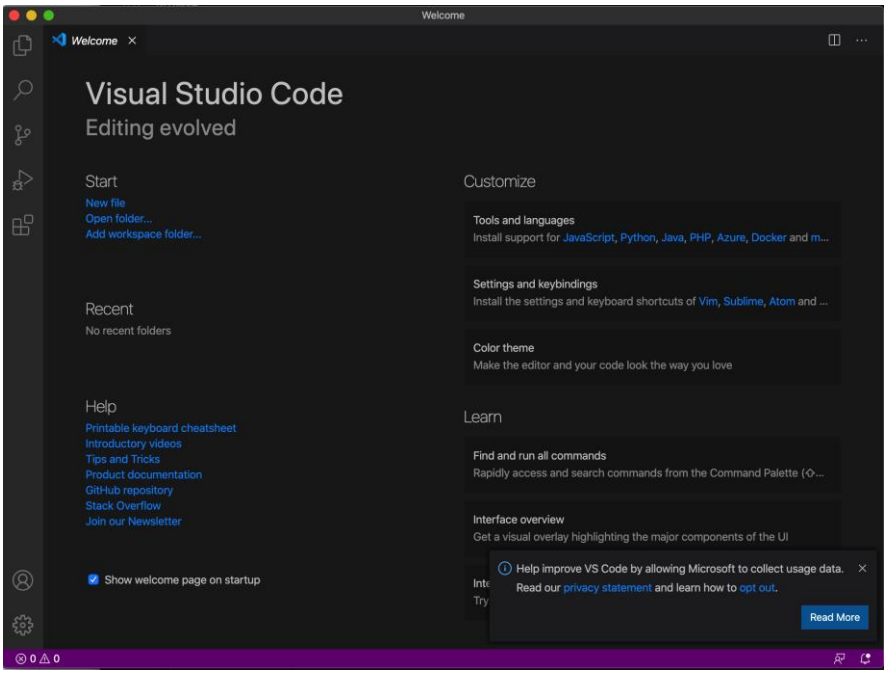
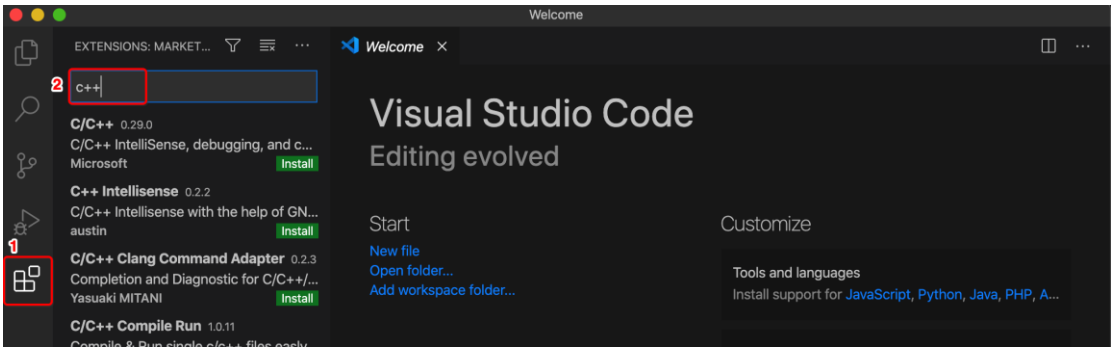
VS Code Installation and Usage for MacOS

