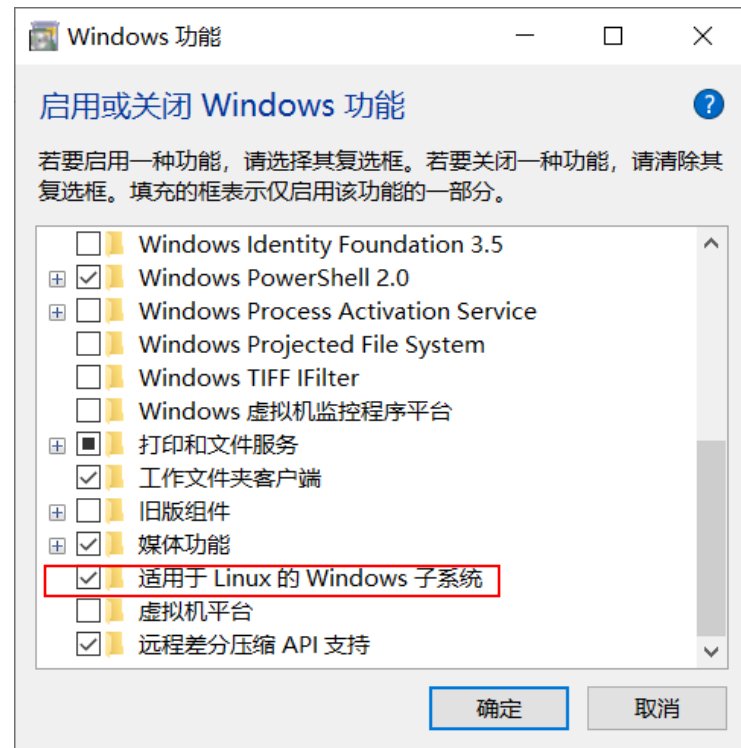
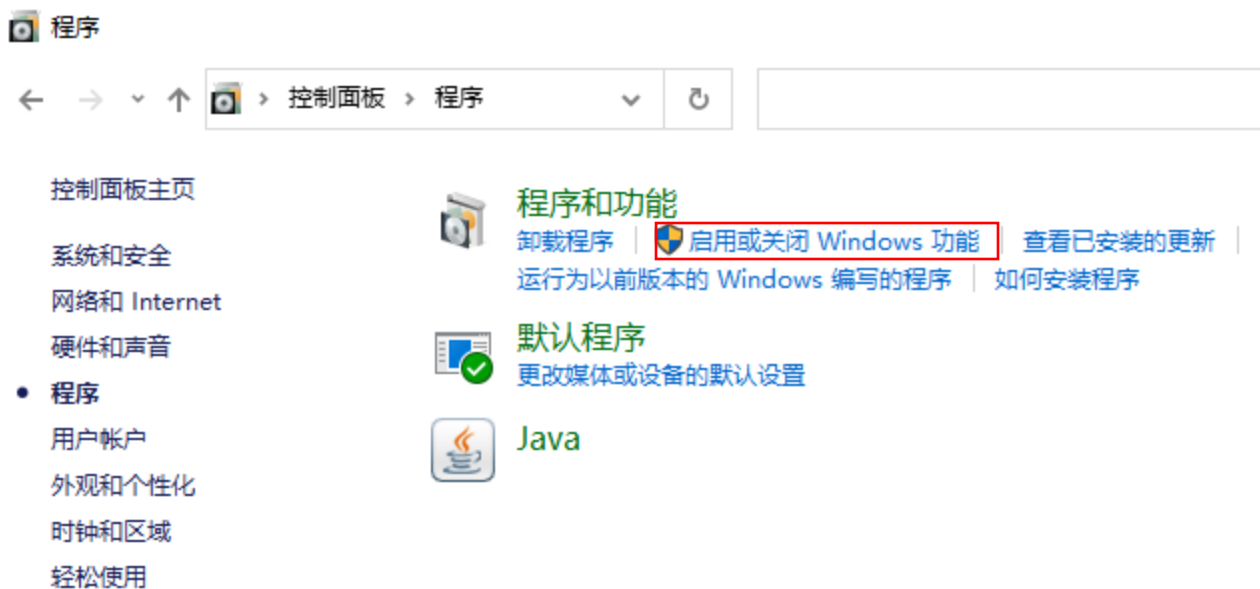




