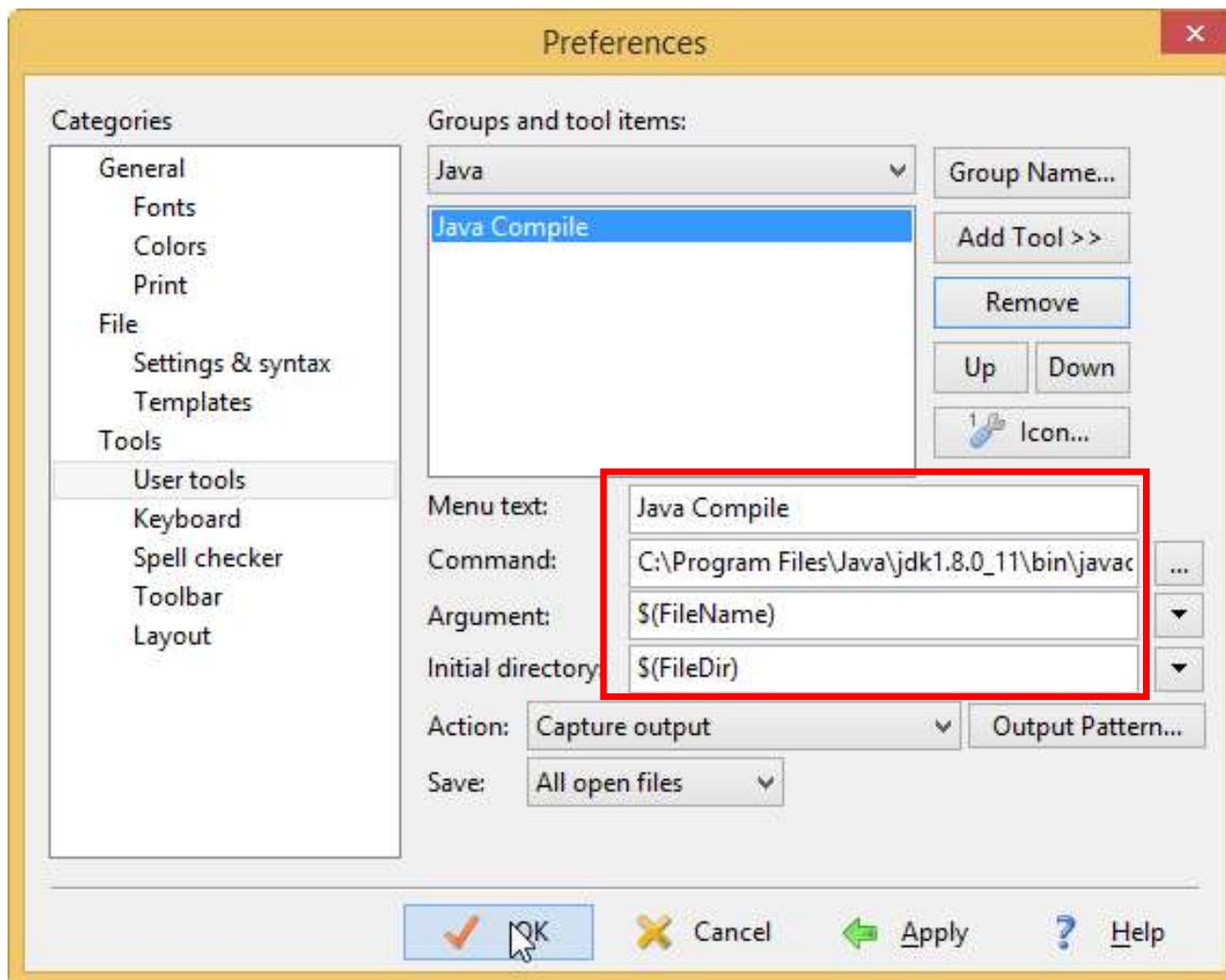
Change Group Name (Cont.)



