

C++ Basics

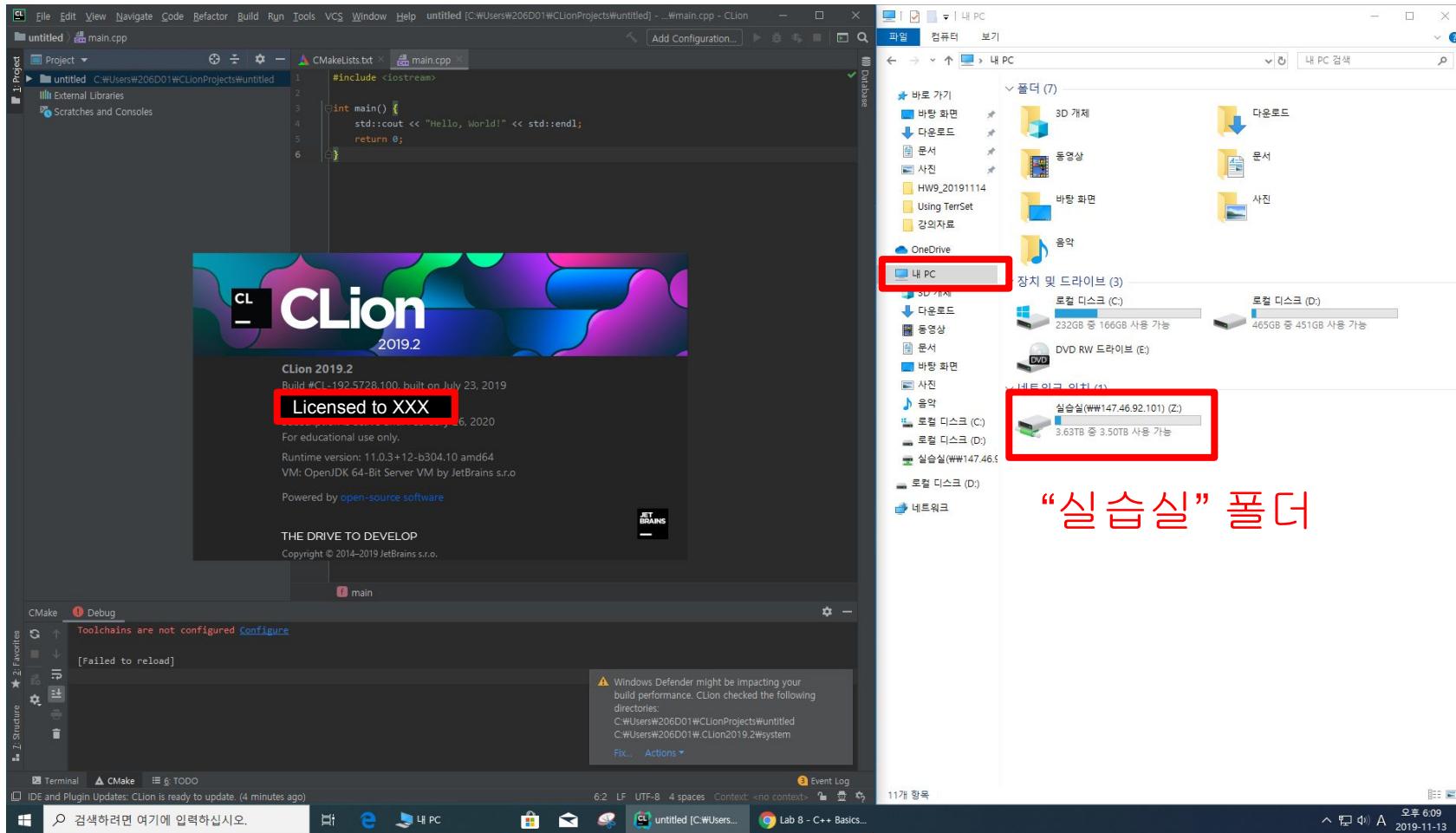
Lab 08

Today's Assignment!

- Take a screenshot with CLion “about” page and the file explorer window showing “실습실” folder in your lab computer (Not your personal computer).
- Submit the screenshot image file to “CLion License Activation Screenshot” in ETL.
- We will give you a penalty if you don’t submit!

Today's Assignment!

- Red parts should be shown in the screenshot.

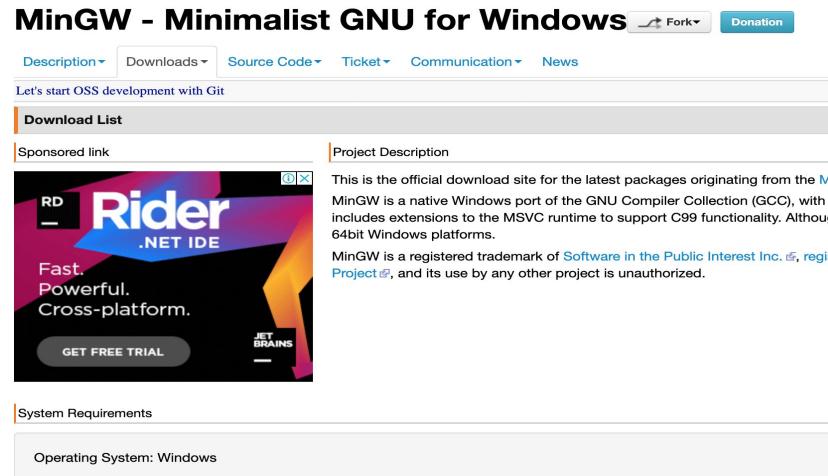


C++ Environment Settings

- We installed java compiler javac and IntelliJ IDEA as a java code editor.
- Let's install C++ compiling environment MinGW, and C++ IDE CLion.

MinGW Installation (1/2)

- MinGW is a software development environment which enables various developing tools including C/C++ compiling on Windows.
- Download MinGW installer in
<https://osdn.net/projects/mingw/releases/>.



Click



mingw-get-setup.exe (Date: 2017-09-06, Size: 91.00 KB)

MinGW Installation (2/2)

파일 열기 - 보안 경고

게시자를 확인하지 못했습니다. 그래도 이 소프트웨어를 실행하시겠습니까?

이름: C:\Users\chphch\Downloads\mingw-get-setup.exe
 게시자: 알 수 없는 게시자
 유형: 응용 프로그램
 시작: C:\Users\chphch\Downloads\mingw-get-setup.exe

이 파일을 열기 전에 항상 확인(W)

이 파일에는 파일의 게시자 확인을 위한 올바른 디지털 서명이 없습니다. 신뢰할 수 있는 게시자로부터의 소프트웨어만 실행해야 합니다.
[실행해도 안전한 소프트웨어를 결정하는 방법](#)

실행(R) 취소

MinGW Installation Manager Setup Tool
 mingw-get version 0.6.3-pre-20170905-1

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.

[View Licence](#) **Install** Cancel

MinGW Installation Manager Setup Tool
 mingw-get version 0.6.3-pre-20170905-1

Step 1: Specify Installation Preferences

Installation Directory Change

If you elect to change this, you are advised to avoid any choice of directory which includes white space within the absolute representation of its path name.

User Interface Options
 Both command line and graphical options are available. The command line interface is always supported; the alternative only if you choose the following option to ...
 ... also install support for the graphical user interface.

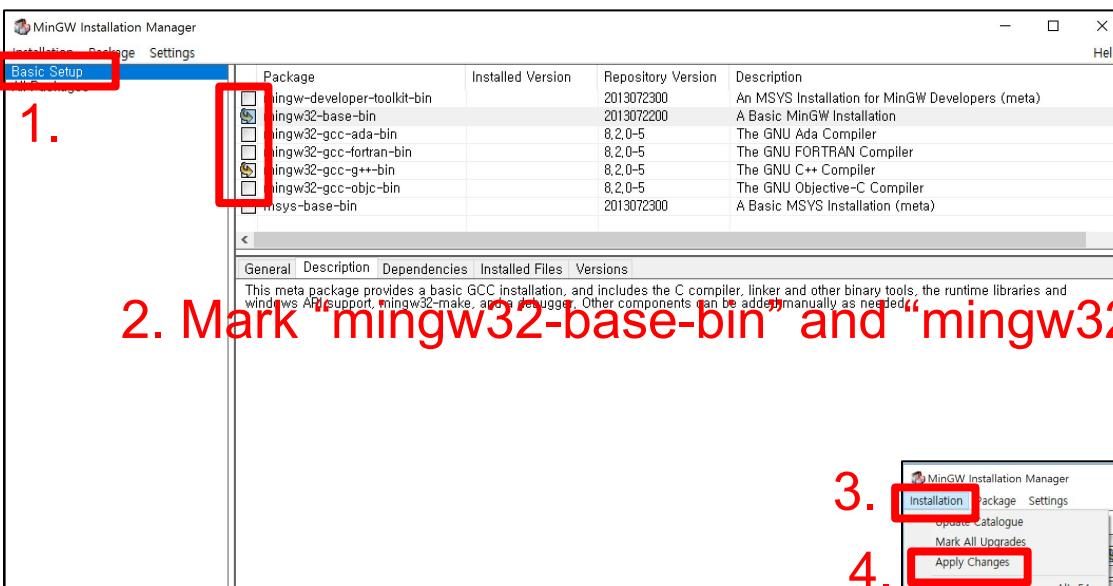
Program shortcuts for launching the graphical user interface should be installed ...
 ... just for me (the current user), or for all users * ...
 ... in the start menu, and/or on the desktop.

* selection of this option requires administrative privilege.

