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Make and CMake: Automating C++ **Build Process**



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Many of my students struggle to understand the C++ compilation when applied to multiple files that belong to same project.

A C++ project, something that will give you one executable, can consists of multiple files. The number could be as large as 1000 for complex projects like Adobe Photoshop or Google Chrome. Now, if I give you this source code, would you be able to compile it and get an executable that you can double click; and the software starts running??? This would be painful (if not difficult) even for an expert.

What about if I give you a list of instructions and a program, that can execute these instructions and do this compilation for you. The end product would be an executable. Isn't it great. No! Its superb. That is what we are going to learn here. How to write the instructions in a file that will be executed

by a program to automate the build (or loosely compilation) process.

The file that we are going to write is named Makefile.

The program we are going to use is called make.

C++ Multi-file Programming
Let us consider a single program to divide 2 numbers. Files that we will require are:

```
1. div.h
   #ifndef DIVISON_H
    #define DIVISON H
3
4
    double divison(int, int);
5
6
   #endif
                                                                                           view raw
medium-900f569a75db-div.h hosted with ♥ by GitHub
```

```
2. div.cnn
```

```
#include "div.h"
    double divison(int dividend, int divisor){
3
        if (divisor == 0){
4
            return -1;
5
        }
6
7
        return (double)dividend / divisor;
8
```



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```
int main(){
    int x; cin >> x;
    int y; cin >> y;

    int quotient = division(x, y);
    cout << quotient;
    return 0;
}
medium-900f569a75db-main.cpp hosted with ♥ by GitHub

view raw</pre>
```

If I want to compile these files and want to transform them into an exectable, i would write the following in terminal:

```
# Just translate the files.
# Result would be div.o main.o in the present working directory
g++ -c div.cpp
g++ -c main.cpp
# Do all the linking stuff
g++ div.o main.o -o divisonExecutable
```

. . .

Writing our Makefile

That's lot to remember. Now let's write an equivalent Makefile Important: The statements starting with # are for humans and shall not be typed in the terminal. But do read them.



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Yup! Just make . *make* looks for makefile, if not found, Makefile. If you need to specify your own file name, you need to specify

make -f name-of-my-file-that-make-will-use

When you will run make, you can see the following in your pwd.

test.o

main.o

divisonExecutable

If you want to learn more about make do visit these two articles which I found really helpful.

Makefile in Linux: An Overview

Small C/C++ applications with a couple of modules are easy to manage. Developers can recompile them easily by calling...

www.codeproject.com

How to create our own Makefile | Creating your own Makefile

Although this blog is not especially oriented to the area of development, but there are several concepts that are...

www.milesweb.com

• • •

CMake

Now what if writing Makefile is also tedious. For that we have cmake that will generate Makefile for us.

• • •

Hope this article helped you understand the make and cmake beyond commands.

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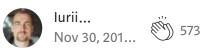






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