

Development Environment

Missing session lecture 1



To write c++ programs...

- You need to
 - Write c++ code
 - Compile it (so that your computer can understand the code)
 - Execute the compiled program
- You need appropriate tools!
 - there exists various options!!

IDE??

- Integrated Development Environment
- Supports almost every step to develop program!!
 - Coding
 - Debugging
 - Compiling & Releasing...
- Extremely Convenient
 - only thing you need to do : write code and press compile button

IDE??

- Example (for cpp development)

- Visual Studio

- Developed by Microsoft
 - Most powerful IDE
 - Standard development tool for *Windows* developers

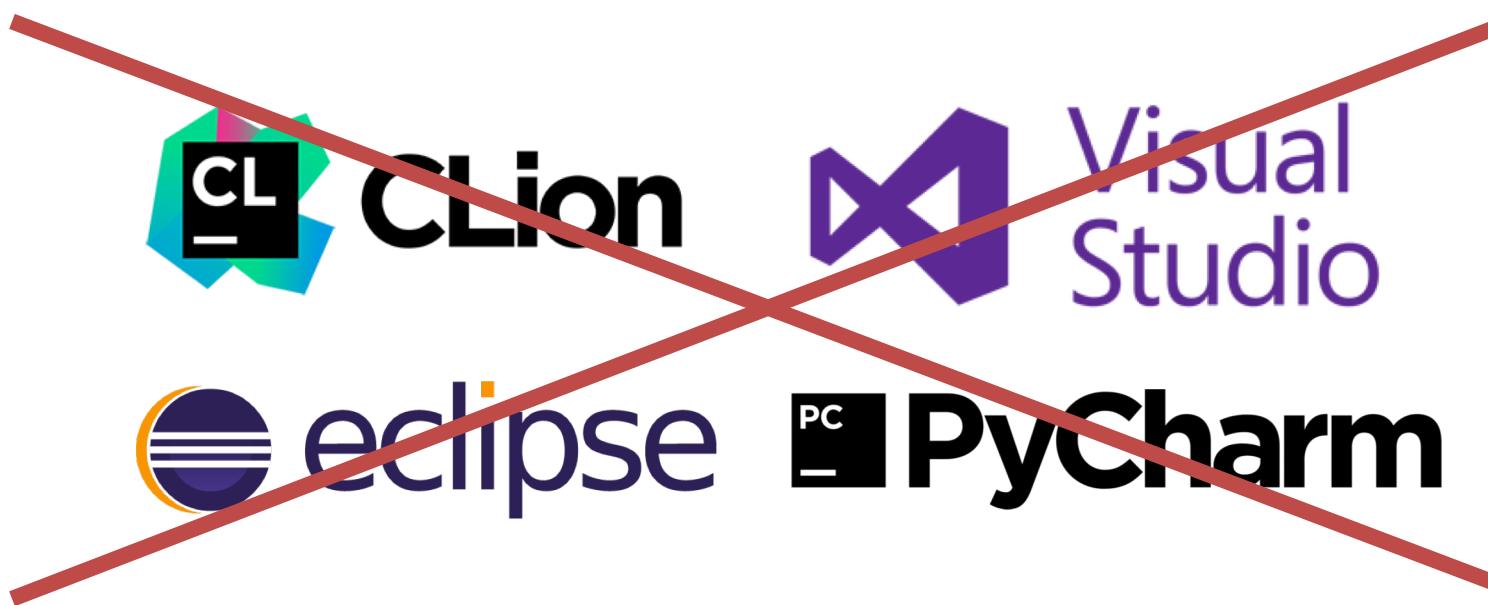
- CLion

- Developed by Jetbrain
 - Supports almost every major OSs (linux / mac OS / Windows / ...)
 - High productivity & Convenience



IDE Hazard

- However, for novice programmers...
- IDE equals to *Disaster!!!* (just my opinion...)
- Why???



IDE Hazard

- Slow update
- Too many functionalities
 - Therefore, Too heavy
 - vulnerable to errors
 - Also, your laptop has limited memory & CPU resources...
 - save them!!
- (IMPORTANT) **HARD TO understand**
 - The fundamentals of programming
 - how your computer works