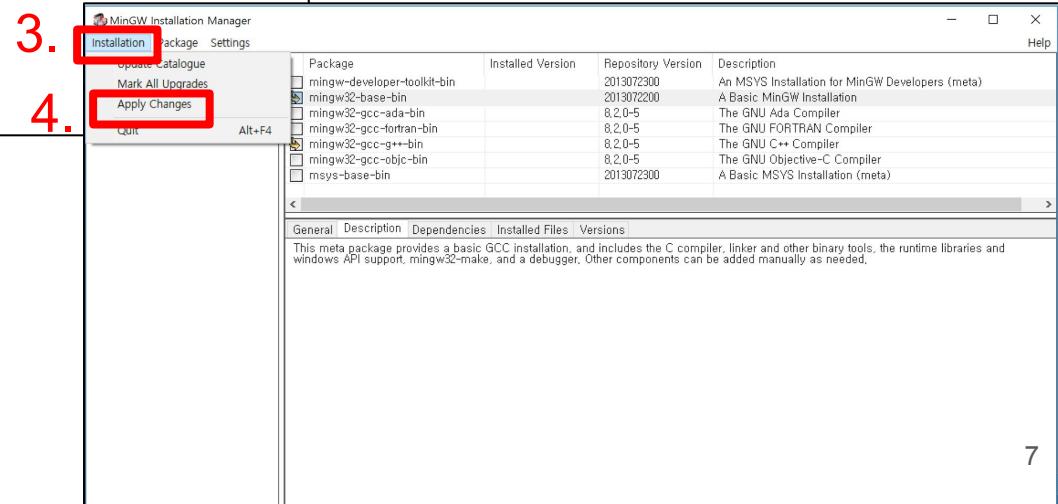
[View Licence](#) **Continue** Cancel

C/C++ Compiler Installation (1/2)

- Install C/C++ compiler on MinGW.



2. Mark "mingw32-base-bin" and "mingw32-gcc-g++-bin"



C/C++ Compiler Installation (2/2)

MinGW Installation Manager

Basic Setup | Package | Settings

Schedule of Pending Actions

Okay to proceed?
The package changes itemised below will be implemented when you choose "Apply"

Apply (button highlighted with a red box)

Defer | Discard

0 installed packages will be removed

0 installed packages will be upgraded

2 new/upgraded packages will be installed
 gcc-c++-8.2.0-5-mingw32-bin.tar.xz
 mingw32-base-2013072200-mingw32-bin.meta

Description

- An MSYS Installation for MinGW Developers (meta)
- A Basic MinGW Installation
- The GNU Ada Compiler
- The GNU FORTRAN Compiler
- The GNU C++ Compiler
- The GNU Objective-C Compiler
- A Basic MSYS Installation (meta)

C compiler, linker and other binary tools, the runtime libraries and headers can be added manually as needed.

MinGW Installation Manager

Basic Setup | Package | Settings

Applying Scheduled Changes

All changes were applied successfully; you may now close this dialogue.

Close dialogue automatically, when activity is complete. **Close** (button)

Details

```
install: mingw32-base-2013072200-mingw32-bin.meta
installing mingw32-base-2013072200-mingw32-bin.meta
install: gcc-c++-8.2.0-5-mingw32-bin.tar.xz
installing gcc-c++-8.2.0-5-mingw32-bin.tar.xz
```

C/C++ compiler is successfully installed!

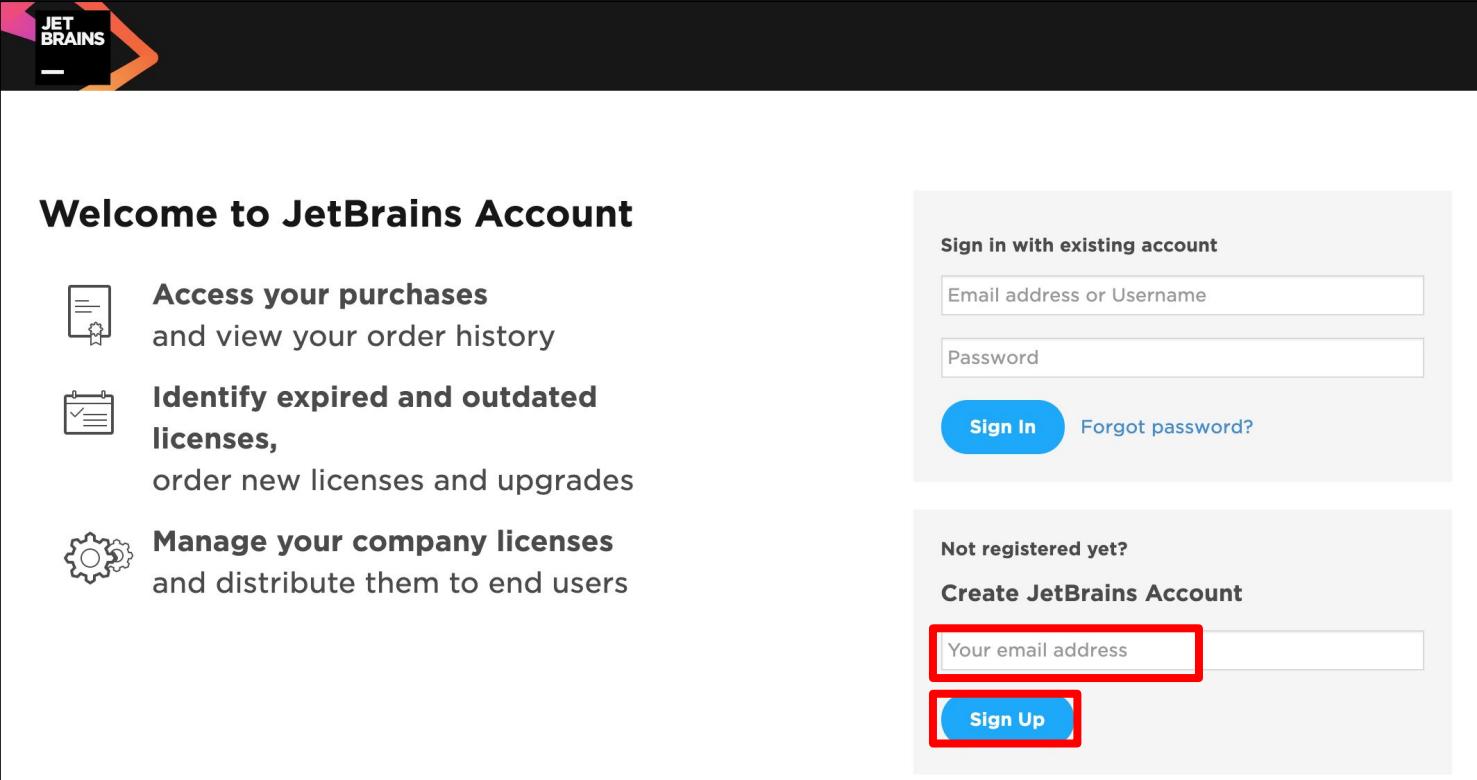
CLion

- CLion is one of the most convenient IDE developed by JetBrains. CLion has almost same UI as IntelliJ IDEA.
- CLion is a basically charged program, but all of you (SNU members) have a license for most of the JetBrains IDEs.

JetBrains Account Creation

- Create a JetBrains account with your SNU email account (xxx@snu.ac.kr).

Link: <https://account.jetbrains.com/login>



The screenshot shows the "Welcome to JetBrains Account" page. On the left, there are three sections with icons and text: "Access your purchases and view your order history", "Identify expired and outdated licenses, order new licenses and upgrades", and "Manage your company licenses and distribute them to end users". On the right, there are two main forms. The top form is for "Sign in with existing account" with fields for "Email address or Username" and "Password", and buttons for "Sign In" and "Forgot password?". The bottom form is for "Create JetBrains Account" with a field for "Your email address" and a "Sign Up" button. The "Your email address" field is highlighted with a red border.

Welcome to JetBrains Account

Access your purchases
and view your order history

Identify expired and outdated licenses,
order new licenses and upgrades

Manage your company licenses
and distribute them to end users

Sign in with existing account

Email address or Username

Password

Sign In [Forgot password?](#)

Not registered yet?

Create JetBrains Account

Your email address

Sign Up

JetBrains Account Creation

1.

Thank you for registering your JetBrains Account!

Please follow the instructions we have just emailed to you at ckrgksakdmac@snu.ac.kr.

2.

★ Complete your account registration

 Click here to add a Tag

From : JetBrains Account <no_reply@jetbrains.com> | [Add to Contacts](#) | Report as Spam

Date : 2019.11.13 15:18

To :

[Add to Contacts](#)

Hello!

Thank you for creating your JetBrains Account.

To complete your registration, click the link below:

[Confirm your account](#)

Welcome to JetBrains Account!

3.

Please complete the registration form below

Email Address

First Name

Last Name

Username

Latin symbols (A-z), digits (0-9) or a valid email address 5 to 100 characters long.

Please make sure you choose a strong password as your account will have access to your purchases.

>Password must contain 8 or more characters at least 3 types:
 - uppercase (A-Z); - digits (0-9);
 - lowercase (a-z); - non-alphanumeric (!, @, #, etc.)

I have read and I accept the [JetBrains Account Agreement](#)

I consent to the use of my name, email address, and location data in email communication concerning JetBrains products held or services used by me or my organization [More](#)

[Submit](#)

4.

Yumin Lim
Notifications

Two-factor authentication is available!
To enable an extra layer of security for your JetBrains account, turn on two-factor auth.