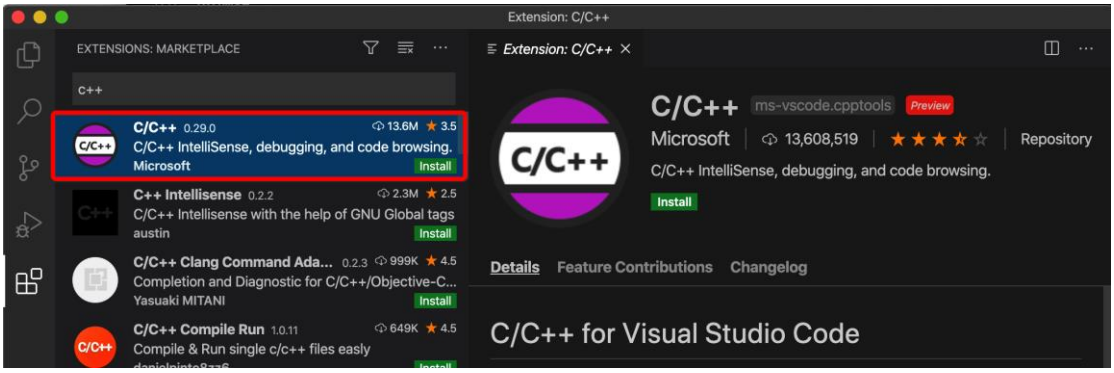
- **Prerequisites**

1. Install the Visual Studio Code on macOS.



2. From the "View" menu, choose "Command palette". The command palette, in which you can search for and run various commands, appears. Search for and run "Extensions: Install Extensions". Find and install the C++ extension for VS Code by searching c++ as shown below in the extension installation dialog. Remember to click “install”.





Close VS Code after installation.

- **Set g++ as the default compiler**

Clang is the default compiler for Mac OS X. Clang may already be installed on your Mac. To verify that it is, open a macOS Terminal window and enter the following command:

```
clang --version
```

```
(base) quanyuqing@MacBook-Pro ~ % clang --version
Apple clang version 11.0.3 (clang-1103.0.32.62)
Target: x86_64-apple-darwin19.6.0
Thread model: posix
InstalledDir: /Library/Developer/CommandLineTools/usr/bin
```

```
(base) quanyuqing@MacBook-Pro ~ % g++ -v
Configured with: --prefix=/Library/Developer/CommandLineTools/usr --with-gxx-include-dir=/Library/Developer/
CommandLineTools/SDKs/MacOSX.sdk/usr/include/c++/4.2.1
Apple clang version 11.0.3 (clang-1103.0.32.62)
Target: x86_64-apple-darwin19.6.0
Thread model: posix
InstalledDir: /Library/Developer/CommandLineTools/usr/bin
```

In COMP2011, COMP2012, and COMP2012H officially we use the g++ compiler.
Here's how to use g++ instead of clang++:

1. Use homebrew to help

Homebrew

Homebrew "installs the stuff that you need that Apple don't". It's like Ubuntu's apt-get, where one can install packages easily from repositories. Instead of having to download, configure, and install something yourself, all you need to do is run one command, and Homebrew will take care of the rest for you.

Pre-requisites

Homebrew requires that you have either Xcode or the Xcode command line tools installed on your Mac. Xcode is a free integrated development environment similar to Eclipse designed by Apple and mainly intended for iOS development or targeting the compiler. In this class, we will focus on .

Refer to https://brew.sh/ to install Homebrew

2. Installing GCC

```
brew search gcc
```

```
(base) quanyuqing@MacBook-Pro ~ % brew search gcc
==> Formulae
gcc                     gcc@5                   gcc@7                   gcc@9                   x86_64-elf-gcc
gcc@4.9                 gcc@6                   gcc@8                   i686-elf-gcc
==> Casks
gcc-arm-embedded
```

brew install gcc@9

```
(base) quanyuqing@MacBook-Pro ~ % brew install gcc@9
Updating Homebrew...
==> Downloading https://homebrew.bintray.com/bottles/gmp-6.2.0.catalina.bottle.tar.gz
==> Downloading from https://d29vzk4ow07wi7.cloudfront.net/2e6acd6e62d1b8ef0800061e113aea30a63f56b32b99c010234c0420fd6d3ecf?
==> Downloading https://homebrew.bintray.com/bottles/isl-0.22.1.catalina.bottle.tar.gz
==> Downloading from https://d29vzk4ow07wi7.cloudfront.net/b5319e3bbbb36ef3536d841999b7497b3dce4bf9e07fb04f6b0db716e087896d?
==> Downloading https://homebrew.bintray.com/bottles/mpfr-4.1.0.catalina.bottle.tar.gz
==> Downloading from https://d29vzk4ow07wi7.cloudfront.net/5fcf57834f58c18761c6c7b0eb961eb7f9fc54325b5361bf3a17c4dee6ebc08a?
```

