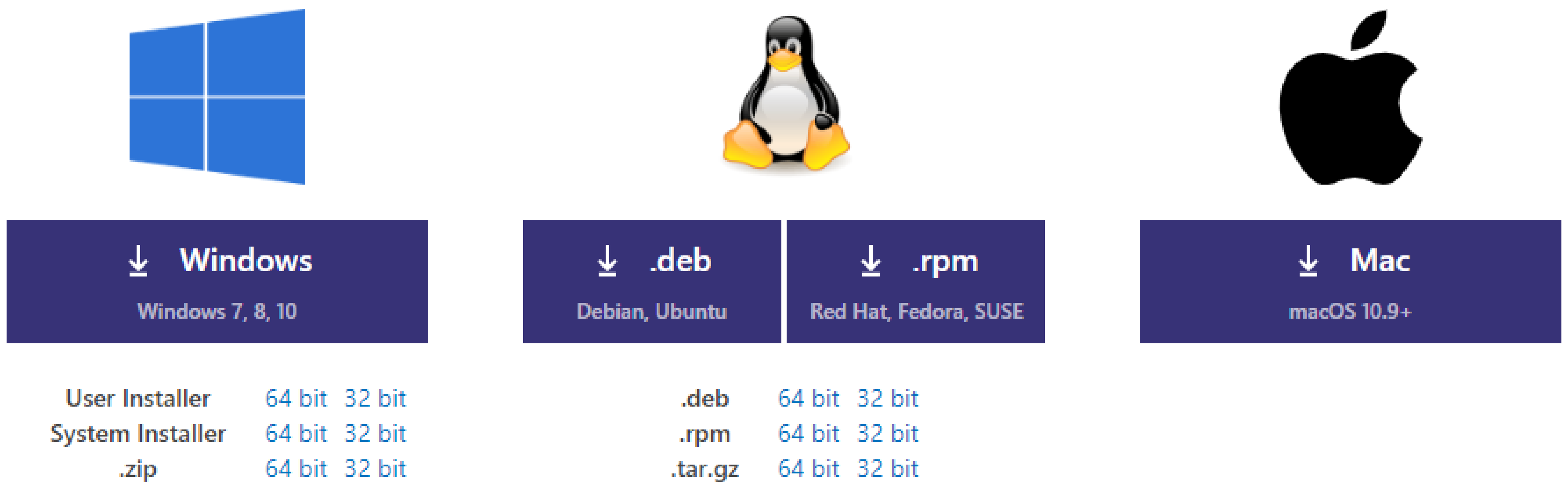
Lab 1

Introduction of Programming Environment

C++ Programming Environment Setup

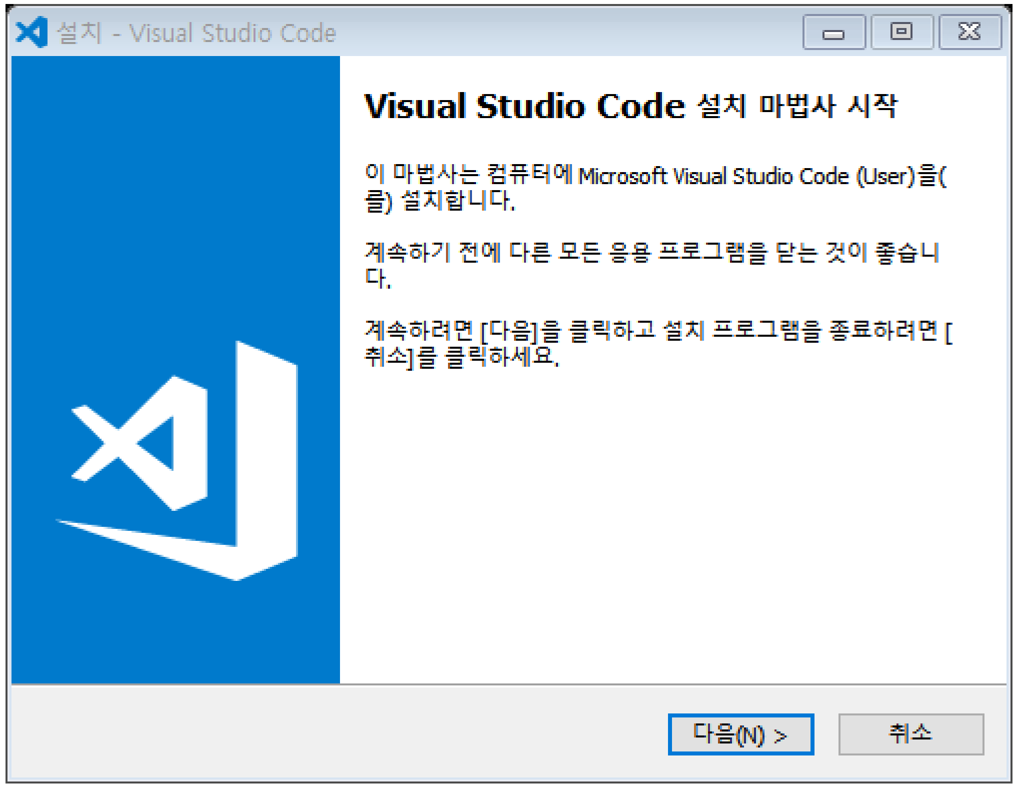
- Visual Studio Code for C++ Programming
- https://code.visualstudio.com/download



User Installer	64 bit	32 bit
System Installer	64 bit	32 bit
.zip	64 bit	32 bit

.deb	64 bit	32 bit
.rpm	64 bit	32 bit
.tar.gz	64 bit	32 bit

C++ Programming Environment Setup

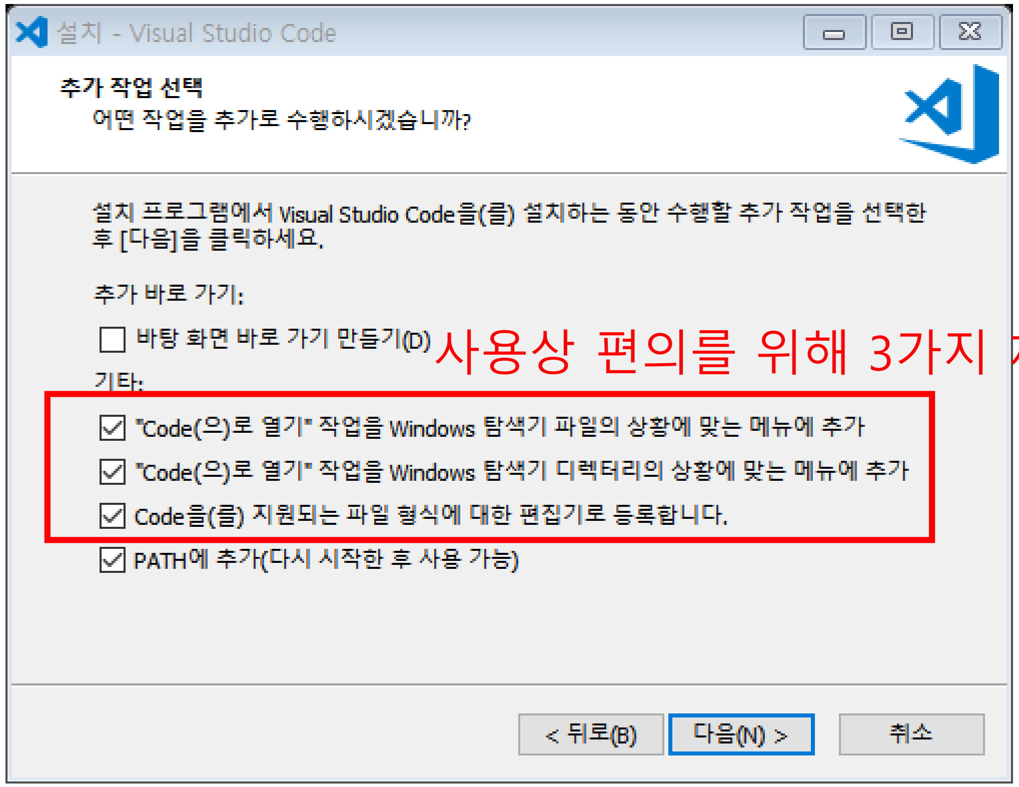

설치 - Visual Studio Code

Visual Studio Code 설치 마법사 시작

이 마법사는 컴퓨터에 Microsoft Visual Studio Code (User)을(를) 설치합니다.

계속하기 전에 다른 모든 응용 프로그램을 닫는 것이 좋습니다.

계속하려면 [다음]을 클릭하고 설치 프로그램을 종료하려면 [취소]를 클릭하세요.


설치 - Visual Studio Code

추가 작업 선택

어떤 작업을 추가로 수행하시겠습니까?

설치 프로그램에서 Visual Studio Code을(를) 설치하는 동안 수행할 추가 작업을 선택한 후 [다음]을 클릭하세요.

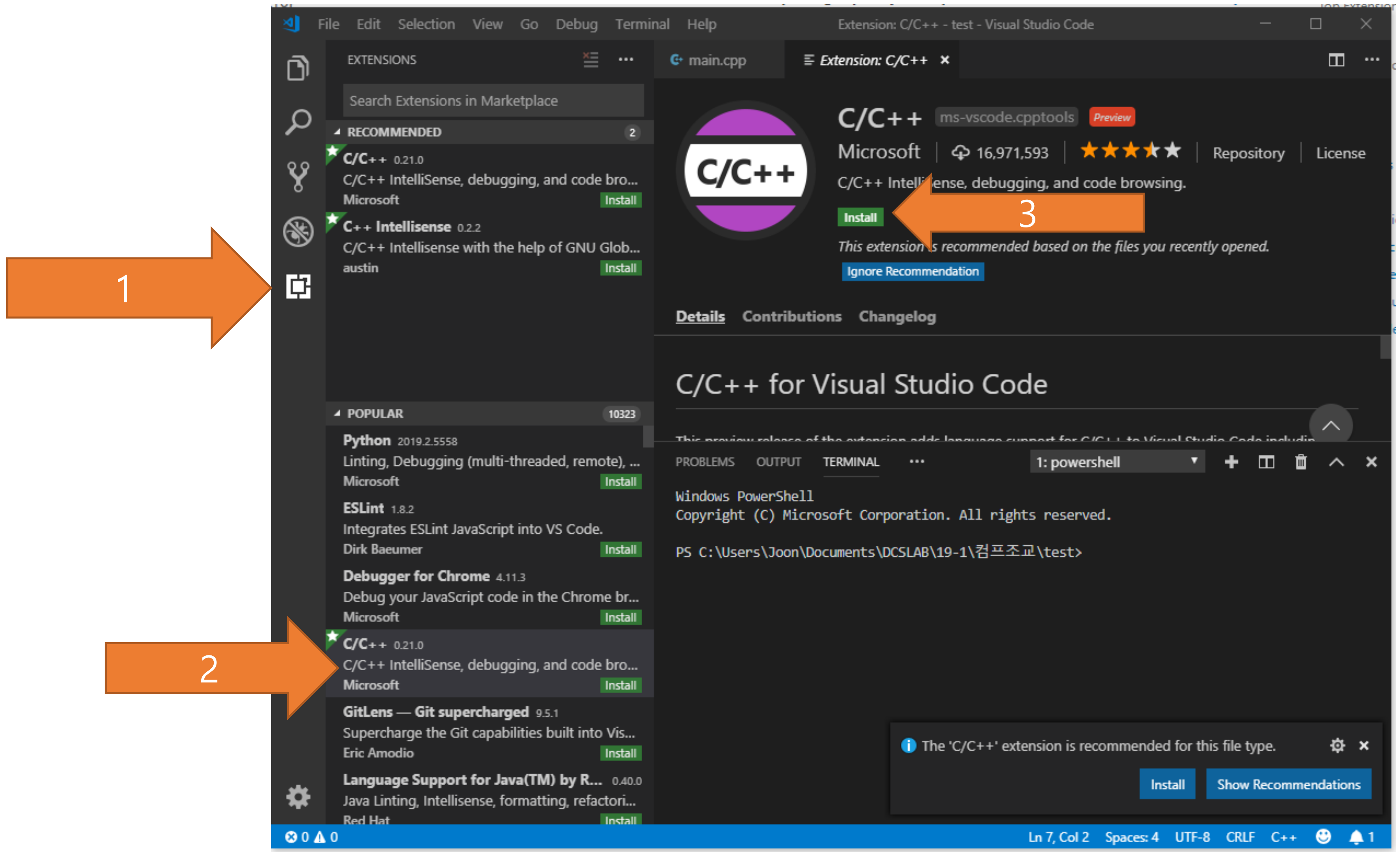
추가 바로 가기:

- [ ] 바탕 화면 바로 가기 만들기(D)

기타:

- [x] "Code(으)로 열기" 작업을 Windows 탐색기 파일의 상황에 맞는 메뉴에 추가
- [x] "Code(으)로 열기" 작업을 Windows 탐색기 디렉터리의 상황에 맞는 메뉴에 추가
- [x] Code을(를) 지원되는 파일 형식에 대한 편집기로 등록합니다.
- [x] PATH에 추가(다시 시작한 후 사용 가능)

사용상 편의를 위해 3가지 체크


1
2
3
File Edit Selection View Go Debug Terminal Help
Extension: C/C++ - test - Visual Studio Code
EXTENSIONS
Search Extensions in Marketplace
RECOMMENDED 2
POPULAR 10323
main.cpp
Extension: C/C++
Details Contributions Changelog
PROBLEMS OUTPUT TERMINAL
1: powershell
Ln 7, Col 2 Spaces: 4 UTF-8 CRLF C++

C/C++ 0.21.0
C/C++ IntelliSense, debugging, and code bro...
Microsoft Install

C++ Intellisense 0.2.2
C/C++ Intellisense with the help of GNU Glob...
austin Install

Python 2019.2.5558
Linting, Debugging (multi-threaded, remote), ...
Microsoft Install

ESLint 1.8.2
Integrates ESLint JavaScript into VS Code.
Dirk Baeumer Install

Debugger for Chrome 4.11.3
Debug your JavaScript code in the Chrome br...
Microsoft Install

C/C++ 0.21.0
C/C++ IntelliSense, debugging, and code bro...
Microsoft Install

GitLens — Git supercharged 9.5.1
Supercharge the Git capabilities built into Vis...
Eric Amodio Install

Language Support for Java(TM) by R... 0.40.0
Java Linting, Intellisense, formatting, refactori...
Red Hat Install

C/C++ ms-vscode.cpptools Preview
Microsoft | 16,971,593 | ★★★★★ | Repository | License
C/C++ IntelliSense, debugging, and code browsing.
Install
This extension is recommended based on the files you recently opened.
Ignore Recommendation

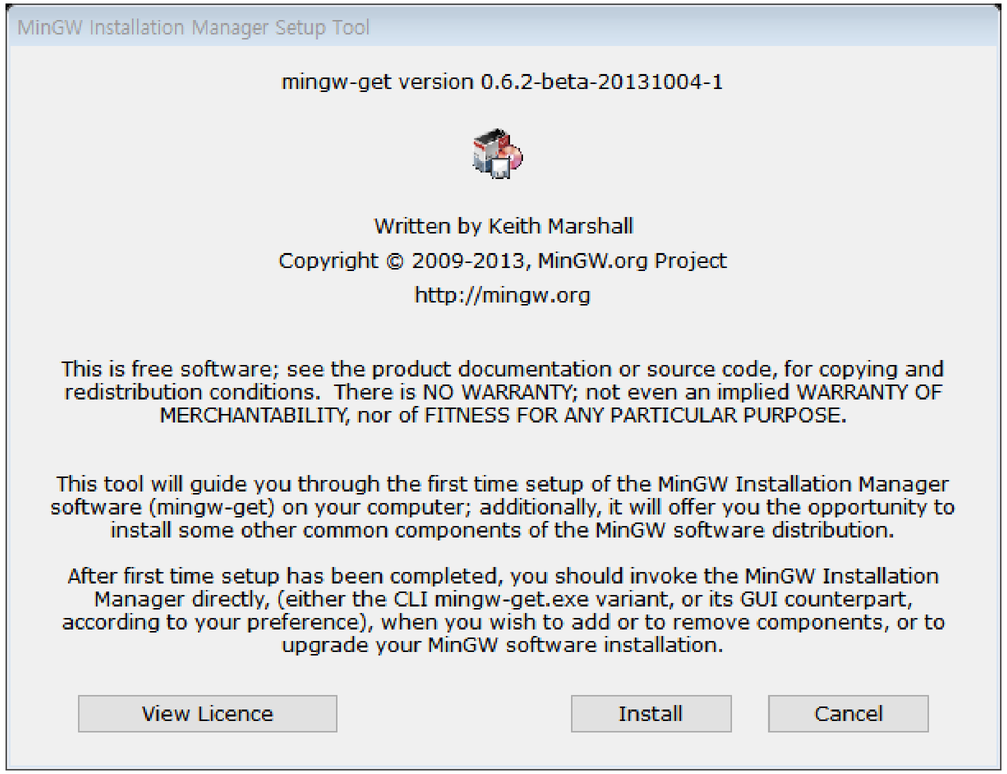
C/C++ for Visual Studio Code

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

PS C:\Users\Joon\Documents\DCSLAB\19-1\컴프조교\test>
```

The 'C/C++' extension is recommended for this file type.
Install Show Recommendations

C++ Programming Environment Setup

- For gcc compile, setup mingw
- https://sourceforge.net/projects/mingw/


MinGW Installation Manager Setup Tool

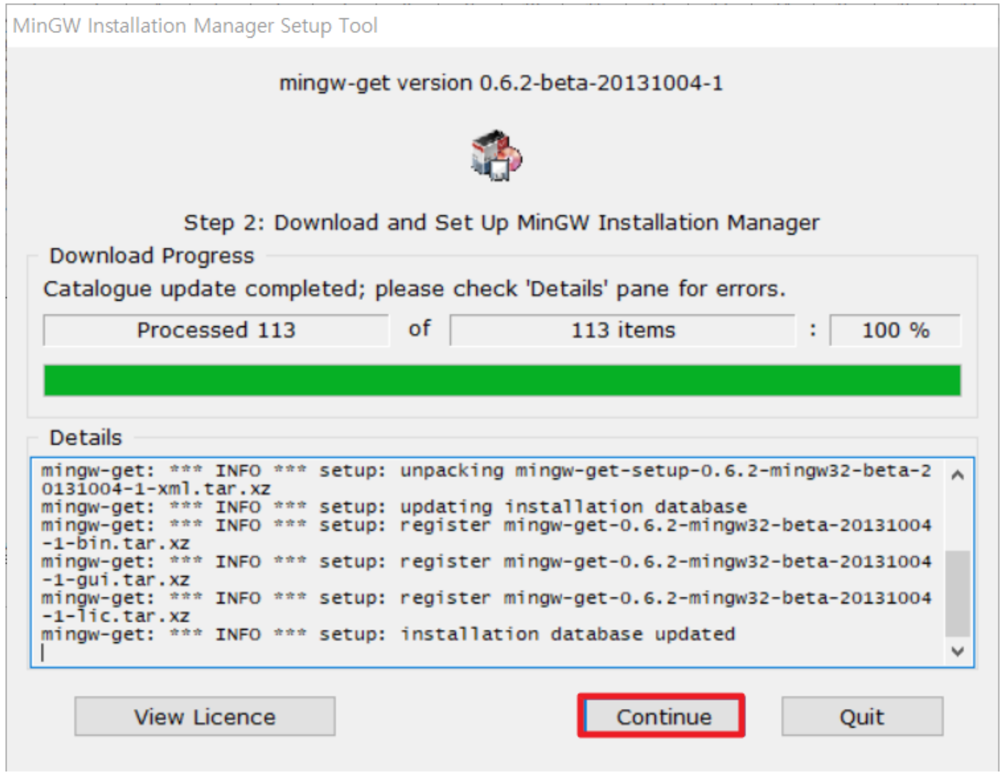
mingw-get version 0.6.2-beta-20131004-1

Written by Keith Marshall
Copyright © 2009-2013, MinGW.org Project
http://mingw.org

This is free software; see the product documentation or source code, for copying and redistribution conditions. There is NO WARRANTY; not even an implied WARRANTY OF MERCHANTABILITY, nor of FITNESS FOR ANY PARTICULAR PURPOSE.

This tool will guide you through the first time setup of the MinGW Installation Manager software (mingw-get) on your computer; additionally, it will offer you the opportunity to install some other common components of the MinGW software distribution.

After first time setup has been completed, you should invoke the MinGW Installation Manager directly, (either the CLI mingw-get.exe variant, or its GUI counterpart, according to your preference), when you wish to add or to remove components, or to upgrade your MinGW software installation.


MinGW Installation Manager Setup Tool

mingw-get version 0.6.2-beta-20131004-1

Step 2: Download and Set Up MinGW Installation Manager

Download Progress

Catalogue update completed; please check 'Details' pane for errors.

Processed 113 of 113 items : 100 %

Details