No Available Licenses

We found no JetBrains product licenses associated with your JetBrains Account. You can:

- Purchase product license(s)
- Link your past purchases to your account
- Contact the person who manages commercial licenses in your company and request an invitation to use them
- Apply for a free student or teacher license for educational purposes

Your JetBrains Account is a single interaction point for activating JetBrains products and accessing the following services:

- JetBrains Account website (you are here)
- Products Support
- Product Blogs
- Plugin Repository for .NET products (e.g. ReSharper)
- Plugin Repository for other IDEs (e.g. IntelliJ IDEA, WebStorm and so on)

JetBrains License Activation

- Go to <https://www.jetbrains.com/shop/eform/students>.



JetBrains Products for Learning

Apply with:

UNIVERSITY EMAIL ADDRESS ISIC/ITIC MEMBERSHIP OFFICIAL DOCUMENT GITHUB

Status:

I'm a student
 I'm a teacher

Level of study:

Undergraduate

Is Computer Science or Engineering your major field of study?

Yes
 No

Graduation date:

Choose

Choose expected graduation date.

Name:

First name Last name

The software product(s) will be registered to your real name.

Email address:

You SHOULD use your SNU email.

I certify that the university email address provided above is valid and belongs to me.

Country / region:

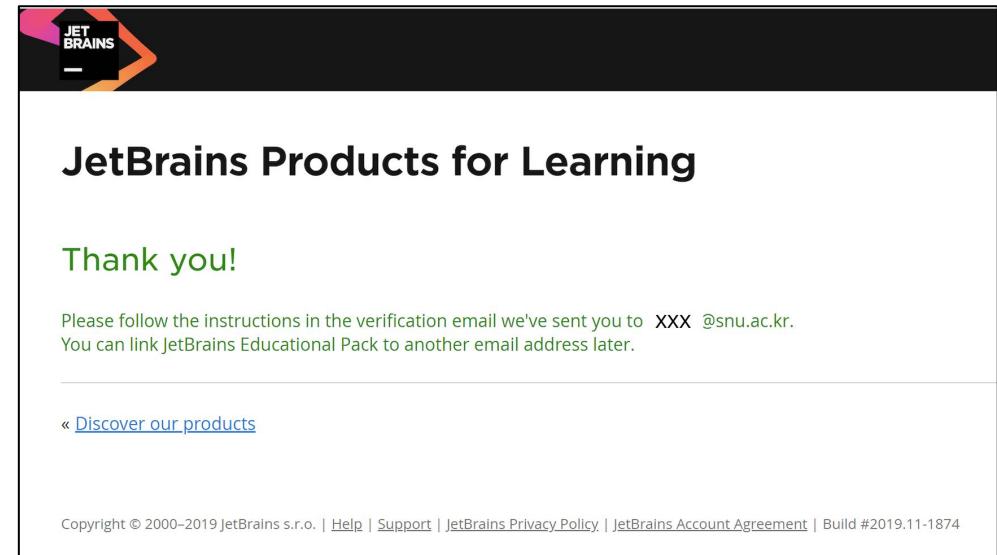
China

I am under 13 years old

I have read and I accept the [JetBrains Account Agreement](#)

I consent to the use of my name, email address, and location data in email communication concerning JetBrains products held or services used by me or my organization [More](#)

APPLY FOR FREE PRODUCTS



JetBrains Products for Learning

Thank you!

Please follow the instructions in the verification email we've sent you to XXX @snu.ac.kr. You can link JetBrains Educational Pack to another email address later.

« [Discover our products](#)

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JetBrains License Activation

- Go to your email service and confirm the activation request.

JetBrains Educational Pack Confirmation 닫은편지함 x

 JetBrains Account <no_reply@jetbrains.com>
나에게 ▾

Hi,

You've received this email because your email address was used for registering/updating your JetBrains account.

Please follow this link to confirm your decision and start using JetBrains Educational Pack.

[Confirm Request](#)

Yours truly,
The JetBrains Team
<https://www.jetbrains.com>
The Drive to Develop

TOOLBOX SUBSCRIPTION AGREEMENT FOR EDUCATION

Version 3.2, effective as of June 26th, 2019

IMPORTANT! READ CAREFULLY:

THIS IS A LEGAL AGREEMENT. BY CLICKING ON THE «I AGREE» (OR SIMILAR) BUTTON THAT IS PRESENTED TO YOU AT THE TIME OF YOUR PURCHASE, OR BY DOWNLOADING, INSTALLING, COPYING, SAVING ON YOUR DEVICE, OR OTHERWISE USING JETBRAINS SOFTWARE, SUPPORT OR PRODUCTS, YOU ARE BECOMING A PARTY TO THIS AGREEMENT, YOU DECLARE YOU HAVE THE LEGAL CAPACITY TO ENTER INTO SUCH AGREEMENT, AND YOU ARE CONSENTING TO BE BOUND BY ALL THE TERMS AND CONDITIONS SET FORTH BELOW.

1. PARTIES

1.1. «JetBrains» or «We» means JetBrains s.r.o., having its principal place of business at Na Hrebenech II 1718/10, Prague, 14000, Czech Republic, registered in the Commercial Register maintained by the Municipal Court of Prague, Section C, File 86211, ID. No.: 265 02 275.

1.2. «Customer» or «You» means a student or an instructor specified in the Subscription Confirmation who is at least 13 years old, or in the case of Redistributable Products the sole proprietor or legal entity with sufficient legal capacity to enter into this Agreement using the Redistributable Product in accordance with this Agreement. For the purpose of this Agreement:
 (A) «student» is an individual who is enrolled at a recognized educational institution (university, college, high school, primary school or a similar institution with educational goals), and upon request by JetBrains is able to provide proof of such enrollment;
 (B) «instructor» is an individual who gives lectures and/or seminars at a recognized educational institution (university, college, high school, primary school or a similar institution with educational goals), and upon request by JetBrains is able to provide proof of such involvement.

2. DEFINITIONS

Please review and accept this license agreement to proceed with product activation.
 Please read to the bottom of the document before continuing.

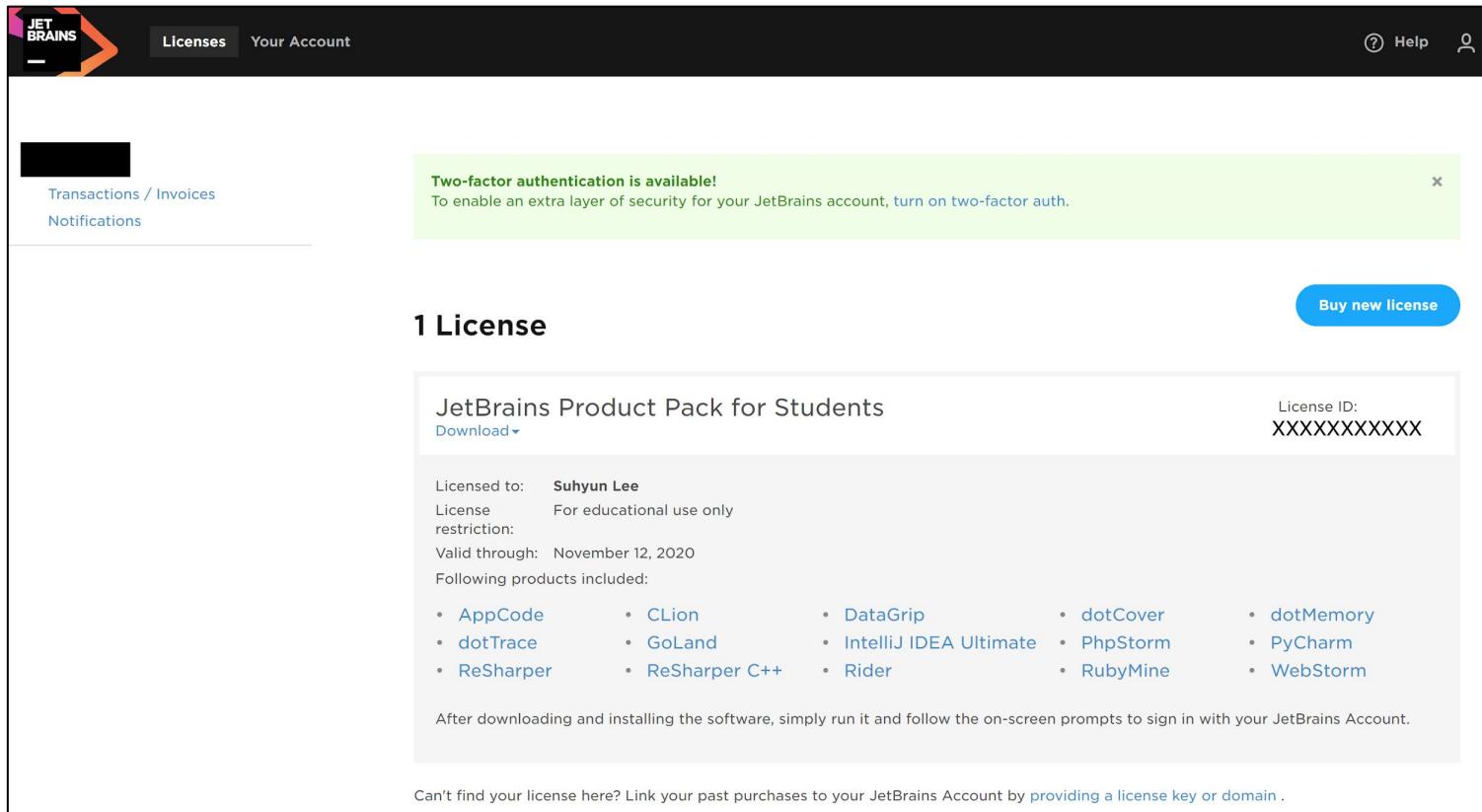
Copyright © 2000–2019 JetBrains s.r.o. | Help | Support | [JetBrains Privacy Policy](#) | [JetBrains Account Agreement](#) | Build #2019.11-1874

I Accept

Scroll to the bottom and click the accept bottom.