1 Download and install GCC on Windows 10 (Based on WSL)

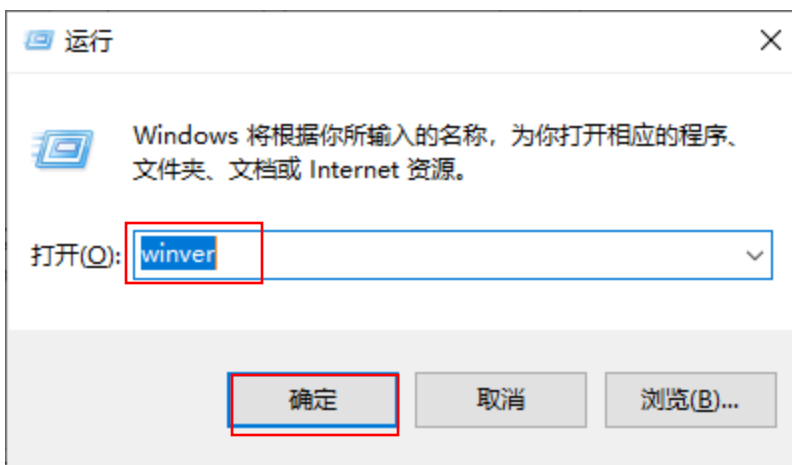
1.1 Install WSL on Windows system

- **Step one:** enable the **Windows Subsystem for Linux**
 - Open the Control Panel and set the Windows functions





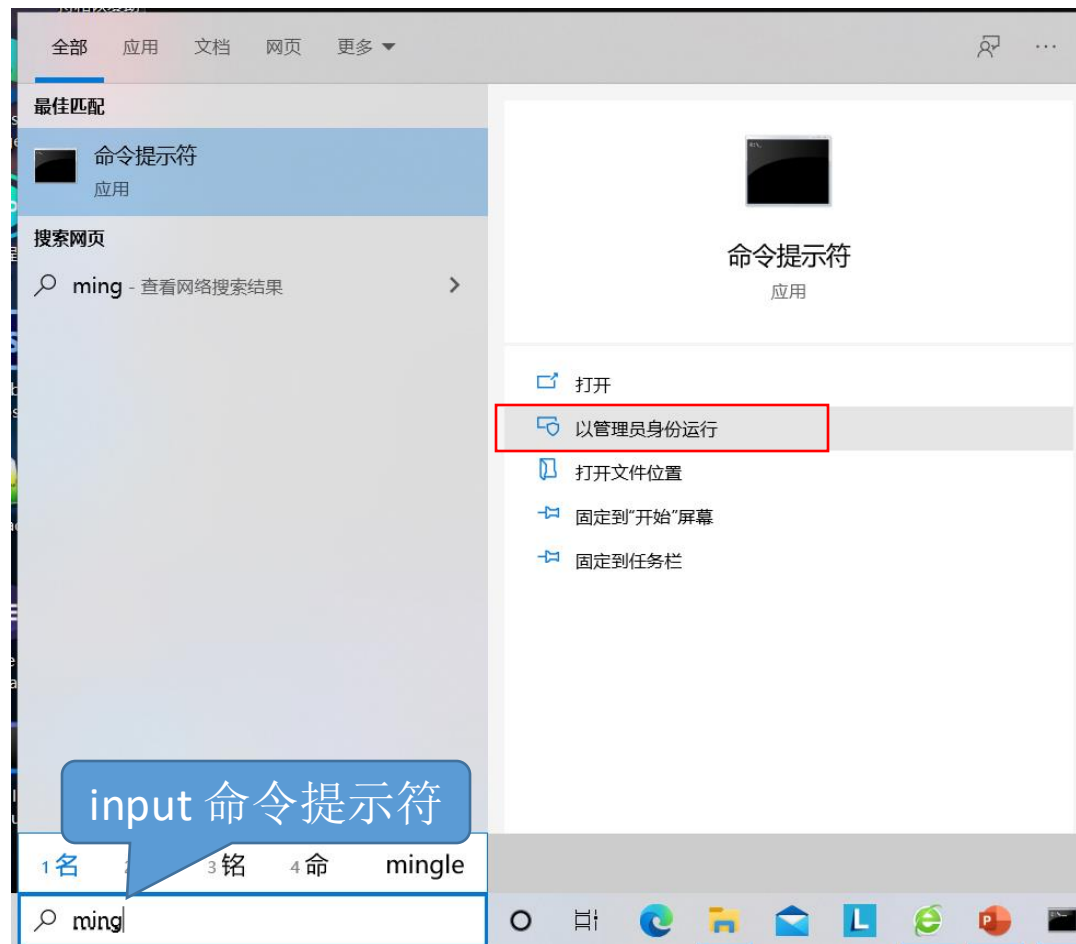
- **Step one:** enable the Windows Subsystem for Linux
 - Check Prerequisites: You must be running Windows 10 version 2004 and higher (Build 19041 and higher) or Windows 11.
 - To check your version and build number, select **Windows** logo key + **R**, type **winver**, select **OK**.