gcc-9 -v

```
(base) quanyuqing@MacBook-Pro ~ % gcc-9 -v
Using built-in specs.
COLLECT_GCC=gcc-9
COLLECT_LTO_WRAPPER=/usr/local/Cellar/gcc@9/9.3.0/libexec/gcc/x86_64-apple-darwin19/9.3.0/lto-wrapper
Target: x86_64-apple-darwin19
Configured with: ../configure --build=x86_64-apple-darwin19 --prefix=/usr/local/Cellar/gcc@9/9.3.0 --libdir=/usr/local/Cellar/gcc@9/9.3.0/lib/gcc/9 --disable-nls --enable-checking=release --enable-languages=c,c++,objc,obj-c++,fortran --program-suffix=-9 --with-gmp=/usr/local/opt/gmp --with-mpfr=/usr/local/opt/mpfr --with-mpc=/usr/local/opt/libmpc --with-isl=/usr/local/opt/isl --with-system-zlib --with-pkgversion='Homebrew GCC 9.3.0' --with-bugurl=https://github.com/Homebrew/homebrew-core/issues --disable-multilib --with-native-system-header-dir=/usr/include --with-sysroot=/Library/Developer/CommandLineTools/SDKs/MacOSX10.15.sdk SED=/usr/bin/sed
Thread model: posix
gcc version 9.3.0 (Homebrew GCC 9.3.0)
```

3. Change configuration parameters and environment variable

nano ~/.bash_profile

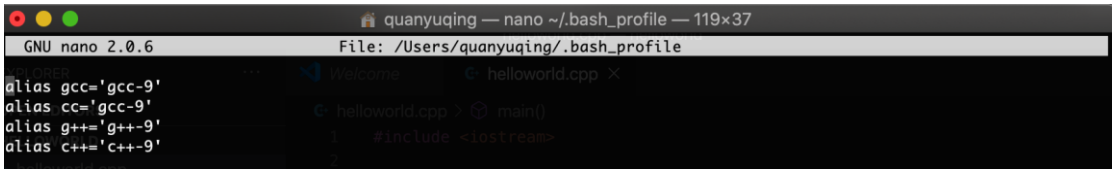
Type the following path:

alias gcc='gcc-9'

alias cc='gcc-9'

alias g++='g++-9'

alias c++='c++-9'



Exit and Save (Press Crtl-O to save after you type all 4 lines carefully. It would ask for the filename to save, just press Enter to save the new content to ~/.bash_profile) (Press Ctrl-X to exit the editor after saving.)

3. Refresh environment variables using the following commands, then make sure you have “GCC version 9.3.0” just like the screenshot, version newer than 9.3.0 is fine.

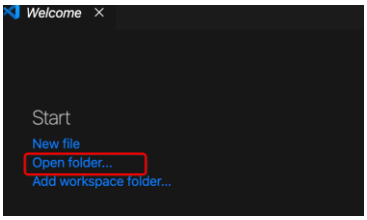
source ~/.bash_profile

g++ -v

```
(base) quanyuqing@MacBook-Pro ~ % sudo vi ~/.bash_profile
Password:
(base) quanyuqing@MacBook-Pro ~ % source ~/.bash_profile
(base) quanyuqing@MacBook-Pro ~ % g++ -v
Using built-in specs.
COLLECT_GCC=g++-9
COLLECT_LTO_WRAPPER=/usr/local/Cellar/gcc@9/9.3.0/libexec/gcc/x86_64-apple-darwin19/9.3.0/lto-wrapper
Target: x86_64-apple-darwin19
Configured with: ../configure --build=x86_64-apple-darwin19 --prefix=/usr/local/Cellar/gcc@9/9.3.0 --libdir=/usr/local/Cellar/gcc@9/9.3.0/lib/gcc/9 --disable-nls --enable-checking=release --enable-languages=c,c++,objc,obj-c++,fortran --program-suffix=-9 --with-gmp=/usr/local/opt/gmp --with-mpfr=/usr/local/opt/mpfr --with-mpc=/usr/local/opt/libmpc --with-isl=/usr/local/opt/isl --with-system-zlib --with-pkgversion='Homebrew GCC 9.3.0' --with-bugurl=https://github.com/Homebrew/homebrew-core/issues --disable-multilib --with-native-system-header-dir=/usr/include --with-sysroot=/Library/Developer/CommandLineTools/SDKs/MacOSX10.15.sdk SED=/usr/bin/sed
Thread model: posix
gcc version 9.3.0 (Homebrew GCC 9.3.0)
(base) quanyuqing@MacBook-Pro ~ %
```