JetBrains License Activation

- You should see “JetBrains Product Pack for Students”.



The screenshot shows the JetBrains License Activation interface. At the top, there's a navigation bar with the JetBrains logo, 'Licenses', 'Your Account', and a user icon. A green notification bar at the top right says 'Two-factor authentication is available! To enable an extra layer of security for your JetBrains account, turn on two-factor auth.' Below this, a section titled '1 License' shows the 'JetBrains Product Pack for Students'. It includes a 'Download' button, a 'Buy new license' button, and a 'License ID: XXXXXXXXXXXX' field. The license details show it's licensed to 'Suhyun Lee' for 'For educational use only' until November 12, 2020. It lists various products included: AppCode, CLion, DataGrip, dotCover, dotMemory, dotTrace, GoLand, IntelliJ IDEA Ultimate, PhpStorm, PyCharm, ReSharper, ReSharper C++, Rider, RubyMine, and WebStorm. A note at the bottom says 'After downloading and installing the software, simply run it and follow the on-screen prompts to sign in with your JetBrains Account.' At the very bottom, there's a link to link past purchases to the account.

Transactions / Invoices
Notifications

Two-factor authentication is available!
To enable an extra layer of security for your JetBrains account, turn on two-factor auth.

1 License

Buy new license

License ID:
XXXXXXXXXXXX

JetBrains Product Pack for Students
[Download](#)

Licensed to: Suhyun Lee
License restriction: For educational use only
Valid through: November 12, 2020
Following products included:

- AppCode
- dotTrace
- ReSharper
- CLion
- GoLand
- ReSharper C++
- DataGrip
- IntelliJ IDEA Ultimate
- Rider
- dotCover
- PhpStorm
- RubyMine
- dotMemory
- PyCharm
- WebStorm

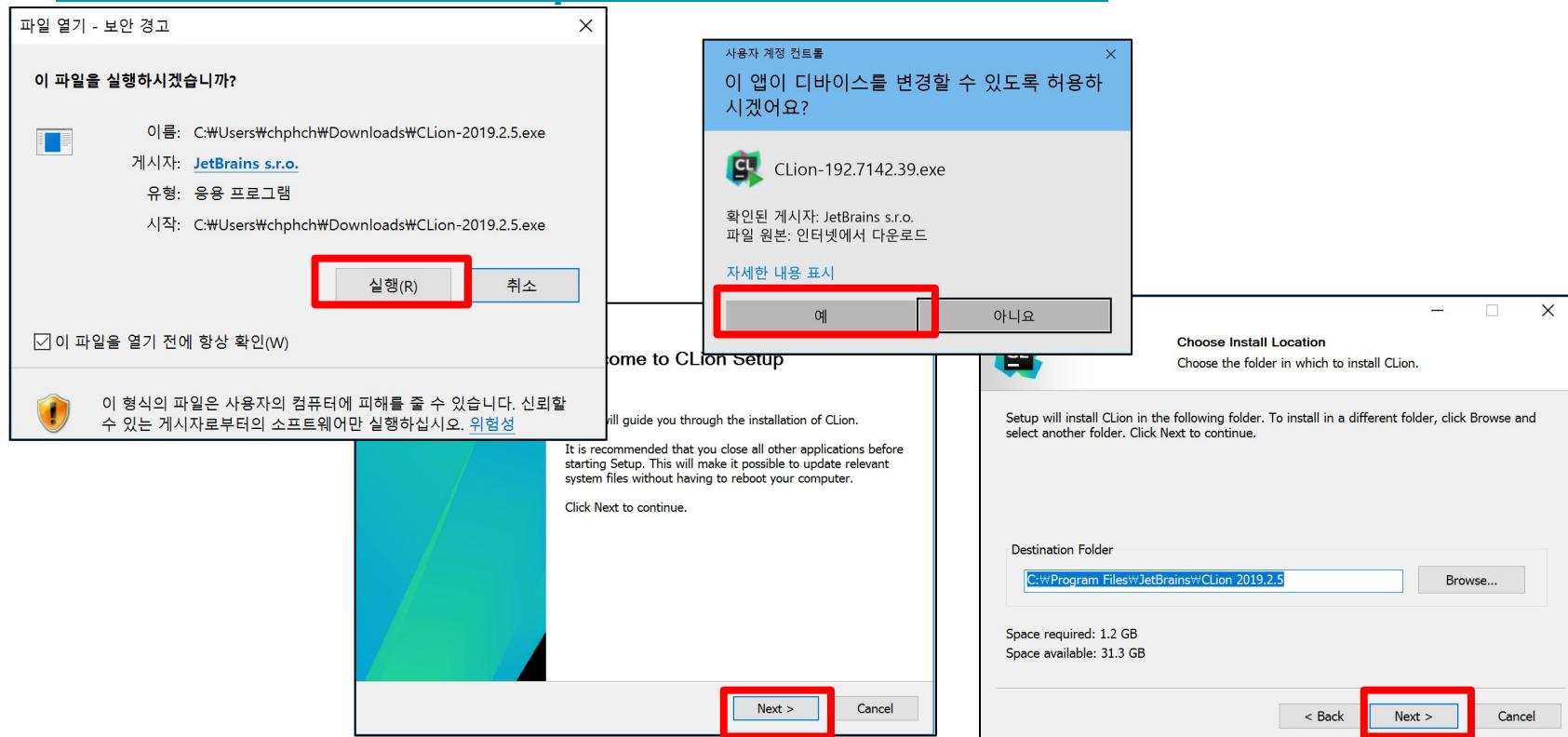
After downloading and installing the software, simply run it and follow the on-screen prompts to sign in with your JetBrains Account.

Can't find your license here? Link your past purchases to your JetBrains Account by [providing a license key or domain](#).

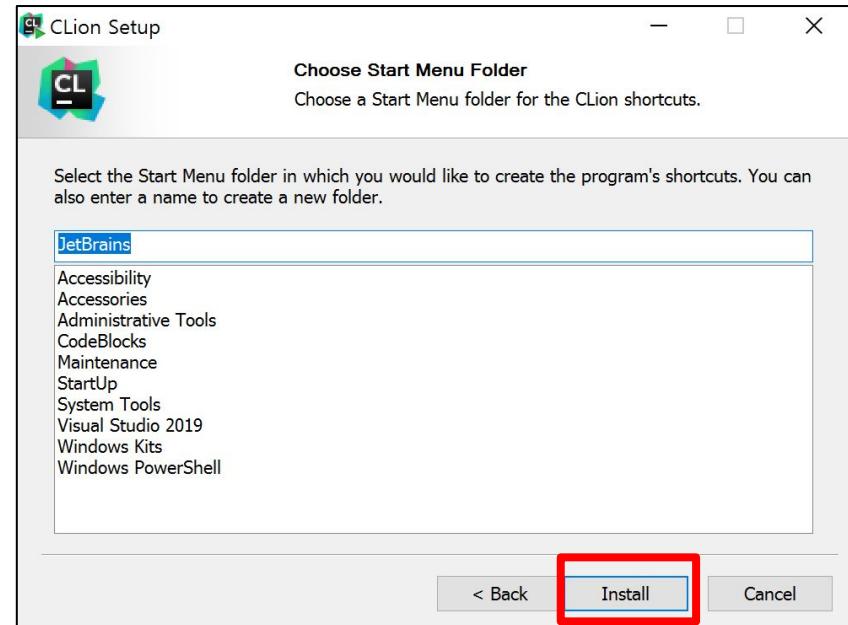
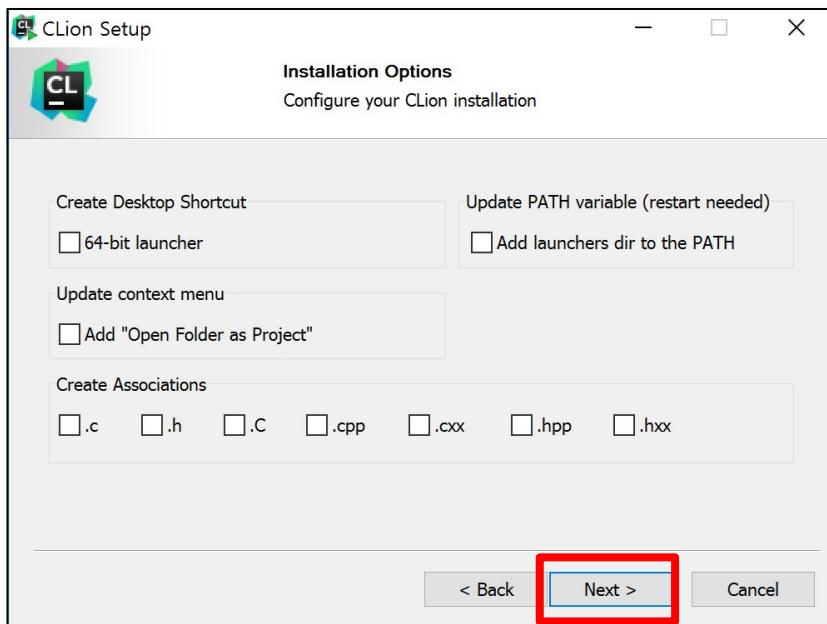
CLion Installation (1/5)

- Let's download/run CLion installer.