```
mingw-get: *** INFO *** setup: unpacking mingw-get-setup-0.6.2-mingw32-beta-2
0131004-1-xml.tar.xz
mingw-get: *** INFO *** setup: updating installation database
mingw-get: *** INFO *** setup: register mingw-get-0.6.2-mingw32-beta-20131004
-1-bin.tar.xz
mingw-get: *** INFO *** setup: register mingw-get-0.6.2-mingw32-beta-20131004
-1-gui.tar.xz
mingw-get: *** INFO *** setup: register mingw-get-0.6.2-mingw32-beta-20131004
-1-lic.tar.xz
mingw-get: *** INFO *** setup: installation database updated
```

C++ Programming Environment

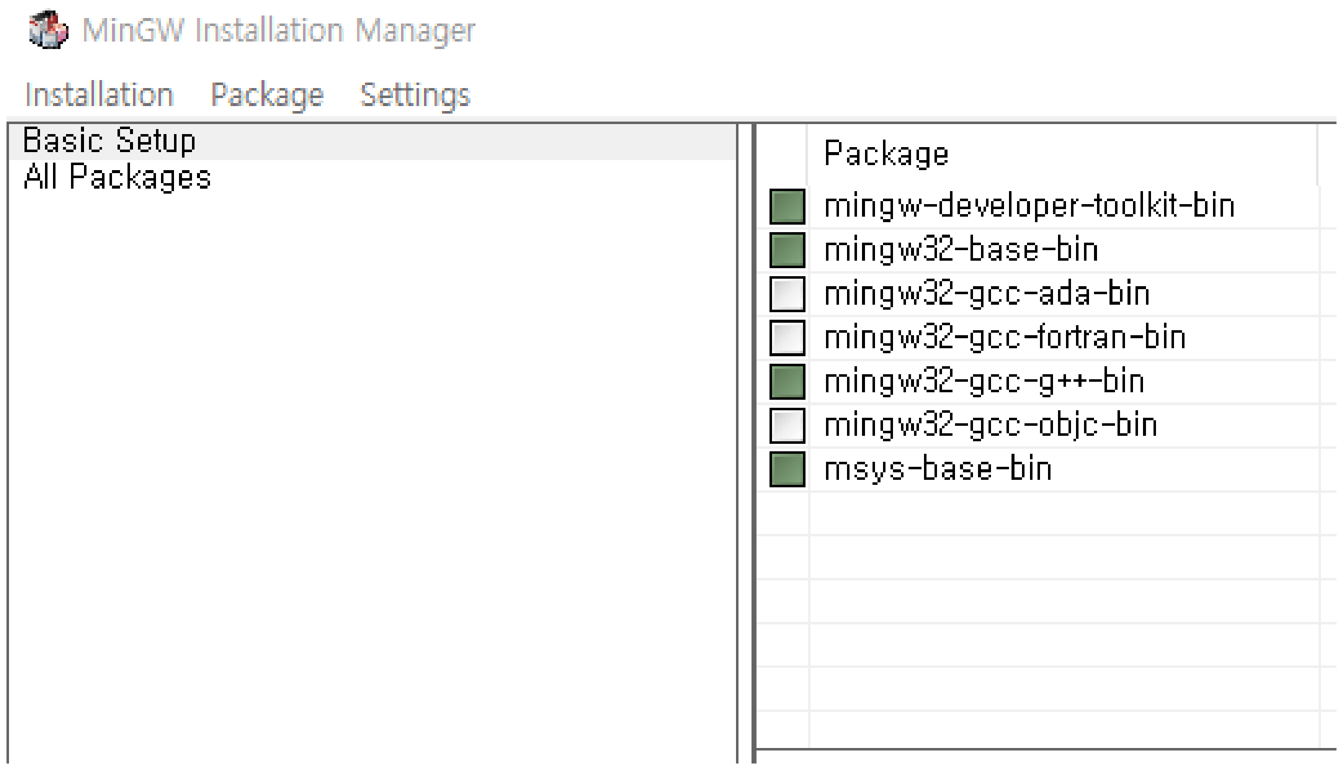
- Check package

mingw-developer-toolkit,

mingw32-base,

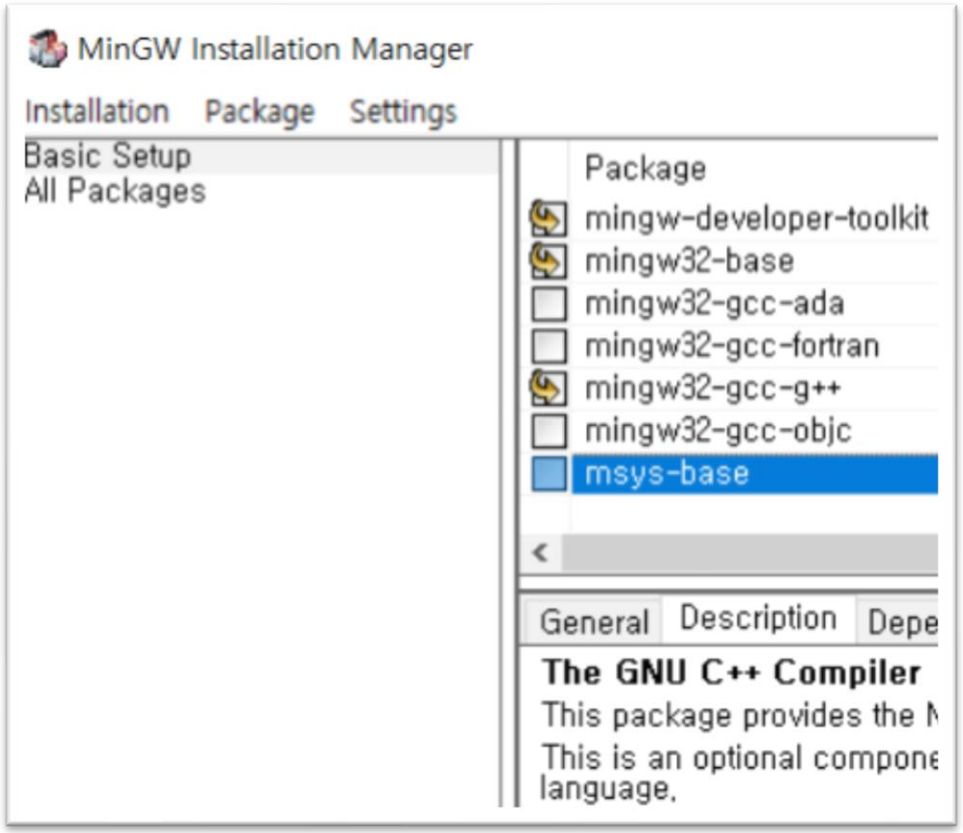
mingw32-gcc-g++,

msys-base-bin

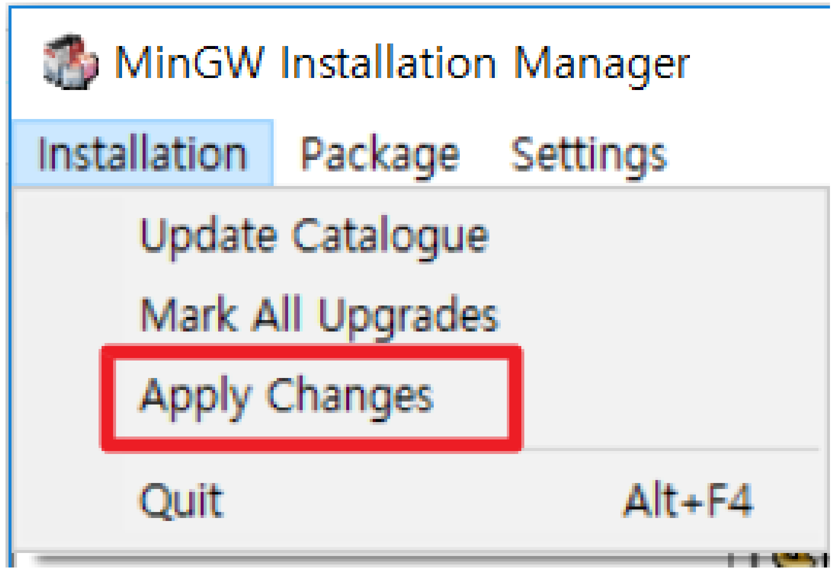


	Package
🟩	mingw-developer-toolkit-bin
🟩	mingw32-base-bin
☐	mingw32-gcc-ada-bin
☐	mingw32-gcc-fortran-bin
🟩	mingw32-gcc-g++-bin
☐	mingw32-gcc-objc-bin
🟩	msys-base-bin

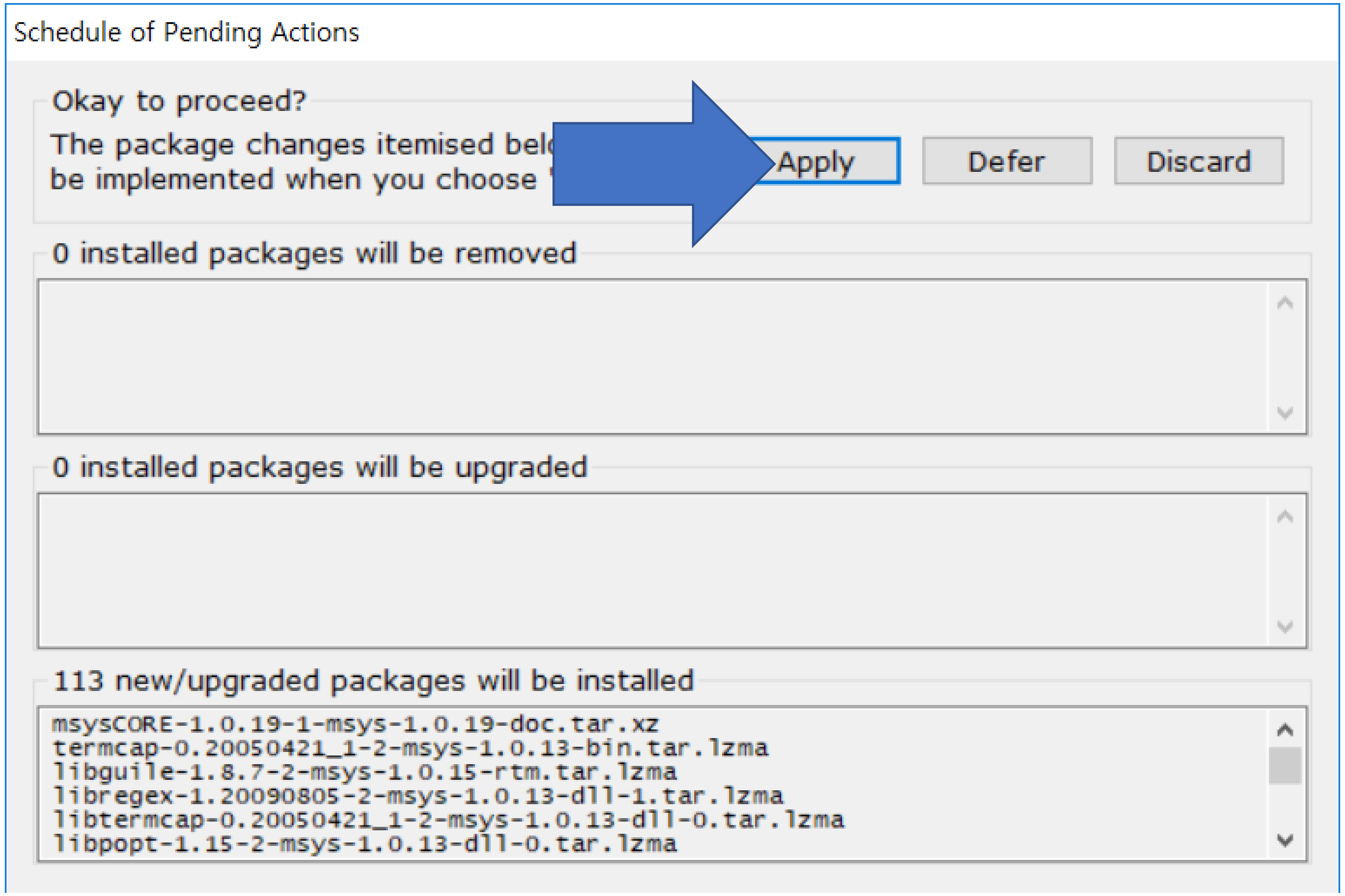
C++ Programming Environment



The GNU C++ Compiler
This package provides the N
This is an optional compone
language.



C++ Programming Environment


Schedule of Pending Actions

The package changes itemised bel
be implemented when you choose '

0 installed packages will be removed

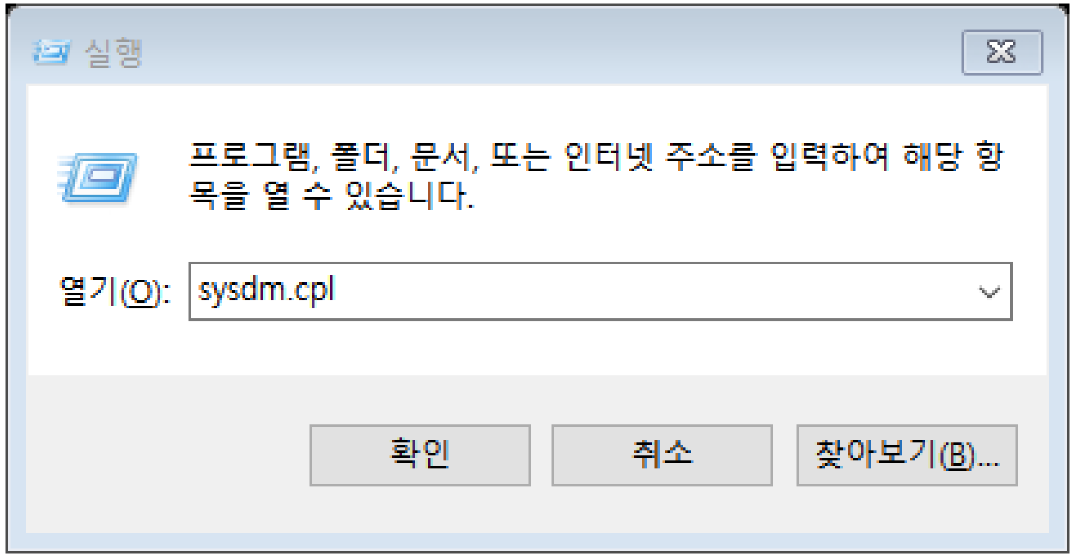
0 installed packages will be upgraded

113 new/upgraded packages will be installed

```
msysCORE-1.0.19-1-msys-1.0.19-doc.tar.xz
termcap-0.20050421_1-2-msys-1.0.13-bin.tar.lzma
libguile-1.8.7-2-msys-1.0.15-rtm.tar.lzma
libregex-1.20090805-2-msys-1.0.13-dll-1.tar.lzma
libtermcap-0.20050421_1-2-msys-1.0.13-dll-0.tar.lzma
libpopt-1.15-2-msys-1.0.13-dll-0.tar.lzma
```

C++ Programming Environment

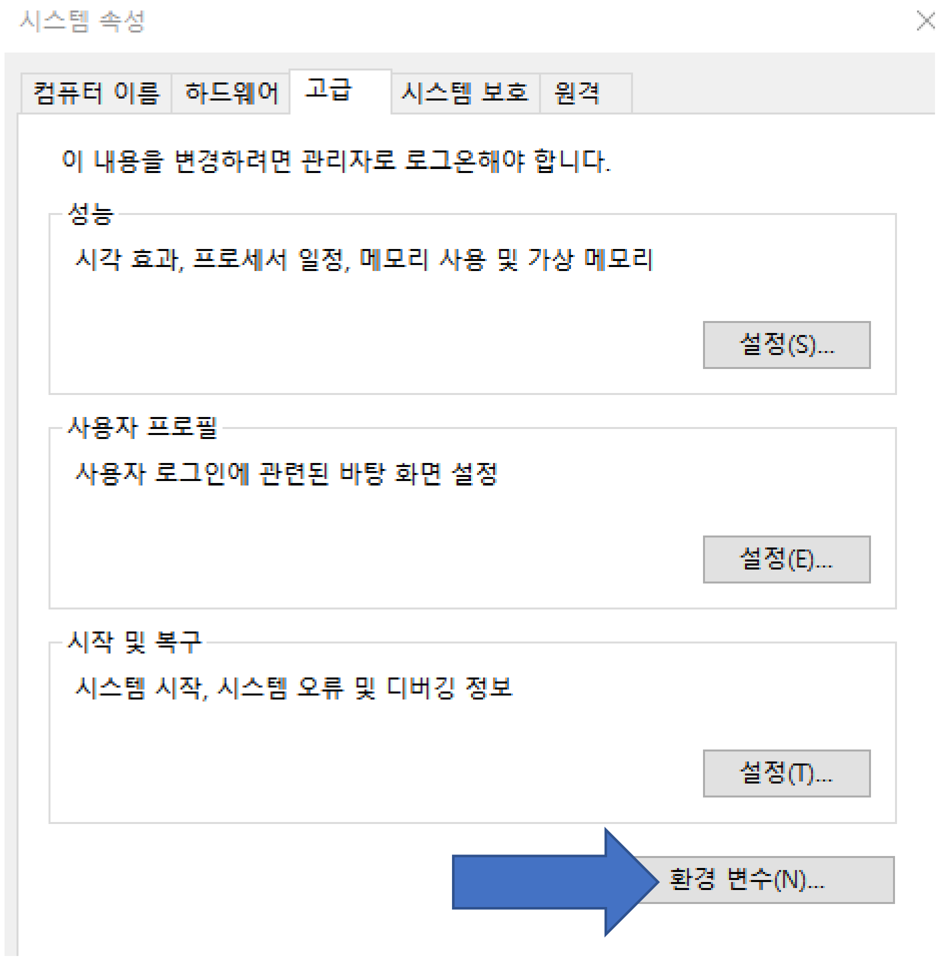
- Edit system path
- Press the window key + R, then type
- sysdm.cpl to run system properties in Control Panel.



실행

프로그램, 폴더, 문서, 또는 인터넷 주소를 입력하여 해당 항목을 열 수 있습니다.

열기(O): sysdm.cpl



시스템 속성

이 내용을 변경하려면 관리자로 로그온해야 합니다.

성능

시각 효과, 프로세서 일정, 메모리 사용 및 가상 메모리

사용자 프로필

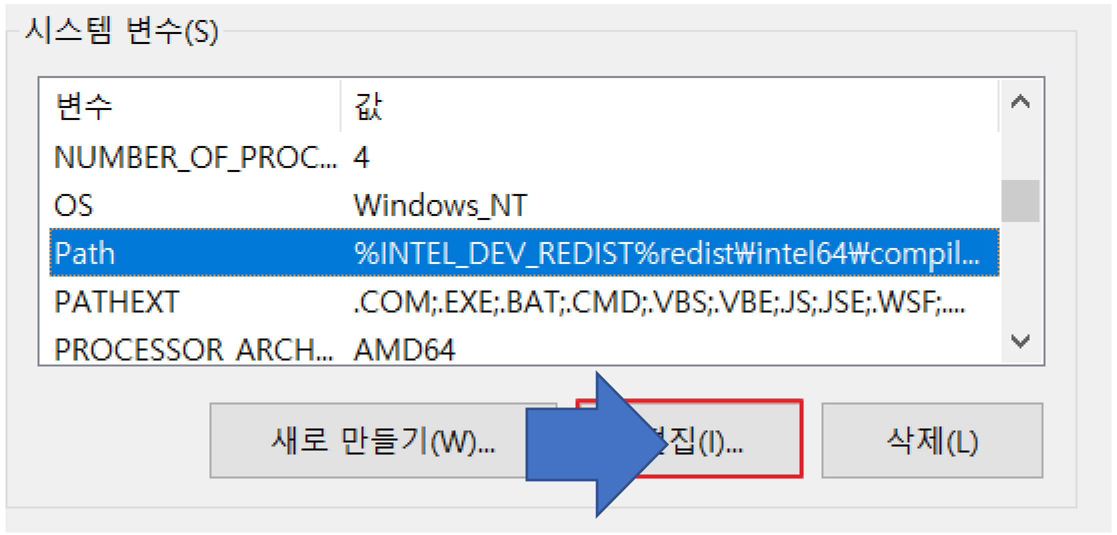
사용자 로그인에 관련된 바탕 화면 설정

시작 및 복구

시스템 시작, 시스템 오류 및 디버깅 정보

C++ Programming Environment

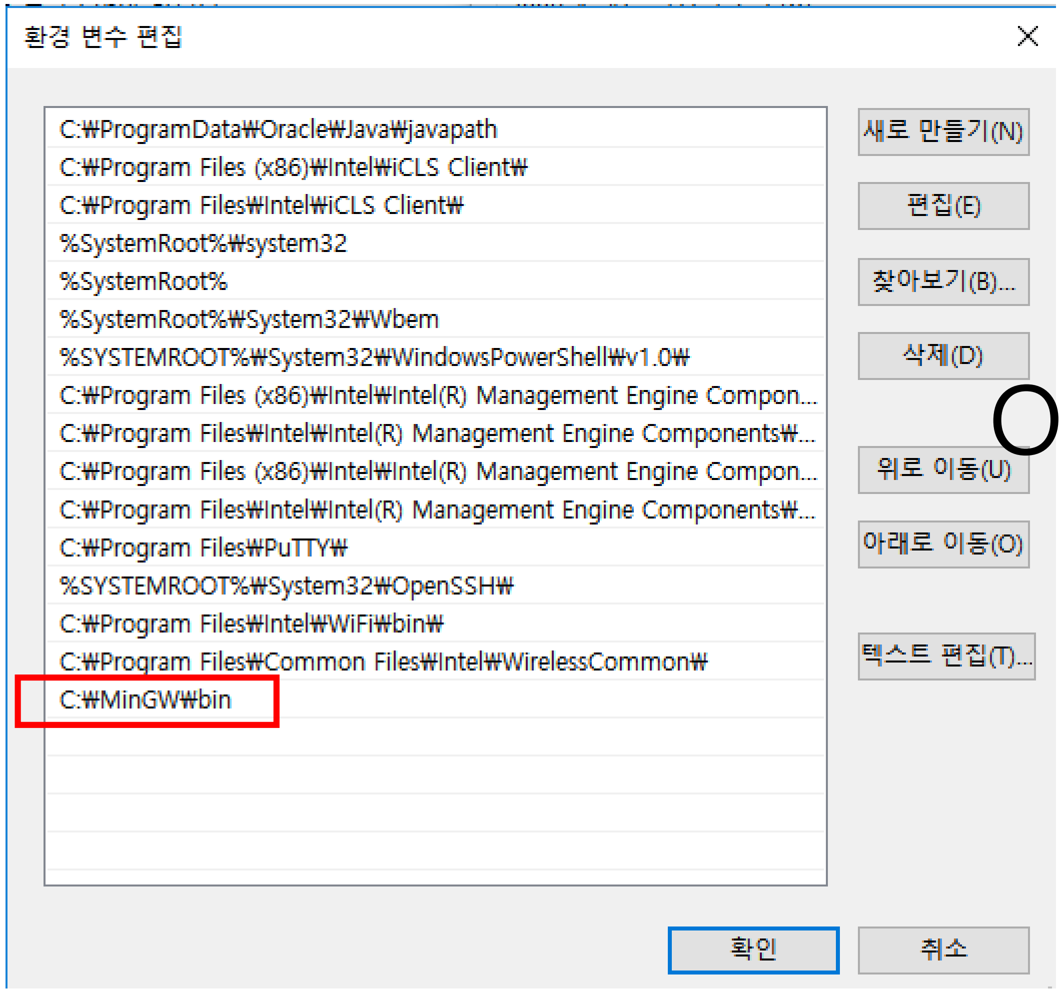
- Under System Variables, select Path and click the Edit button.



시스템 변수(S)

변수	값
NUMBER_OF_PROC...	4
OS	Windows_NT
Path	%INTEL_DEV_REDIST%redist₩intel64₩compil...
PATHEXT	.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;....
PROCESSOR_ARCH...	AMD64

C++ Programming Environment

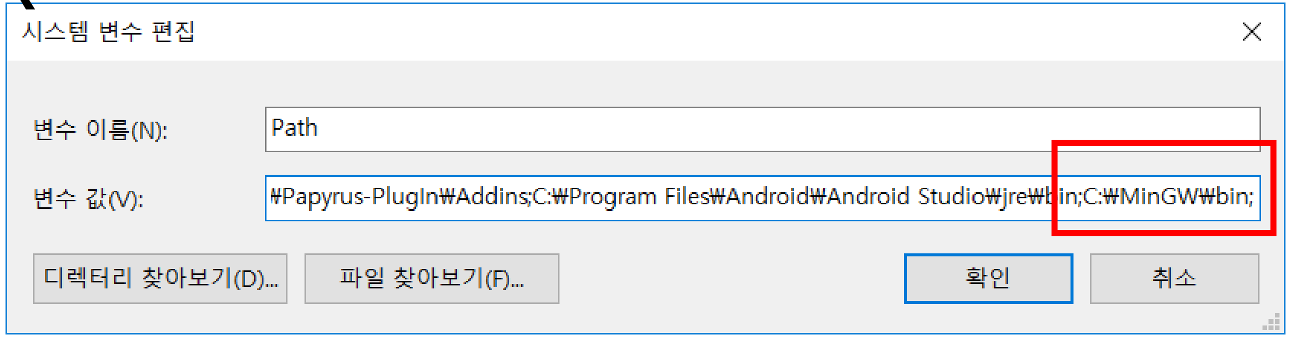


환경 변수 편집