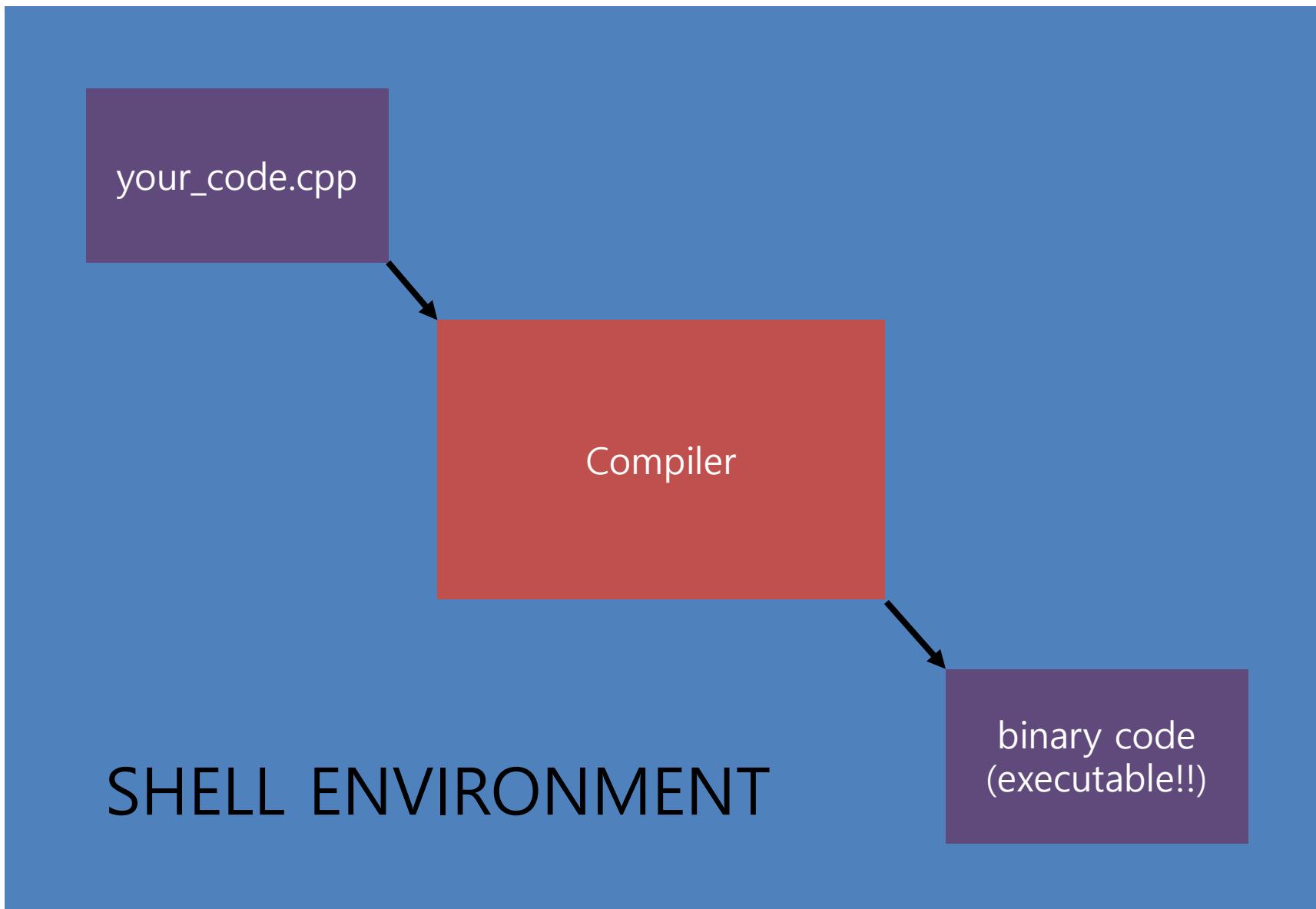
Your OWN Dev environment

- Therefore, you need to setup your own dev environment!!!
- This will help you
 - to understand the entire process of programming
 - to earn background knowledge to study computer system
 - **to customize your DEV ENVIRONMENT (most attractive feature)**
- And will help your computer
 - to save its resources
 - to be sensitive to latest techs (by setting & updating the environment on your own)

Basic components to develop something

- Editor
 - you have to “write” or “edit” the code!!
 - possible to just use *Notepad*...but less convenient
 - \exists lots of fancy code editors!!
- Compiler
 - okay, you write the code, but computer cannot understand it
 - you need to “compile” the code which your computer can execute
- (CLI) Shell environment
 - conventional environment to write, compile, and execute code
 - TUI: command line interface - powerful tool with only a few commands

Why we need them?

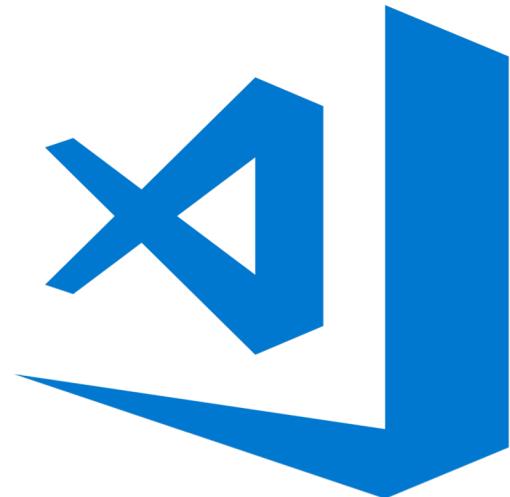


In this course

- In this course, I recommend to use
 - editor
 - Visual Studio Code
 - Compiler
 - gcc compiler
 - Shell
 - Window : command prompt & mingw environment
 - Mac OS : iterm
 - Linux : Maybe you're already an expert of customizing dev environment..

Visual Studio Code

- Developed by *Microsoft*, released in 2016
- Currently, “Most famous” code editor
- Platform-free
 - supports Linux, mac OS, Windows
- Powerful extension environments
 - customize your own editor!!
 - supports almost all major programming languages
 - you can even develop your own extension
- * *Visual Studio Code is not Visual Studio!!*