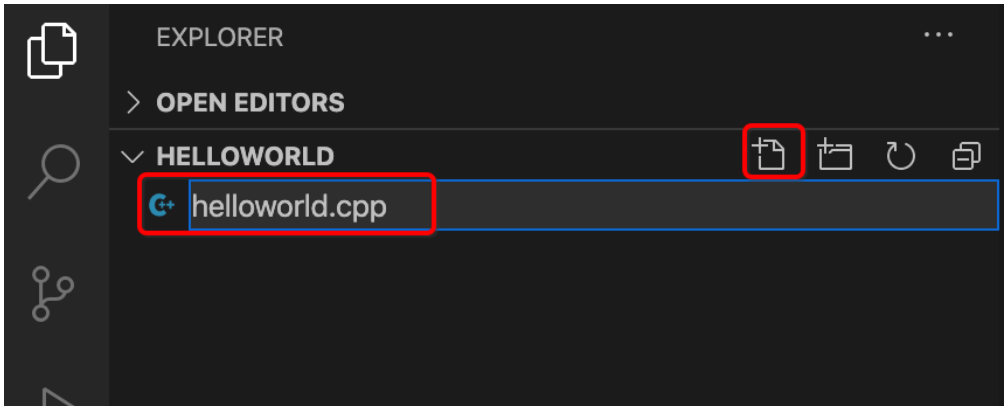
- **Create Hello World**

Create a new folder “projects” on your Mac. Open VS Code. Click “File -> Open Folder…” to select the folder just created



- **Add hello world source code file**

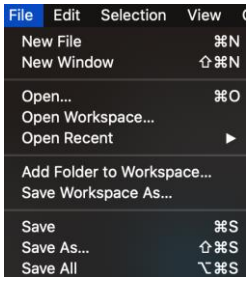
In the File Explorer title bar, select **New File** and name the file `helloworld.cpp`.



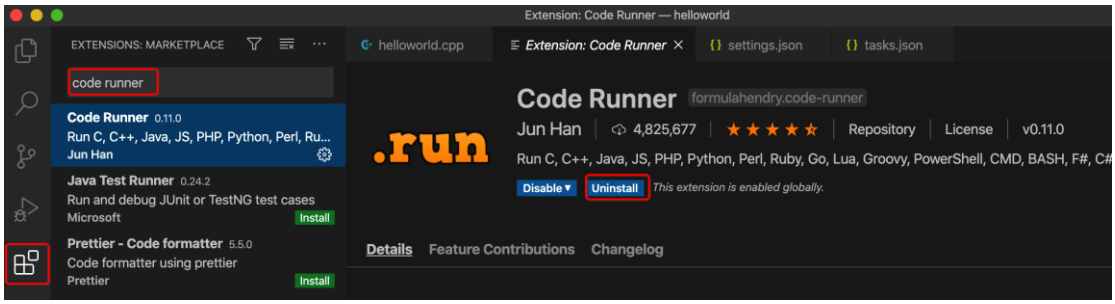
Paste in the following source code:

```
#include <iostream>
using namespace std;
int main( )
{
    cout << "Hello world! :)" << endl;
}
```

Remember to save the file, do “File -> Save”.