```
C:₩ProgramData₩Oracle₩Java₩javapath
C:₩Program Files (x86)₩Intel₩iCLS Client₩
C:₩Program Files₩Intel₩iCLS Client₩
%SystemRoot%₩system32
%SystemRoot%
%SystemRoot%₩System32₩Wbem
%SYSTEMROOT%₩System32₩WindowsPowerShell₩v1.0₩
C:₩Program Files (x86)₩Intel₩Intel(R) Management Engine Compon...
C:₩Program Files₩Intel₩Intel(R) Management Engine Components₩...
C:₩Program Files (x86)₩Intel₩Intel(R) Management Engine Compon...
C:₩Program Files₩Intel₩Intel(R) Management Engine Components₩...
C:₩Program Files₩PuTTY₩
%SYSTEMROOT%₩System32₩OpenSSH₩
C:₩Program Files₩Intel₩WiFi₩bin₩
C:₩Program Files₩Common Files₩Intel₩WirelessCommon₩
C:₩MinGW₩bin
```

Depending on the version of the window, click New to add the path C:₩MinGW₩bin or add ;C:₩MinGW₩bin to the end of the path variable value.

OR



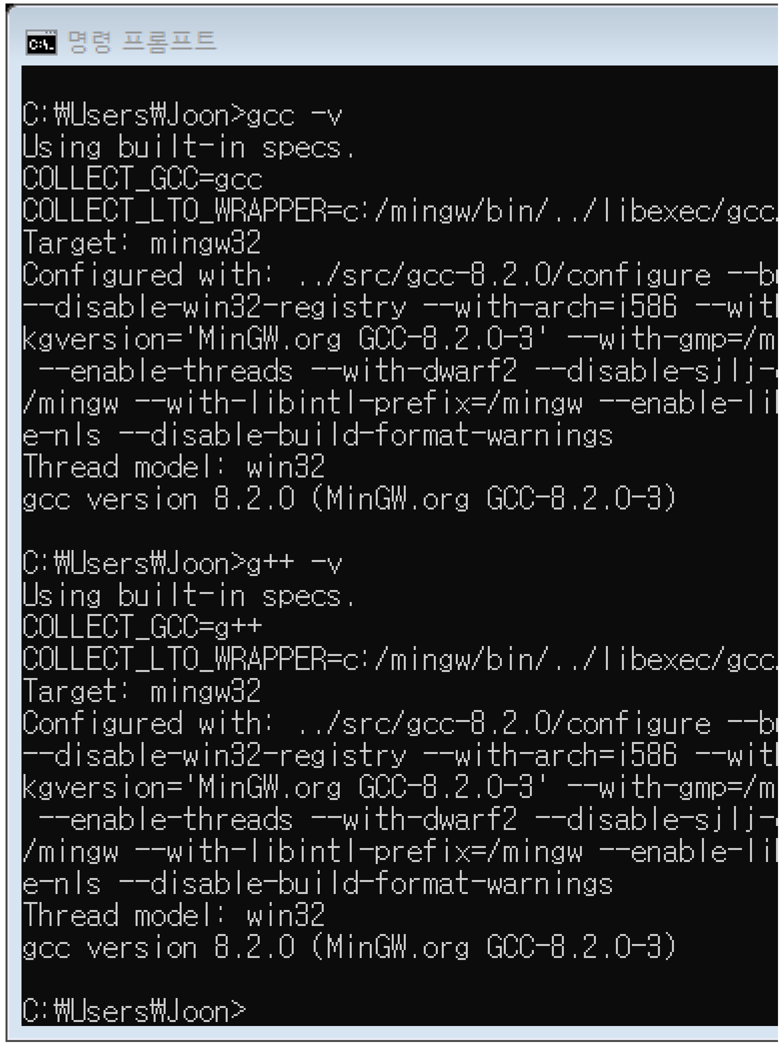
시스템 변수 편집

변수 이름(N): Path

변수 값(V): ₩Papyrus-PlugIn₩Addins;C:₩Program Files₩Android₩Android Studio₩jre₩bin;C:₩MinGW₩bin;

C++ Programming Environment

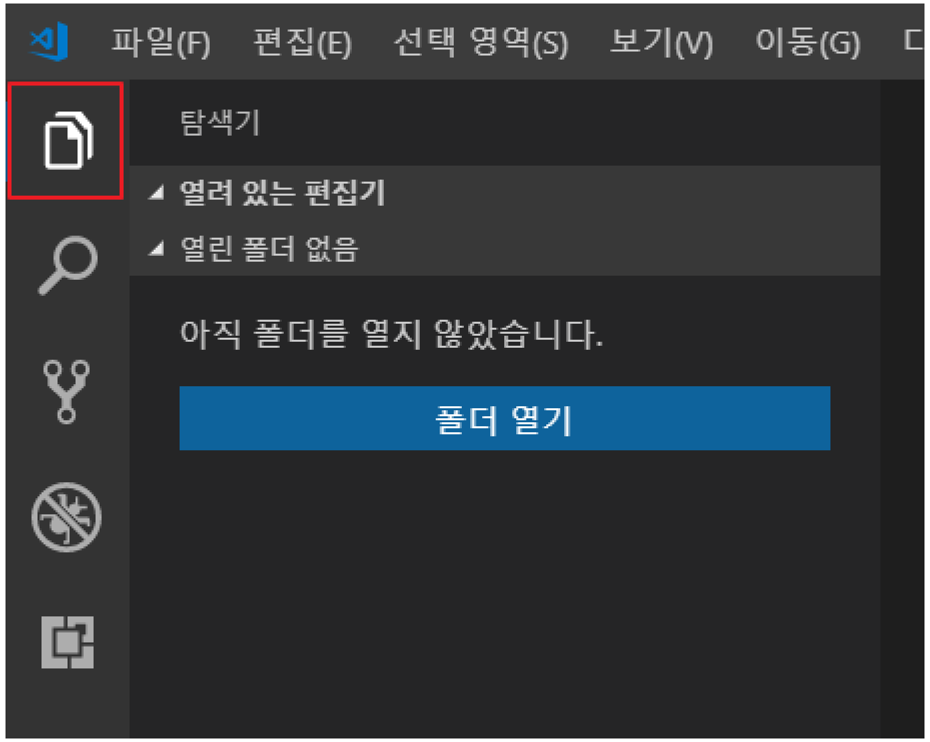
- If the progress is successful, you can check the gcc, g++ version information at the command prompt as follows:



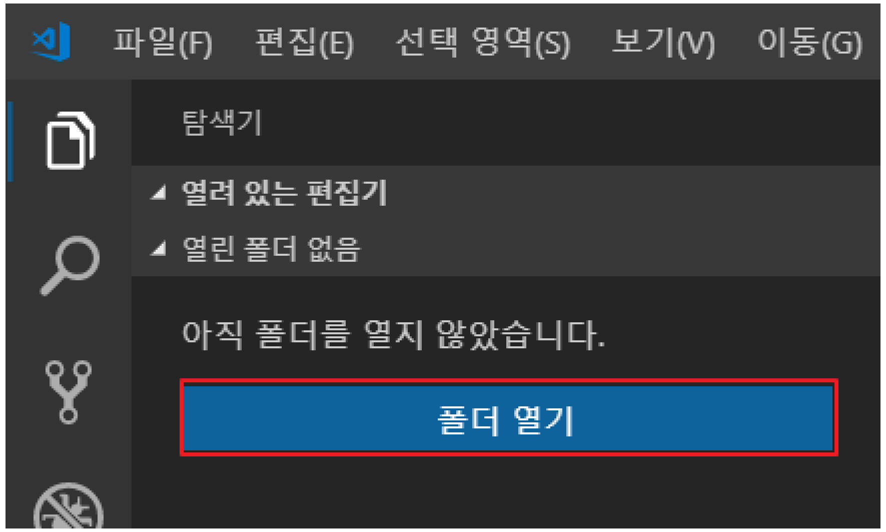
```
C:₩Users₩Joon>gcc -v
Using built-in specs.
COLLECT_GCC=gcc
COLLECT_LTO_WRAPPER=c:/mingw/bin/../libexec/gcc
Target: mingw32
Configured with: ../src/gcc-8.2.0/configure --b
--disable-win32-registry --with-arch=i586 --wit
kgversion='MinGW.org GCC-8.2.0-3' --with-gmp=/m
 --enable-threads --with-dwarf2 --disable-sjlj-
/mingw --with-libintl-prefix=/mingw --enable-li
e-nls --disable-build-format-warnings
Thread model: win32
gcc version 8.2.0 (MinGW.org GCC-8.2.0-3)

C:₩Users₩Joon>g++ -v
Using built-in specs.
COLLECT_GCC=g++
COLLECT_LTO_WRAPPER=c:/mingw/bin/../libexec/gcc
Target: mingw32
Configured with: ../src/gcc-8.2.0/configure --b
--disable-win32-registry --with-arch=i586 --wit
kgversion='MinGW.org GCC-8.2.0-3' --with-gmp=/m
 --enable-threads --with-dwarf2 --disable-sjlj-
/mingw --with-libintl-prefix=/mingw --enable-li
e-nls --disable-build-format-warnings
Thread model: win32
gcc version 8.2.0 (MinGW.org GCC-8.2.0-3)