GCC Compiler

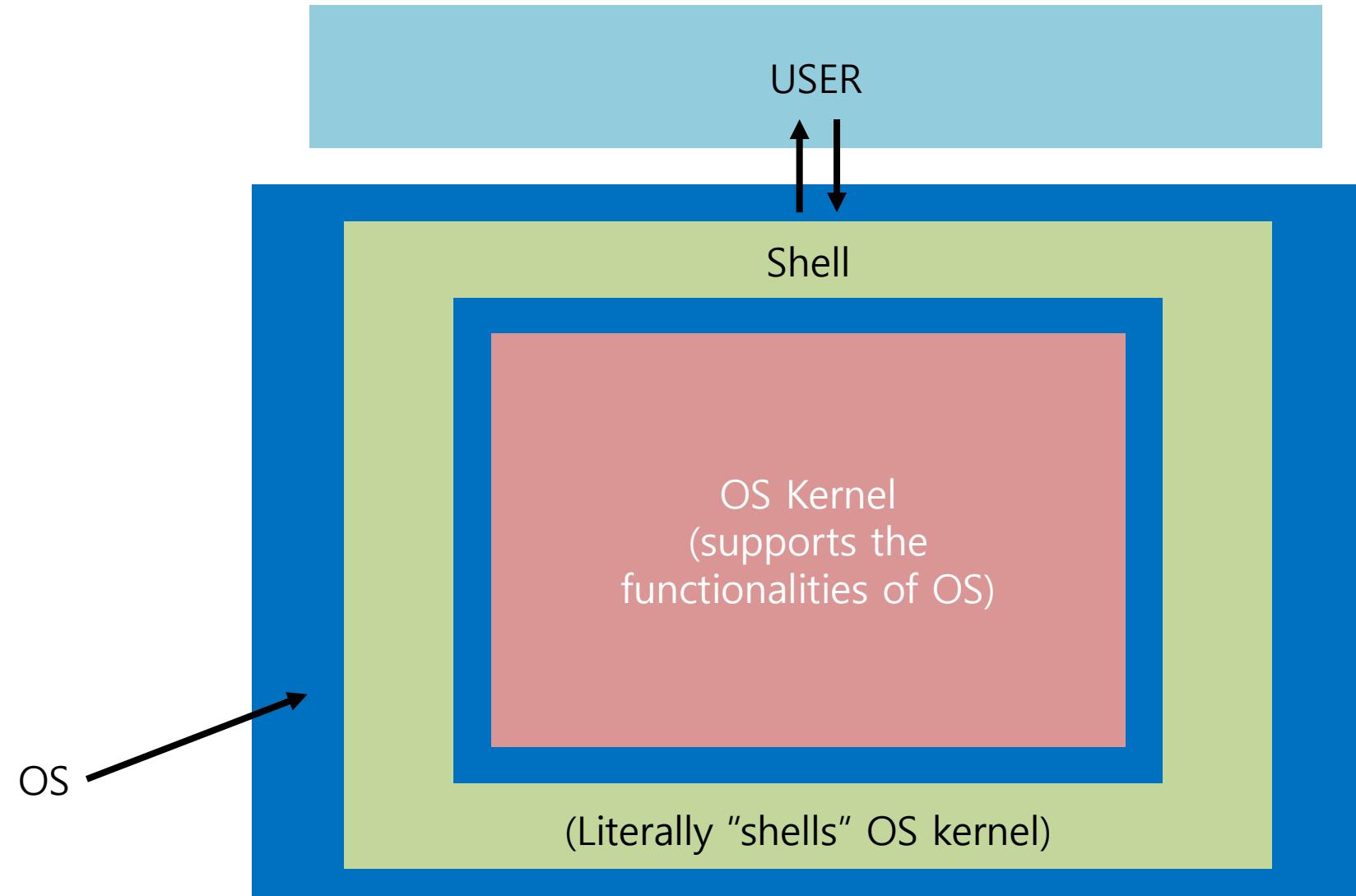
- GNU Compiler Collection
- initially developed by *Richard Stallman*
- open source, free, multi-platform
- supports
 - c, cpp, objective-c, objective-cpp
 - Fortran, Java, Go, Pascal
 - and else...



Shell / OS

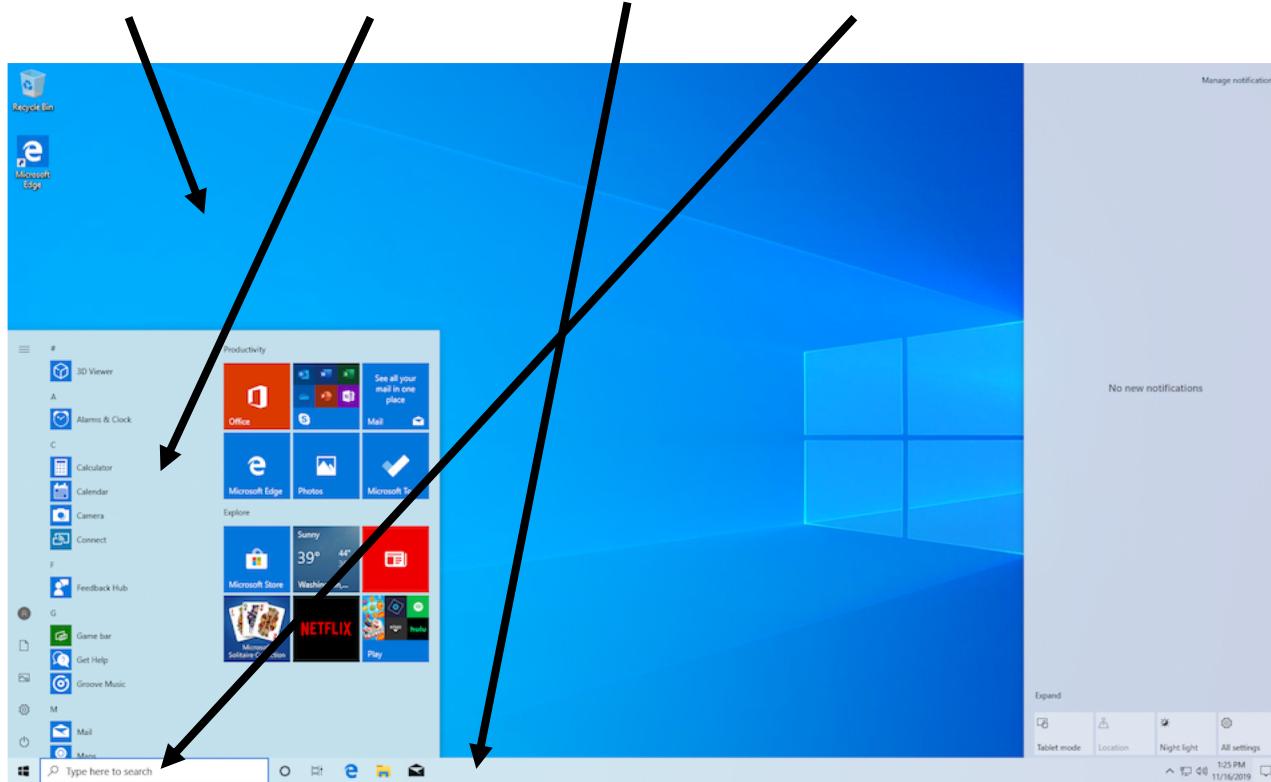
- Shell
 - What is shell?
 - User interface for access to an **OS**'s services (*Wikipedia*)
 - Actually, part of OS
 - So, to understand shell, you must know the basic of OS!!
- OS (Operating System)
 - Manages computer hardware resources (CPU, memory, HDD...)
 - Manages processes / programs
 - Provides file system (including directory, file, link_(shortcut))