<https://learn.microsoft.com/en-us/windows/wsl/install>



- **Step one:** enable the Windows Subsystem for Linux
 - Open Powershell or Windows Command Prompt in administrator mode and enter the ***wsl --install*** command





```
Administrator: Command Promj X + v - □ X
C:\Users\Craig>wsl --install
Installing: Virtual Machine Platform
Virtual Machine Platform has been installed.
Installing: Windows Subsystem for Linux
Windows Subsystem for Linux has been installed.
Downloading: Ubuntu
[===== ]
```

It usually downloads and installs Ubuntu in your computer.

```
C:\> 管理员: 命令提示符 - wsl --install
Microsoft Windows [版本 10.0.19045.3086]
(c) Microsoft Corporation。保留所有权利。

C:\WINDOWS\system32>wsl --install
正在安装: 虚拟机平台
已安装 虚拟机平台。
正在安装: 适用于 Linux 的 Windows 子系统
已安装 适用于 Linux 的 Windows 子系统。
正在安装: 适用于 Linux 的 Windows 子系统
```

If Ubuntu is not downloaded, terminate the current installation by **Ctrl+c** and restart your computer.



Use the command `wsl -l -o` to check which version of Ubuntu is valid to your system. Then use the command `wsl --install -d` with the name of Ubuntu. For example, `wsl --install -d Ubuntu-20.04`.

```
C:\WINDOWS\system32>wsl -l -o
以下是可安装的有效分发的列表。
请使用“wsl --install -d <分发>”安装。

NAME                                FRIENDLY NAME
Ubuntu                              Ubuntu
Debian                              Debian GNU/Linux
kali-linux                          Kali Linux Rolling
Ubuntu-18.04                        Ubuntu 18.04 LTS
Ubuntu-20.04                        Ubuntu 20.04 LTS
Ubuntu-22.04                        Ubuntu 22.04 LTS
OracleLinux_7_9                     Oracle Linux 7.9
OracleLinux_8_7                     Oracle Linux 8.7
OracleLinux_9_1                     Oracle Linux 9.1
openSUSE-Leap-15.5                  openSUSE Leap 15.5
SUSE-Linux-Enterprise-Server-15-SP4 SUSE Linux Enterprise Server 15 SP4
SUSE-Linux-Enterprise-15-SP5        SUSE Linux Enterprise 15 SP5
openSUSE-Tumbleweed                 openSUSE Tumbleweed

C:\WINDOWS\system32>wsl --install -d Ubuntu-20.04
```