C:₩Users₩Joon>
```

C++ Programming Environment

- Click the Explorer icon in the activity bar located on the left, or press the shortcut Ctrl + Shift + E to open the Explorer on the sidebar as shown in the capture screen below.



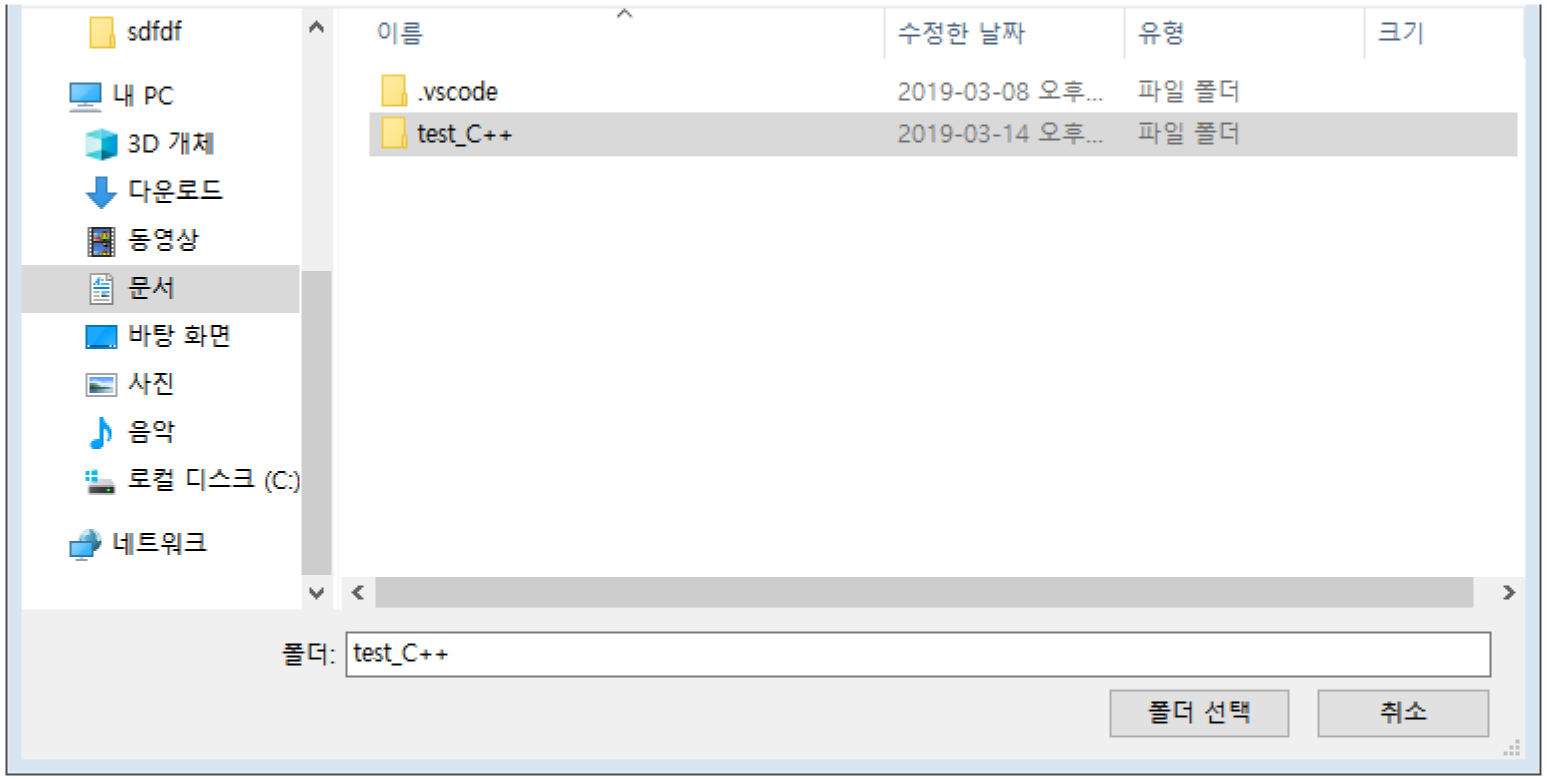
아직 폴더를 열지 않았습니다.



아직 폴더를 열지 않았습니다.

C++ Programming Environment

- Create the test_C++ folder and click the Select Folder button.

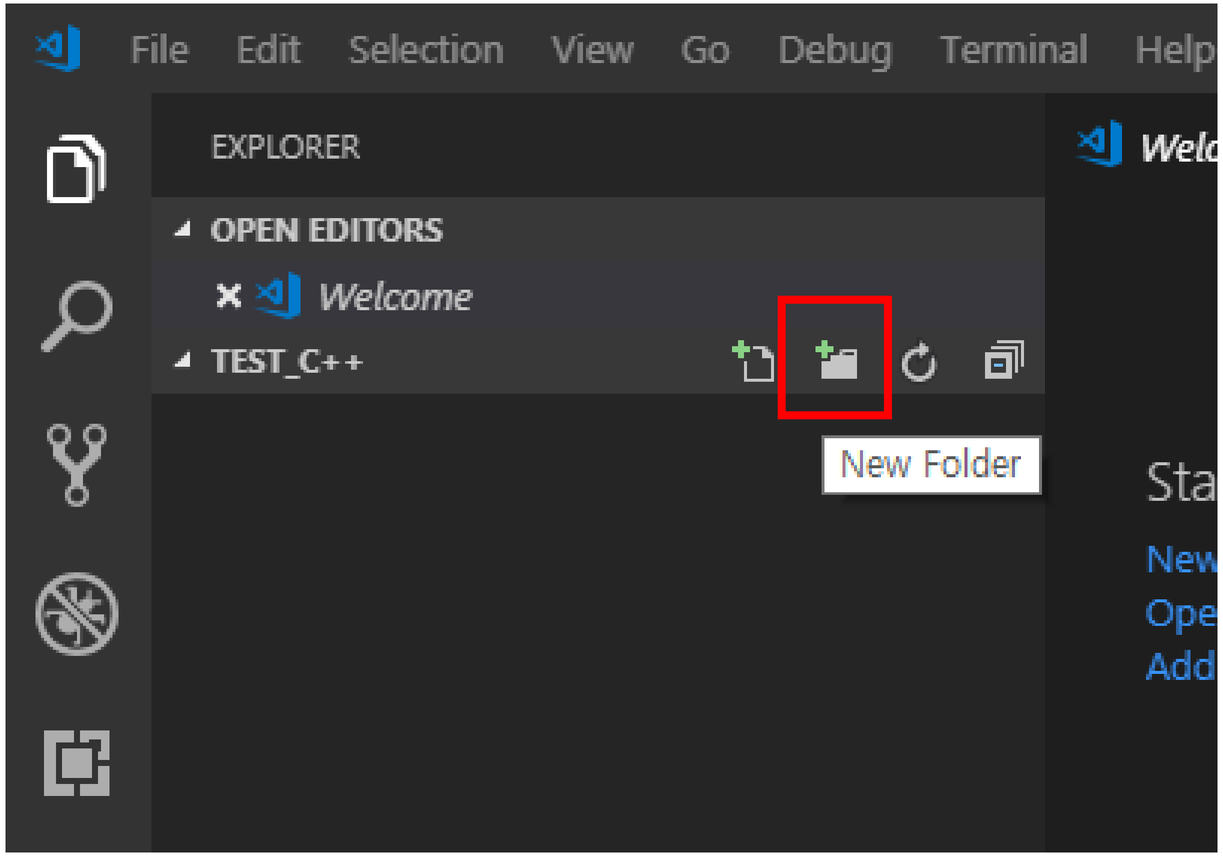


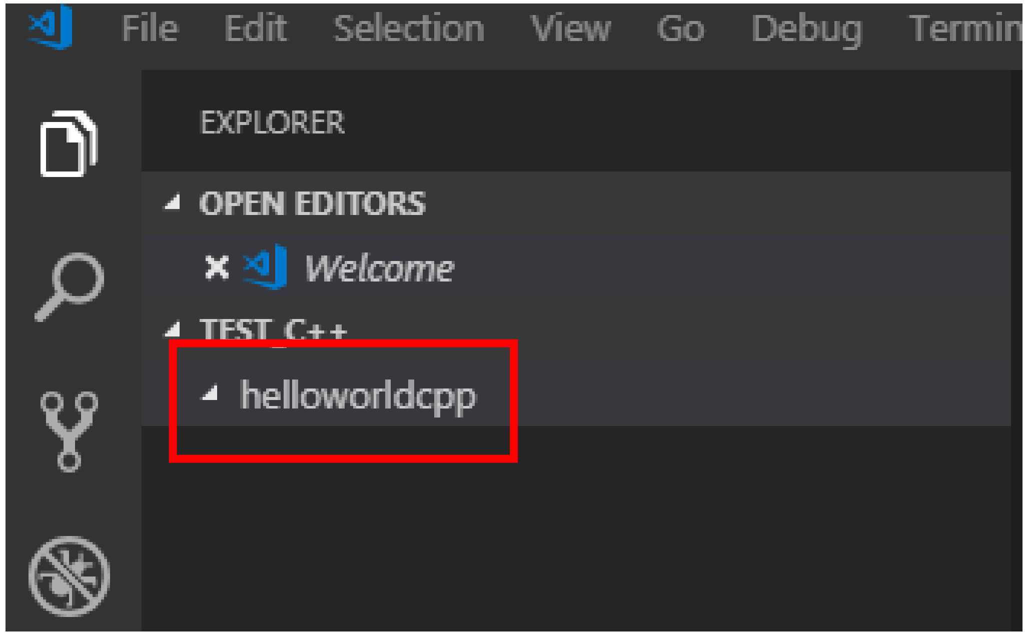
이름	수정한 날짜	유형	크기
.vscode	2019-03-08 오후...	파일 폴더	
test_C++	2019-03-14 오후...	파일 폴더	

폴더: test_C++

C++ Programming Environment

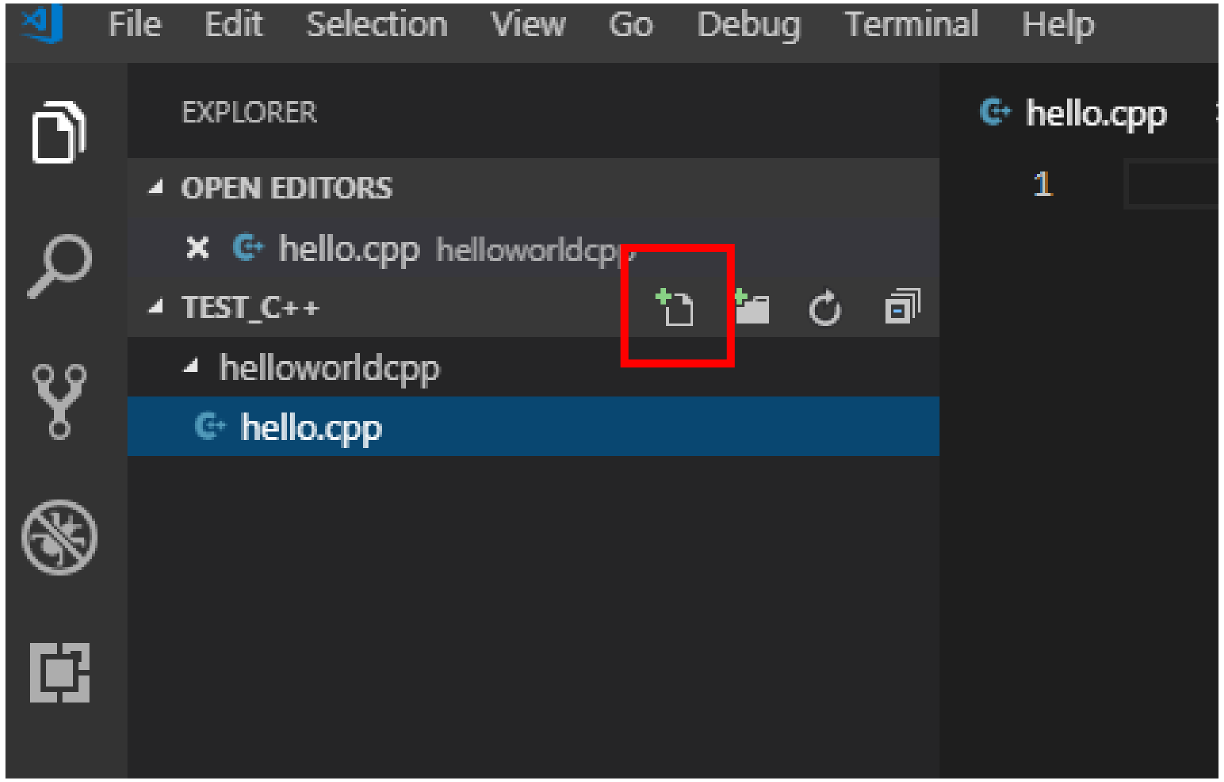
- Click the new folder icon and create helloworldcpp folder.





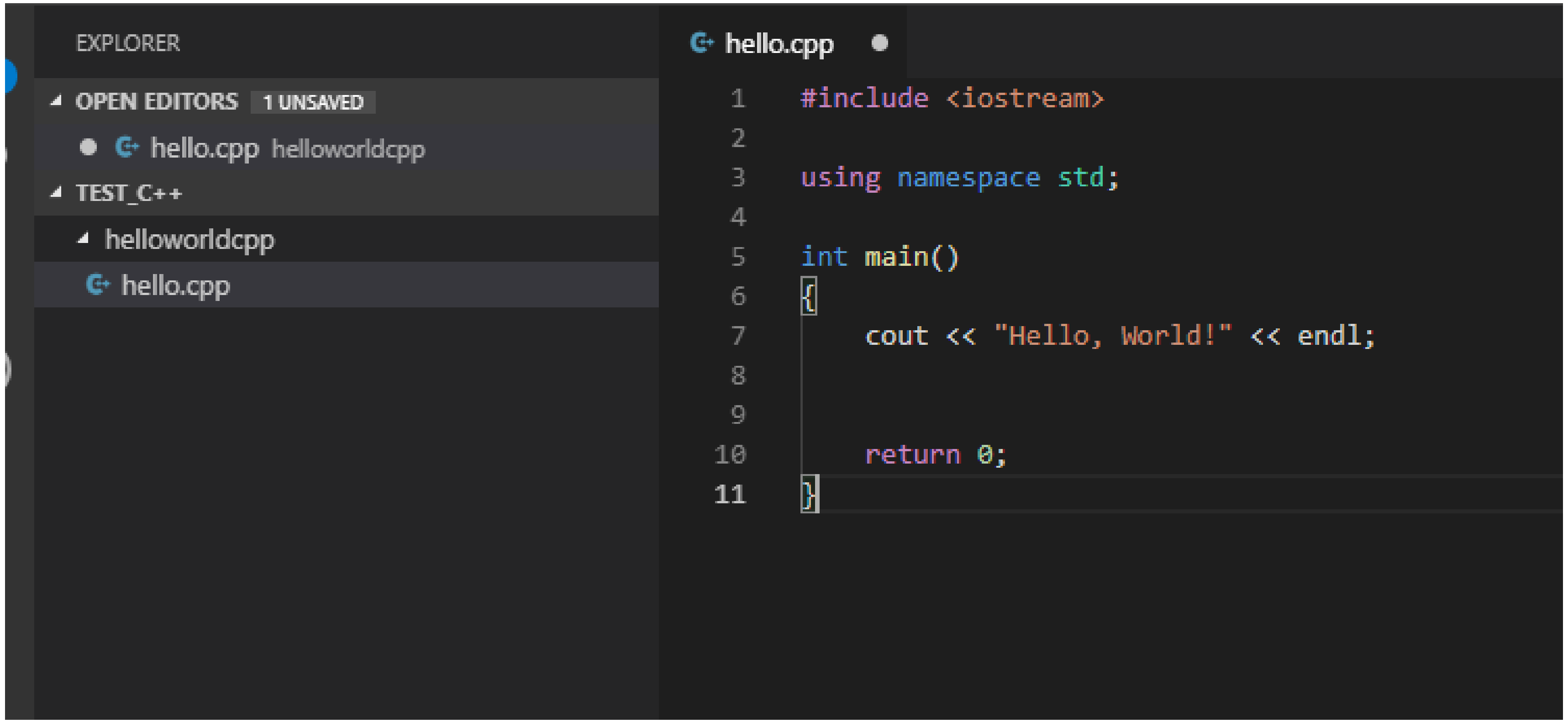
C++ Programming Environment

- Click the new file icon and create hello.cpp



C++ Programming Environment

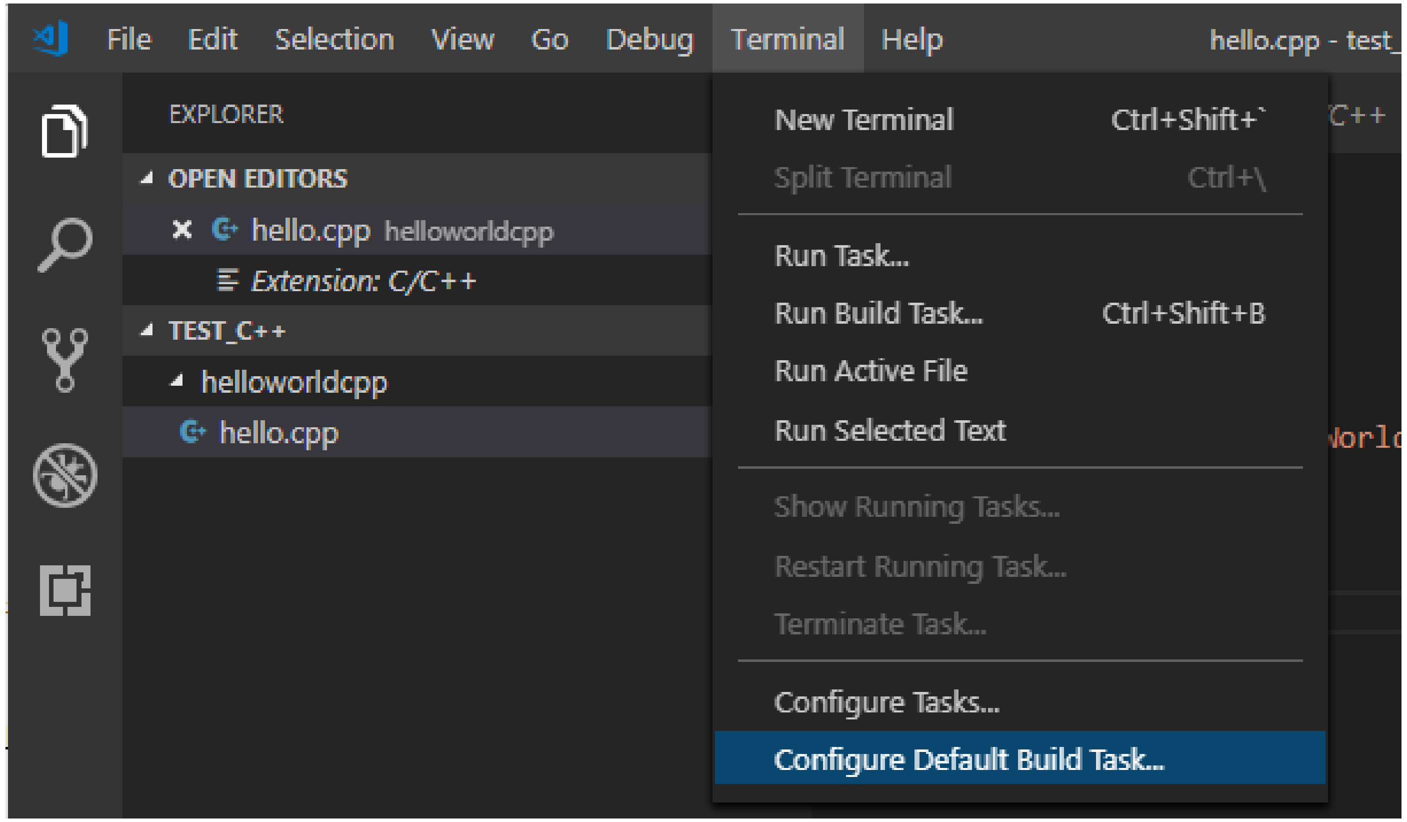
- Enter the following code into the Hello.cpp file and press Ctrl + S to save.



```cpp
#include <iostream>

using namespace std;

int main()
{
    cout << "Hello, World!" << endl;


    return 0;
}
```

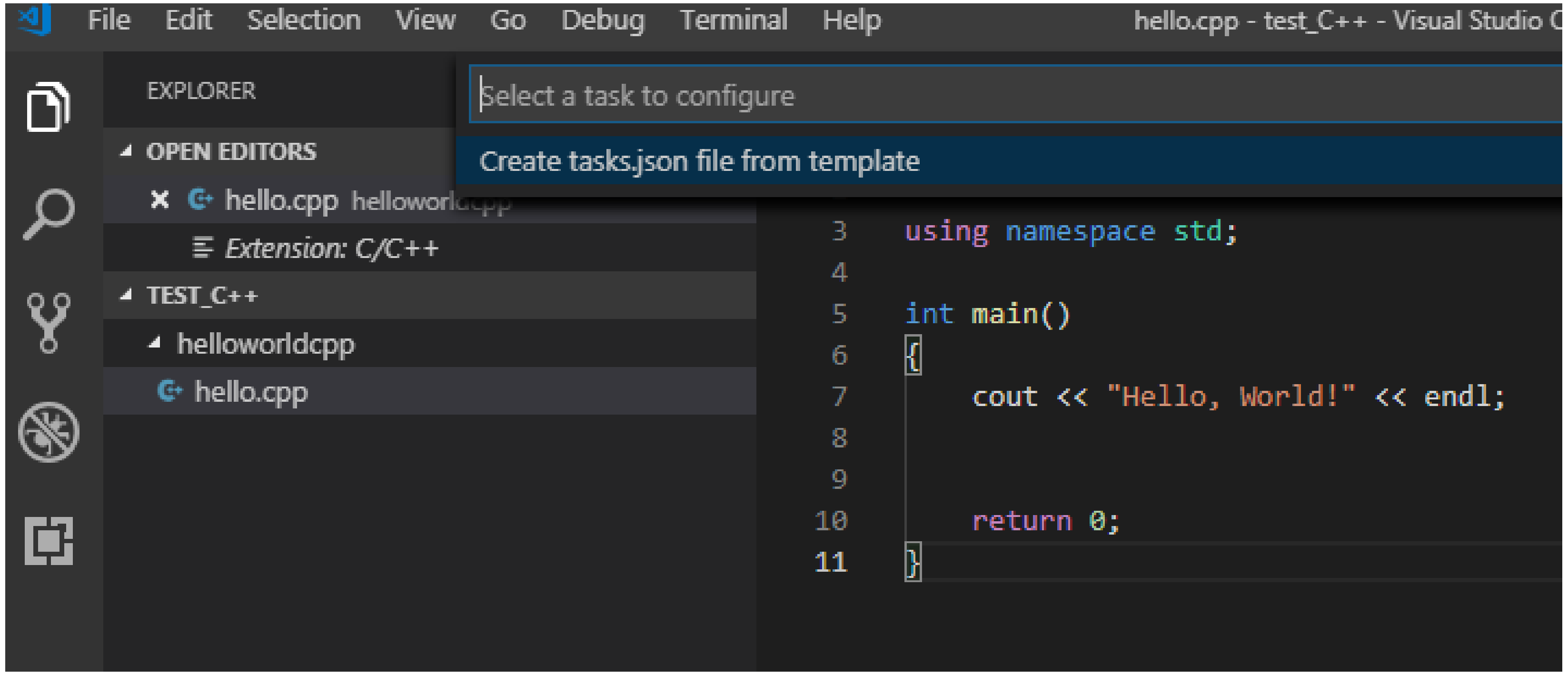
C++ Programming Environment

- From the menu of the Visual Studio Code, select Terminal > Default Build Job Configuration.



C++ Programming Environment

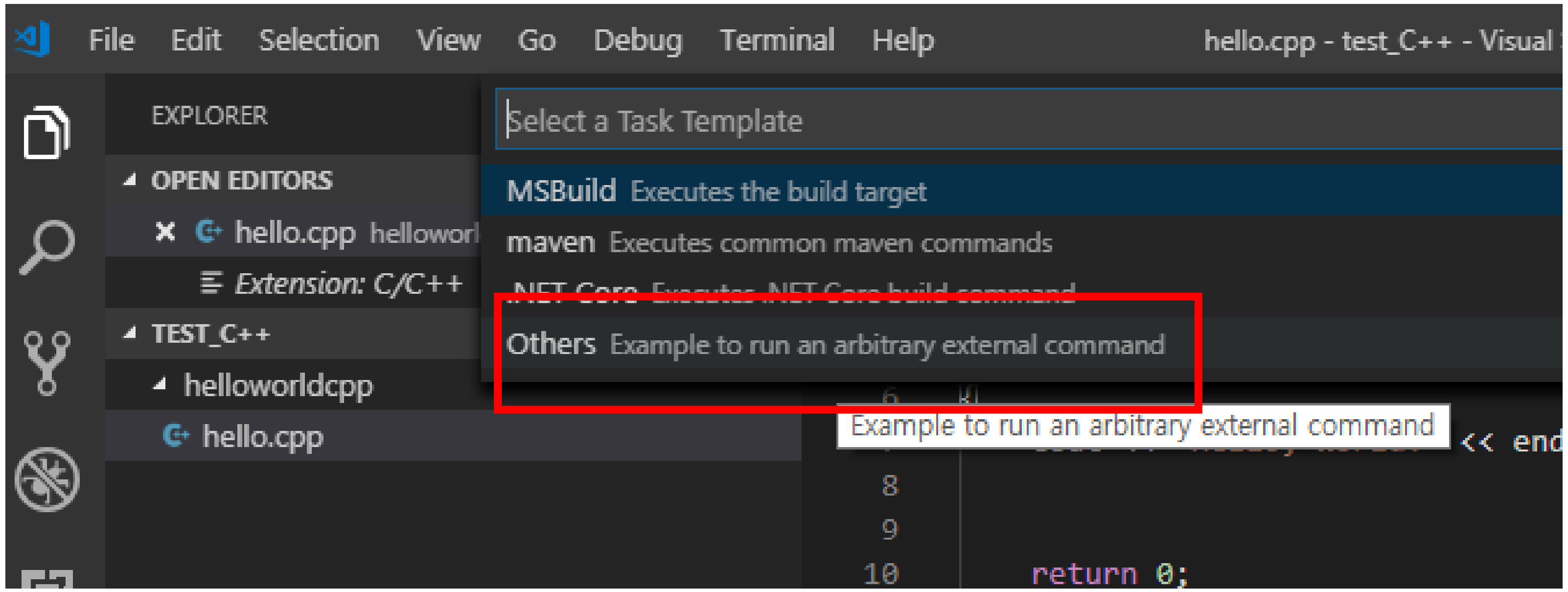
- Click Create tasks.json file from template.


File Edit Selection View Go Debug Terminal Help
hello.cpp - test_C++ - Visual Studio C
EXPLORER
OPEN EDITORS
hello.cpp helloworldcpp
Extension: C/C++
TEST_C++
helloworldcpp
hello.cpp
Select a task to configure
Create tasks.json file from template