Shell / OS



Shell

- You're already using shell!!
 - Windows shell
 - Desktop, Start menu, Taskbar, Explorer...



Shell

- In this course, we'll use CLI shell!!
- Maybe familiar to CS students

```
[root@localhost ~]# ping -q fa.wikipedia.org
PING text.pmta.wikimedia.org (208.80.152.2) 56(84) bytes of data.
^C
--- text.pmta.wikimedia.org ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 540.528/540.528/540.528/0.000 ms
[root@localhost ~]# pwd
/root
[root@localhost ~]# cd /var
[root@localhost var]# ls -la
total 72
drwxr-xr-x. 18 root root 4096 Jul 30 22:43 .
drwxr-xr-x. 23 root root 4096 Sep 14 20:42 ..
drwxr-xr-x. 2 root root 4096 May 14 00:15 account
drwxr-xr-x. 11 root root 4096 Jul 31 22:26 cache
drwxr-xr-x. 3 root root 4096 May 18 16:03 db
drwxr-xr-x. 3 root root 4096 May 18 16:03 empty
drwxr-xr-x. 2 root root 4096 May 18 16:03 games
drwxrwx--T. 2 root gdm 4096 Jun 2 18:39 gdm
drwxr-xr-x. 38 root root 4096 May 18 16:03 lib
drwxr-xr-x. 2 root root 4096 May 18 16:03 local
lrwxrwxrwx. 1 root root 11 May 14 00:12 lock -> ../run/lock
drwxr-xr-x. 14 root root 4096 Sep 14 20:42 log
lrwxrwxrwx. 1 root root 10 Jul 30 22:43 mail -> spool/mail
drwxr-xr-x. 2 root root 4096 May 18 16:03 nis
drwxr-xr-x. 2 root root 4096 May 18 16:03 opt
drwxr-xr-x. 2 root root 4096 May 18 16:03 preserve
drwxr-xr-x. 2 root root 4096 Jul 1 22:11 report
lrwxrwxrwx. 1 root root 6 May 14 00:12 run -> ../run
drwxr-xr-x. 14 root root 4096 May 18 16:03 spool
drwxrwxrwt. 4 root root 4096 Sep 12 23:50 tmp
drwxr-xr-x. 2 root root 4096 May 18 16:03 yp
[root@localhost var]# yum search wiki
Loaded plugins: langpacks, presto, refresh-packagekit, remove-with-leaves
rpmfusion-free-updates                                         | 2.7 kB   00:00
rpmfusion-free-updates/primary_db                           | 206 kB   00:04
rpmfusion-nonfree-updates                                    | 2.7 kB   00:00
updates/metalink                                            | 5.9 kB   00:00
updates                                                       | 4.7 kB   00:00
updates/primary_db                                         73% [=====]   62 KB/s | 2.6 MB   00:15 ETA
```

CLI Shell

- Convenient, light, and fast
 - If you become familiar...
- Can manage entire OS / Dev environment
 - with only few commands
 - for beginners: `ls`, `cd`, and `cat` commands are sufficient!!
 - we'll see them soon

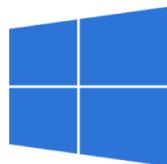
Let's start the setting!!

Visual Studio code

- Reference official download page (Very easy)
- <https://code.visualstudio.com/download>

Download Visual Studio Code

Free and built on open source. Integrated Git, debugging and extensions.