<https://www.jetbrains.com/clion/download/download-thanks.html?platform=windows>

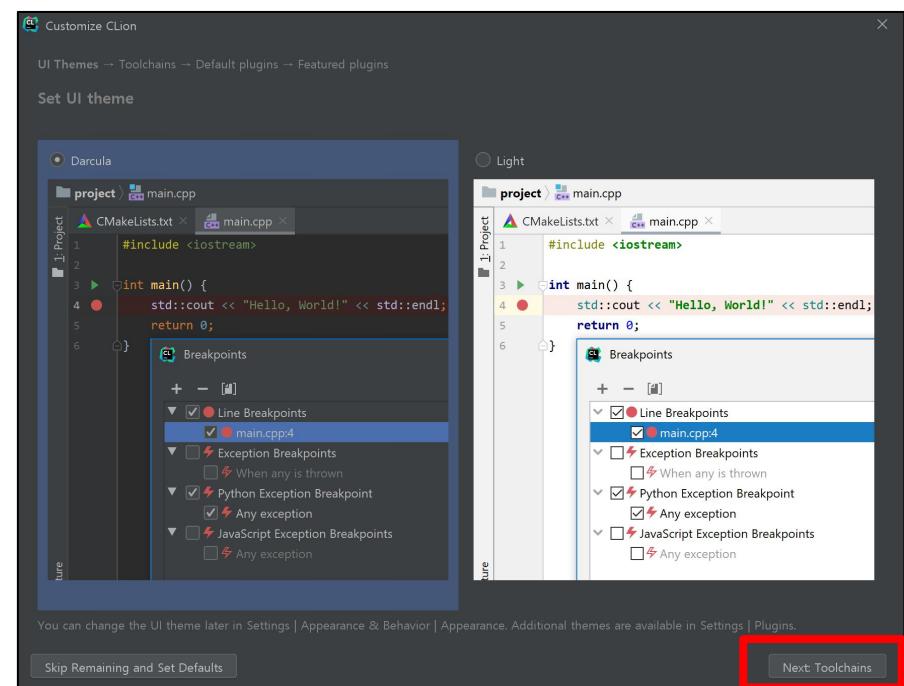
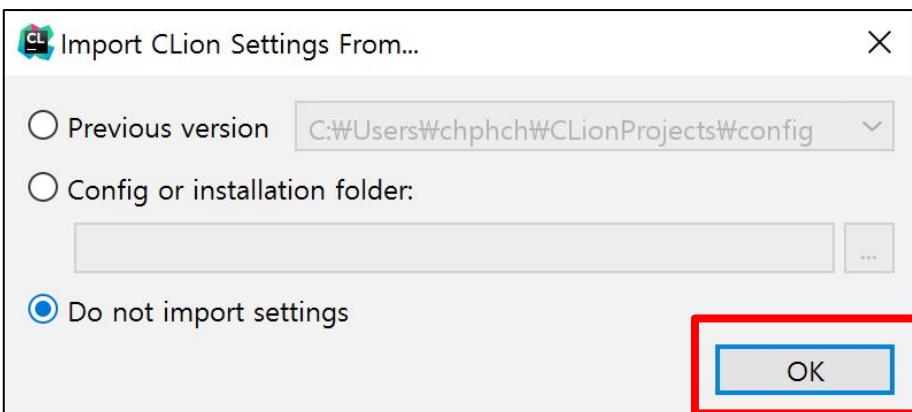


CLion Installation (2/5)



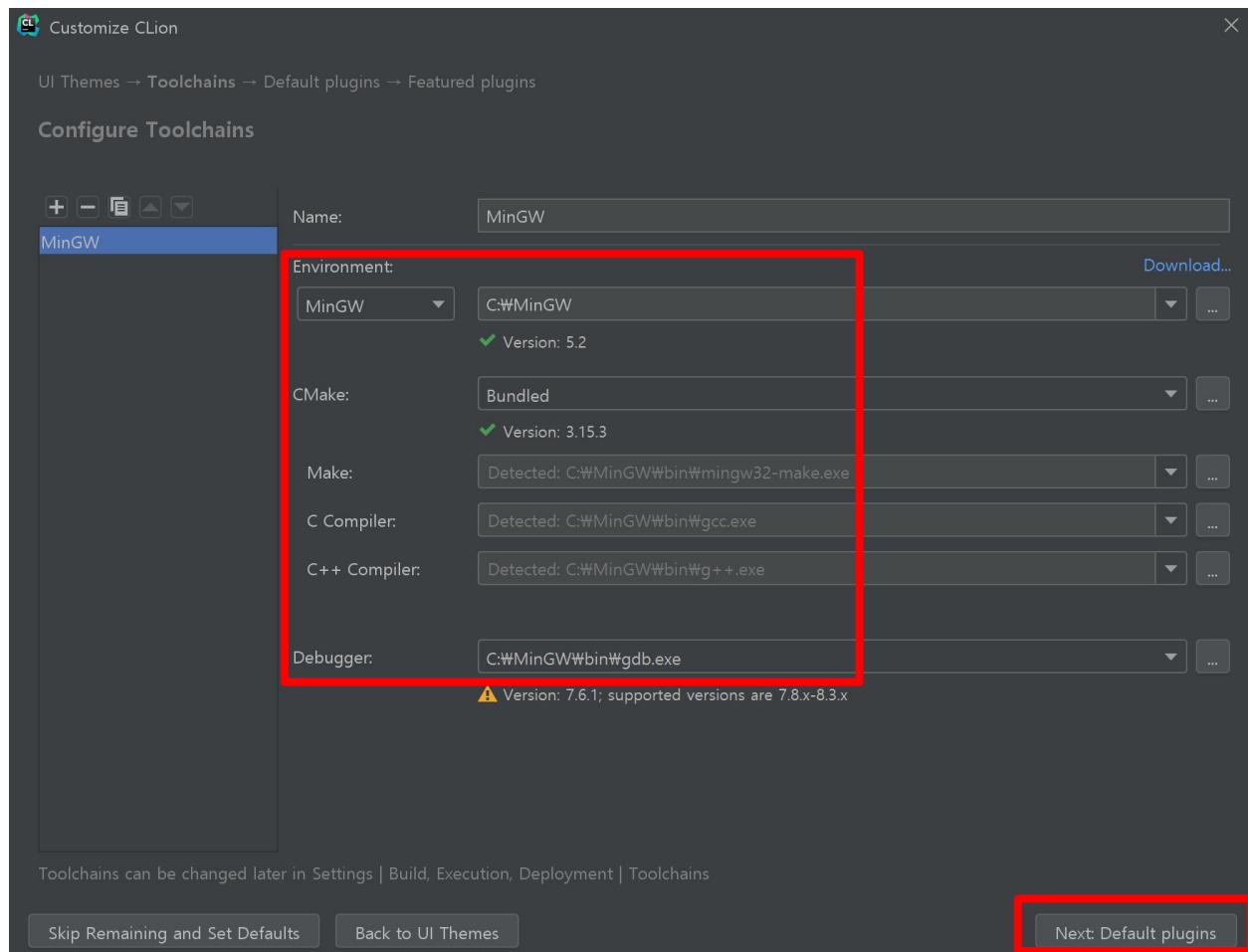
CLion Installation (3/5)

- Run CLion.

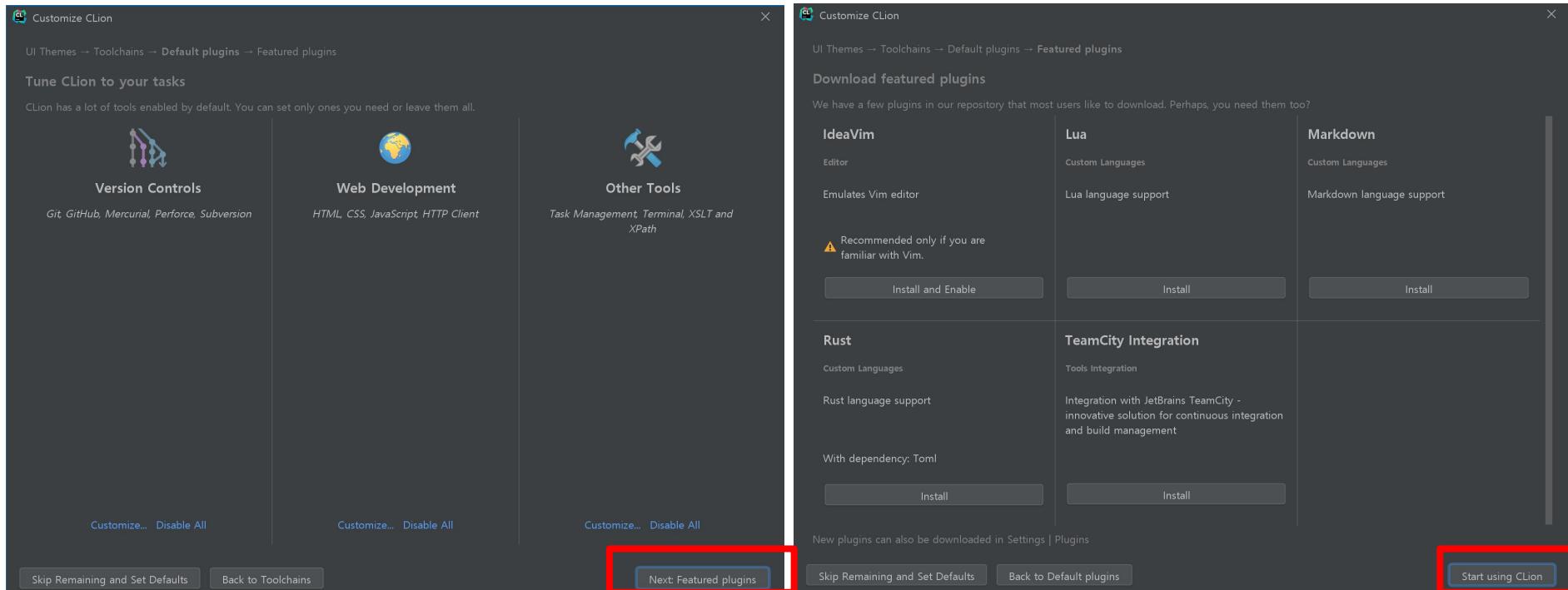


CLion Installation (4/5)

- Set CLion environment with MinGW.