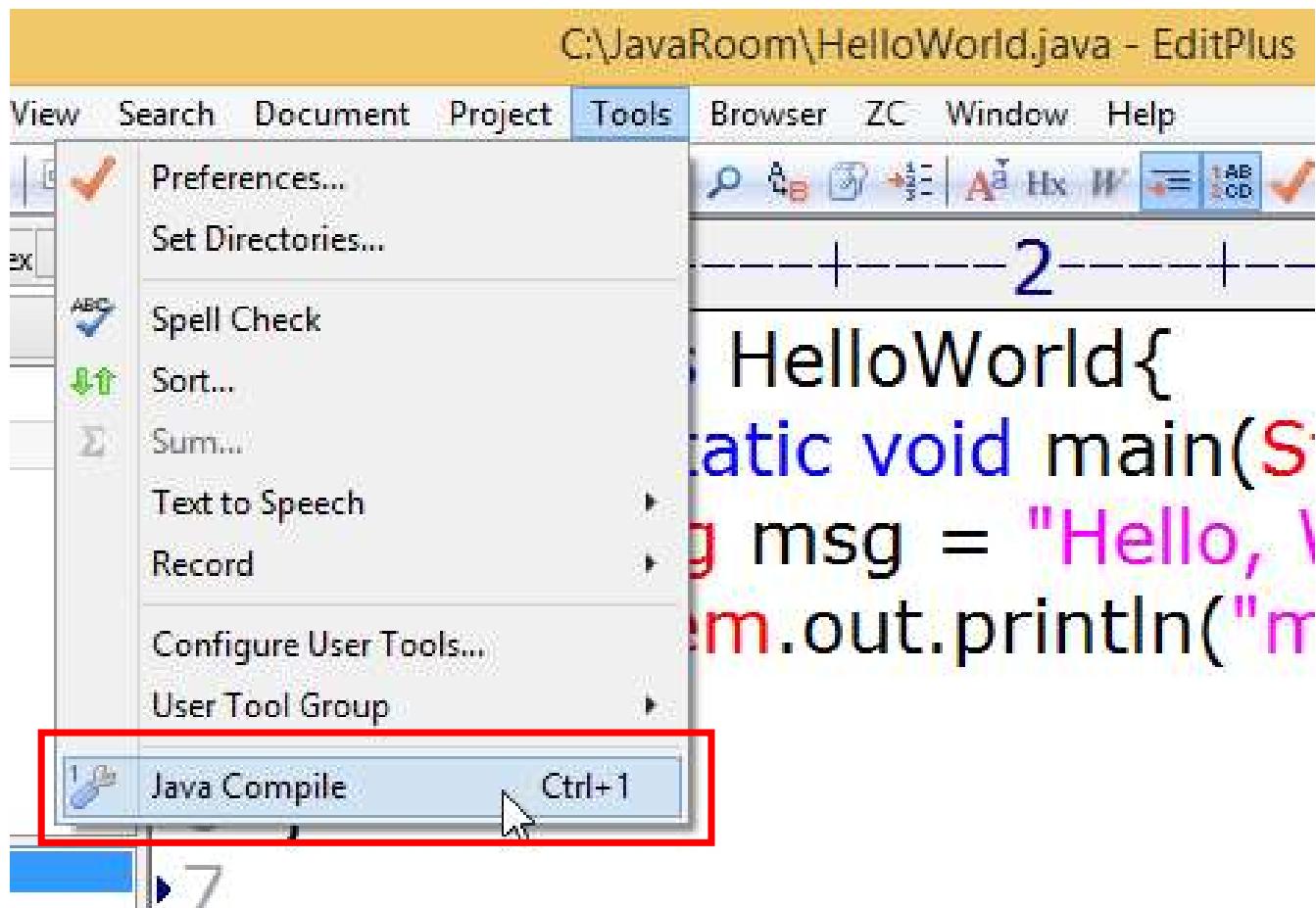
Register Compiler Tool



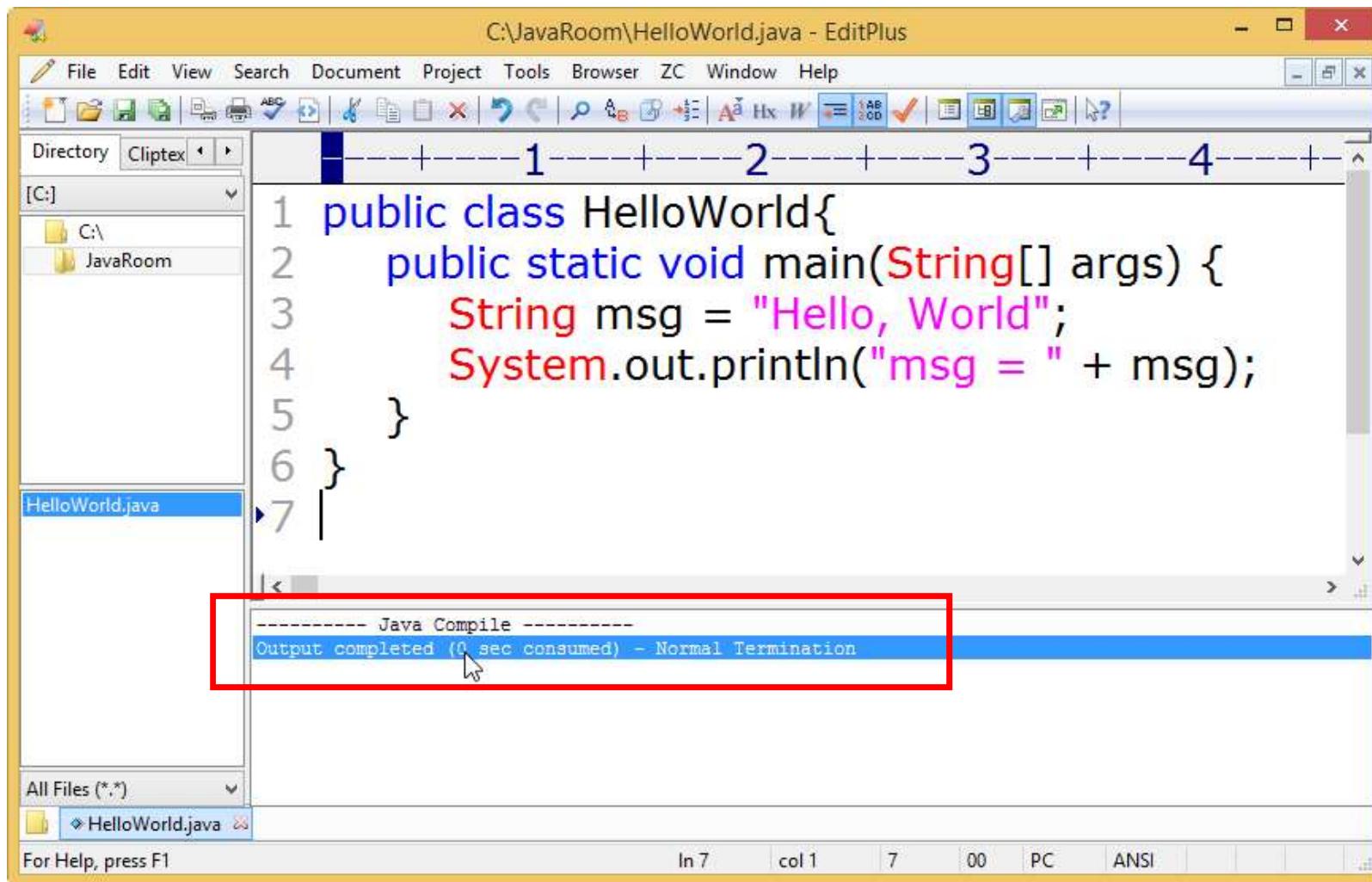
Register Compiler Tool (Cont.)



Register Compiler Tool (Cont.)



Register Compiler Tool (Cont.)

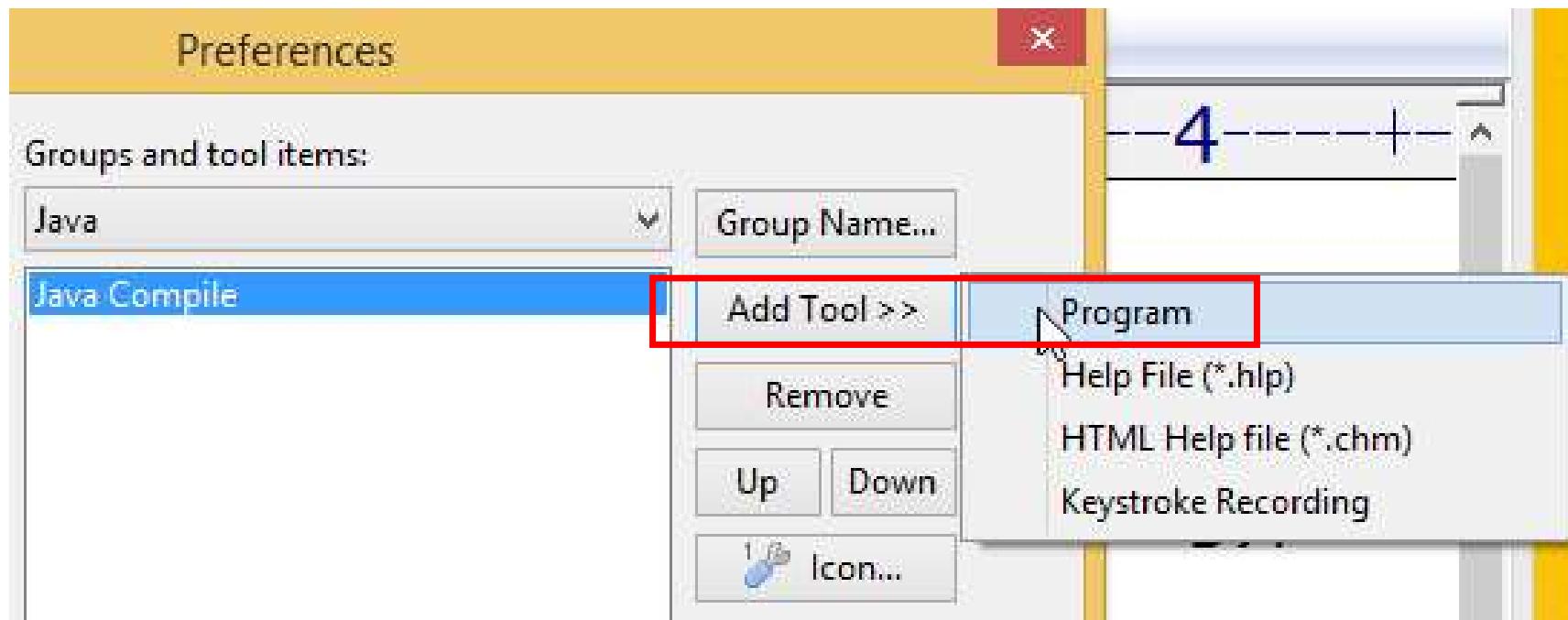


The screenshot shows the EditPlus text editor interface. The title bar reads "C:\JavaRoom\HelloWorld.java - EditPlus". The menu bar includes File, Edit, View, Search, Document, Project, Tools, Browser, ZC, Window, Help. The toolbar has various icons for file operations. The left sidebar shows a directory tree with "C:" and "JavaRoom" selected, and a file list with "HelloWorld.java" highlighted. The main code editor window displays the following Java code:

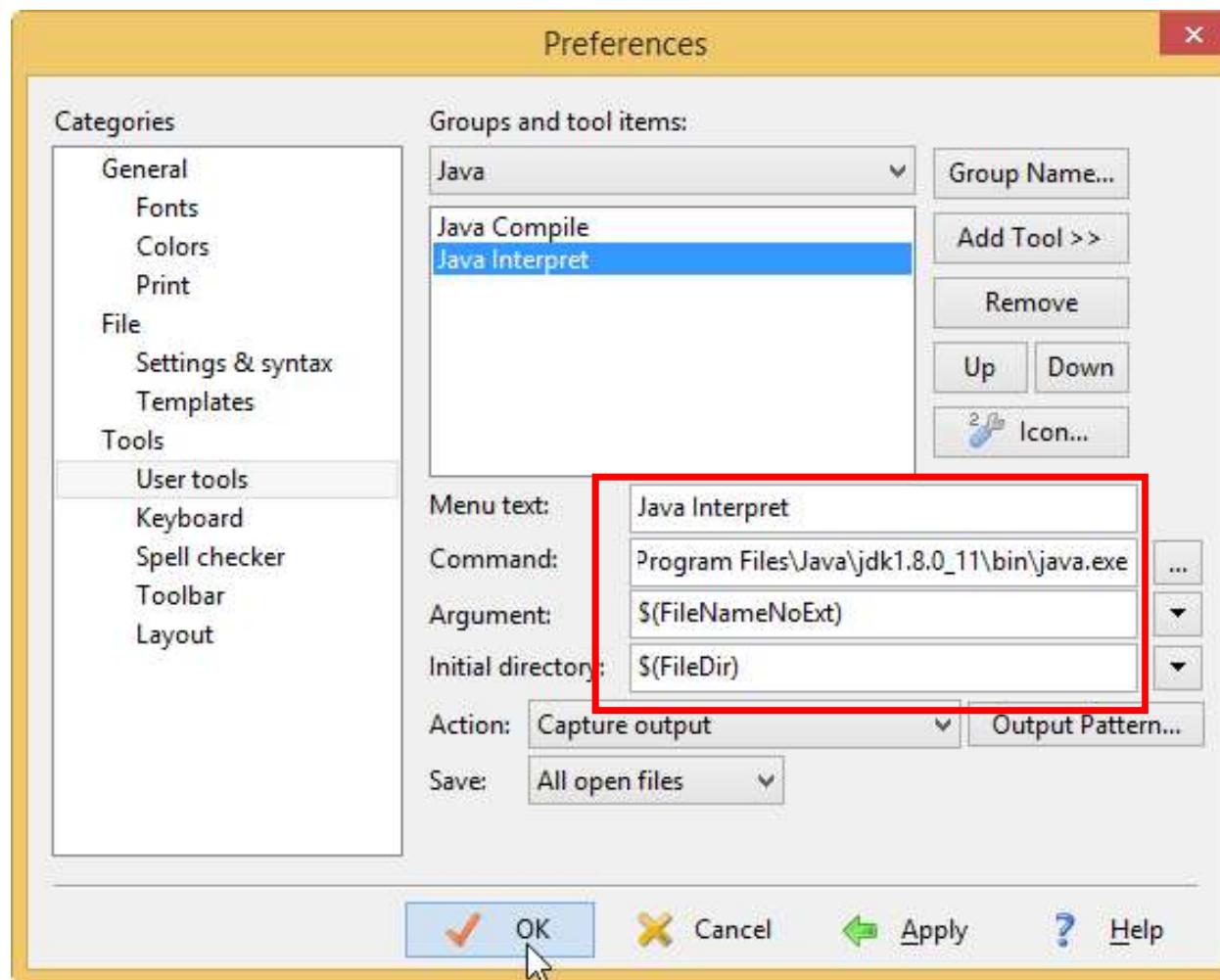
```
1 public class HelloWorld{
2     public static void main(String[] args) {
3         String msg = "Hello, World";
4         System.out.println("msg = " + msg);
5     }
6 }
7
```

At the bottom of the editor, there is a status bar with "For Help, press F1" and some other status indicators. A red box highlights a message in the status bar area that says "----- Java Compile ----- Output completed (0 sec consumed) - Normal Termination".