↓ Windows

Windows 7, 8, 10



↓ .deb

Debian, Ubuntu

↓ .rpm

Red Hat, Fedora, SUSE



↓ Mac

macOS 10.10+

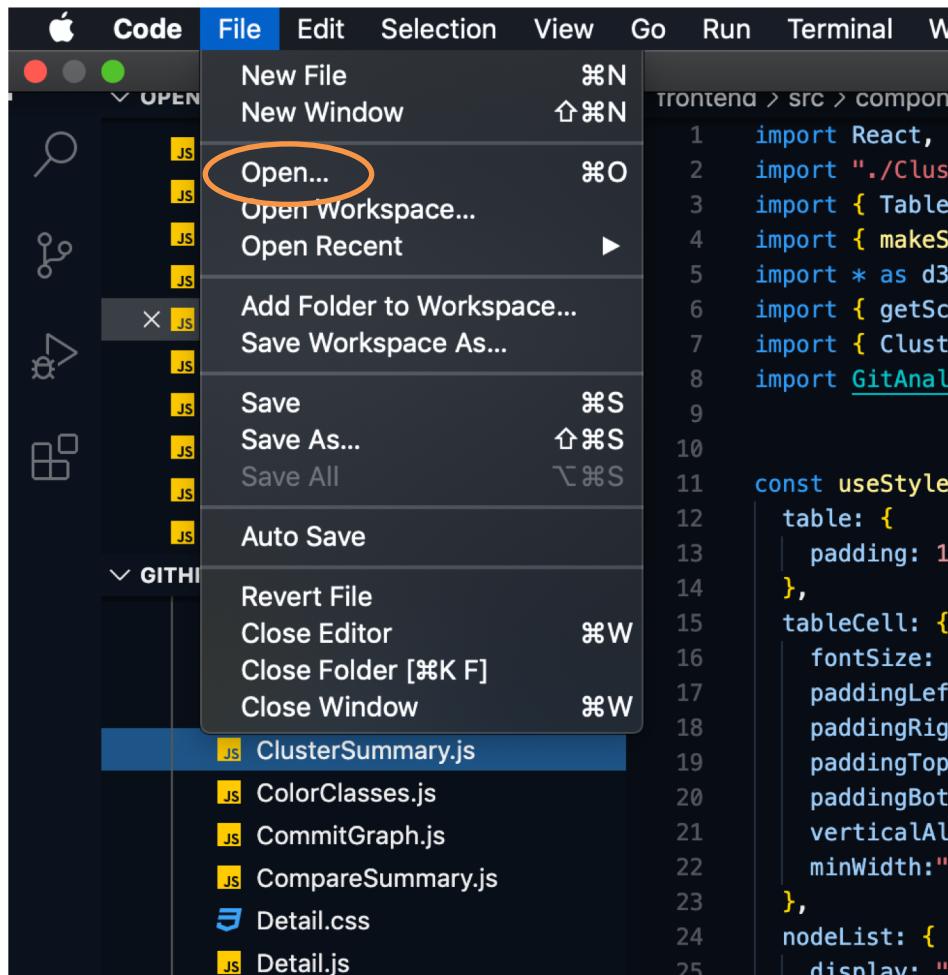
User Installer 64 bit 32 bit
System Installer 64 bit 32 bit
.zip 64 bit 32 bit

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

[Snap Store](#)

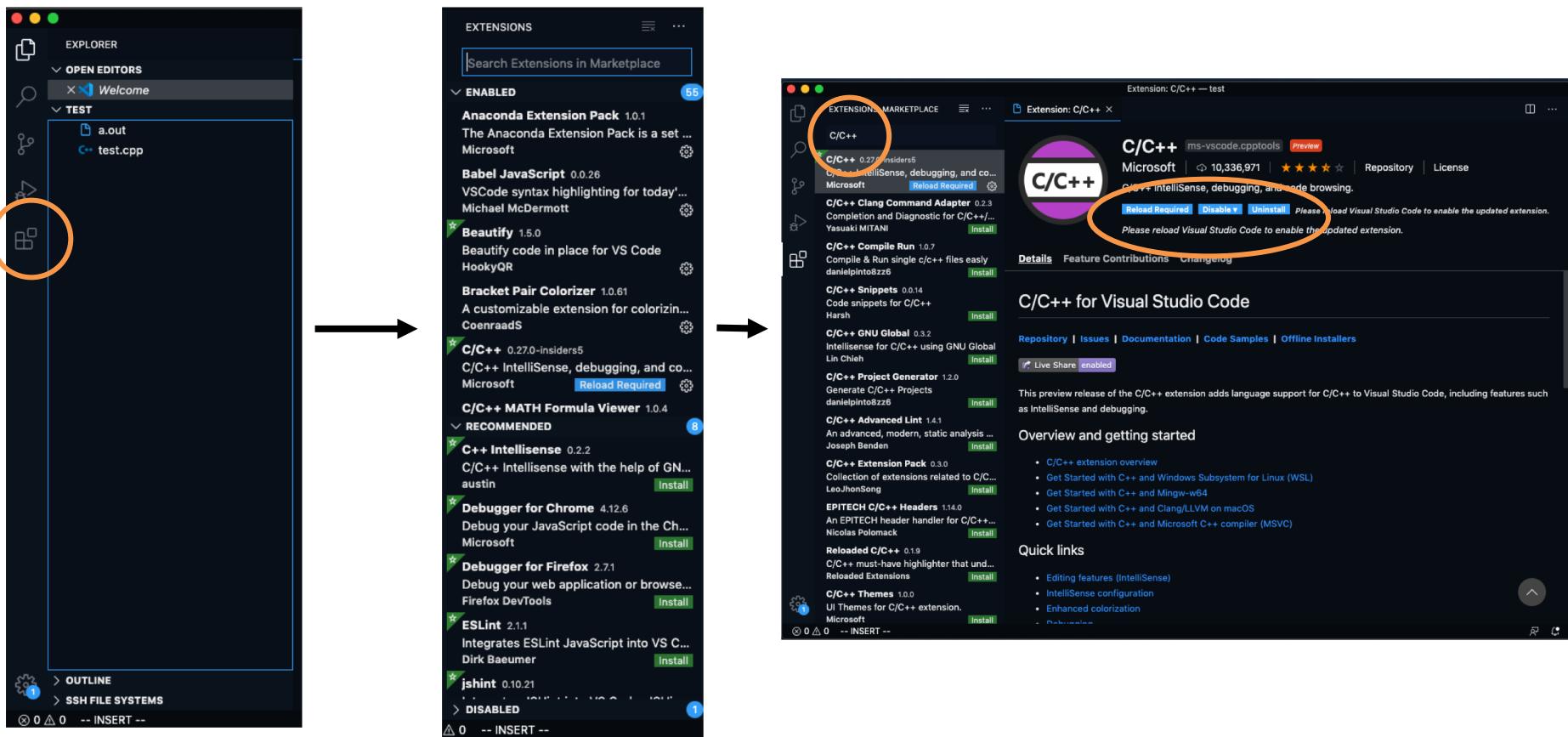
Visual Studio code

- Select working directory by accessing File >> Open menu
 - Now you're free to use the editor!!