If you use command ***wsl --install*** and return the command instruction, it means that the default Ubuntu is not fit to your system(If you input the wrong command, it shows you the same window).

```
C:\WINDOWS\system32\cmd.exe
C:\Users\liaomq>wsl --install
版权所有 (c) Microsoft Corporation。保留所有权利。

用法: wsl.exe [Argument] [Options...] [CommandLine]

运行 Linux 二进制文件的参数:

    如果未提供命令行, wsl.exe 将启动默认 shell。

    --exec, -e <CommandLine>
        在不使用默认 Linux Shell 的情况下执行指定的命令。

    --
        按原样传递其余命令行。

选项:

    --cd <Directory>
        将指定目录设置为当前工作目录。
        如果使用了 /, 则将使用 Linux 用户的主页路径。如果路径
        以 / 字符开头, 将被解释为绝对 Linux 路径。
        否则, 该值一定是绝对 Windows 路径。

    --distribution, -d <Distro>
        运行指定分发。

    --user, -u <UserName>
        以指定用户身份运行。

管理适用于 Linux 的 Windows 子系统的参数:

    --help
        显示用法信息。

    --install [选项]
        安装额外的适用于 Linux 的 Windows 子系统分发。
        要获得有效分发列表, 请使用 "wsl --list --online"。

        选项:
            --distribution, -d [参数]
                按名称下载并安装分发。

            参数:
                有效分发名称(不区分大小写)。

            示例:
                wsl --install -d Ubuntu
                wsl --install --distribution Debian

    --set-default-version <Version>
        更改新分发的默认安装版本。

    --shutdown
        立即终止所有运行的分发及 WSL 2
        轻型实用工具虚拟机。

    --status
```

At this time, you need open PowerShell as administrator and run:

**dism.exe /online /enable-feature
/featurename:VirtualMachinePlatform /all /norestart**

```
管理员: 命令提示符
(c) Microsoft Corporation。保留所有权利。

C:\WINDOWS\system32>dism.exe /online /enable-feature /featurename:VirtualMachinePlatform /all /norestart

部署映像服务和管理工具
版本: 10.0.19041.844

映像版本: 10.0.19043.1165

启用一个或多个功能
[=====100.0%=====]
操作成功完成。

C:\WINDOWS\system32>
```

Copy the command and run

Restart your computer, open the **Microsoft Store**, search for your preferred Linux distribution (Ubuntu), get and install it in your computer according to the guidance.



```
liao@DESKTOP-OOC4F37: ~  
Installing, this may take a few minutes...  
Please create a default UNIX user account. The username does not need to match your Windows username.  
For more information visit: https://aka.ms  
Enter new UNIX username: liao  
New password:  
Retype new password:  
passwd: password updated successfully  
Installation successful!  
适用于 Linux 的 Windows 子系统现已在 Microsoft Store 中可用:  
你可以通过运行“wsl.exe --update”或通过访问 https://aka.ms/wslstorepage 进行升级  
从 Microsoft Store 安装 WSL 将可以更快地获取最新的 WSL 更新。  
有关详细信息, 请访问 https://aka.ms/wslstoreinfo  
  
To run a command as administrator (user "root"), use "sudo <command>".  
See "man sudo_root" for details.  
  
Welcome to Ubuntu 20.04.6 LTS (GNU/Linux 4.4.0-19041-Microsoft x86_64)  
  
* Documentation: https://help.ubuntu.com  
* Management: https://landscape.canonical.com  
* Support: https://ubuntu.com/advantage  
  
System information as of Mon Sep  4 13:13:33 CST 2023  
  
System load:   0.52      Processes:            7  
Usage of /home: unknown  Users logged in:      0  
Memory usage:  36%      IPv4 address for eth0: 10.16.75.223  
Swap usage:    0%       IPv6 address for eth0: 2001:da8:201d:1107::1239  
  
Expanded Security Maintenance for Applications is not enabled.  
  
0 updates can be applied immediately.  
  
Enable ESM Apps to receive additional future security updates.  
See https://ubuntu.com/esm or run: sudo pro status  
  
The list of available updates is more than a week old.  
To check for new updates run: sudo apt update  
  
This message is shown once a day. To disable it please create the  
/home/liao/.hushlogin file.  
liao@DESKTOP-OOC4F37: $
```

Input new UNIX username and new password.
Remember your username and password.
Note: the password is not displayed on the screen.