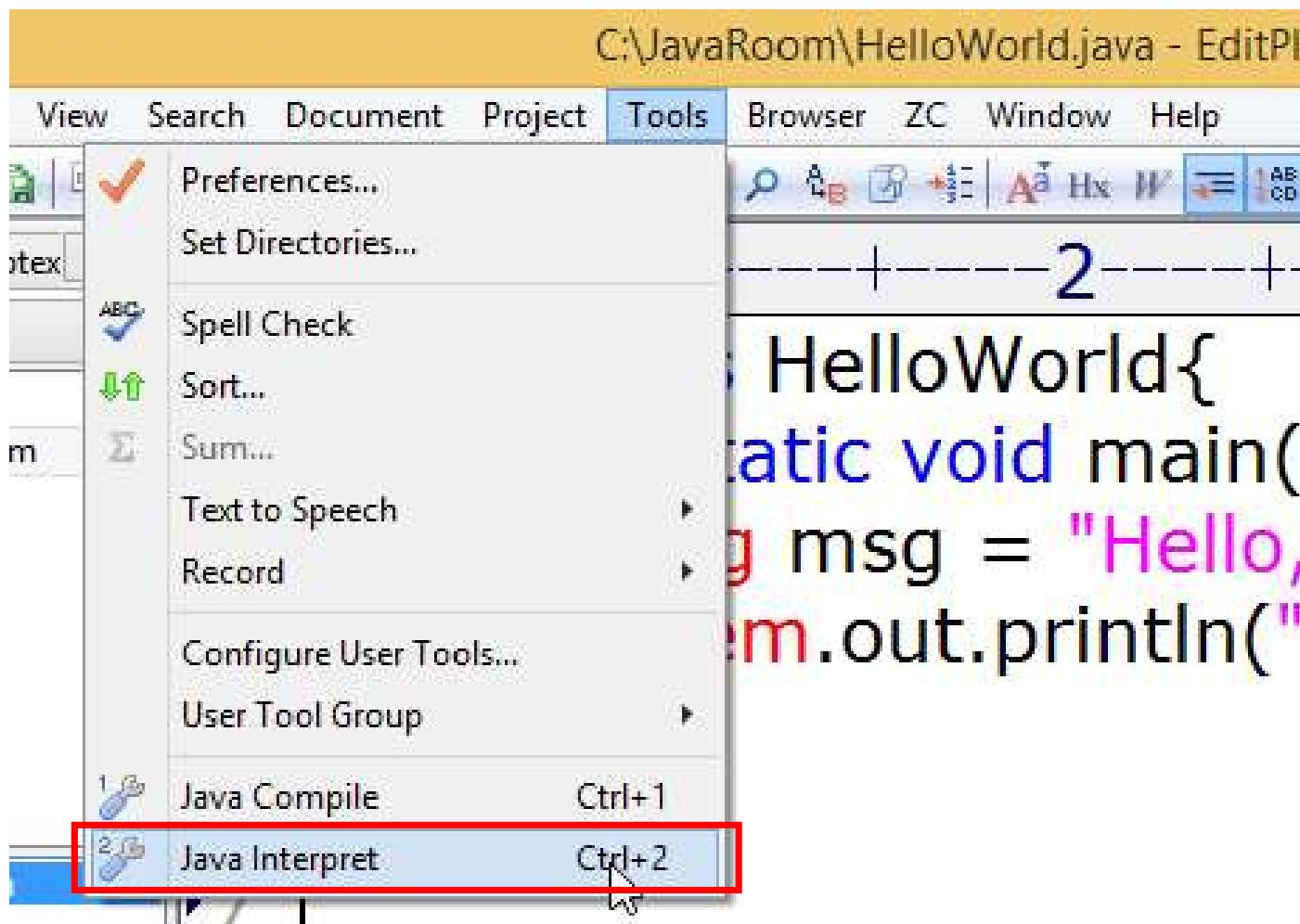
Register Interpreter Tool



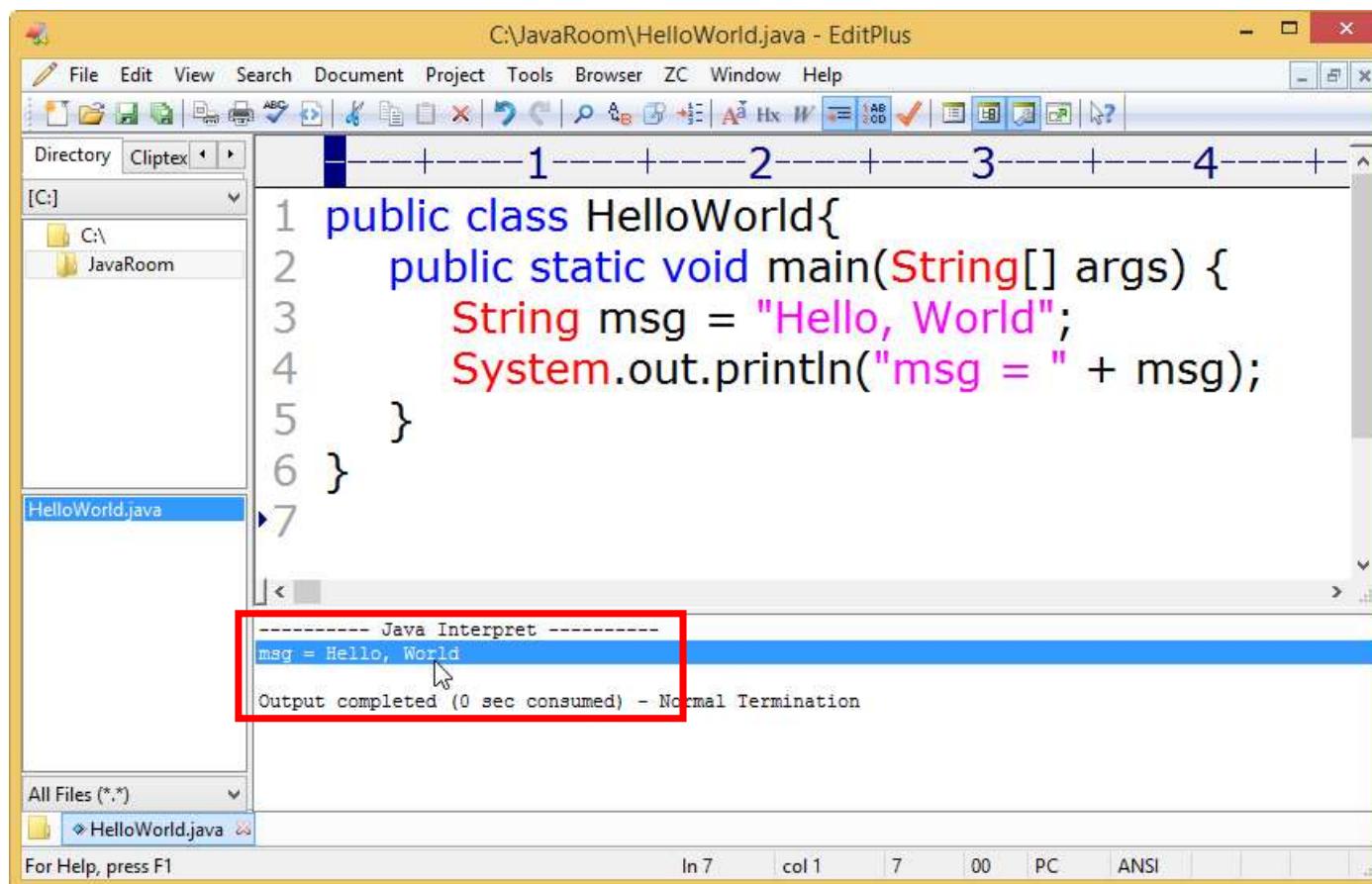
Register Interpreter Tool (Cont.)



Register Interpreter Tool (Cont.)



Register Interpreter Tool (Cont.)



The screenshot shows a Windows application window titled "C:\JavaRoom\HelloWorld.java - EditPlus". The window contains a code editor with the following Java code:

```
1 public class HelloWorld{
2     public static void main(String[] args) {
3         String msg = "Hello, World";
4         System.out.println("msg = " + msg);
5     }
6 }
```

Below the code editor is a terminal window showing the output of the Java interpreter:

```
----- Java Interpret -----
msg = Hello, World
Output completed (0 sec consumed) - Normal Termination
```

A red box highlights the terminal output area.

Eclipse Setting on Windows Platform



Connect to <https://www.eclipse.org>

The screenshot shows a web browser window displaying the Eclipse Foundation homepage at [eclipse.org](https://www.eclipse.org). The page features a dark background with orange and white text. At the top, there's a navigation bar with links for Projects, Supporters, Collaborations, Resources, and The Foundation, along with a prominent 'Download' button. The main headline reads 'The Community for Open Collaboration and Innovation'. Below it, a sub-headline states: 'The Eclipse Foundation provides our global community of individuals and organisations with a mature, scalable, and business-friendly environment for open source software collaboration and innovation.' A 'Learn More' button is located in a white box. On the right side, there's a graphic of a hand pointing at a network of nodes connected by lines. A large orange banner at the bottom encourages users to 'Take the 2024 IoT &'. At the very bottom, a cookie consent message from the Eclipse Foundation informs users about cookie usage and provides 'Decline' and 'Allow cookies' buttons.

The Eclipse Foundation provides our global community of individuals and organisations with a mature, scalable, and business-friendly environment for open source software collaboration and innovation.