```
using namespace std;

int main()
{
    cout << "Hello, World!" << endl;


    return 0;
}
```

C++ Programming Environment

- Click Others.



Select a Task Template

MSBuild Executes the build target

maven Executes common maven commands

.NET Core Executes .NET Core build command

Others Example to run an arbitrary external command

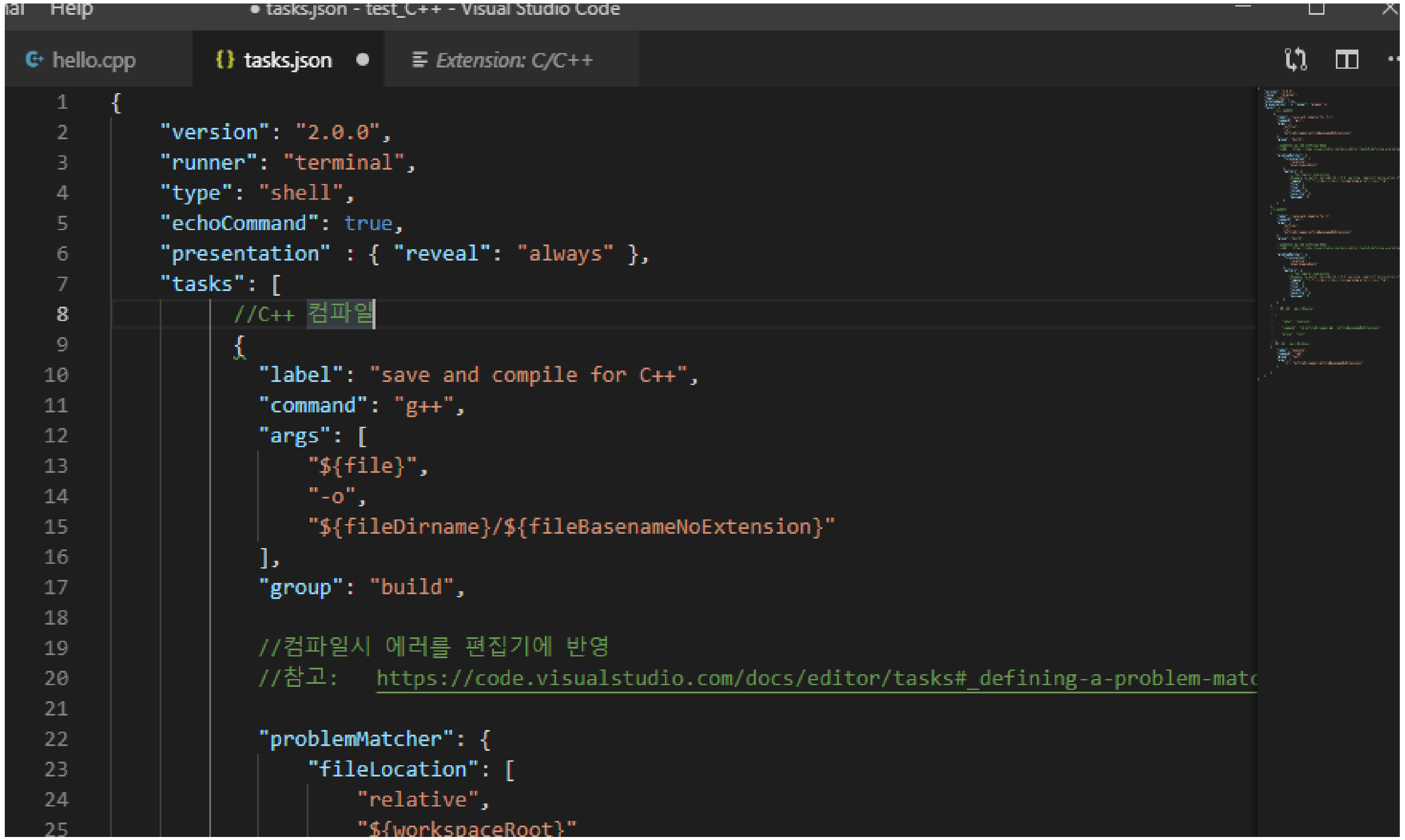
Example to run an arbitrary external command

```
<< end

return 0;
```

C++ Programming Environment

- Copy & Paste code

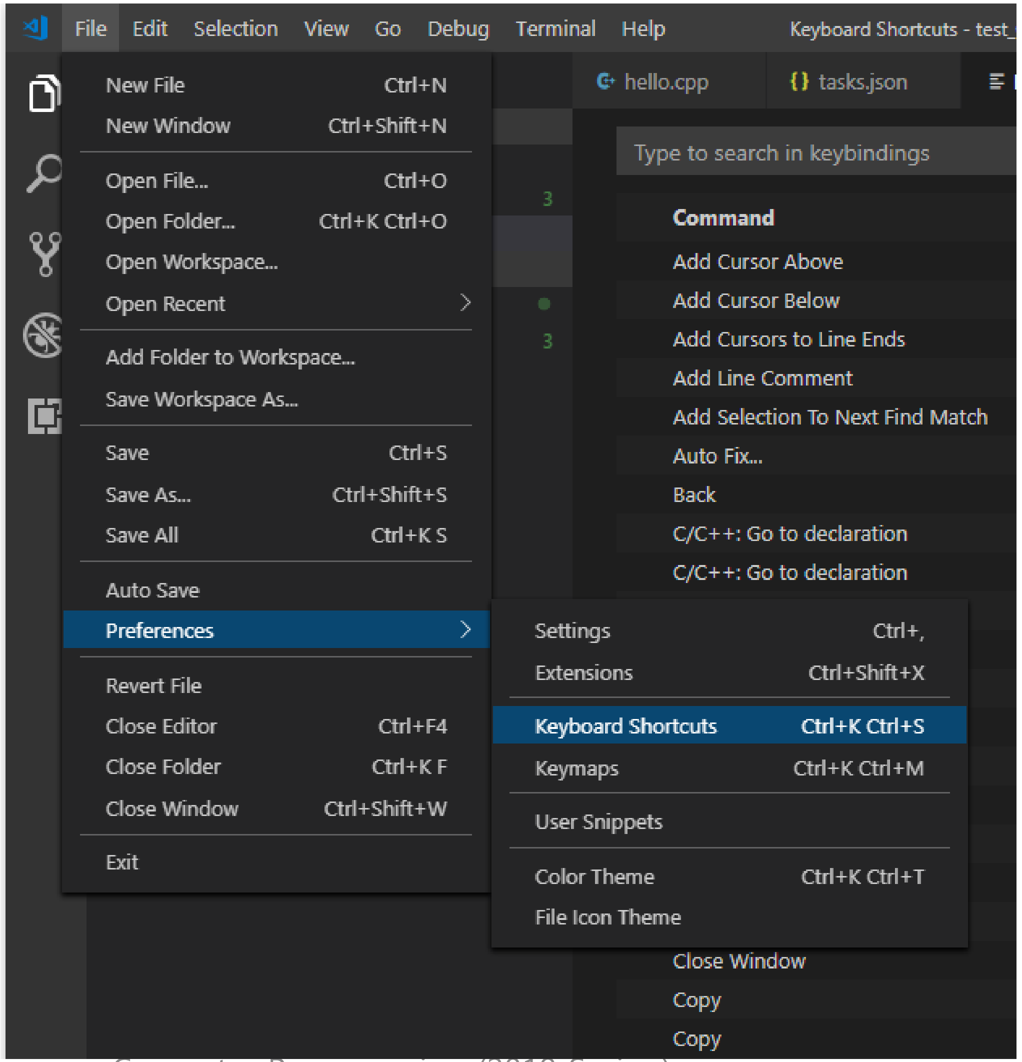
  https://pastebin.com/8fnC7bhS



```
{
    "version": "2.0.0",
    "runner": "terminal",
    "type": "shell",
    "echoCommand": true,
    "presentation" : { "reveal": "always" },
    "tasks": [
          //C++ 컴파일
          {
            "label": "save and compile for C++",
            "command": "g++",
            "args": [
                "${file}",
                "-o",
                "${fileDirname}/${fileBasenameNoExtension}"
            ],
            "group": "build",

            //컴파일시 에러를 편집기에 반영
            //참고:   https://code.visualstudio.com/docs/editor/tasks#_defining-a-problem-matc

            "problemMatcher": {
                "fileLocation": [
                    "relative",
                    "${workspaceRoot}"
```

C++ Programming Environment

- For your convenience, set the shortcut key.

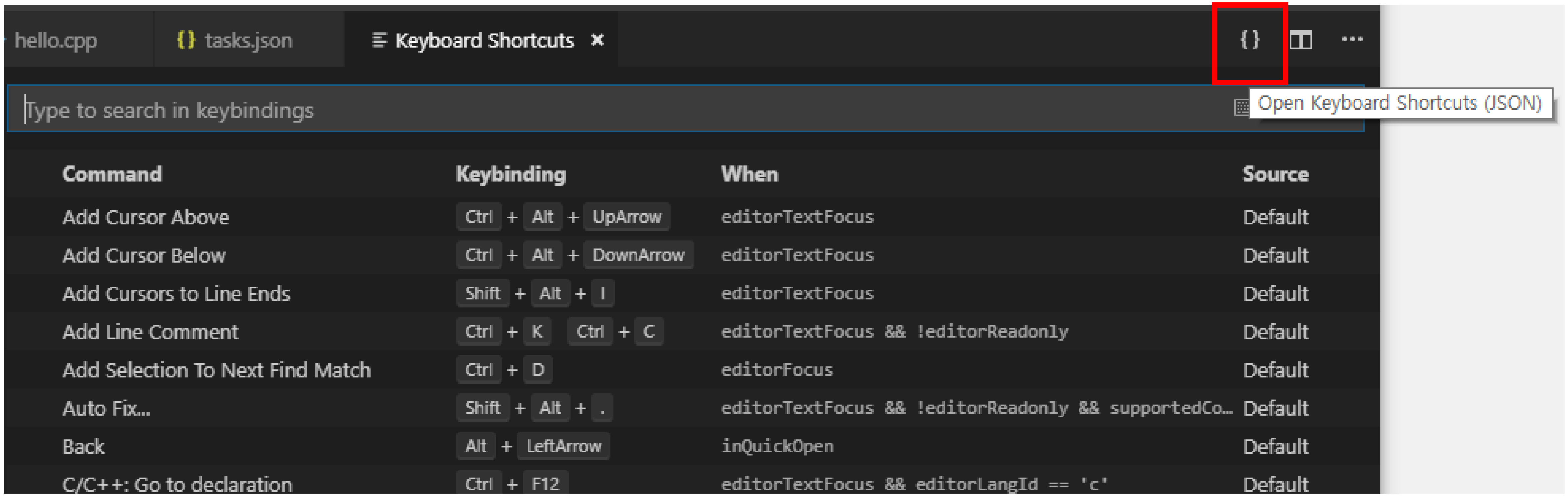


New File	Ctrl+N
New Window	Ctrl+Shift+N
Open File...	Ctrl+O
Open Folder...	Ctrl+K Ctrl+O
Open Workspace...	
Open Recent	
Add Folder to Workspace...	
Save Workspace As...	
Save	Ctrl+S
Save As...	Ctrl+Shift+S
Save All	Ctrl+K S
Auto Save	
Preferences	
Revert File	
Close Editor	Ctrl+F4
Close Folder	Ctrl+K F
Close Window	Ctrl+Shift+W
Exit	

Settings	Ctrl+,
Extensions	Ctrl+Shift+X
Keyboard Shortcuts	Ctrl+K Ctrl+S
Keymaps	Ctrl+K Ctrl+M
User Snippets	
Color Theme	Ctrl+K Ctrl+T
File Icon Theme	

Command
Add Cursor Above
Add Cursor Below
Add Cursors to Line Ends
Add Line Comment
Add Selection To Next Find Match
Auto Fix...
Back
C/C++: Go to declaration
C/C++: Go to declaration
Close Window
Copy
Copy

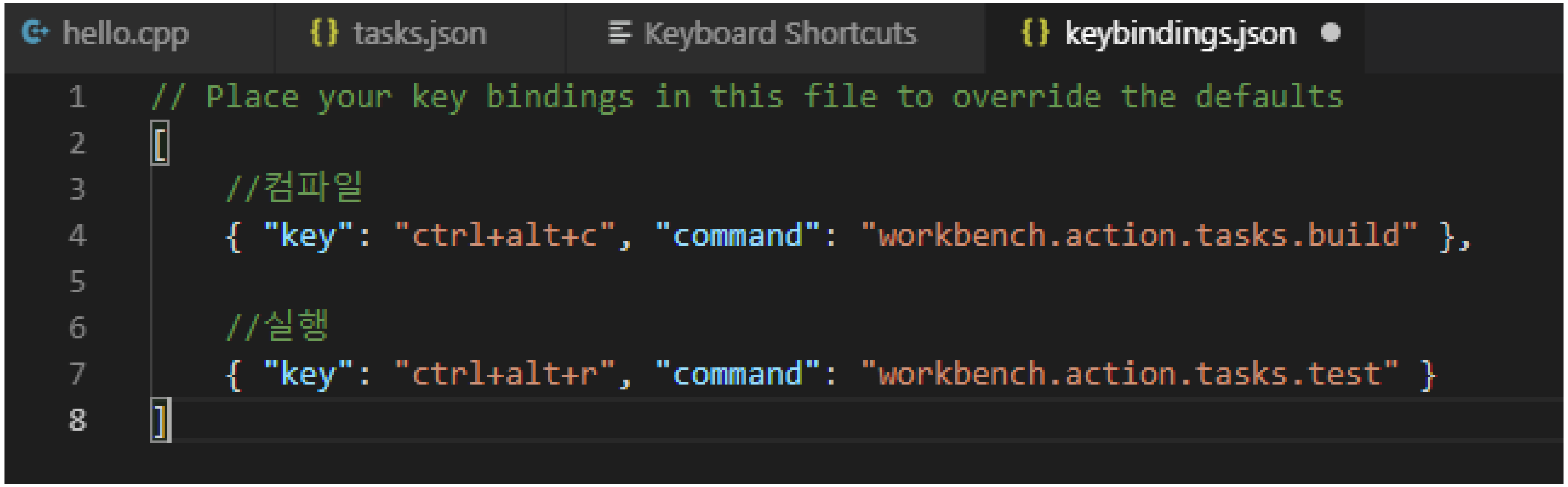
C++ Programming Environment



Command	Keybinding	When	Source
Add Cursor Above	Ctrl + Alt + UpArrow	editorTextFocus	Default
Add Cursor Below	Ctrl + Alt + DownArrow	editorTextFocus	Default
Add Cursors to Line Ends	Shift + Alt + I	editorTextFocus	Default
Add Line Comment	Ctrl + K Ctrl + C	editorTextFocus && !editorReadonly	Default
Add Selection To Next Find Match	Ctrl + D	editorFocus	Default
Auto Fix...	Shift + Alt + .	editorTextFocus && !editorReadonly && supportedCo...	Default
Back	Alt + LeftArrow	inQuickOpen	Default
C/C++: Go to declaration	Ctrl + F12	editorTextFocus && editorLangId == 'c'	Default

C++ Programming Environment

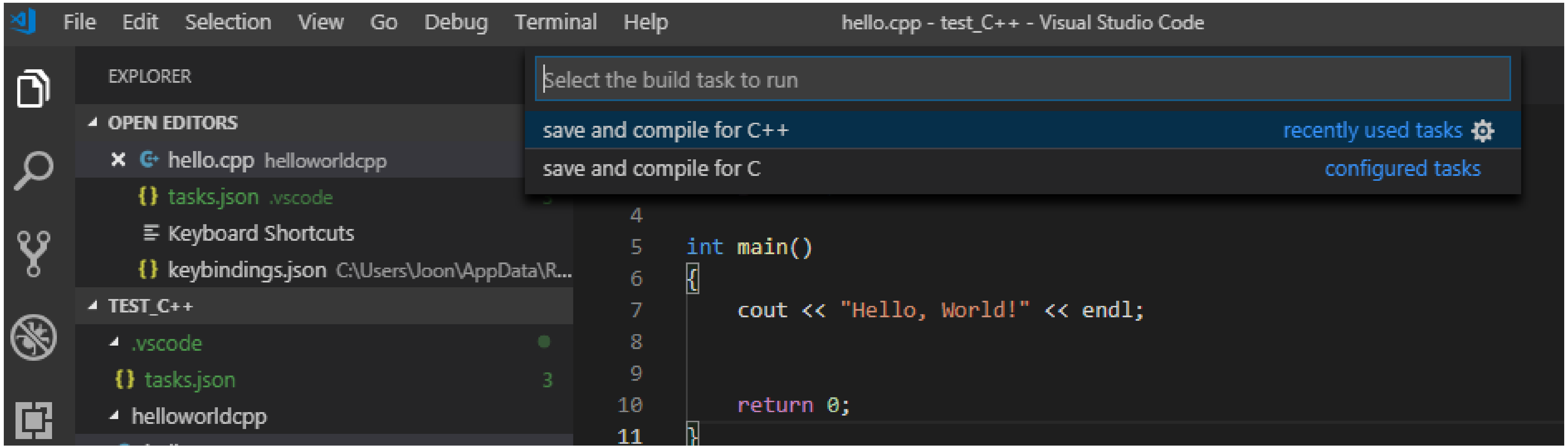
- Enter and press Ctrl + S to save as follows



```
// Place your key bindings in this file to override the defaults
[
    //컴파일
    { "key": "ctrl+alt+c", "command": "workbench.action.tasks.build" },

    //실행
    { "key": "ctrl+alt+r", "command": "workbench.action.tasks.test" }
]
```

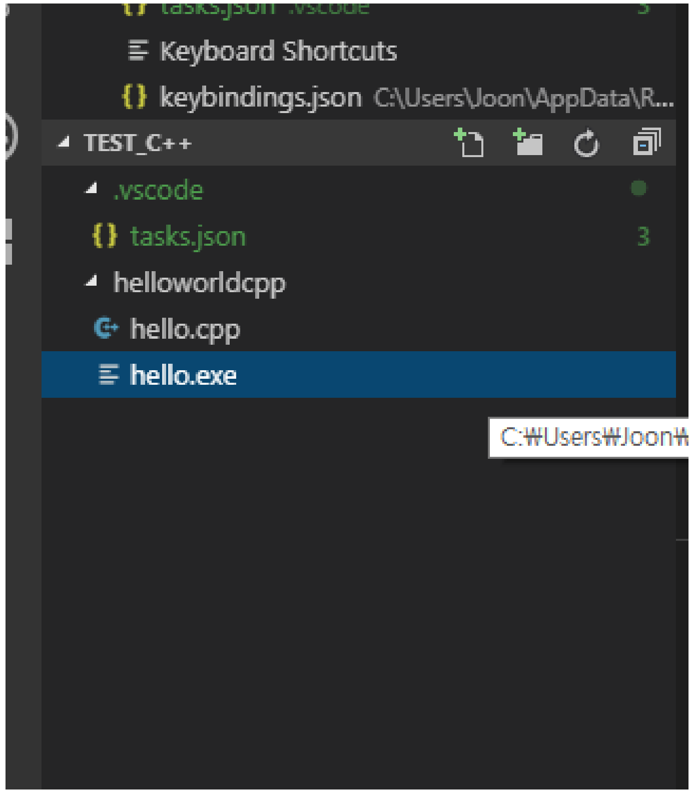
C++ Programming Environment

- In Hello.cpp, press Ctrl +Alt + C and click *save and compile for C++.*



```
int main()
{
    cout << "Hello, World!" << endl;