Linux command prompt



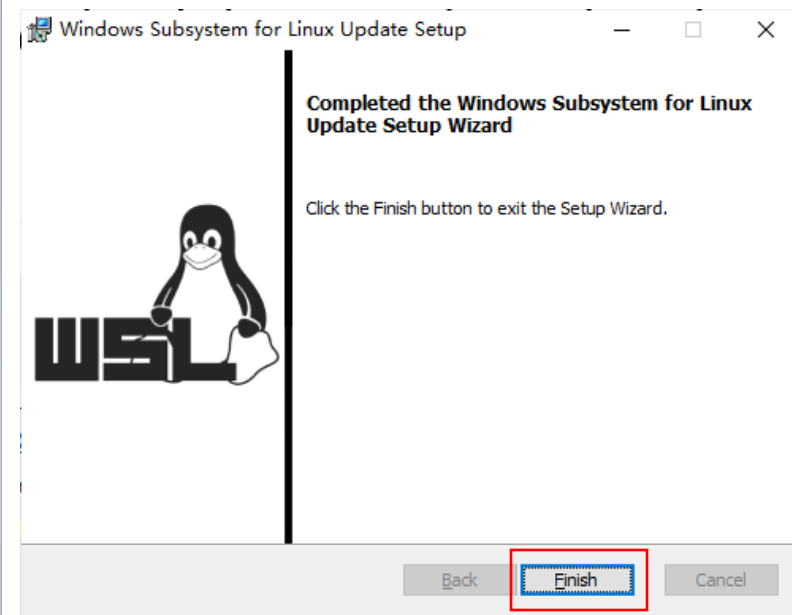
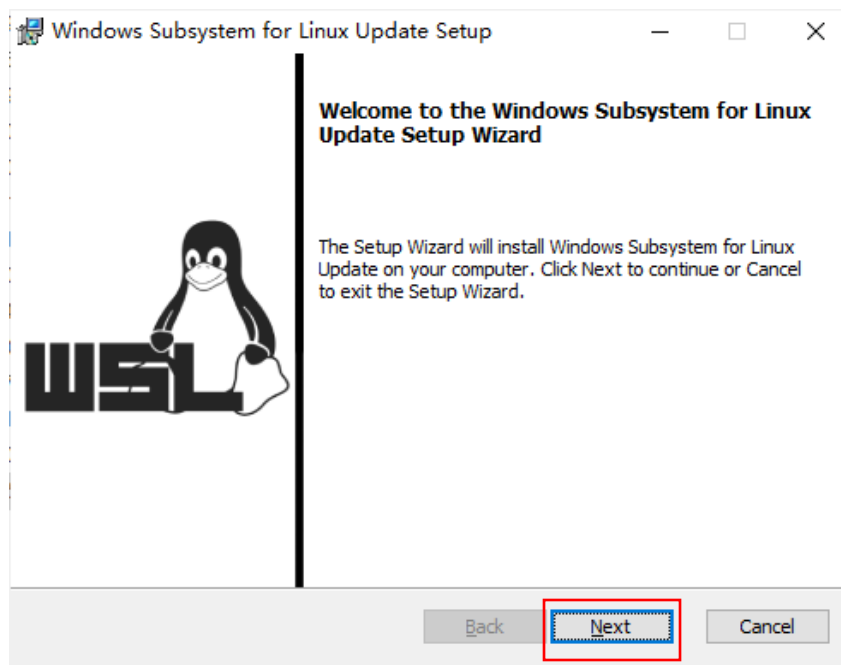
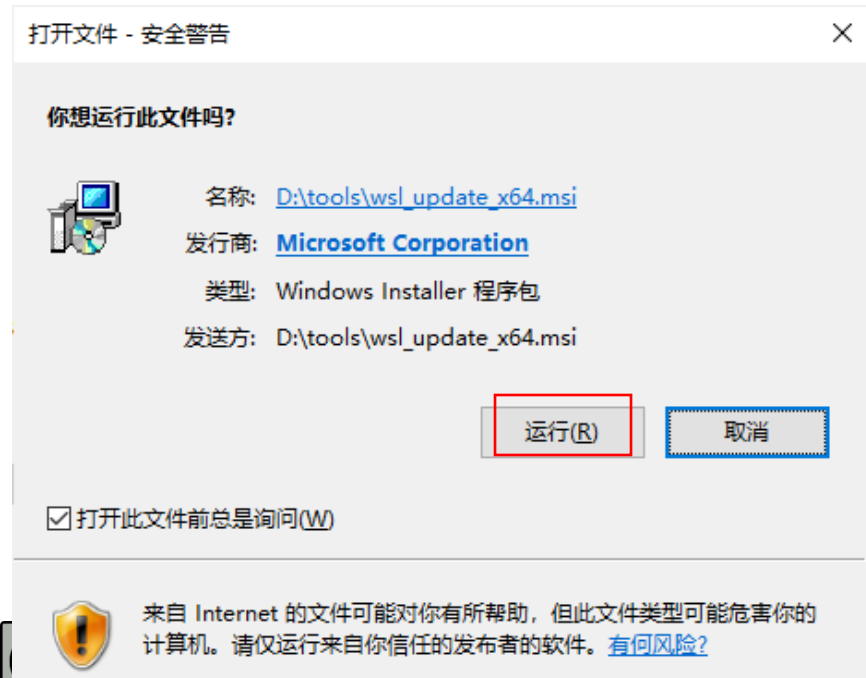
1.1 Install WSL on Windows 10(cont.)