Visual Studio Code

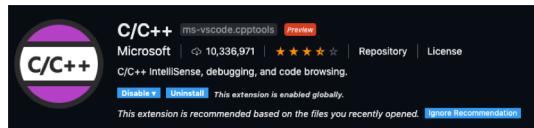
- To earn the full power of VS Code...
- You must install proper extensions!!



Visual Studio Code

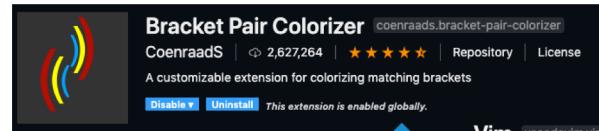
- Installing extensions
 - Search it / and install it!!
 - Very easy....I guess
- Essential extensions for cpp dev:

- C/C++

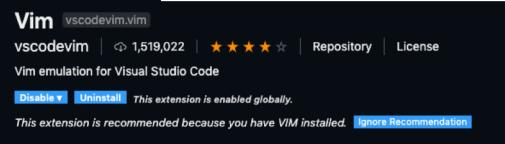


- Recommendation:

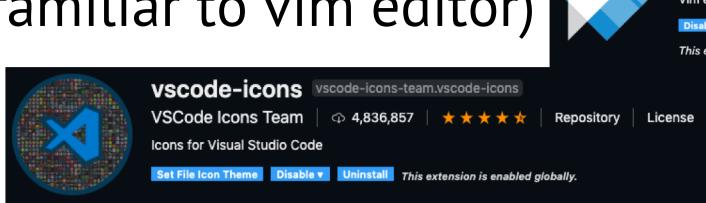
- Bracket Pair Colorizer



- vim (if you're familiar to vim editor)



- vscode-icons



Shell

- Linux
 - Use default cli shell (Terminal)
- mac OS
 - mac provides default cli shell...but ∃ a better alternative
 - install iterm2
 - <https://www.iterm2.com/>

What is iTerm2?

iTerm2 is a replacement for Terminal and the successor to iTerm. It works on Macs with macOS 10.12 or newer. iTerm2 brings the terminal into the modern age with features you never knew you always wanted.

Why Do I Want It?

Check out the impressive [features and screenshots](#). If you spend a lot of time in a terminal, then you'll appreciate all the little things that add up to a lot. It is free software and you can find the source code on [Github](#).

How Do I Use It?

Try the [FAQ](#) or the [documentation](#). Got problems or ideas? Report them in the [bug tracker](#), take it to the [forum](#), or send me email (gnachman at gmail dot com).

[Download](#)

iTerm2 is licensed under [GPL v2](#).

Shell

- Windows
 - use “command prompt” (already installed)
 - press (田 Window key) + R and type “cmd”
 - reference <https://www.lifewire.com/how-to-open-command-prompt-2618089>

```
c:\> Command Prompt
Microsoft Windows [Version 10.0.17134.590]
© 2018 Microsoft Corporation. All rights reserved.

\Users\roble>
\Users\roble>dir /w
Volume in drive C is Windows
Volume Serial Number is 10C4-2221

Directory of C:\Users\roble

[...]
[3D Objects] [Contacts] [Creative Cloud Files]
[Desktop] [Documents] [Downloads] [Dropbox] [Favorites]
[Google Drive] [Links] [Music] [OneDrive] [Roaming]
[Saved Games] [Searches] [Videos]

    0 File(s)          0 bytes
   18 Dir(s)  906,686,758,912 bytes free

\Users\roble>ping www.google.com

Pinging www.google.com [172.217.14.228] with 32 bytes of data:
Reply from 172.217.14.228: bytes=32 time=2571ms TTL=52
Reply from 172.217.14.228: bytes=32 time=53ms TTL=52
Reply from 172.217.14.228: bytes=32 time=49ms TTL=52
Reply from 172.217.14.228: bytes=32 time=49ms TTL=52

Ping statistics for 172.217.14.228:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 49ms, Maximum = 2571ms, Average = 680ms
```

GCC compiler environment

- Linux
 - <https://linuxize.com/post/how-to-install-gcc-compiler-on-ubuntu-18-04/>
- mac OS
 - open iterm2 terminal (cli shell)
 - install "brew"
 - paste this command in the terminal
 - `/bin/bash -c "$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/master/install.sh)"`
 - install “gcc”
 - run the command: `brew install gcc`
 - check whether the installation finished successfully or not by
 - running the command: `gcc -v`

GCC compiler environment

- Windows
 - we'll use MinGW!!
 - Minimalist GNU for Windows
 - provides GCC compiler for Windows
 - you should first install MinGW, and then integrate it to Windows
 - http://www.mingw.org/wiki/Getting_Started
 - Follow the instruction!!
 - Korean ver: <https://mingtrace.tistory.com/446>

Okay, let's test the environment!