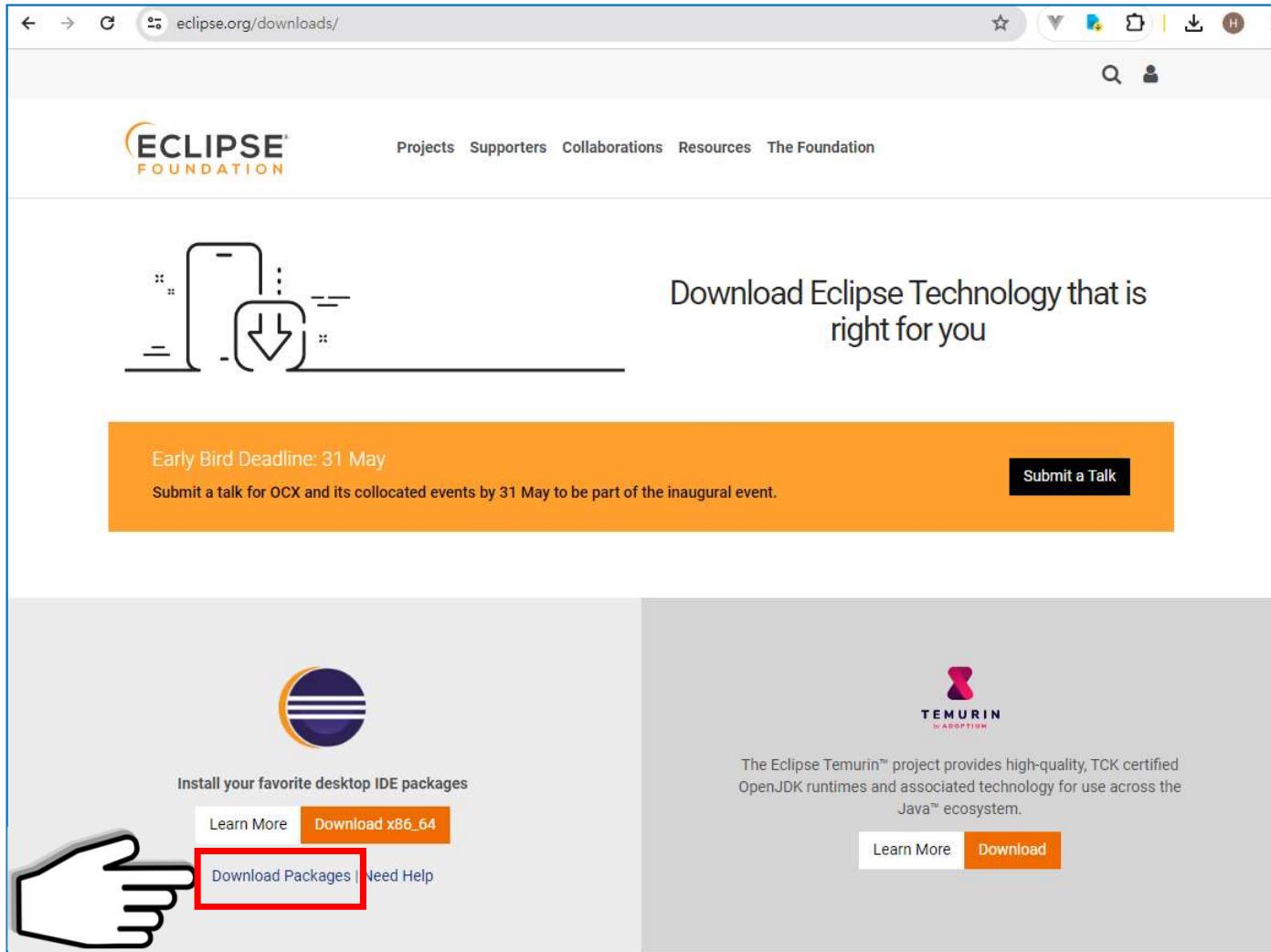
Learn More

Take the 2024 IoT &

Some Eclipse Foundation pages use cookies to better serve you when you return to the site. You can set your browser to notify you before you receive a cookie or turn off cookies. If you do so, however, some areas of some sites may not function properly. To read Eclipse Foundation Privacy Policy [click here](#).

Decline Allow cookies

Eclipse Downloads from <https://www.eclipse.org/downloads/>



The screenshot shows the Eclipse Foundation's Downloads page. At the top, there is a navigation bar with links for Projects, Supporters, Collaborations, Resources, and The Foundation. Below the navigation, there is a search bar and a user icon. The main content area features the Eclipse Foundation logo and a large graphic of a smartphone with a download arrow pointing to it. To the right, the text "Download Eclipse Technology that is right for you" is displayed. A yellow banner at the bottom left promotes an "Early Bird Deadline: 31 May" for OCX events, with a "Submit a Talk" button. The main content area is divided into two sections: one for desktop IDE packages and one for the Eclipse Temurin project.

Desktop IDE Packages

Install your favorite desktop IDE packages

Learn More [Download x86_64](#)

Download Packages | Need Help

Eclipse Temurin

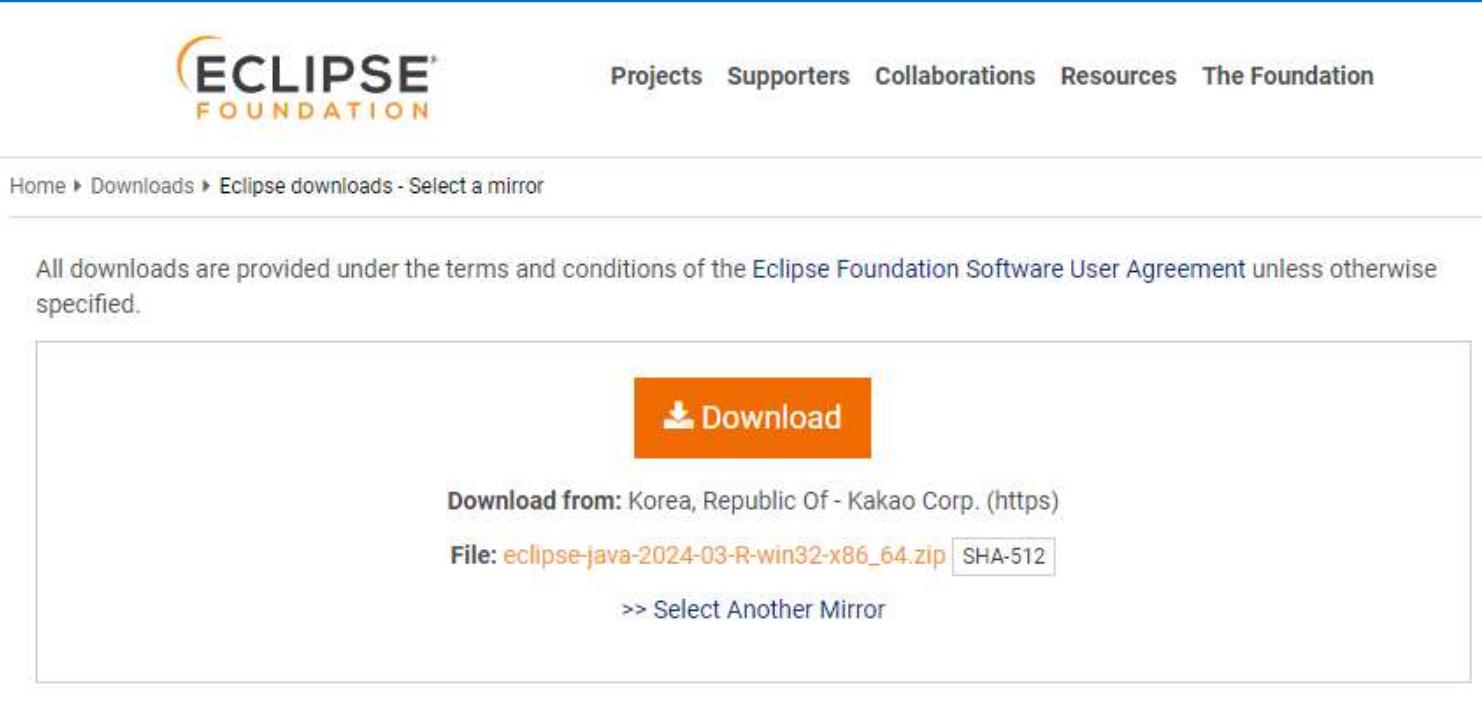
The Eclipse Temurin™ project provides high-quality, TCK certified OpenJDK runtimes and associated technology for use across the Java™ ecosystem.

Learn More [Download](#)

Eclipse Downloads from <https://www.eclipse.org/downloads/packages/> (Cont.)