- **Step two:** Update WSL kernel
- Download the latest package and run the update package

https://wslstorestorage.blob.core.windows.net/wslblob/wsl_update_x64.msi

If you're using an ARM64 machine, please download the **ARM64 package** instead.

https://wslstorestorage.blob.core.windows.net/wslblob/wsl_update_arm64.msi





1.1 Install WSL on Windows 10(cont.)

- **Step three:** Set WSL version as 2
- Open PowerShell or Windows command prompt and run this command to set WSL version as 2 : `wsl --set-version Ubuntu-20.04 2`

```
管理员: 命令提示符
Microsoft Windows [版本 10.0.19045.3208]
(c) Microsoft Corporation。保留所有权利。

C:\WINDOWS\system32>wsl -l -v
  NAME                STATE      VERSION
* Ubuntu-20.04        Stopped    1

C:\WINDOWS\system32>wsl --set-version Ubuntu-20.04 2
正在进行转换, 这可能需要几分钟时间...
有关与 WSL 2 的主要区别的信息, 请访问 https://aka.ms/ws12
转换完成。

C:\WINDOWS\system32>wsl -l -v
  NAME                STATE      VERSION
* Ubuntu-20.04        Stopped    2

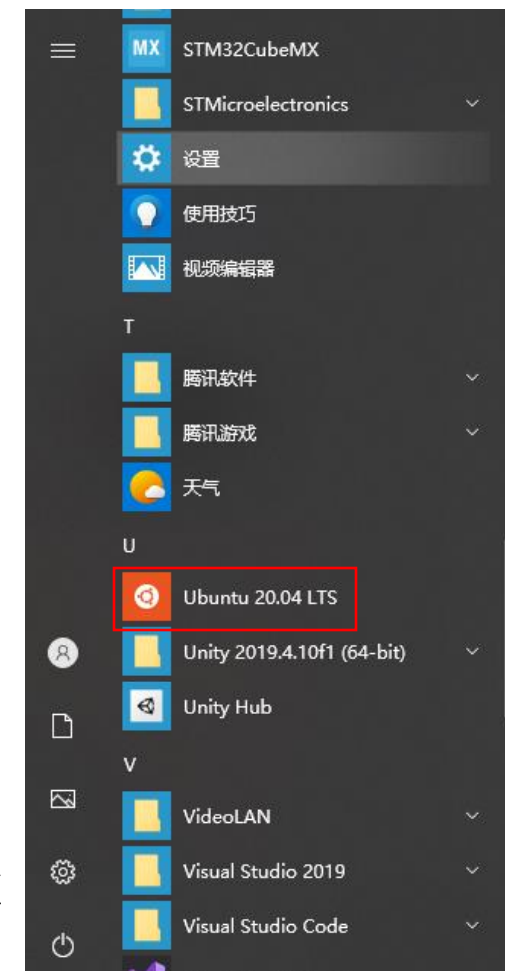
C:\WINDOWS\system32>
```

