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Appendix 1 - Guide to emacs and g++

Using emacs and g++ to create and run a simple C++ program

This tutorial shows you how to create, compile and execute a simple "hello_world" C++ program using the emacs editor and the g++ compiler.

Step One - Create a new directory/folder

- Log into a UNIX machine (either log in at the console, or connect from a Windows machine using Exceed and/or a ssh-client like putty).
- At the UNIX prompt, type **mkdir hello_world** to create a new directory/folder for your application.
- Change into the new directory by typing **cd hello_world**.

It is recommended that you create a new folder for each program that you wish to write.

Step Two - Create the program files

- At the UNIX prompt, type **emacs hello_world.cpp**
- Using emacs enter the following short program (click here for emacs help and quick reference):

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

int main() {
        cout << "hello world!" << endl;
        return 0;
}
```

- Save your program by pressing **Ctrl-x Ctrl-s**.

Should you wish to quit emacs you can do so with **Ctrl-x Ctrl-c**, but in fact everything you need to do to run your program can be done from inside emacs so this is not necessary.

Step Three - Create a Makefile

- Create a file called **makefile** inside the **hello_world** folder. You can do this by editing a new file from inside emacs by pressing **Ctrl-x Ctrl-f**, or you can run **emacs makefile** from the UNIX prompt.
- Enter (and save) the following text:

```
hello_world: hello_world.cpp
[TAB]g++ -Wall -g hello_world.cpp -o hello_world
```

- For [TAB] you should press the TAB key (the key to the left of the Q key); if you are using Exceed you may need to press **Ctrl-i**.

A "makefile" is a set of rules for compiling a program for use by the Unix utility **make**. The interpretation of this particular **makefile** is that the target of the compilation is an executable file called **hello_world**. **hello_world** depends on the file **hello_world.cpp**, such that whenever **hello_world.cpp** is altered, **hello_world** should be remade. The command for remaking **hello_world** from **hello_world.cpp** using the g++ compiler is given in the second line. Here the **-Wall** option turns all warnings on, **-g** includes debug information and **-o hello_world** tells the compiler to put the executable program in a file called **hello_world**. For more information about target directed compilation using **make** click here.

Step Four - Compile the program and prepare the executable

- Now, to compile your program just type **make** at the UNIX prompt.

Alternatively (and this is recommended) if you have installed the appropriate .emacs file you can continue to do everything from inside emacs:

- Use **Ctrl-x b** to switch back to **hello_world.cpp**.
- Now press **Ctrl-x c** and hit enter to begin the compilation.
- The screen will split into two windows (press **Ctrl-x o** to switch between them and **Ctrl-x 1** to return to single window mode).
- If there are any errors they should be listed in the compilation window. To correct them use **Ctrl-x g** to go to a particular line (alternatively advanced users might like to edit their .emacs file and map the emacs command **next-error** onto a key of their choice).

Step Five - run the executable program

- To execute your program just type **./hello_world** at the UNIX prompt.

Alternatively, you can continue to work from inside emacs (with the recommended .emacs files):

- If you are not in two window mode, press **Ctrl-x 2**.
- If you are not in the lower of the two windows, press **Ctrl-x o** until you are.
- Press **Ctrl-x Ctrl-u** to bring up a UNIX prompt inside the current emacs window.
- Now type **./hello_world** at the UNIX prompt. All the output from the program will be displayed in the emacs window.

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