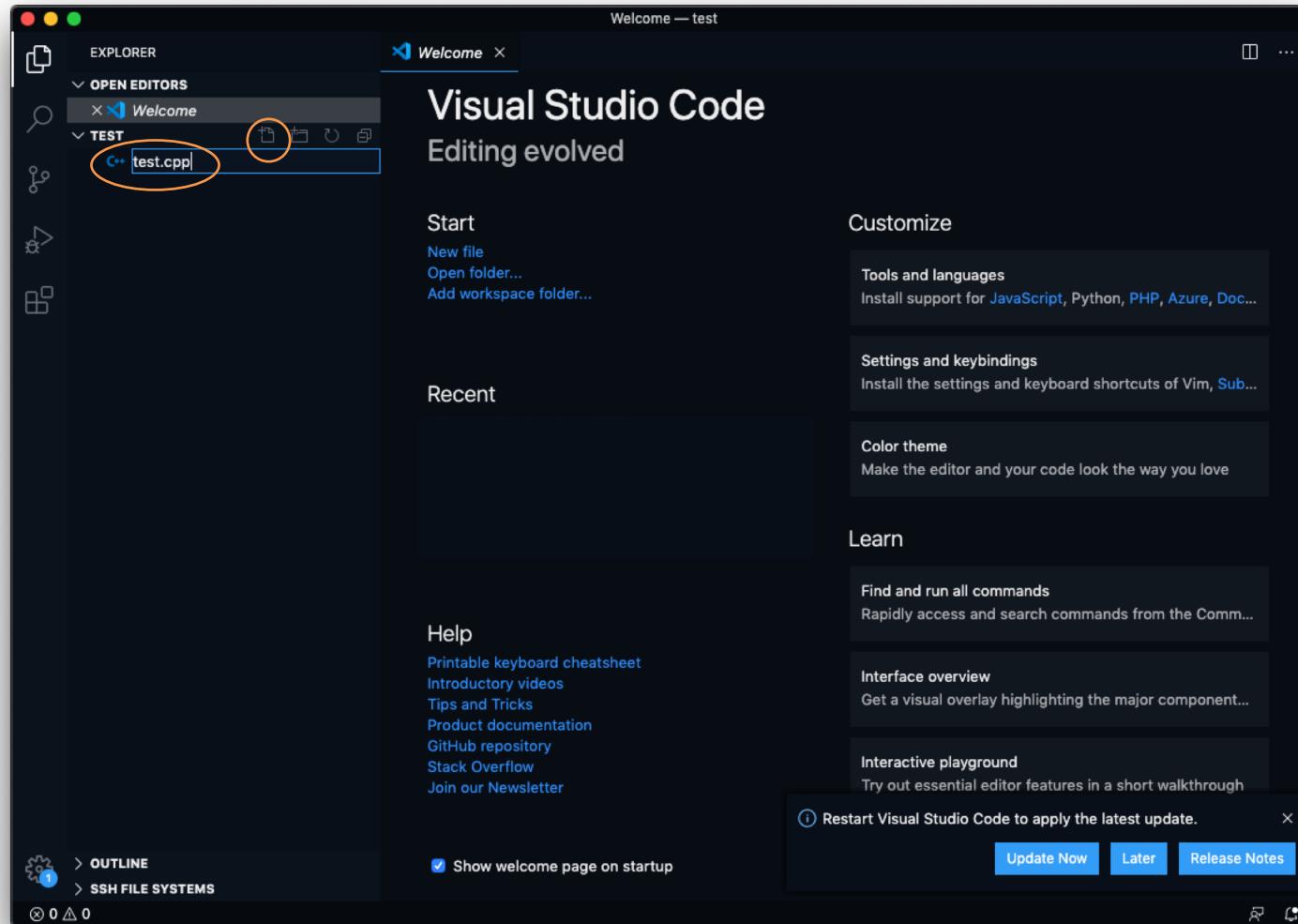
1. Make test directory in your desktop



2. Execute visual studio code, and open the directory:
 - Path will be similar to ~/Desktop/test

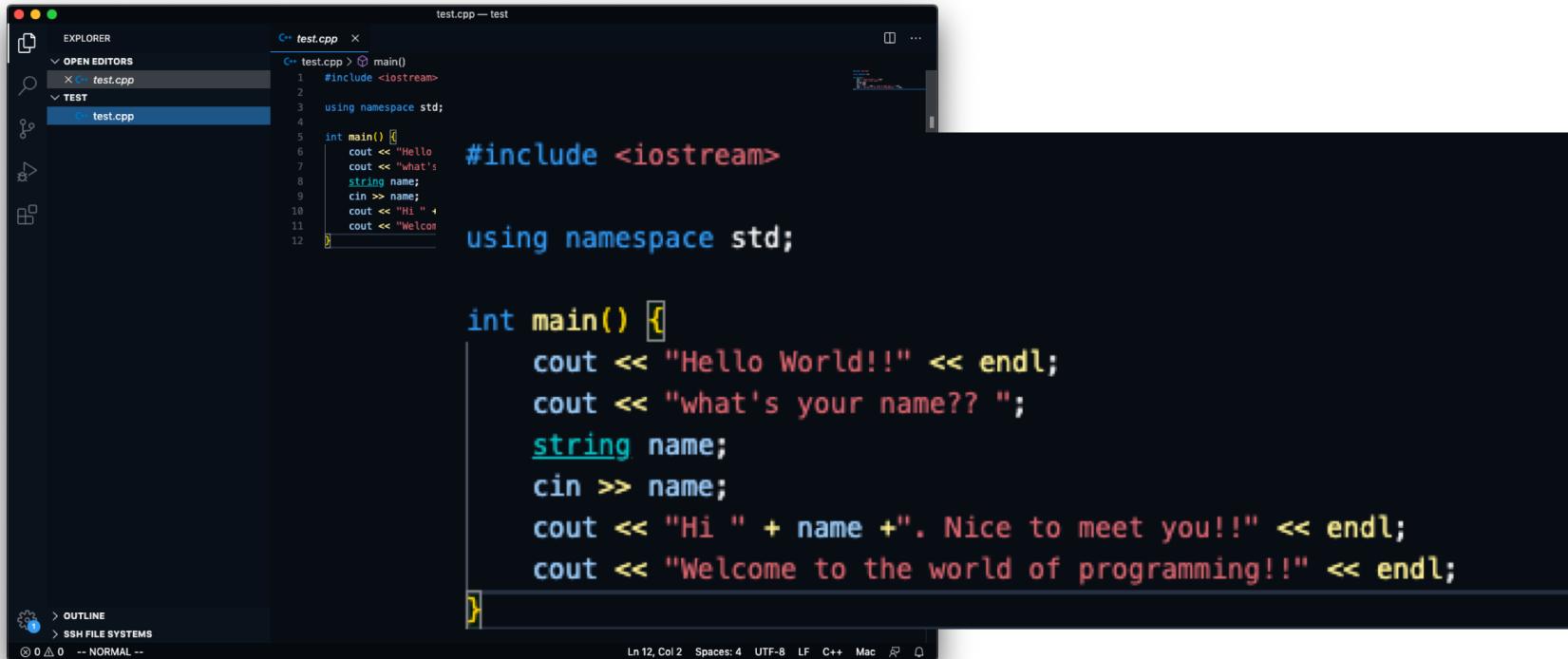
Okay, let's test the environment!