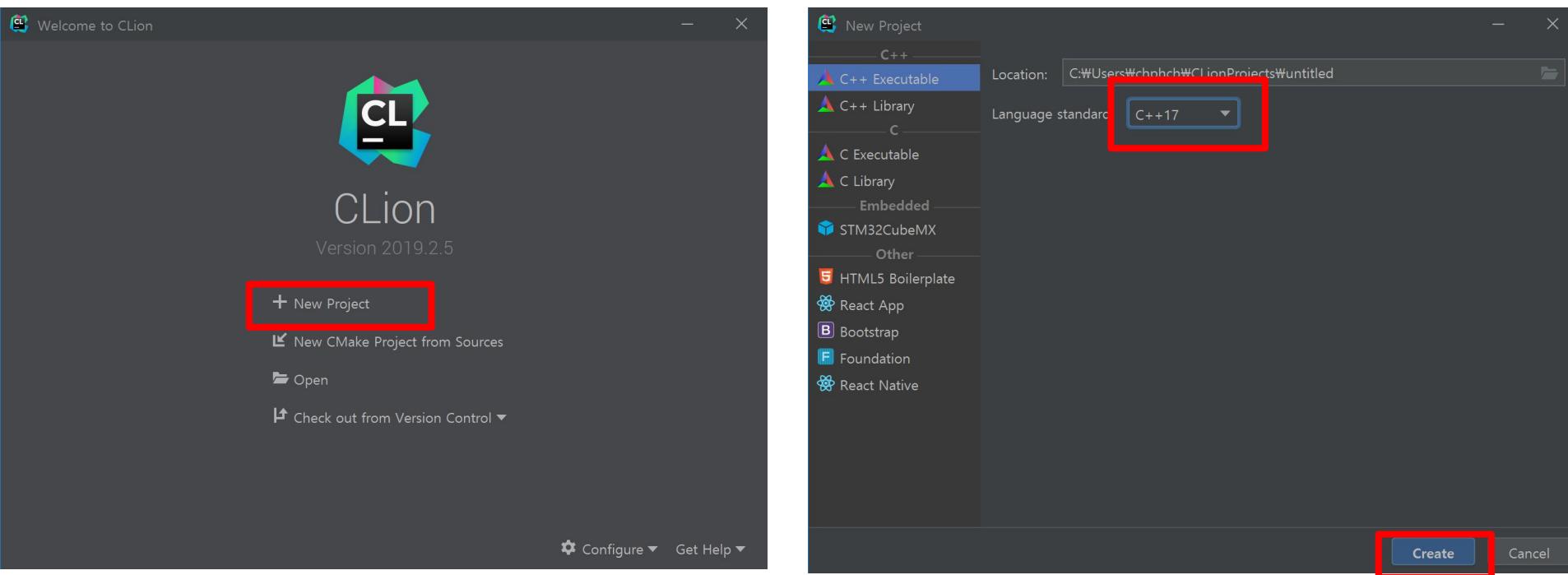


CLion Installation (5/5)

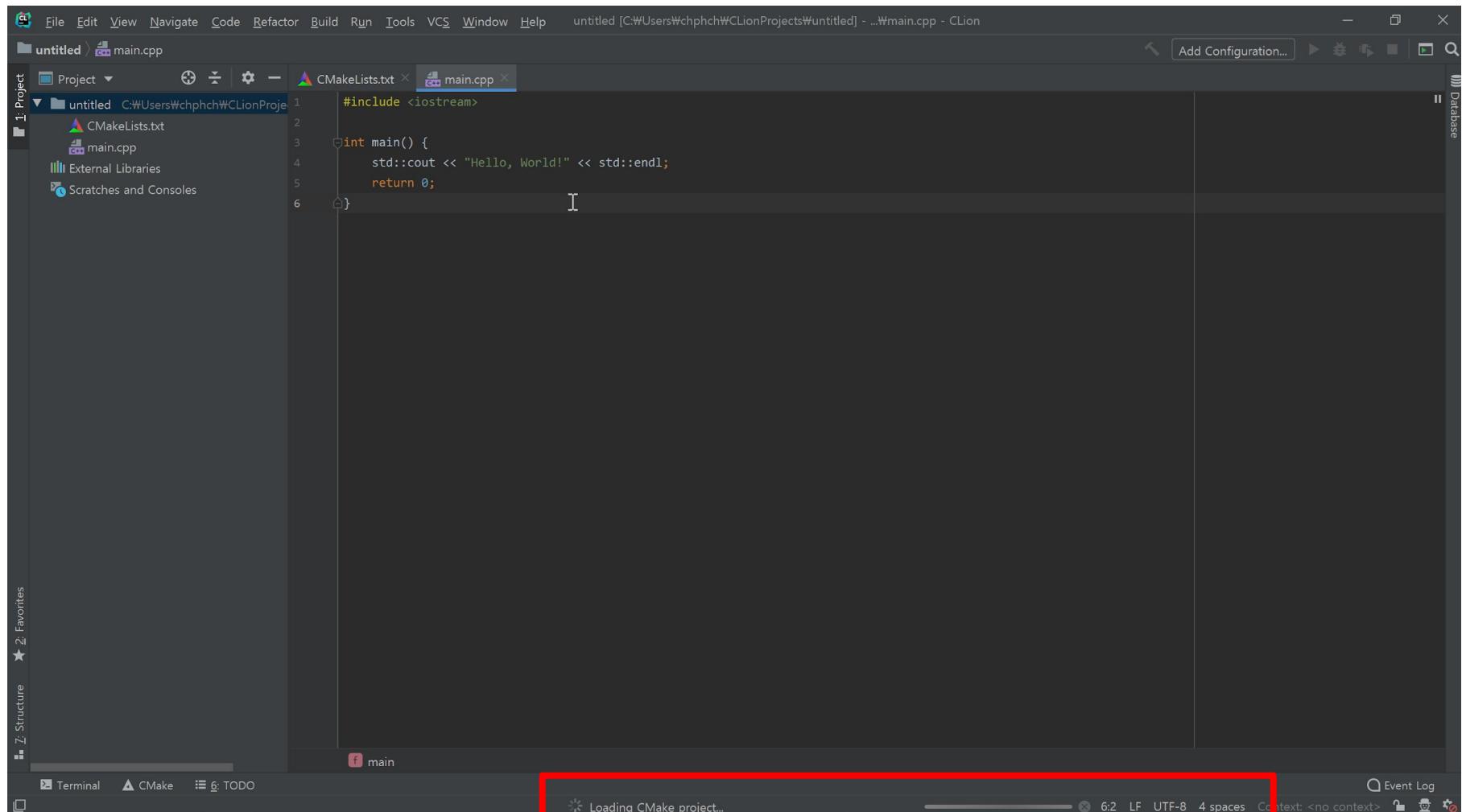


Your First C++ Project (1/3)

- Create your first C++ project!
- In this class, we will always use C++17.



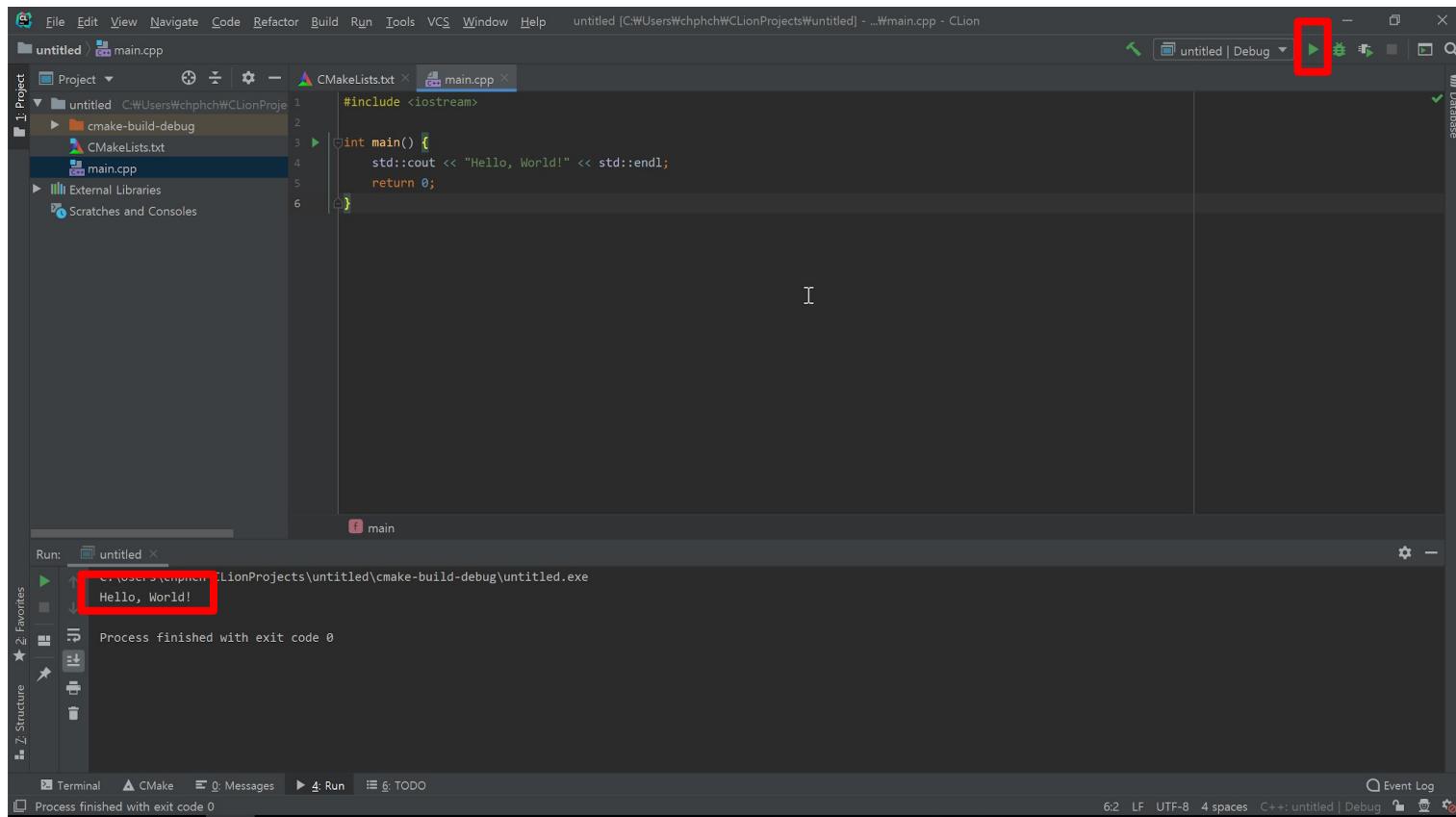
Your First C++ Project (2/3)