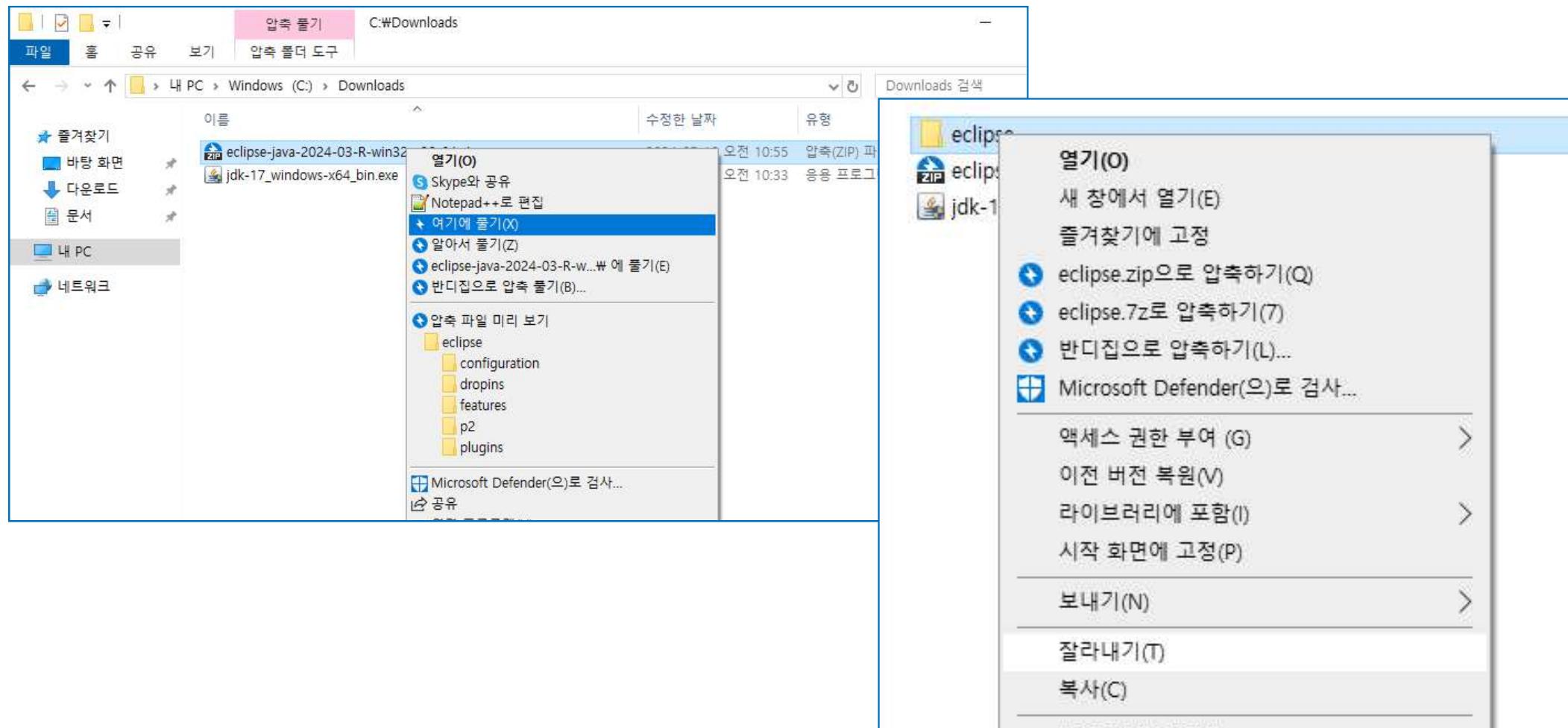
The screenshot shows the Eclipse Foundation website's download page for the Eclipse IDE 2024-03 R Packages. At the top, there's a banner stating: "The Eclipse Installer 2024-03 R now includes a JRE for macOS, Windows and Linux." Below this, there's a section titled "Try the Eclipse Installer 2024-03 R" which includes a link to "Find out more" and download counts for "1,273,215 Installer Downloads" and "954,048 Package Downloads and Updates". To the right, there's a "Download" section with links for "macOS x86_64 | AArch64", "Windows x86_64", and "Linux x86_64 | AArch64". A large hand icon points to the "Windows x86_64" link, which is highlighted with a red box. On the right side of the main content area, there's an advertisement for "list ceatech" with the tagline "An Open-Source Strategy" and a "Learn More" button. At the bottom, there are links for "Eclipse IDE for Java Developers" and "Eclipse IDE for Enterprise Java and Web".

Eclipse Downloads from <http://www.eclipse.org/download/packages/> (Cont.)

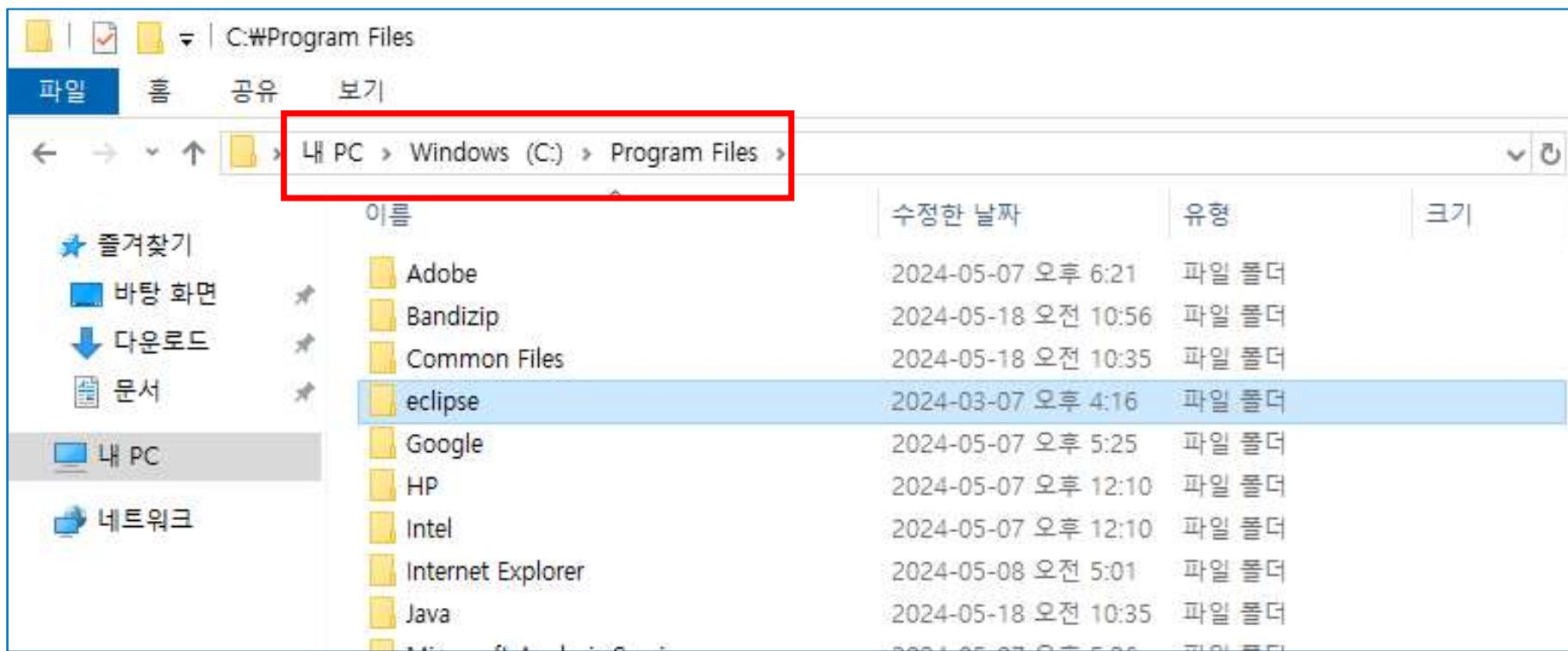


The screenshot shows the Eclipse Foundation's Downloads page. At the top, there is a navigation bar with links to Projects, Supporters, Collaborations, Resources, and The Foundation. Below the navigation bar, a breadcrumb trail indicates the current location: Home ▶ Downloads ▶ Eclipse downloads - Select a mirror. A note below the breadcrumb states: "All downloads are provided under the terms and conditions of the Eclipse Foundation Software User Agreement unless otherwise specified." In the center, there is a large orange "Download" button with a downward arrow icon. Below the button, the download information is displayed: "Download from: Korea, Republic Of - Kakao Corp. (https)" and "File: [eclipse-java-2024-03-R-win32-x86_64.zip](#) [SHA-512]". At the bottom of the download area, there is a link: ">> Select Another Mirror".

