ppp2_novice_template

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中文 (额外地, 有全网最全的 VSCode 配置教程)

This is a template for novices learning *Programming: Principles and Practice Using C++ (2rd Edition)*. It requires no C++ or cmake experience.

Software Requirements

- Git
- a C++ IDE that supports CMake (latest Visual Studio, Qt Creator, CLion, etc.)

Download and unzip

1. Click the green `Code` button near the top of this page.
2. Click the `Download ZIP` button. This will download the latest repository as a zip file.
3. Unzip the downloaded zip file somewhere you are going to store your code.

Usage

1. Open your IDE (latest Visual Studio, Qt Creator, CLion, etc.) or *configured* Editors (VSCode with CMake Tools, etc.).
2. In your IDE, open this unzipped folder `as a folder` or `as a cmake project`.

How to add a new program?

Basics

The best thing about studying C++ with cmake is that a single project can manage multiple programs: you're not required to setup a new project in order to do the next exercise.

In this template, you can simply add a program by:

1. open `CMakeLists.txt` in the root folder.
2. add `add_program(<program_name> <source_file1> [source_file2...])`. For example,
    - `add_program(example_single src/example_single/main.cpp)` adds an executable named `example_single`, with its associated code file located at `src/example_single/main.cpp`. This code file contains an `int main()` function, which serves as the entry point for the program. After adding this line of `add_program`, we can use CMake to generate the program from the corresponding code and then execute the program.

- `add_program(example_multiple src/example_multiple/main.cpp src/example_multiple/hello.cpp)` adds an executable named `example_multiple`, with its associated code files located at `src/example_multiple/main.cpp` and `src/example_multiple/hello.cpp`. Among these code files, there is only one `int main()` function, which serves as the entry point for the program. After adding this line of `add_program`, we can use CMake to generate the program from the corresponding code and then execute the program.

3. Reconfigure the project by using some button or reopening the IDE.

The headers used in book is configured correctly by default, just do the `add_program` step, then you can `#include "std_lib_facilities.h"` freely.

It's highly recommended to put your code inside `src` folder.

Headers

As for header files (`.h`, `.hpp`, etc.), you can simply put them together with source files. Then source files will be able to correctly `#include "<header_file>"`. For example, in `src/example_multiple` folder, `hello.cpp` can `#include "hello.hpp"` directly.

If you want to make a header file includable globally, you can put it inside `include` folder. For example, in `src/example_single` folder, `main.cpp` can `#include "add.hpp"` which is put inside `include` folder.

Install fltk

Here I provide two ways to install fltk.

Use vcpkg

⚠️ Please make sure the network, especially inside terminal, is accessible to github (for instance, in the "steam++ toolbox" app you can choose to speed up github access). If you're using a VPN, please enable "tun mode" or something alike.

Edit `CMakeLists.txt`, add a line `run_vcpkg()` between `include(fetch_project_options)` and `project(cpp_starter LANGUAGES CXX)`. That is:

```
cmake_minimum_required(VERSION 3.25)

list(APPEND CMAKE_MODULE_PATH "${CMAKE_CURRENT_SOURCE_DIR}/cmake")
include(fix_msvc)
include(fetch_project_options)

run_vcpkg()
project(cpp_starter LANGUAGES CXX)
```

Clear the CMake cache and reconfigure CMake in your IDE in some way (for example, you might delete the build or out folder and restart the software). Then if you're lucky, the installation should have happened automatically.

Use conan

⚠️ Please make sure the network, especially inside terminal, is accessible to github (for instance, in the "steam++ toolbox" app you can choose to speed up github access). If you're using a VPN, please enable "tun mode" or something alike.

1. Install conan 2 somehow. For example, you can download it from the official website.
2. Similarly, add `run_conan()` between `include(fetch_project_options)` and `project(cpp_starter LANGUAGES CXX)`.
3. Clear the CMake cache and reconfigure CMake in your IDE in some way (for example, you might delete the build or out folder and restart the software).

If you're lucky, the installation should have happened automatically.

Install other third-party libraries

See README_install_thirdparty_libraries.

References

I learnt cmake mostly from *Modern CMake for C++*; my C++ learning map is listed in 学习大纲 (although the table of contents is in Chinese, almost all resources in it are in English).

What's more, this repository highly depends on aminya/project_options, which improves the CMake experience a lot.

For conan 2.0, the official documentation is helpful.

Details about this repository can be found in 对配置文件的解释.