Wait for CLion to set your project. This may take a while.

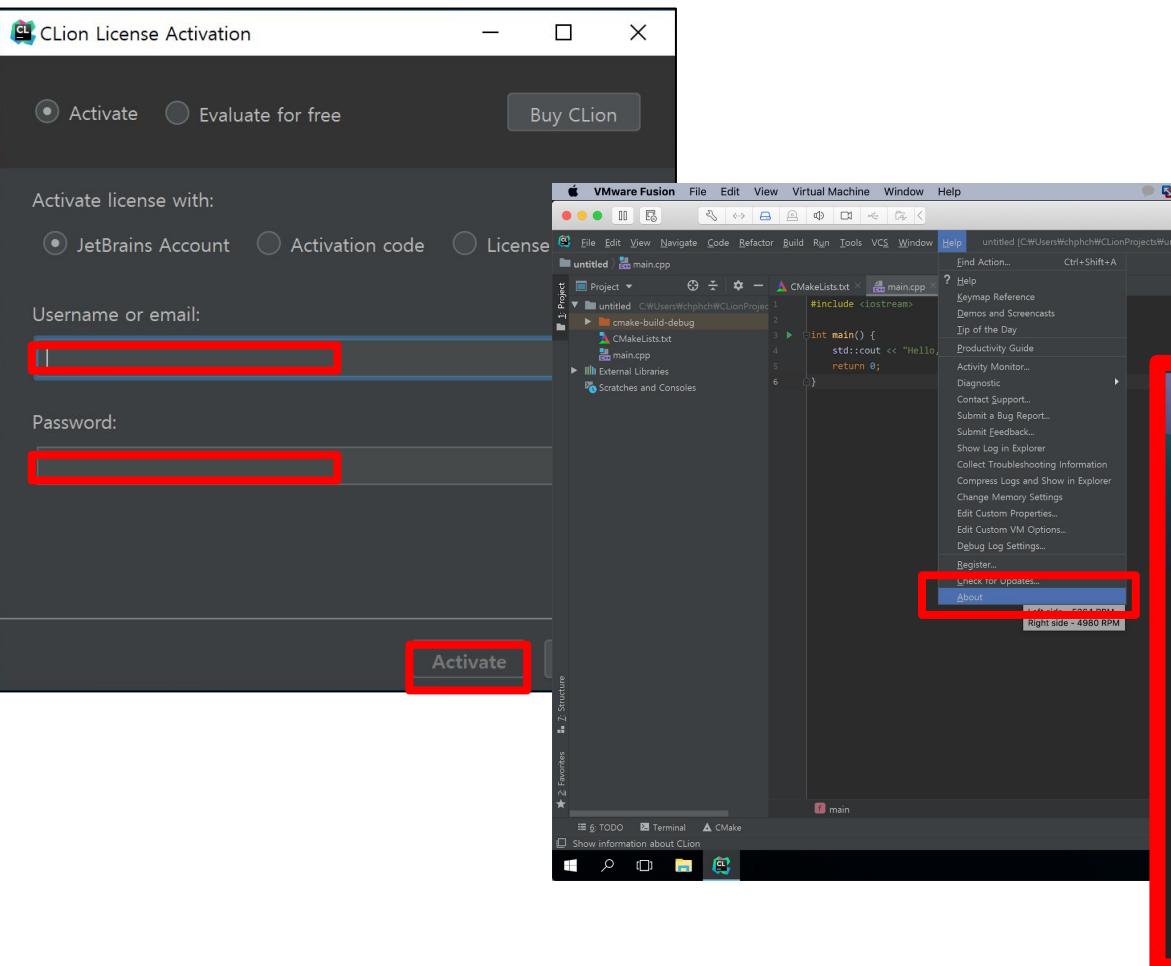
Your First C++ Project (3/3)

- Press the “run” button or press “shift”+“F10” to run your first C++ program.



CLion License Activation

- Check CLion License Activation.



The screenshot shows the CLion License Activation window on the left and the CLion IDE interface on the right. The activation window has three tabs: 'Activate' (selected), 'Evaluate for free', and 'Buy CLion'. It prompts for a 'Username or email' and 'Password', both of which are redacted. A large red box highlights the 'Activate' button. The CLion IDE window shows a project with files CMakeLists.txt and main.cpp, containing the following code:

```
#include <iostream>
int main() {
    std::cout << "Hello, World!" << std::endl;
    return 0;
}
```

A context menu is open over the code editor, with a red box highlighting the 'About' option under the Help menu. The 'About' dialog on the right side of the screen displays the following information:

CLion 2019.2.5
Build #CL-192.7142.39, built on October 30, 2019
Licensed to: XXXXXXXX
Subscription is active until February 26, 2020
For educational use only.
Runtime version: 11.0.4+10-b304.77 amd64
VM: OpenJDK 64-Bit Server VM by JetBrains s.r.o
Powered by open-source software

A large red box surrounds the entire 'About' dialog, with the text 'Capture this window and submit!' displayed in red above it.

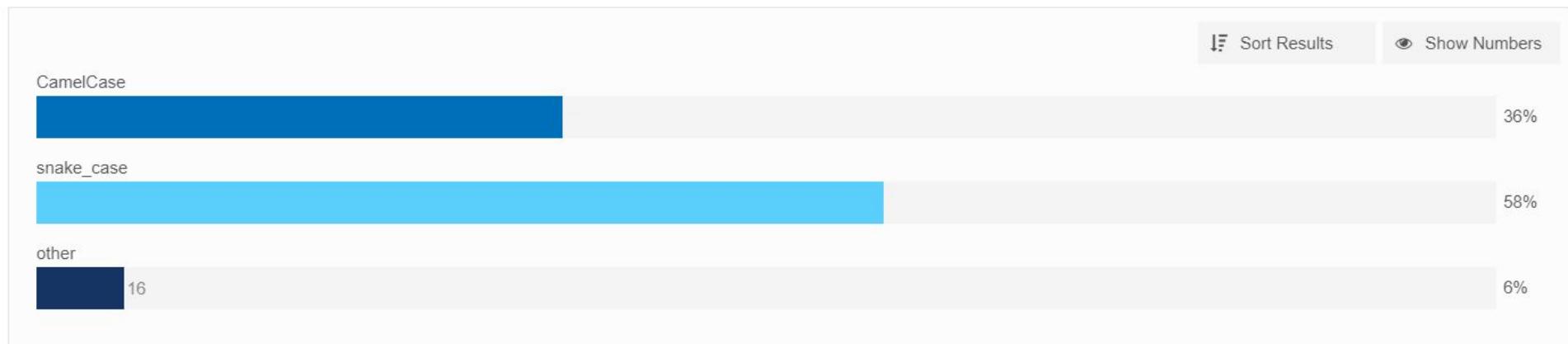
Extending “Hello World” program

```
1 #include <iostream>
2 #include <string>
3
4 ► int main() {
5     std::string name;
6     std::cin >> name;
7     std::cout << "Hello, " << name << std::endl;
8     return 0;
9 }
```

```
Lab_1113 ✘
"C:\Users\javel\CLionPr
Kiroong
Hello, Kiroong
```

Variable naming convention

- There is no strong standard of naming variables in C++
- Standard library uses `snake_case` for variables and methods
- Choose what you like, but be always consistent with your naming convention