3. select “new file” icon and create new file: “test.cpp”



Okay, let's test the environment!

4. Write Test code



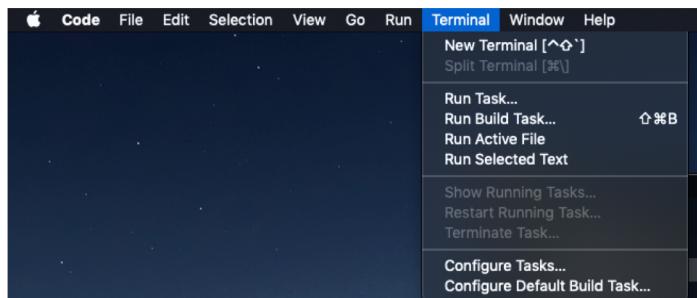
```
#include <iostream>
using namespace std;

int main() {
    cout << "Hello World!!" << endl;
    cout << "what's your name?? ";
    string name;
    cin >> name;
    cout << "Hi " + name + ". Nice to meet you!!" << endl;
    cout << "Welcome to the world of programming!!" << endl;
}
```

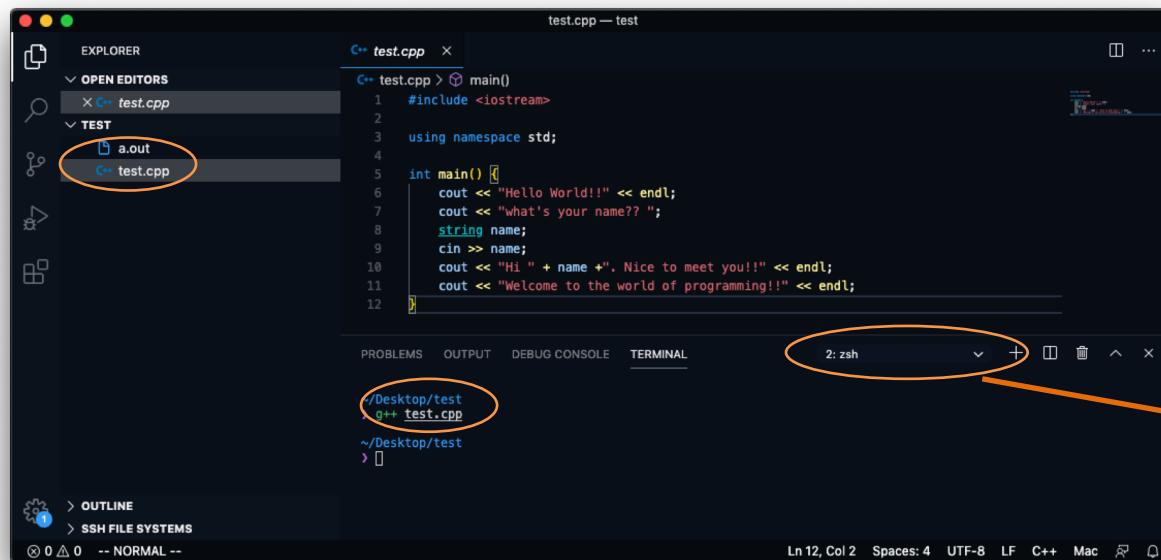
- The code is available at : https://github.com/jeonhyun97/cpp_4_undergraduates/blob/master/missing_session/lecture1/code/test.cpp
- but I highly recommend you to type the code in your own

Okay, let's test the environment!

- Open terminal (cli shell) by using Menu Tab:
- Terminal >> New Terminal



- run the command: g++ test.cpp



new executable file
will be created!!
max / linux : a.out
windows: a.exe

For windows, change this tab
to "command prompt"

Okay, let's test the environment!

- Now ready to run the code!!
- run the command:
 - Windows: a.exe
 - mac OS / Linux: ./a.out
- The program will ask your name...answer
- And it will say hello to you!!

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

~/Desktop/test
> g++ test.cpp

~/Desktop/test
> ./a.out
Hello World!!
what's your name?? █
```



```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

~/Desktop/test
> g++ test.cpp

~/Desktop/test
> ./a.out
Hello World!!
what's your name?? Hyeon
Hi Hyeon. Nice to meet you!!
Welcome to the world of programming!!

~/Desktop/test 1m 37s
> █
```

Thank you!!

contact: jeonhyun97@postech.ac.kr