Check the version of WSL.



1.2 Install GCC on WSL

- Once you finished the installation of Ubuntu 20.04 LTS, you can find it on your start menu.
- Open it and you will see a Terminal for Linux
- You can set username and password for your system (Please remember this password as you need it to switch to root user later)
- Use the two commands below to install GNU: (If you are using any Linux distribution based on debian you can use below to install, too)
 - **sudo apt update** this command will update your apt library (apt: Advanced Packaging Tools)
 - **sudo apt install g++ -y** this command will install g++ and its independence





```
liao@DESKTOP-OOC4F37: ~  
适用于 Linux 的 Windows 子系统现已在 Microsoft Store 中可用！  
你可以通过运行“wsl.exe --update”或通过访问 https://aka.ms/wslstorepage 进行升级  
从 Microsoft Store 安装 WSL 将可以更快地获取最新的 WSL 更新。  
有关详细信息，请访问 https://aka.ms/wslstoreinfo  
  
To run a command as administrator (user “root”), use “sudo <command>”.  
See “man sudo_root” for details.  
  
liao@DESKTOP-OOC4F37:~$ sudo apt update  
[sudo] password for liao:  
Get:1 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]  
Hit:2 http://archive.ubuntu.com/ubuntu focal InRelease  
Get:3 http://archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]  
Get:4 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [2401 kB]  
Get:5 http://archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]  
Get:6 http://archive.ubuntu.com/ubuntu focal/universe amd64 Packages [8628 kB]  
Get:7 http://archive.ubuntu.com/ubuntu focal/universe Translation-en [5124 kB]  
Get:8 http://archive.ubuntu.com/ubuntu focal/universe amd64 c-n-f Metadata [265 kB]  
Get:9 http://archive.ubuntu.com/ubuntu focal/multiverse amd64 Packages [144 kB]  
Get:10 http://archive.ubuntu.com/ubuntu focal/multiverse Translation-en [104 kB]  
Get:11 http://archive.ubuntu.com/ubuntu focal/multiverse amd64 c-n-f Metadata [9136 B]  
Get:12 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [2788 kB]  
Get:13 http://archive.ubuntu.com/ubuntu focal-updates/main Translation-en [461 kB]  
Get:14 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 c-n-f Metadata [17.0 kB]  
Get:15 http://archive.ubuntu.com/ubuntu focal-updates/restricted amd64 Packages [2243 kB]  
Get:16 http://archive.ubuntu.com/ubuntu focal-updates/restricted Translation-en [313 kB]  
Get:17 http://archive.ubuntu.com/ubuntu focal-updates/restricted amd64 c-n-f Metadata [576 B]  
Get:18 http://archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [1105 kB]  
Get:19 http://archive.ubuntu.com/ubuntu focal-updates/universe Translation-en [264 kB]  
Get:20 http://archive.ubuntu.com/ubuntu focal-updates/universe amd64 c-n-f Metadata [25.4 kB]
```