    return 0;
}
```

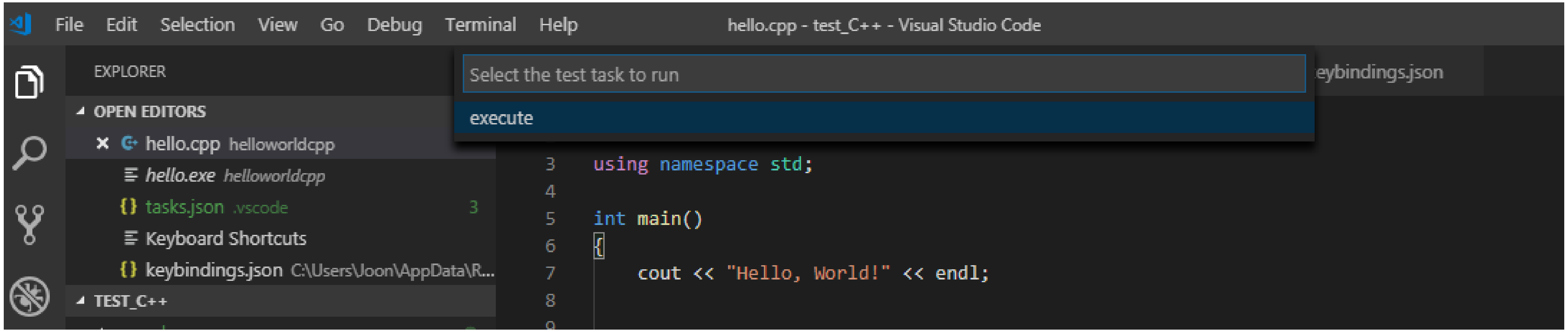
C++ Programming Environment



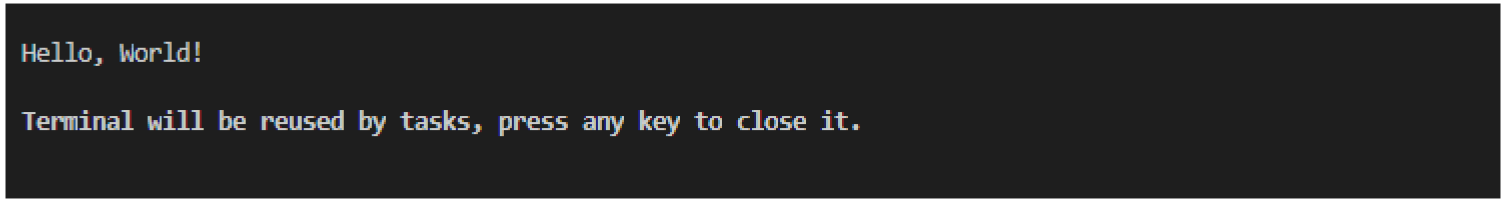
- All files being edited will be saved and the compilation progress will be shown in the terminal before.
- If the compile was run without any problems, the file Hello.exe, the compilation result, will be displayed in the left navigator.

C++ Programming Environment

- Press Ctrl + Alt + R and click *execute*
- The results of the execution are displayed in the terminal.



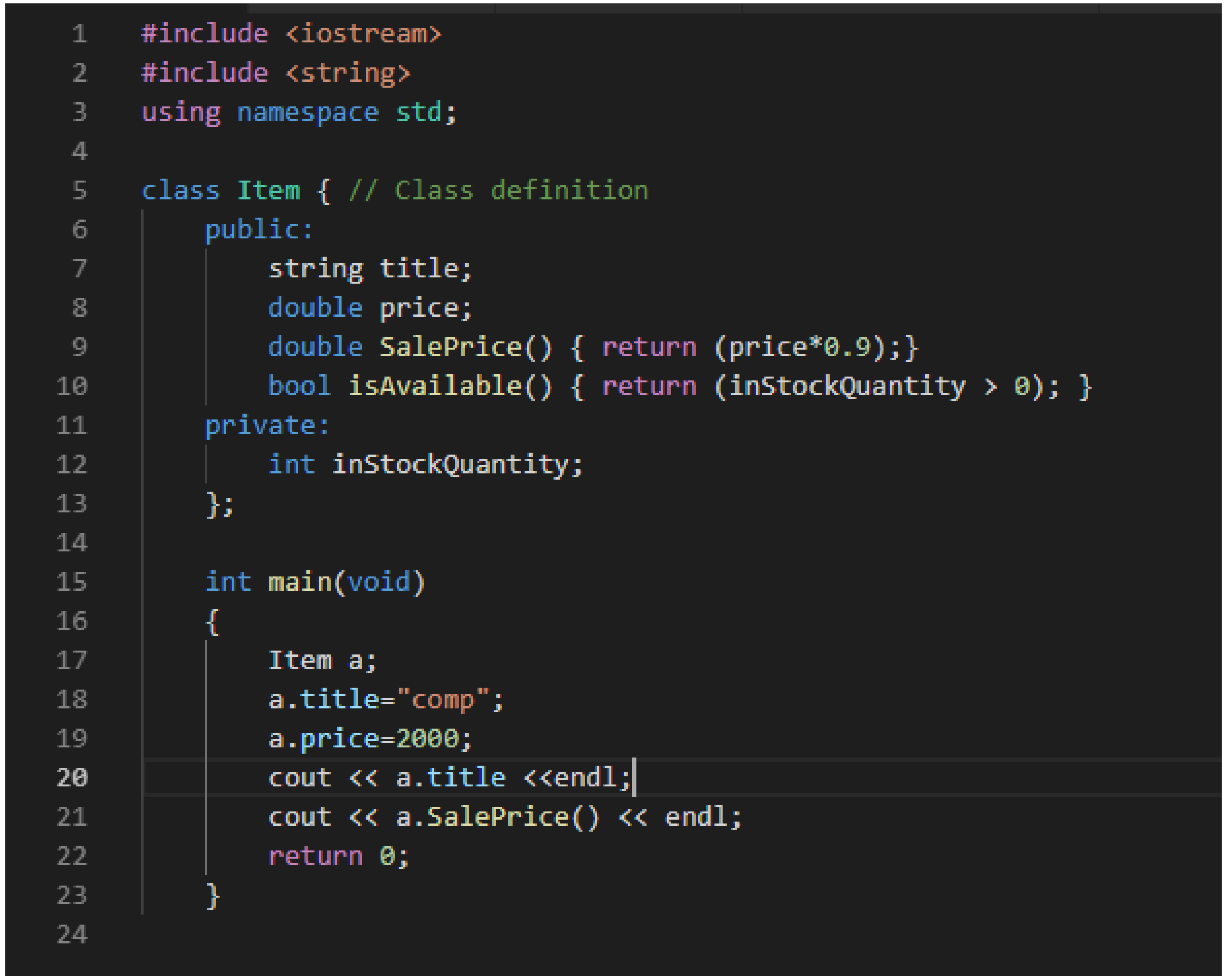
```
using namespace std;

int main()
{
    cout << "Hello, World!" << endl;
```



```
Hello, World!

Terminal will be reused by tasks, press any key to close it.
```

C++ Example code 1

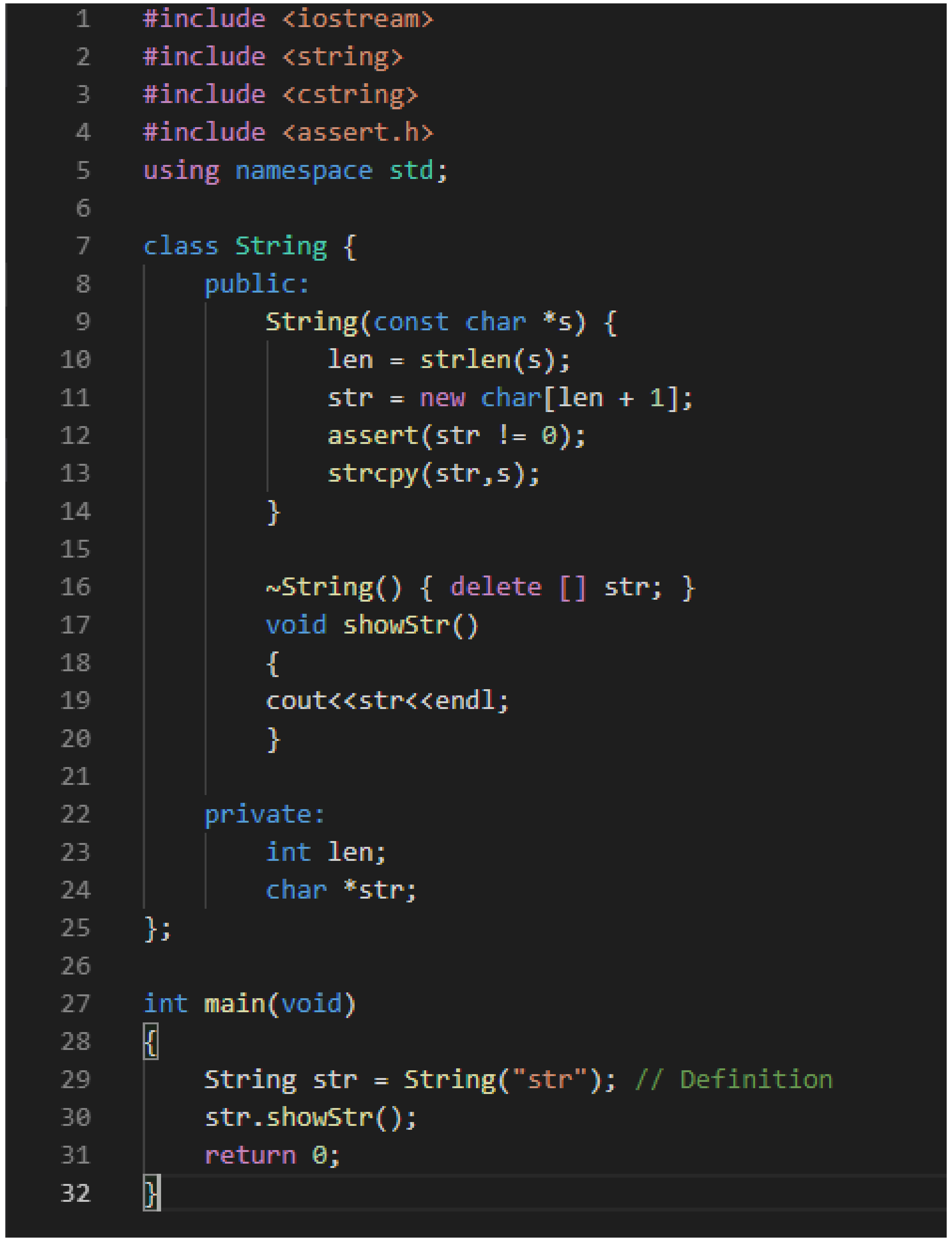
- Try to compile this code and print out the results.
- What functions should added to change private variable? (indirect approach)



```
#include <iostream>
#include <string>
using namespace std;

class Item { // Class definition
    public:
        string title;
        double price;
        double SalePrice() { return (price*0.9);}
        bool isAvailable() { return (inStockQuantity > 0); }
    private:
        int inStockQuantity;
    };

    int main(void)
    {
        Item a;
        a.title="comp";
        a.price=2000;
        cout << a.title <<endl;
        cout << a.SalePrice() << endl;
        return 0;
    }

```

C++ Example code 2

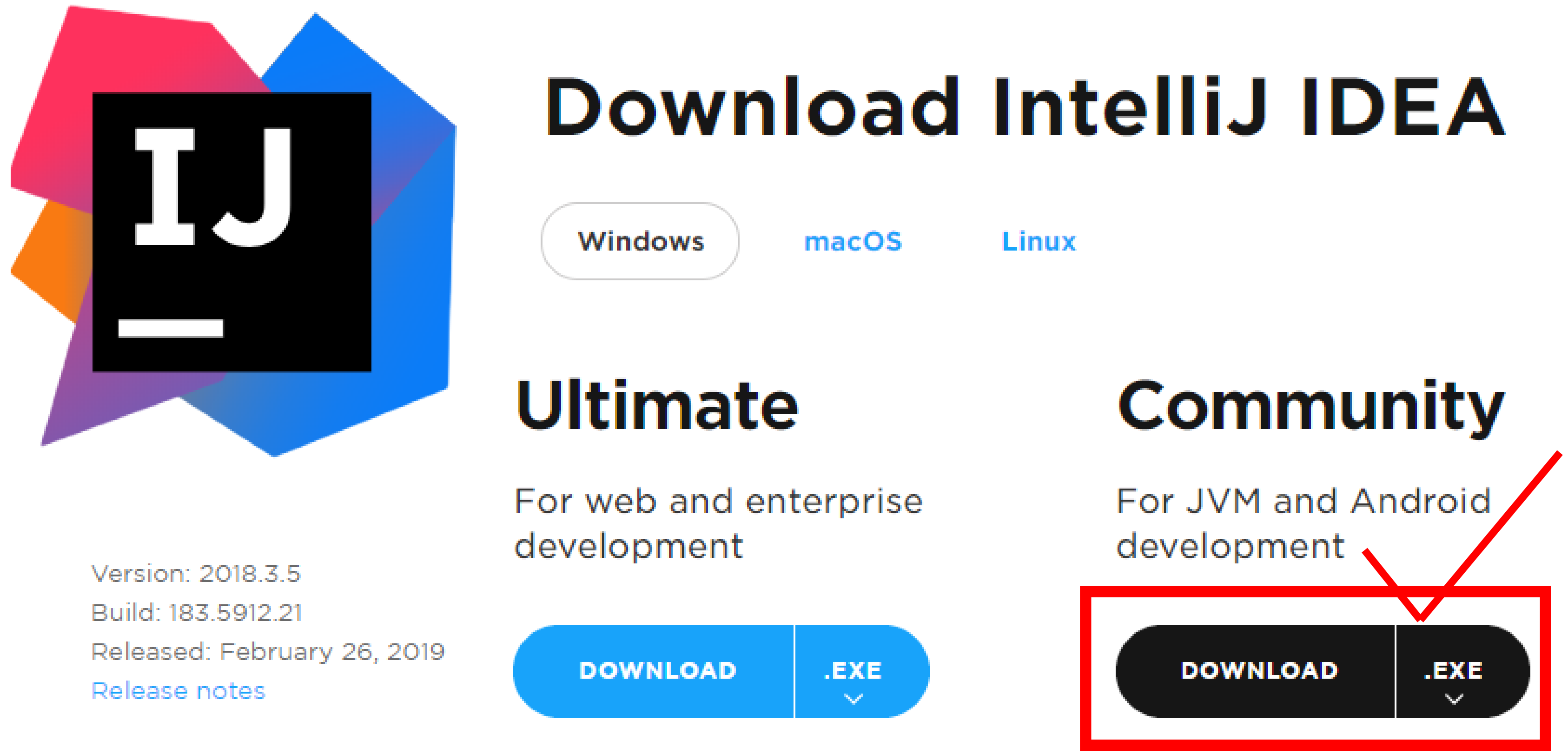
- Try to compile this code and print out the results.



```cpp
#include <iostream>
#include <string>
#include <cstring>
#include <assert.h>
using namespace std;

class String {
    public:
        String(const char *s) {
            len = strlen(s);
            str = new char[len + 1];
            assert(str != 0);
            strcpy(str,s);
        }

        ~String() { delete [] str; }
        void showStr()
        {
        cout<<str<<endl;
        }

    private:
        int len;
        char *str;
};

int main(void)
{
    String str = String("str"); // Definition
    str.showStr();
    return 0;
}
```

Java Programming Environment Setup

- https://www.jetbrains.com/idea/



Download IntelliJ IDEA

Windows macOS Linux

Ultimate

For web and enterprise development

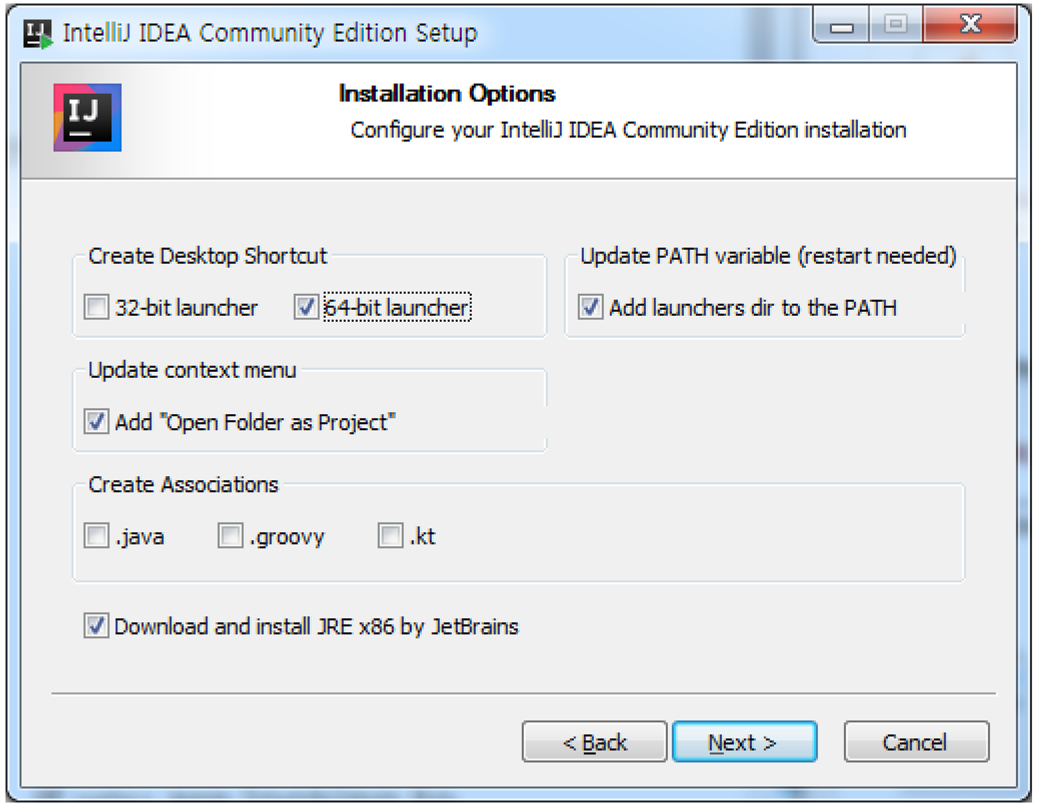
Community

For JVM and Android development

Version: 2018.3.5
Build: 183.5912.21
Released: February 26, 2019
Release notes

Installation 2

Next > … >


IntelliJ IDEA Community Edition Setup

Installation Options

Configure your IntelliJ IDEA Community Edition installation

Create Desktop Shortcut

- [ ] 32-bit launcher
- [✓] 64-bit launcher

Update PATH variable (restart needed)

- [✓] Add launchers dir to the PATH

Update context menu

- [✓] Add "Open Folder as Project"

Create Associations

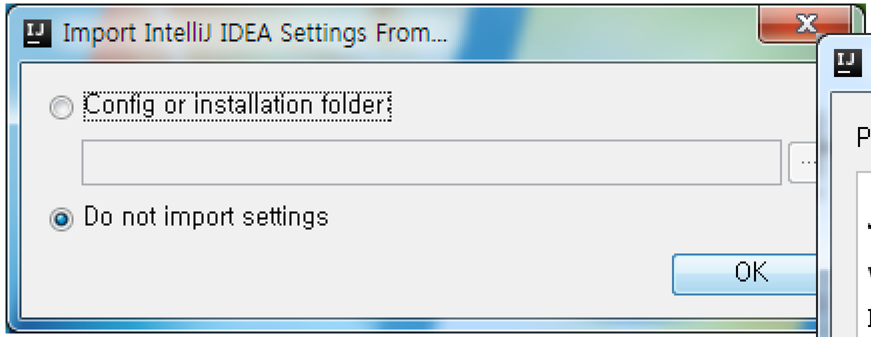
- [ ] .java
- [ ] .groovy
- [ ] .kt

- [✓] Download and install JRE x86 by JetBrains

→ Install

Installation 3

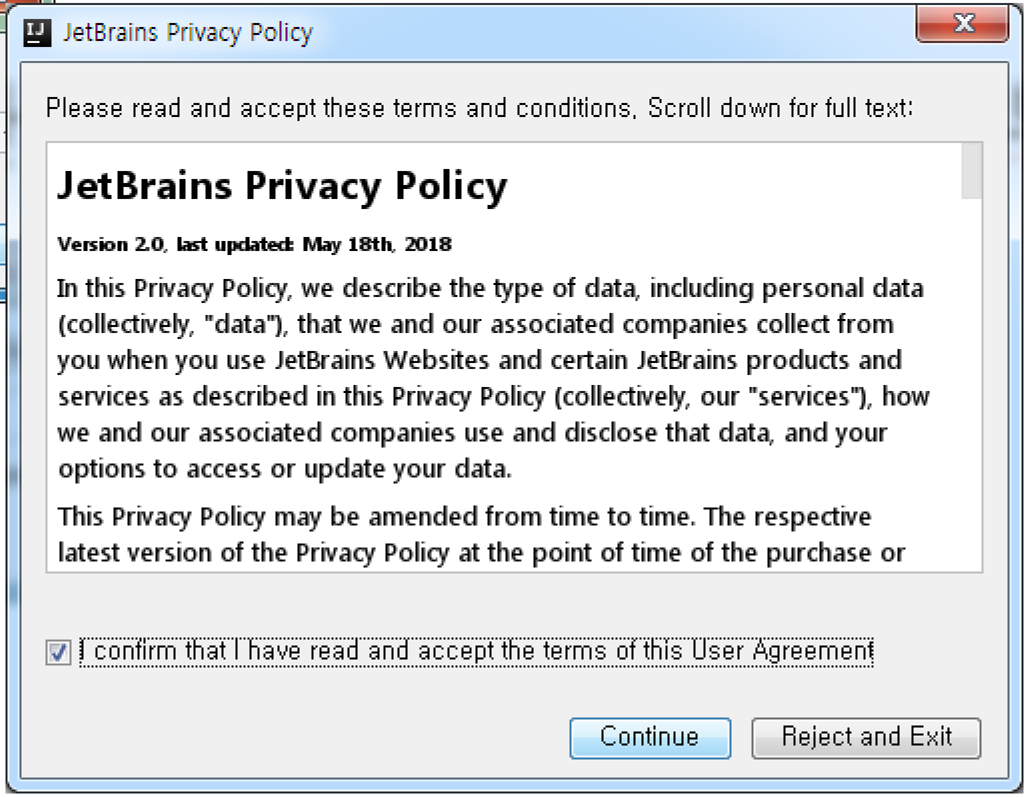
- Reboot the computer and run program



Import IntelliJ IDEA Settings From...

( ) Config or installation folder:

[✓ Do not import settings]



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Version 2.0, last updated: May 18th, 2018

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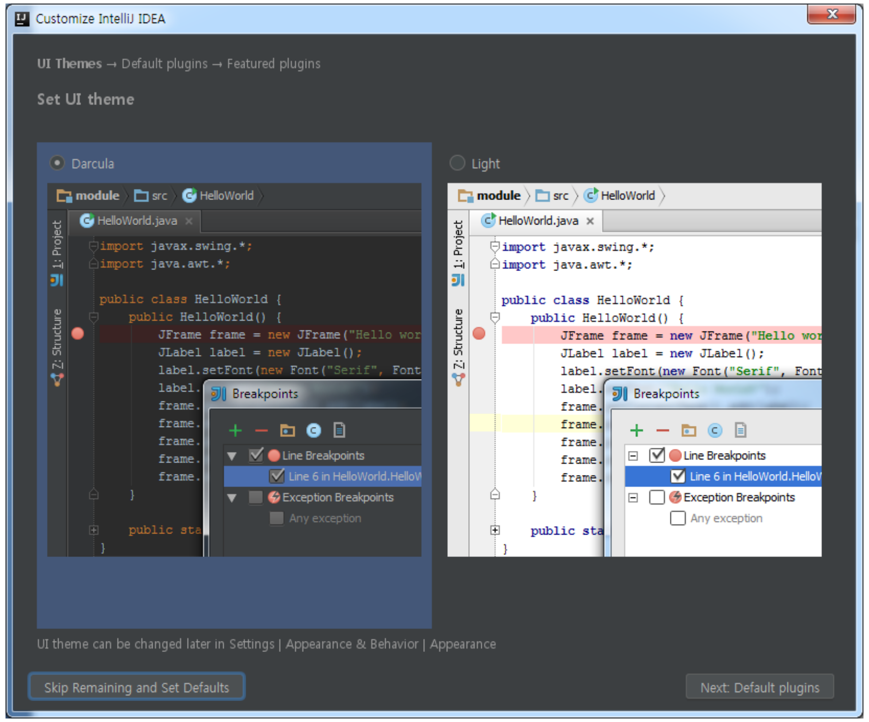
This Privacy Policy may be amended from time to time. The respective latest version of the Privacy Policy at the point of time of the purchase or

[✓] I confirm that I have read and accept the terms of this User Agreement

Installation 4

- Select either Darcula / Light
- Press Next -> Finished.



Customize IntelliJ IDEA

UI Themes → Default plugins → Featured plugins

Set UI theme

Darcula

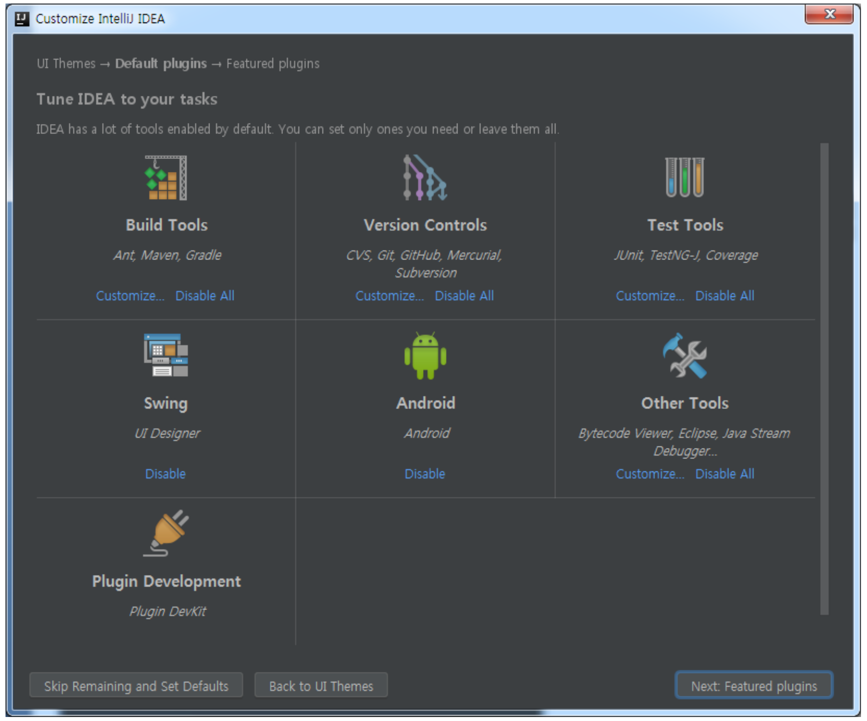
```
import javax.swing.*;
import java.awt.*;