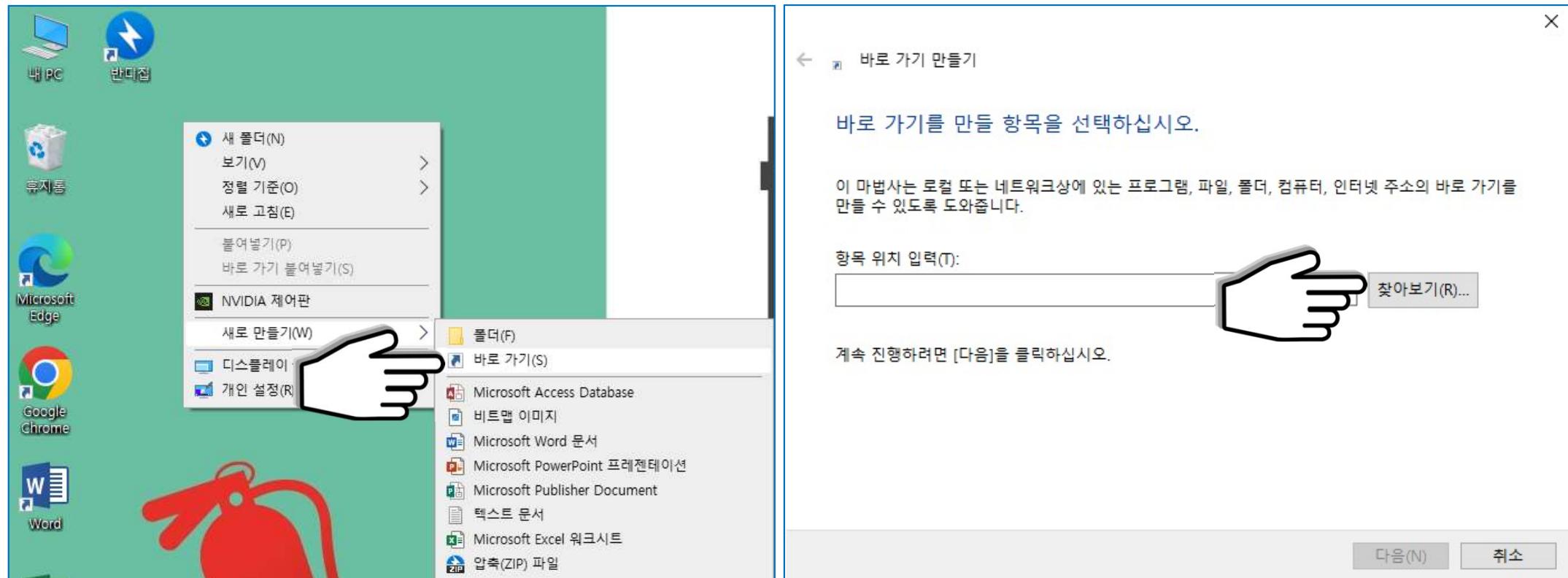
Unzip Files & Move



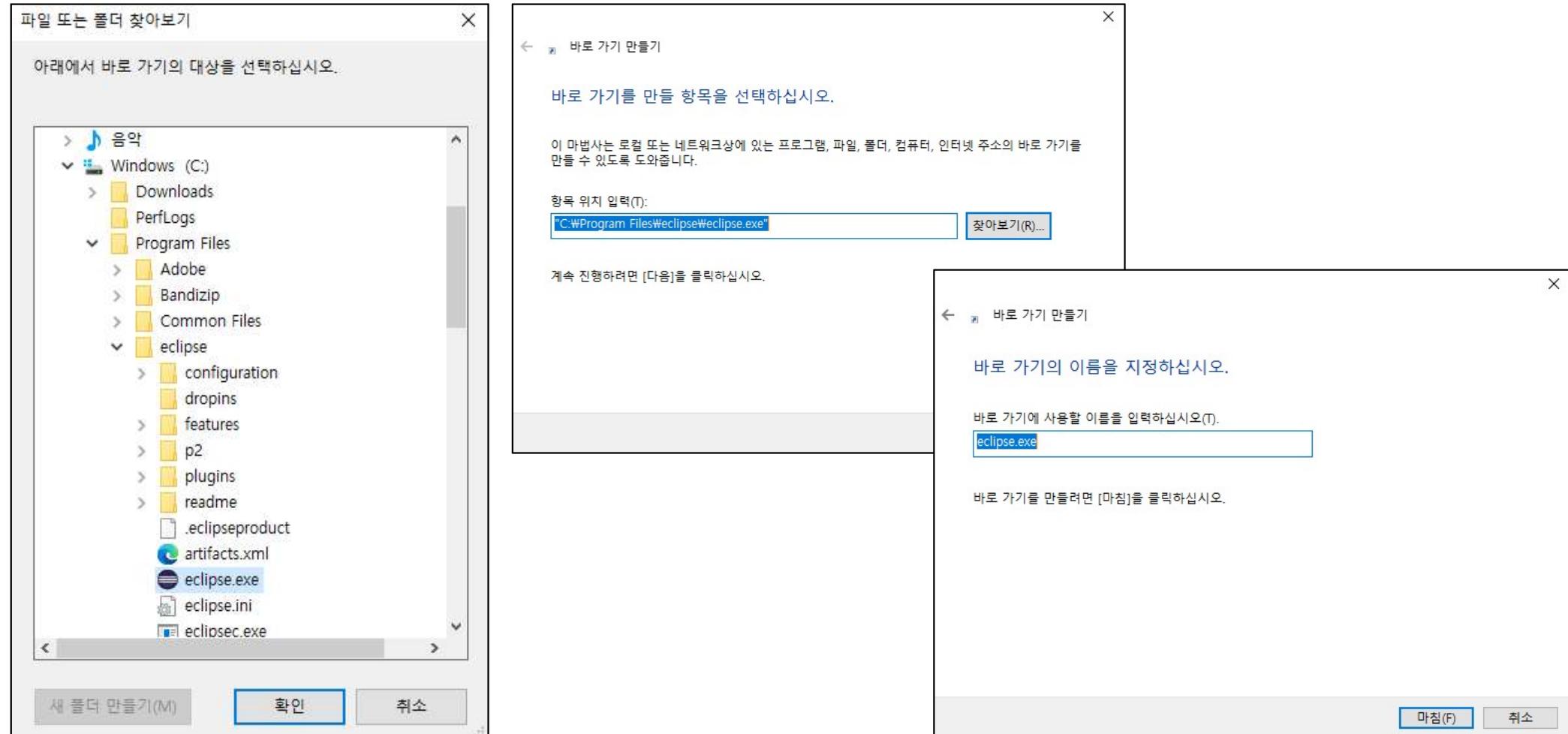
Unzip Files & Move (Cont.)