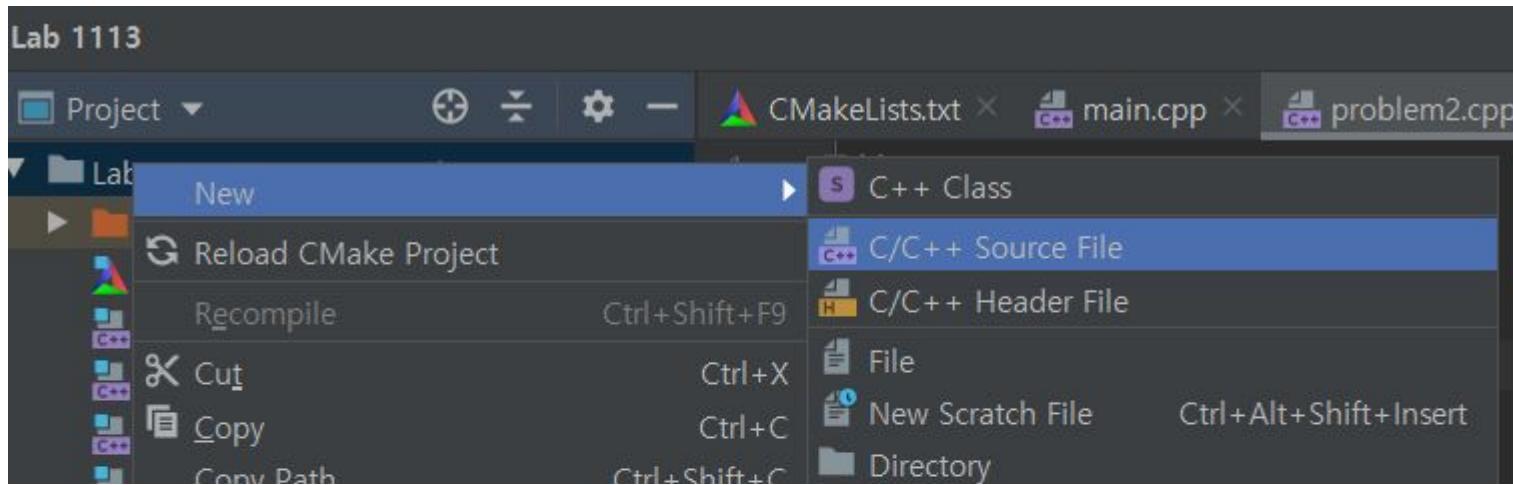


Today's Practice

- There are 8 problems
 - Not the lab test! Practice as you want
 - Refer to lecture slides if needed
- The solution code will be uploaded later

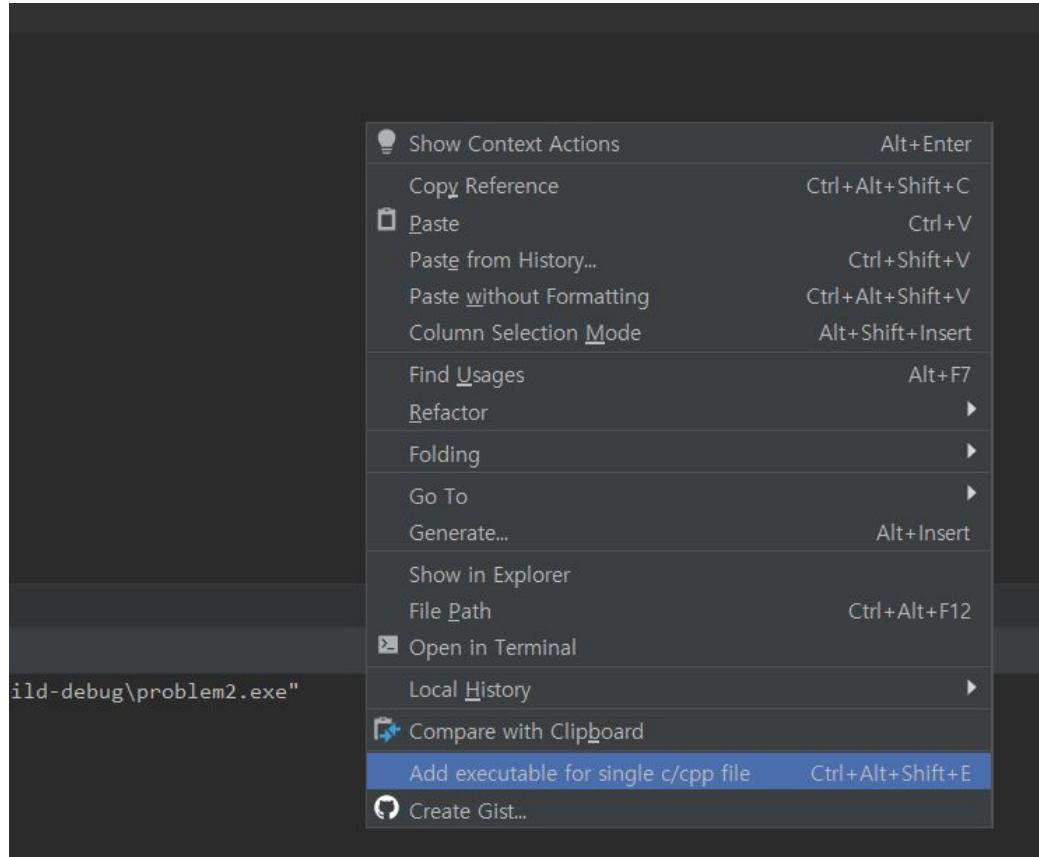
Building multiple single-source files

1. File > Settings > Plugins > “single file execution”
2. Install “C/C++ Single File Execution”
 - a. Select the one with more downloads
3. Make a new source file



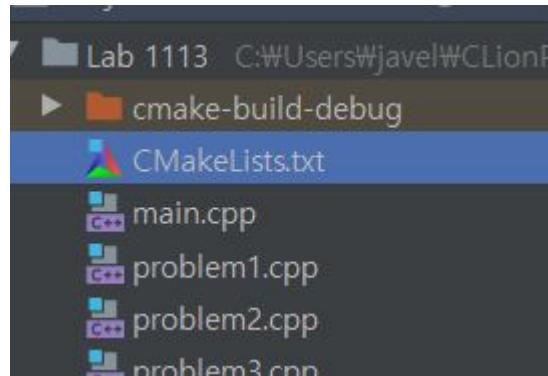
Building multiple single-source files

4. Select a file, right click on the editor panel, and click “Add executable for single c/cpp file”

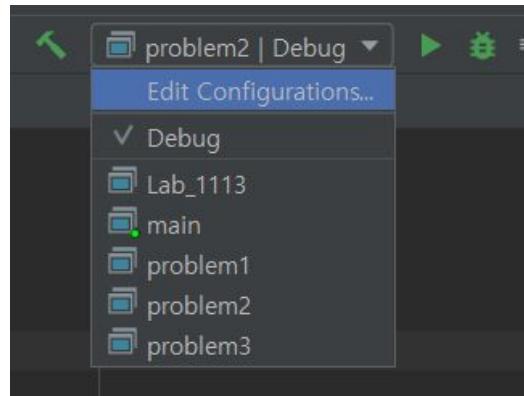


Building multiple single-source files

5. Go to CMakeLists.txt file, and enable auto-reload option



6. Choose the right execution target and run



Problem 1

Extend our hello world code using string comparison

- Input
 - *name*, a single line of string from **stdin**
- Output
 - If the *name* is “Youngki”, print
 - “Hello, Professor!”
 - Otherwise, print
 - “Hello, (name)!”

Problem 2

Write a code that calculates the area of a circle,
using the following macro

```
#define PI 3.14159
```

```
#define AREA(r) ?????
```

- Input
 - r , a floating-point number
- Output
 - The area of a circle of radius r

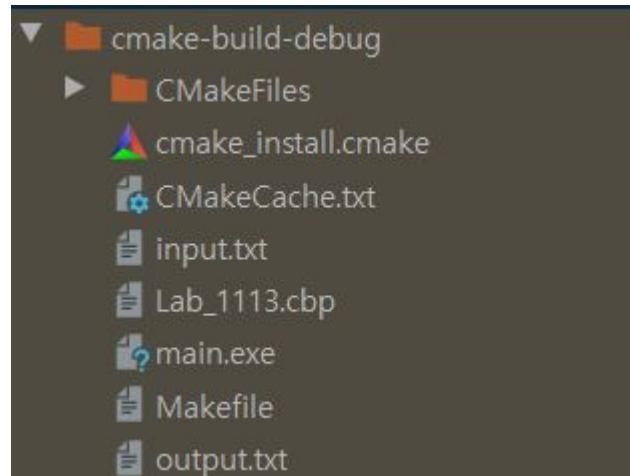
Problem 3

- Input
 - n , an integer
- Output
 - Print all natural number i that is smaller than n and is an even number
 - However, don't print 38, and numbers larger than 70

Problem 4

The same as problem 3, but make and use files named “input.txt” and “output.txt” to get input and output

- Place files in ***cmake-build-debug*** directory



Problem 5

Implement two 3-swap functions using both pointers and references

```
void 3_swap(int *a, int *b, int *c);
```

```
void 3_swap(int &a, int &b, int &c);
```

- Input
 - **a**, **b**, **c**, 3 integers separated by whitespaces
- Output
 - **a** should be changed to **b**, **b** to **c**, and **c** to **a**

Problem 6

Write a function that determines if a given natural number is prime or not

```
bool is_prime(int n)
```

- Input
 - n , an integer, $n \leq 10000$
- Output (return value)
 - true iff n is prime, false otherwise

Problem 6-2

Write a function that lists all prime numbers in a given range

```
void print_primes_in(int a, int b)
```

- Input
 - **a, b**, two integers, ≤ 10000
- Output
 - Print all prime numbers **p** that is $a \leq p \leq b$, in increasing order, separated by one space

Problem 6-3

Change the ***is_prime*** function so that it stores the result in a global array, and reuse it for later calls to prevent recalculating the same thing

```
int is_prime_ans[10000];
```

```
bool is_prime(int n);
```

Hint. Initialize the array with -1