public class HelloWorld {
    public HelloWorld() {
        JFrame frame = new JFrame("Hello wor
        JLabel label = new JLabel();
        label.setFont(new Font("Serif", Font
        label.
        frame.
        frame.
        frame.
        frame.
        frame.
    }

    public sta
}
```

Breakpoints: Line Breakpoints — Line 6 in HelloWorld.HelloW; Exception Breakpoints — Any exception

Light

```
import javax.swing.*;
import java.awt.*;

public class HelloWorld {
    public HelloWorld() {
        JFrame frame = new JFrame("Hello wor
        JLabel label = new JLabel();
        label.setFont(new Font("Serif", Font
        label.
        frame.
        frame.
        frame.
        frame.
        frame.
    }

    public sta
}
```

UI theme can be changed later in Settings | Appearance & Behavior | Appearance



Customize IntelliJ IDEA

UI Themes → **Default plugins** → Featured plugins

Tune IDEA to your tasks

IDEA has a lot of tools enabled by default. You can set only ones you need or leave them all.

Build Tools — *Ant, Maven, Gradle* — Customize... Disable All

Version Controls — *CVS, Git, GitHub, Mercurial, Subversion* — Customize... Disable All

Test Tools — *JUnit, TestNG-J, Coverage* — Customize... Disable All

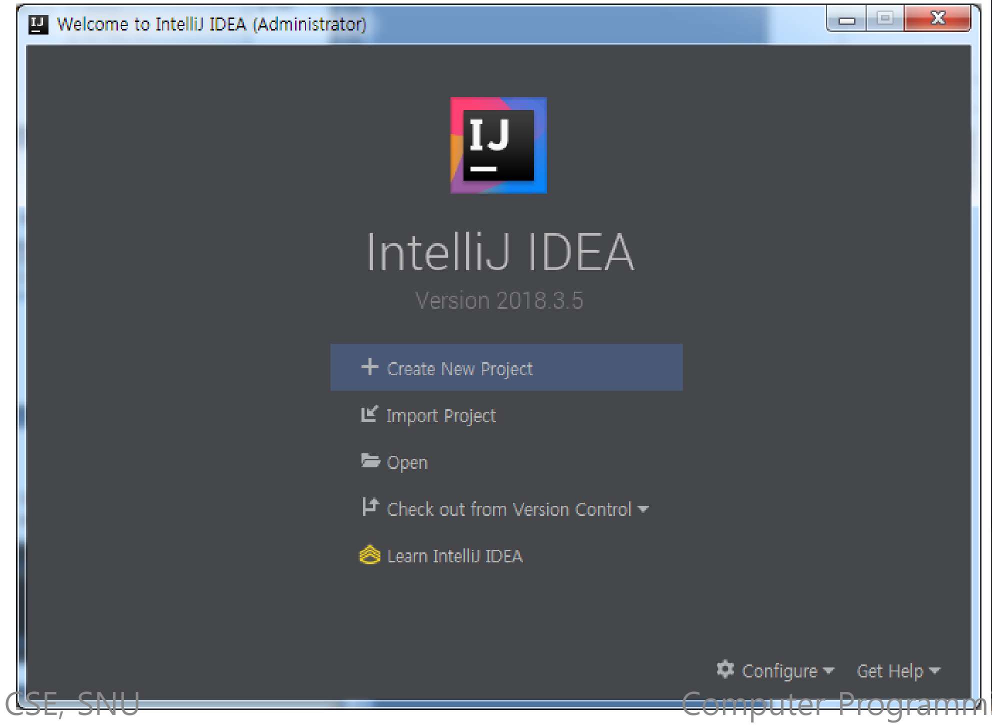
Swing — *UI Designer* — Disable

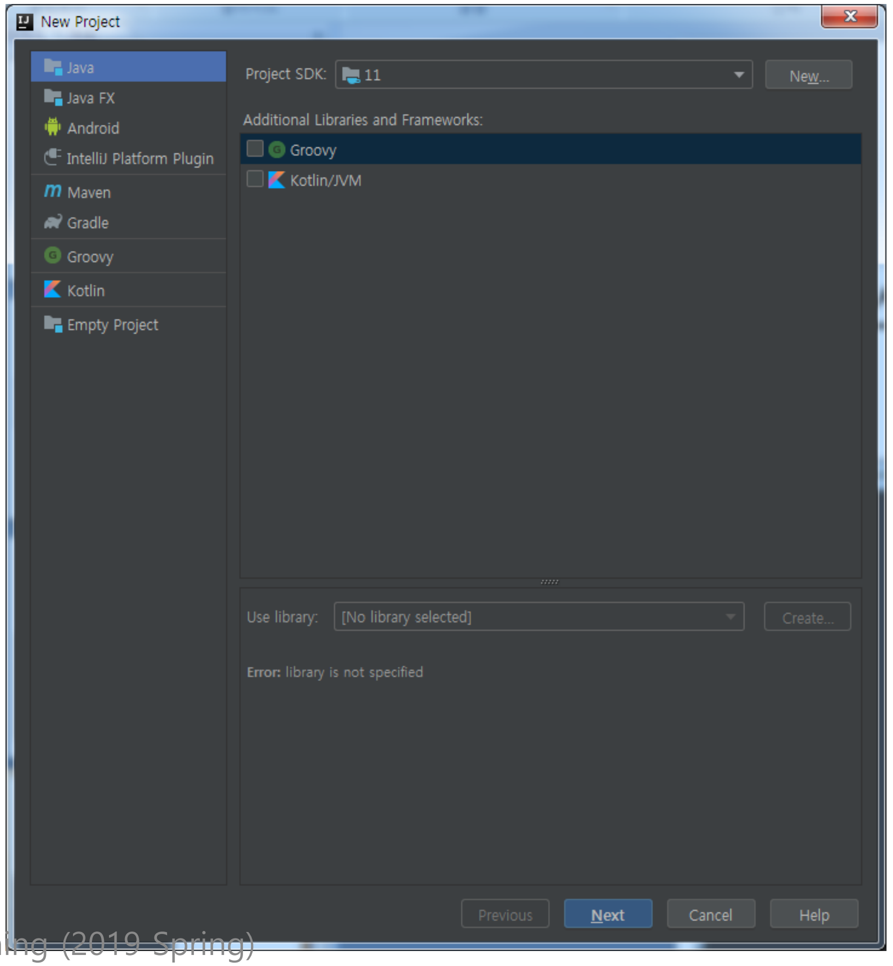
Android — *Android* — Disable

Other Tools — *Bytecode Viewer, Eclipse, Java Stream Debugger...* — Customize... Disable All

Plugin Development — *Plugin DevKit*

First Start-up settings



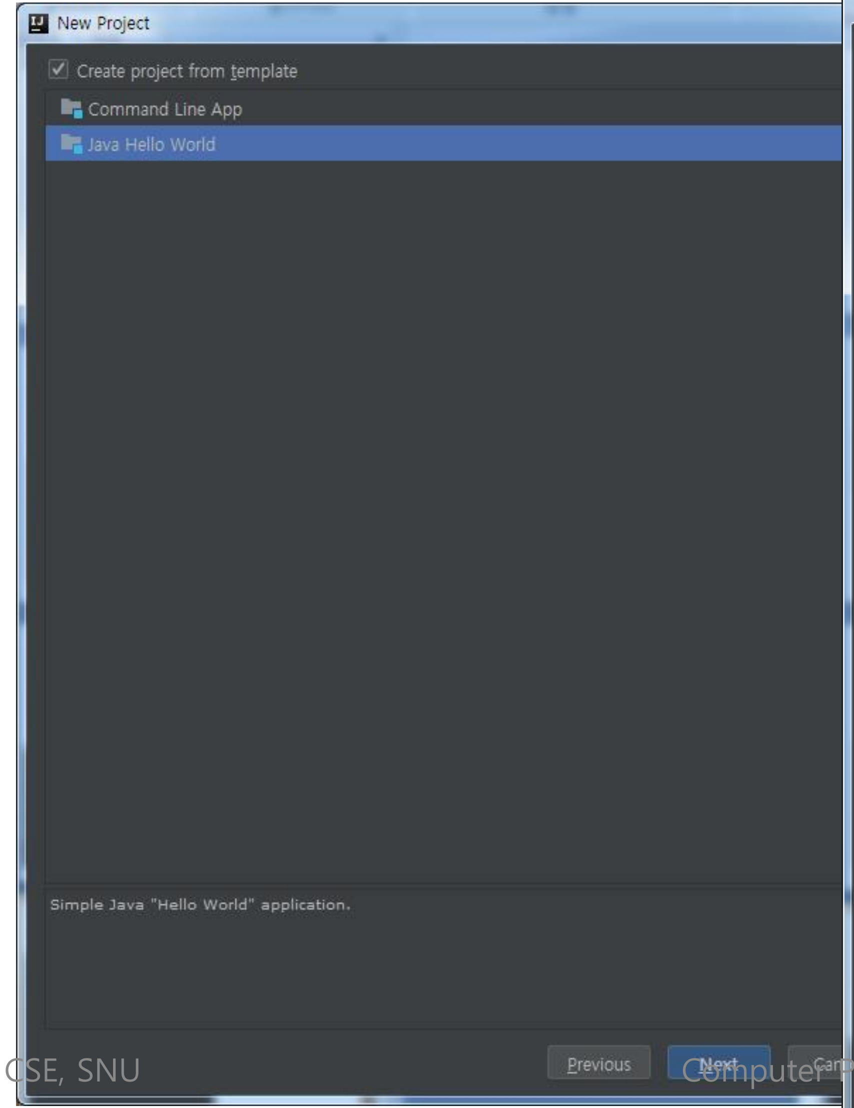


Project SDK: 11

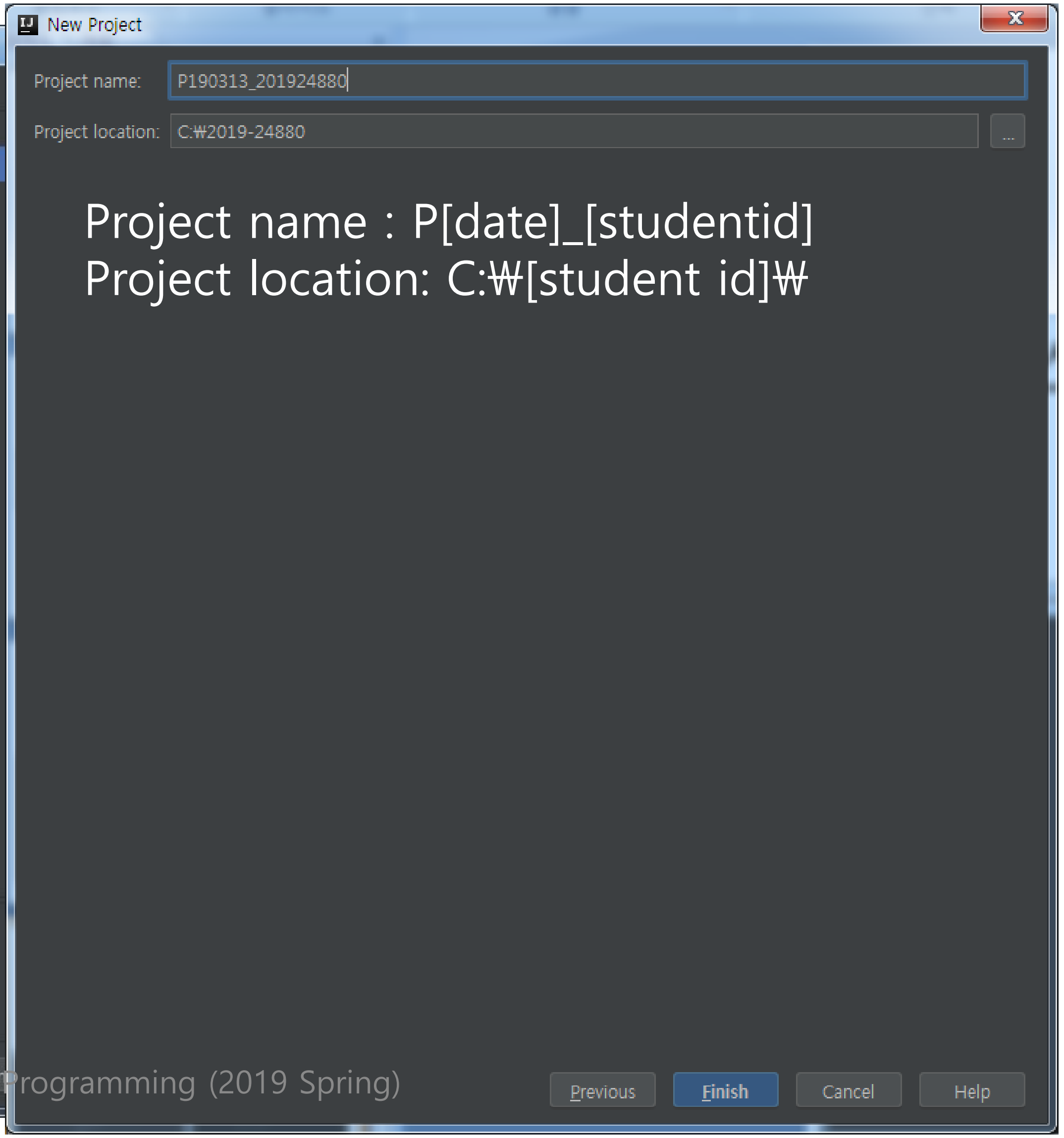
Use library: [No library selected]

Error: library is not specified

Cont.



Simple Java "Hello World" application.

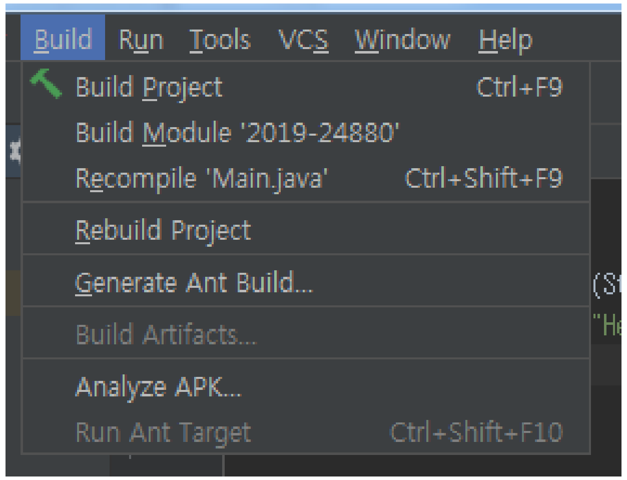


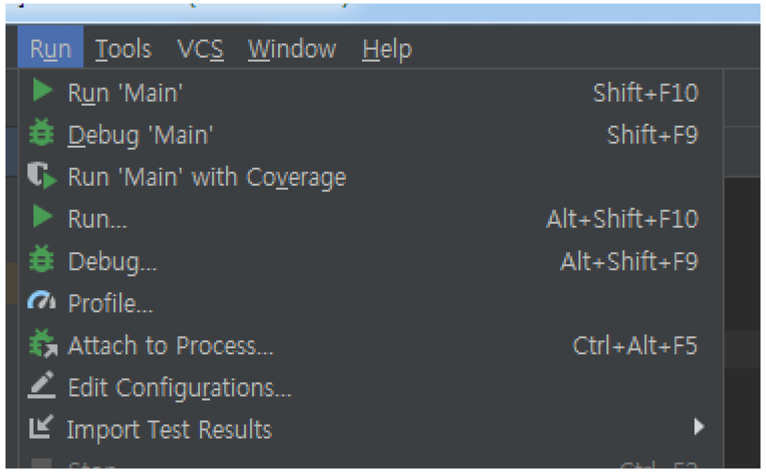
Project name: P190313_201924880

Project location: C:₩2019-24880

Project name : P[date]_[studentid]
Project location: C:₩[student id]₩

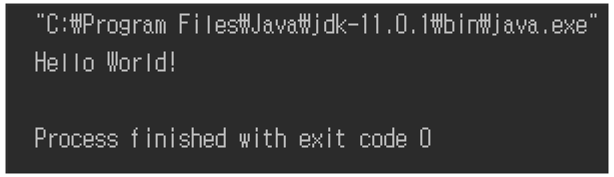
First Build and first run





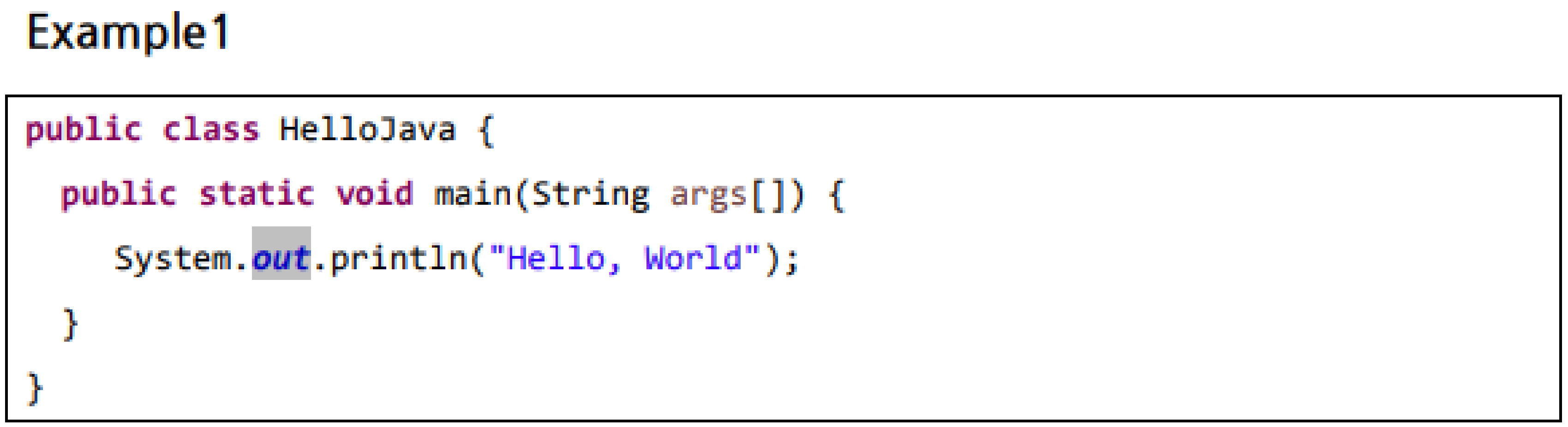
Build (CTRL+F9)-> Run (SHIFT + F10)

Result :



```
"C:₩Program Files₩Java₩jdk-11.0.1₩bin₩java.exe"
Hello World!