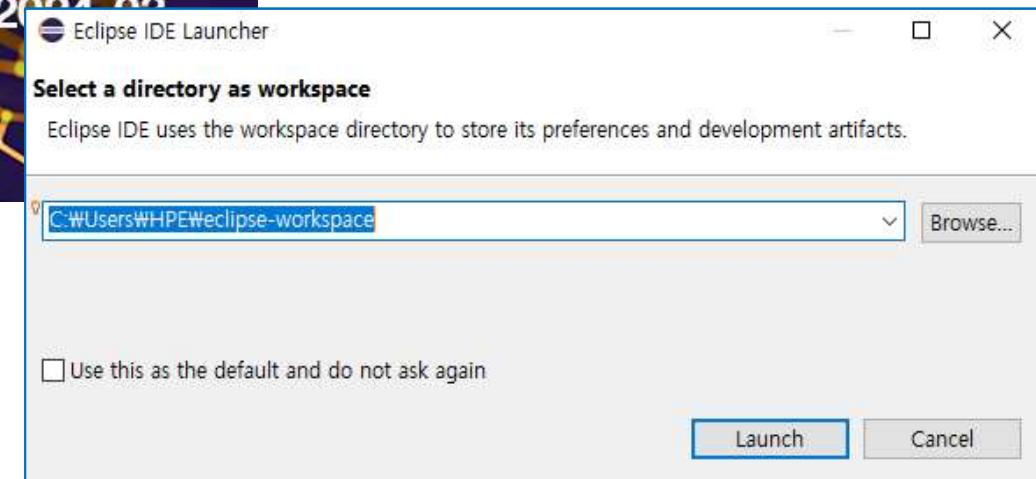
Creates desktop shortcut file



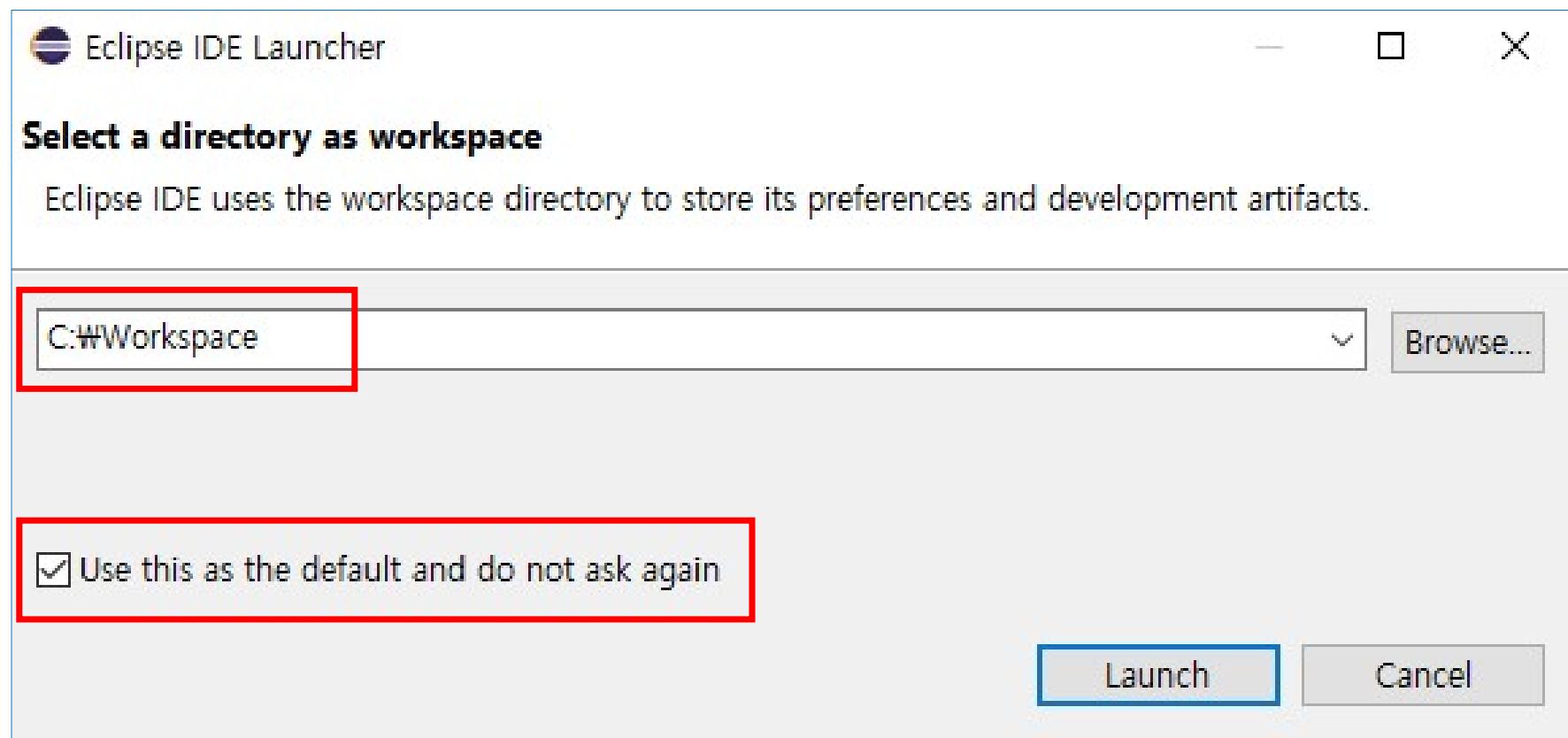
Creates desktop shortcut file (Cont.)

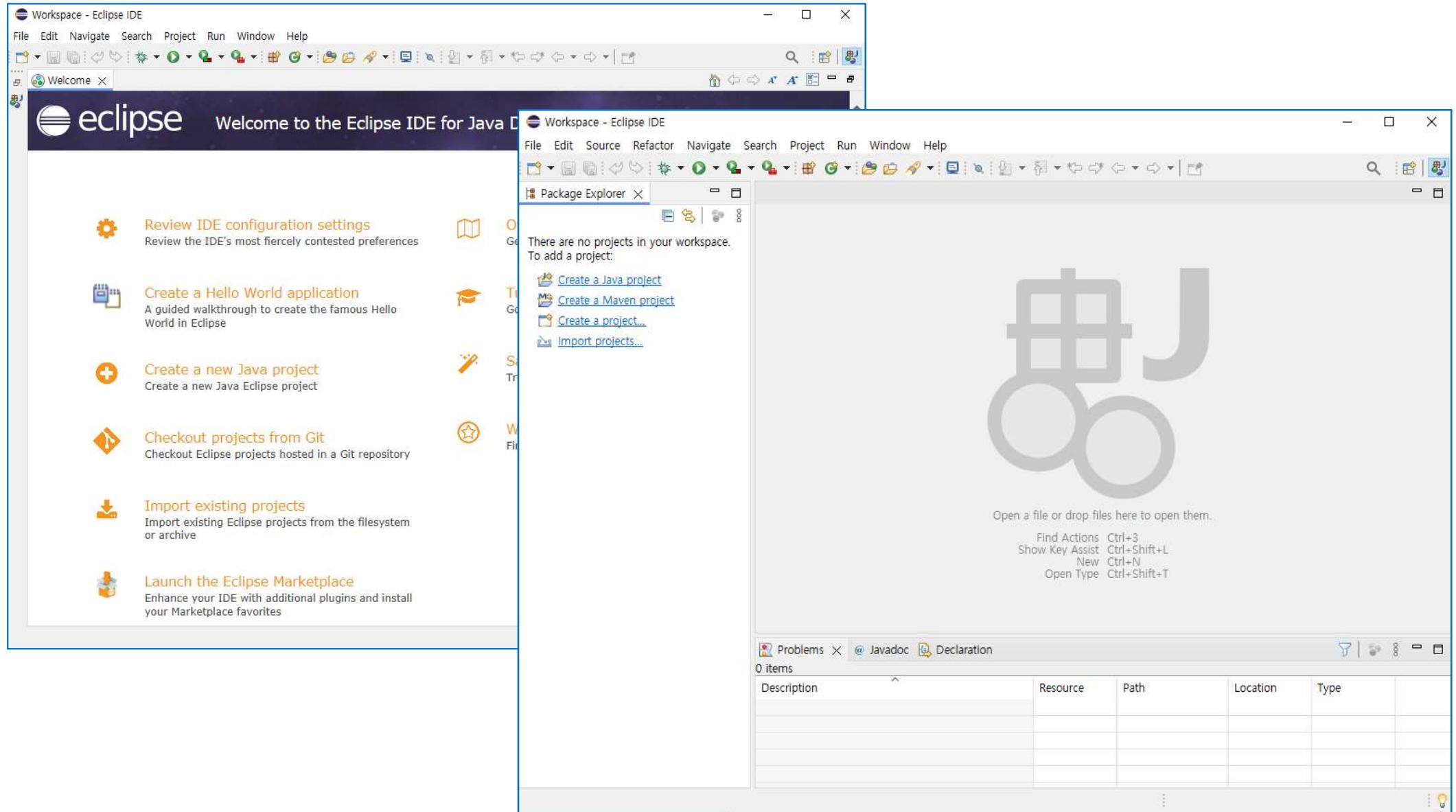


Running Eclipse



Running Eclipse (Cont.)







Lab1. Installation & Configuration