input the command and
your password



```
liao@DESKTOP-OOC4F37: ~  
Get:41 http://security.ubuntu.com/ubuntu focal-security/multiverse Translation-en [5504 B]  
Get:42 http://security.ubuntu.com/ubuntu focal-security/multiverse amd64 c-n-f Metadata [548 B]  
Fetched 27.9 MB in 36s (773 kB/s)  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
80 packages can be upgraded. Run 'apt list --upgradable' to see them.  
liao@DESKTOP-OOC4F37: ~$ sudo apt install g++ -y  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
The following additional packages will be installed:  
  binutils binutils-common binutils-x86-64-linux-gnu cpp cpp-9 g++-9 gcc gcc-10-base gcc-9 gcc-9-base libasan5  
  libatomic1 libbinutils libc-dev-bin libc6-dev libc++1-0 libcrypt-dev libctf-nobfd0 libctf0 libgcc-9-dev libgcc-s1  
  libgomp1 libisl22 libitm1 liblsan0 libmpc3 libquadmath0 libstdc++-9-dev libstdc++6 libtsan0 libubsan1 linux-libc-dev  
  manpages-dev  
Suggested packages:  
  binutils-doc cpp-doc gcc-9-locales g++-multilib g++-9-multilib gcc-9-doc gcc-multilib make autoconf automake libtool  
  flex bison gdb gcc-doc gcc-9-multilib glibc-doc libstdc++-9-doc  
The following NEW packages will be installed:  
  binutils binutils-common binutils-x86-64-linux-gnu cpp cpp-9 g++ g++-9 gcc gcc-9 gcc-9-base libasan5 libatomic1  
  libbinutils libc-dev-bin libc6-dev libc++1-0 libcrypt-dev libctf-nobfd0 libctf0 libgcc-9-dev libgomp1 libisl22  
  libitm1 liblsan0 libmpc3 libquadmath0 libstdc++-9-dev libtsan0 libubsan1 linux-libc-dev manpages-dev  
The following packages will be upgraded:  
  gcc-10-base libgcc-s1 libstdc++6  
3 upgraded, 31 newly installed, 0 to remove and 77 not upgraded.  
Need to get 44.7 MB of archives.  
After this operation, 197 MB of additional disk space will be used.  
Get:1 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 gcc-10-base amd64 10.5.0-1ubuntu1~20.04 [20.8 kB]  
Get:2 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 libstdc++6 amd64 10.5.0-1ubuntu1~20.04 [501 kB]  
1% [2 libstdc++6 2613 B/501 kB 1%]
```

input the command to install g++



1.3 Verify GCC on WSL

- You can input command: `gcc --version` or `g++ --version` to check whether the GCC is installed well

```
liao@DESKTOP-OOC4F37: ~  
Setting up binutils-x86-64-linux-gnu (2.34-6ubuntu1.6) ...  
Setting up binutils (2.34-6ubuntu1.6) ...  
Setting up libgcc-9-dev:amd64 (9.4.0-1ubuntu1~20.04.2) ...  
Setting up cpp (4:9.3.0-1ubuntu2) ...  
Setting up gcc-9 (9.4.0-1ubuntu1~20.04.2) ...  
Setting up libstdc++-9-dev:amd64 (9.4.0-1ubuntu1~20.04.2) ...  
Setting up gcc (4:9.3.0-1ubuntu2) ...  
Setting up g++-9 (9.4.0-1ubuntu1~20.04.2) ...  
Setting up g++ (4:9.3.0-1ubuntu2) ...  
update-alternatives: using /usr/bin/g++ to provide /usr/bin/c++ (c++) in auto mode  
Processing triggers for man-db (2.9.1-1) ...  
Processing triggers for libc-bin (2.31-0ubuntu9.9) ...  
liao@DESKTOP-OOC4F37:~$ gcc --version  
gcc (Ubuntu 9.4.0-1ubuntu1~20.04.2) 9.4.0  
Copyright (C) 2019 Free Software Foundation, Inc.  
This is free software; see the source for copying conditions. There is NO  
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  
  
liao@DESKTOP-OOC4F37:~$ g++ --version  
g++ (Ubuntu 9.4.0-1ubuntu1~20.04.2) 9.4.0  
Copyright (C) 2019 Free Software Foundation, Inc.  
This is free software; see the source for copying conditions. There is NO  
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  
  
liao@DESKTOP-OOC4F37:~$ _
```

Input `gcc --version` or `g++ --version` to check if the compiler is installed successfully