Process finished with exit code 0
```

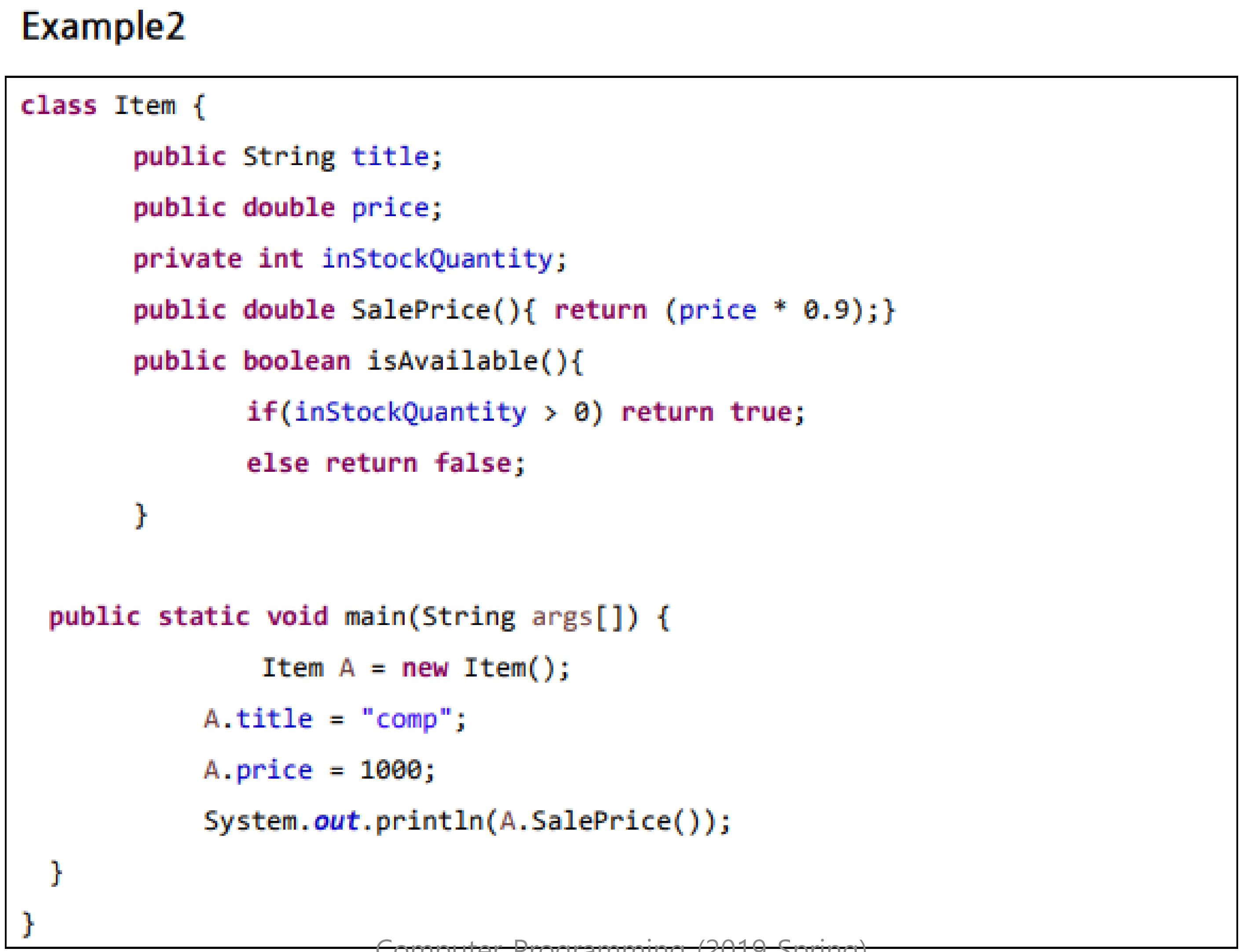
Example 1



Example1

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

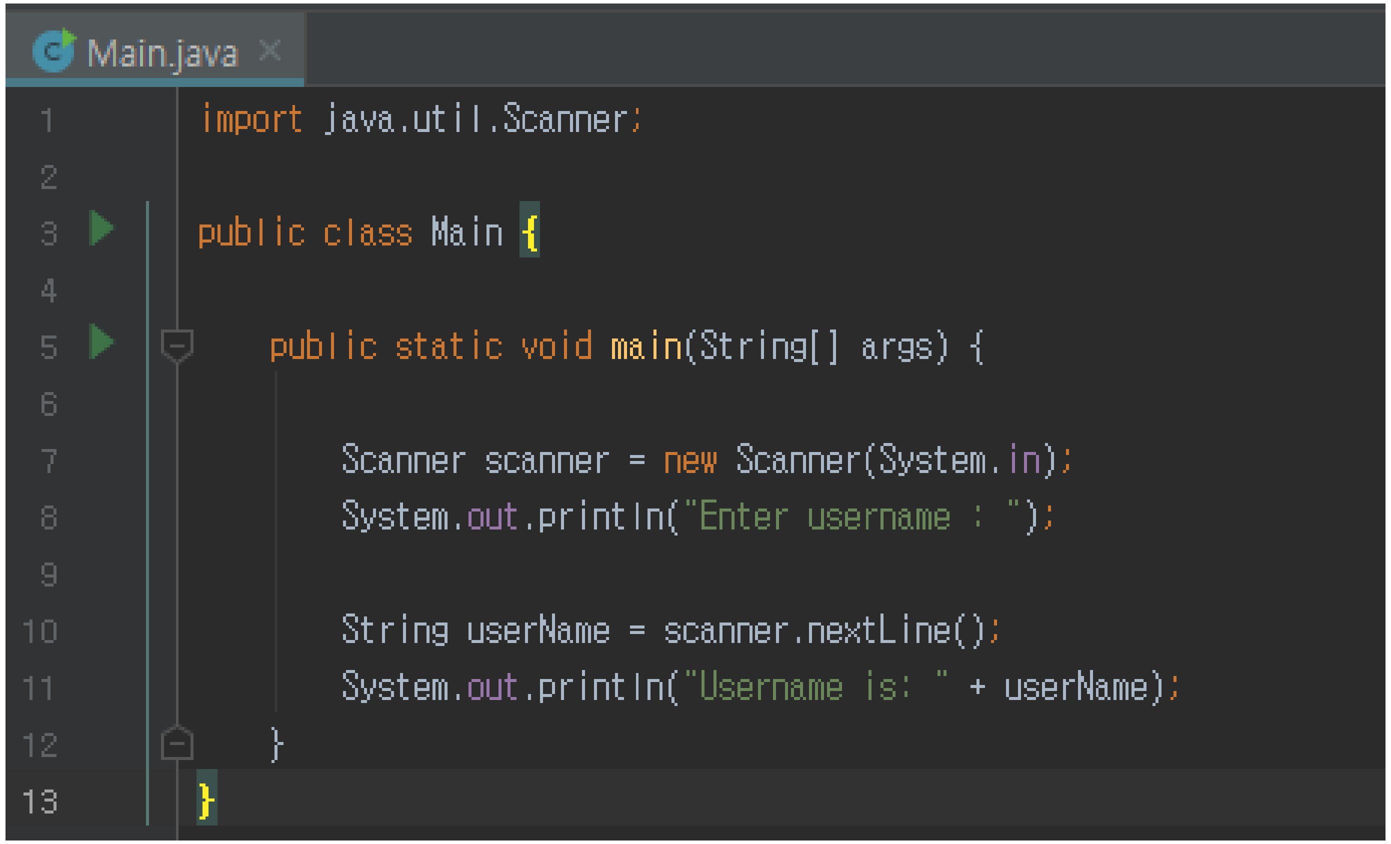
Example 2



Example2

```
class Item {
        public String title;
        public double price;
        private int inStockQuantity;
        public double SalePrice(){ return (price * 0.9);}
        public boolean isAvailable(){
                if(inStockQuantity > 0) return true;
                else return false;
        }

  public static void main(String args[]) {
                Item A = new Item();
            A.title = "comp";
            A.price = 1000;
            System.out.println(A.SalePrice());
  }
}
```

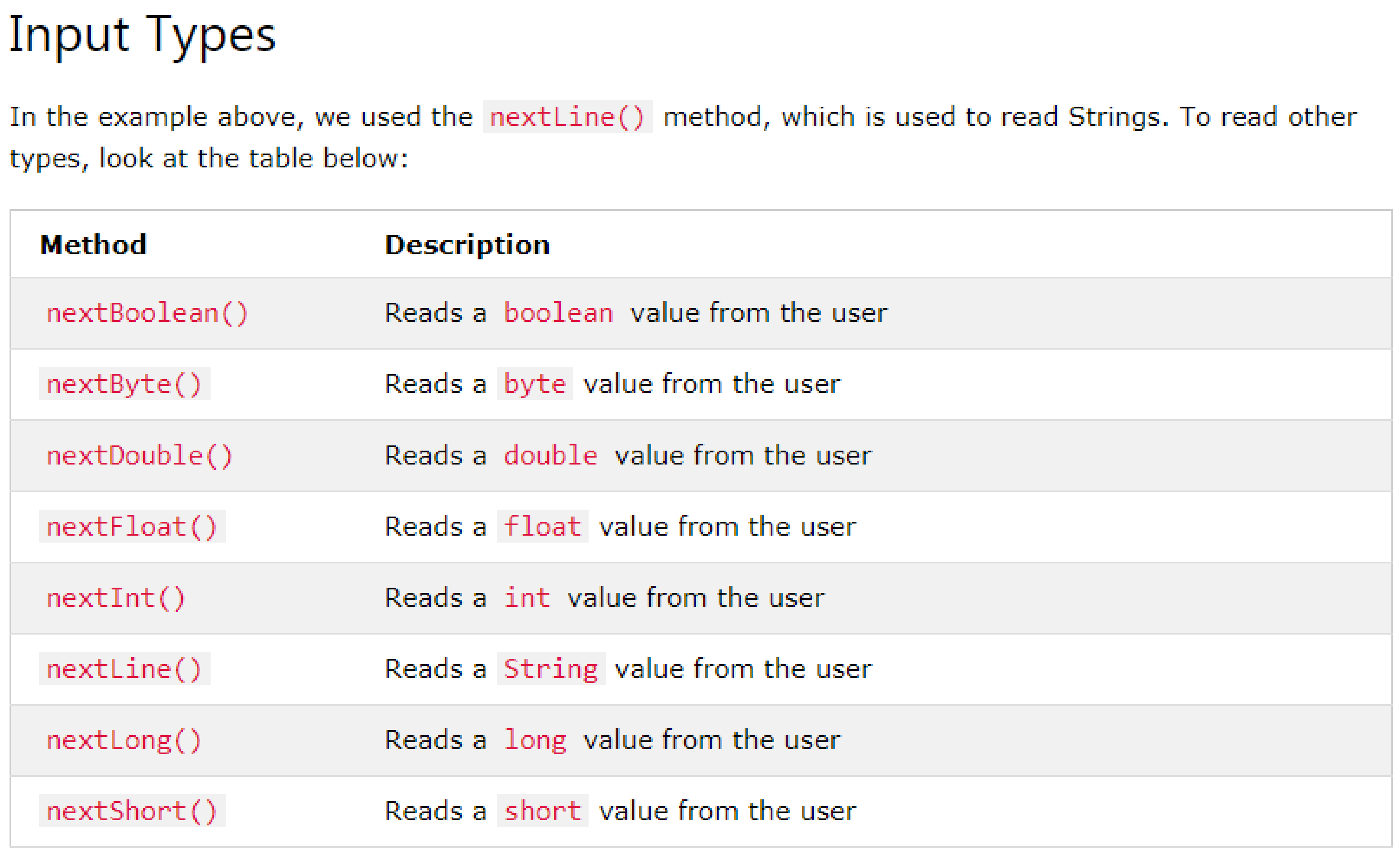
Example 3



Main.java

```java
import java.util.Scanner;

public class Main {

    public static void main(String[] args) {

        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter username : ");

        String userName = scanner.nextLine();
        System.out.println("Username is: " + userName);
    }
}
```

Example 3

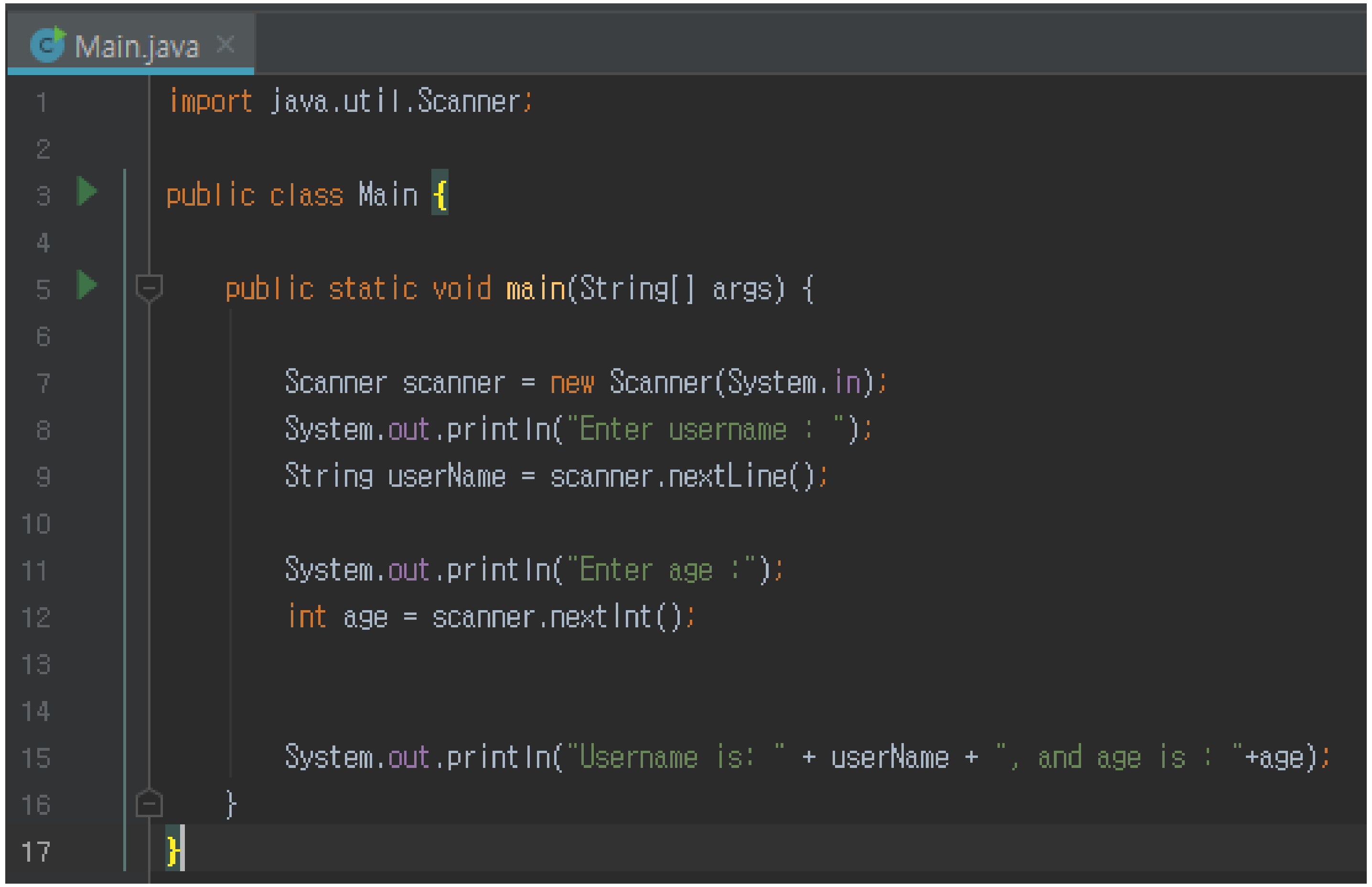


Input Types

In the example above, we used the `nextLine()` method, which is used to read Strings. To read other types, look at the table below:

Method	Description
`nextBoolean()`	Reads a `boolean` value from the user
`nextByte()`	Reads a `byte` value from the user
`nextDouble()`	Reads a `double` value from the user
`nextFloat()`	Reads a `float` value from the user
`nextInt()`	Reads a `int` value from the user
`nextLine()`	Reads a `String` value from the user
`nextLong()`	Reads a `long` value from the user
`nextShort()`	Reads a `short` value from the user

Example 4

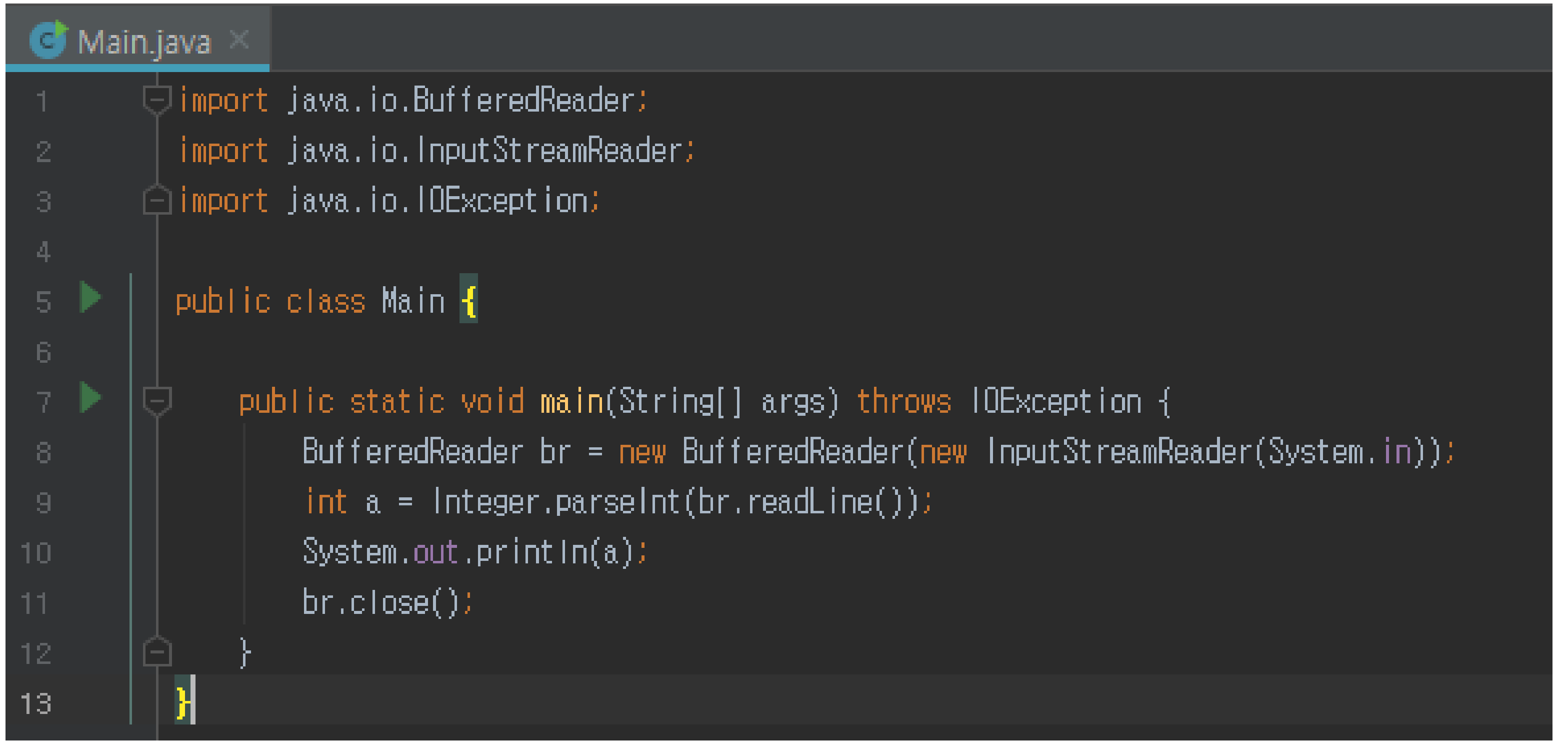


Main.java

```java
import java.util.Scanner;

public class Main {

    public static void main(String[] args) {

        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter username : ");
        String userName = scanner.nextLine();

        System.out.println("Enter age :");
        int age = scanner.nextInt();


        System.out.println("Username is: " + userName + ", and age is : "+age);
    }
}
```

Example 5

BufferedReader : 보통 한 줄씩 읽어올 때 사용합니다.
Scanner 보다 처리속도가 빨라서 보통 속도가 중요할 때 사용합니다.
(Ex. 백준 알고리즘 코딩 테스트)



```java
import java.io.BufferedReader;
import java.io.InputStreamReader;
import java.io.IOException;

public class Main {

    public static void main(String[] args) throws IOException {
        BufferedReader br = new BufferedReader(new InputStreamReader(System.in));
        int a = Integer.parseInt(br.readLine());
        System.out.println(a);
        br.close();
    }
}
```