- **Add "Code Runner"**



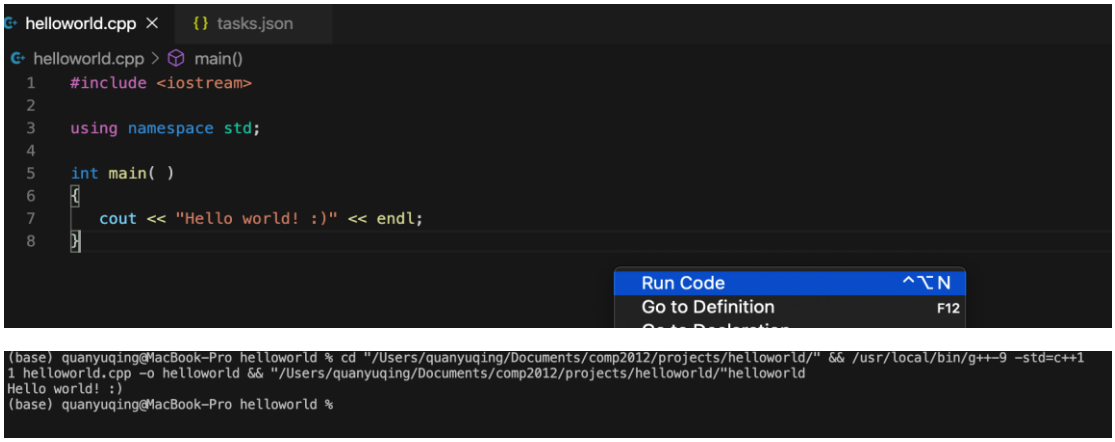
Now open the command palette, type and run "Preferences: Open Settings (JSON)". Put in the following and save the file:

```
{
    "update.mode": "none",
    "code-runner.customCommand": "make",
    "code-runner.runInTerminal": true,
    "code-runner.saveFileBeforeRun": true,
    "code-runner.saveAllFilesBeforeRun": true,
    "code-runner.ignoreSelection": true,
    "code-runner.clearPreviousOutput": true,
    "terminal.integrated.scrollback": 10240,
    "files.eol": "\n",
    "code-runner.executorMap": { "cpp" : "cd $dir && /usr/local/bin/g++-9 -std=c++11 $fileName -o $fileNameWithoutExt &&
$dir$fileNameWithoutExt" }
}
```

Note that the line code-runner.executorMap": { "cpp" : "cd $dir && /usr/local/bin/g++-9 -std=c++11 $fileName -o $fileNameWithoutExt && dirfileNameWithoutExt" } is just ONE single line.

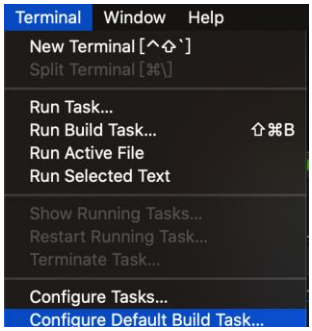
Remember to save the Setting file.

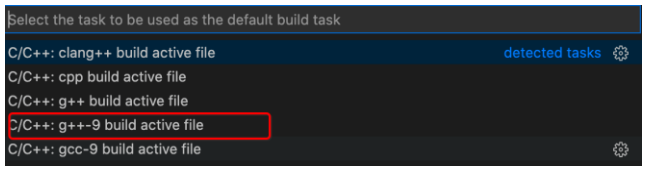
Go to “helloworld.cpp”, open the Command Palette, run “Run code” to compile and run your code easily with the Code Runner extension.



- **Build helloworld.cpp (optional section)**

If you want to perform some customization for your project, you may use the build task instead of “Run Code” with code Runner extension. This section is optional.
From the main menu, choose **Terminal** > **Configure Default Build Task**. Choose **C/C++ g++ build active file** to build the file that is currently displayed (active) in the editor.

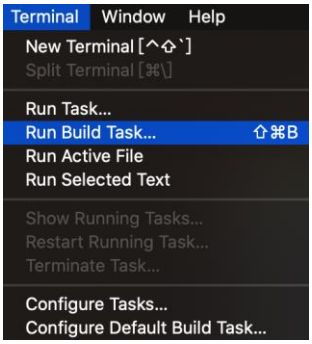




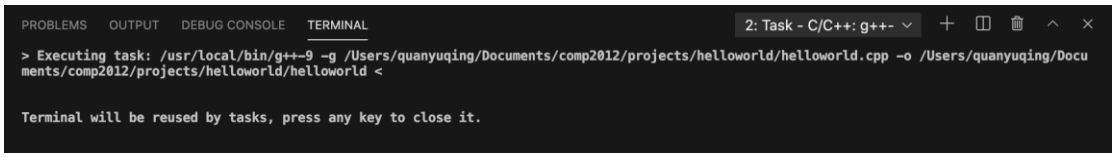
This will create a `tasks.json` file in the `.vscode` folder and open it in the editor.

- **Running the build**

1. Go back to `helloworld.cpp`.
2. To run the build task that you defined in tasks.json, click **Terminal** main menu and choose **Run Build Task**.



3. For a successful build, the output looks something like this:



4. Create a new terminal using the + button and you'll have a new terminal with the `helloworld` folder as the working directory. Run `ls` and you should now see the executable `helloworld` along with the debugging file (`helloworld.dSYM`).

5. You can run `helloworld` in the terminal by typing `./helloworld`.