

Math 4610 Lecture Notes

A Brief Coding/Compilation Example *

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Coding Example for Math 4610 at USU: Creation of a sub-directory.

First start up a terminal to do the work to create a file with code in it. For Cygwin, double click on the Cygwin Icon on your desktop or click on the the icon in the task bar.

A terminal as shown below will appear. Type in the command shown to create a new subfolder in the current directory. In the window, the command that does the work is:

```
mkdir src
```

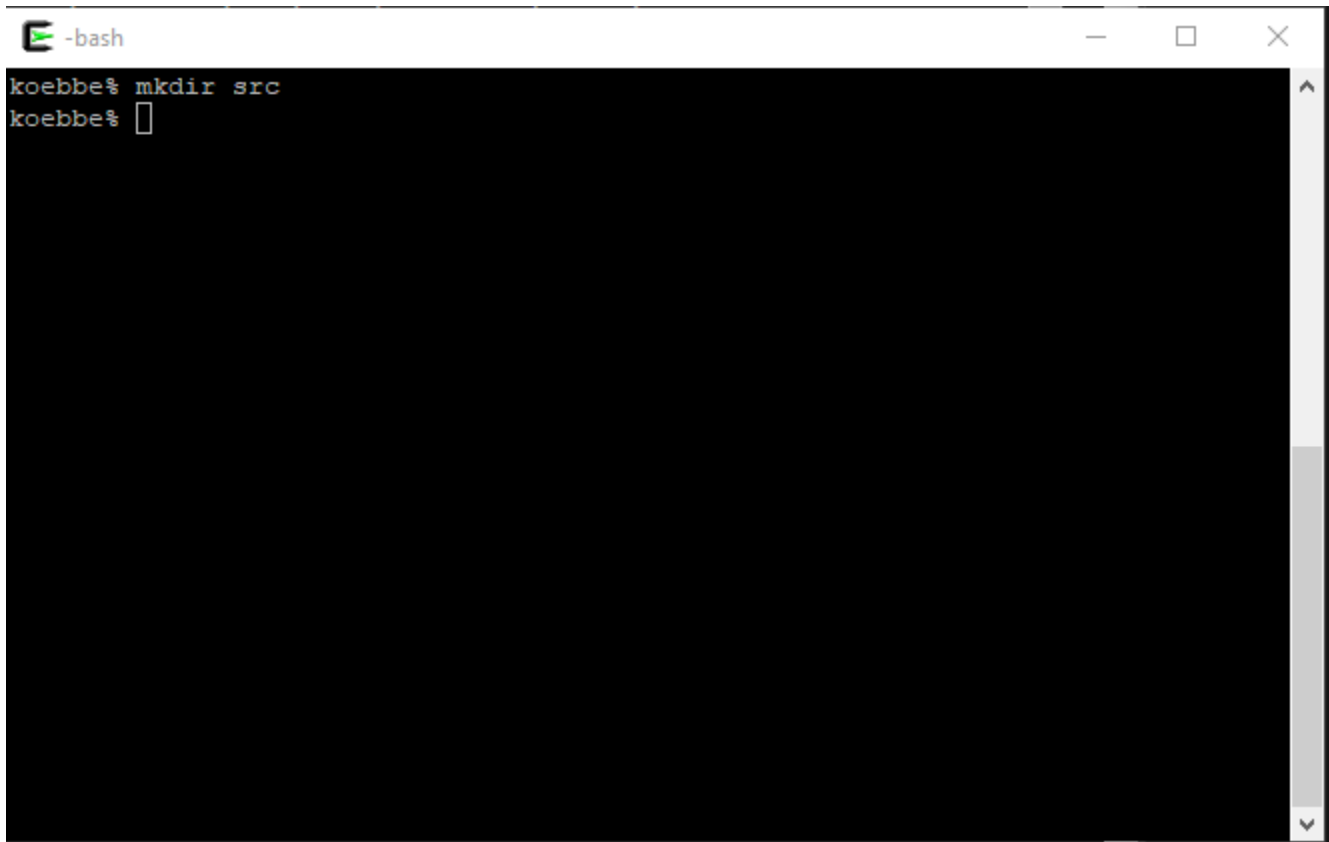


Figure 1: Screenshot taken using **Snip & Sketch**. This is an app on my Windows 10 box

Coding Example for Math 4610 at USU: Change Directory and Edit

To change the directory, use the command

```
cd src
```

Once in the new directory, the next step is to edit a file to implement some sort of action for the computer. So, type:

```
vim hello.c
```

The editor, “vim” is a very standard editor and comes with the installation of Cygwin.

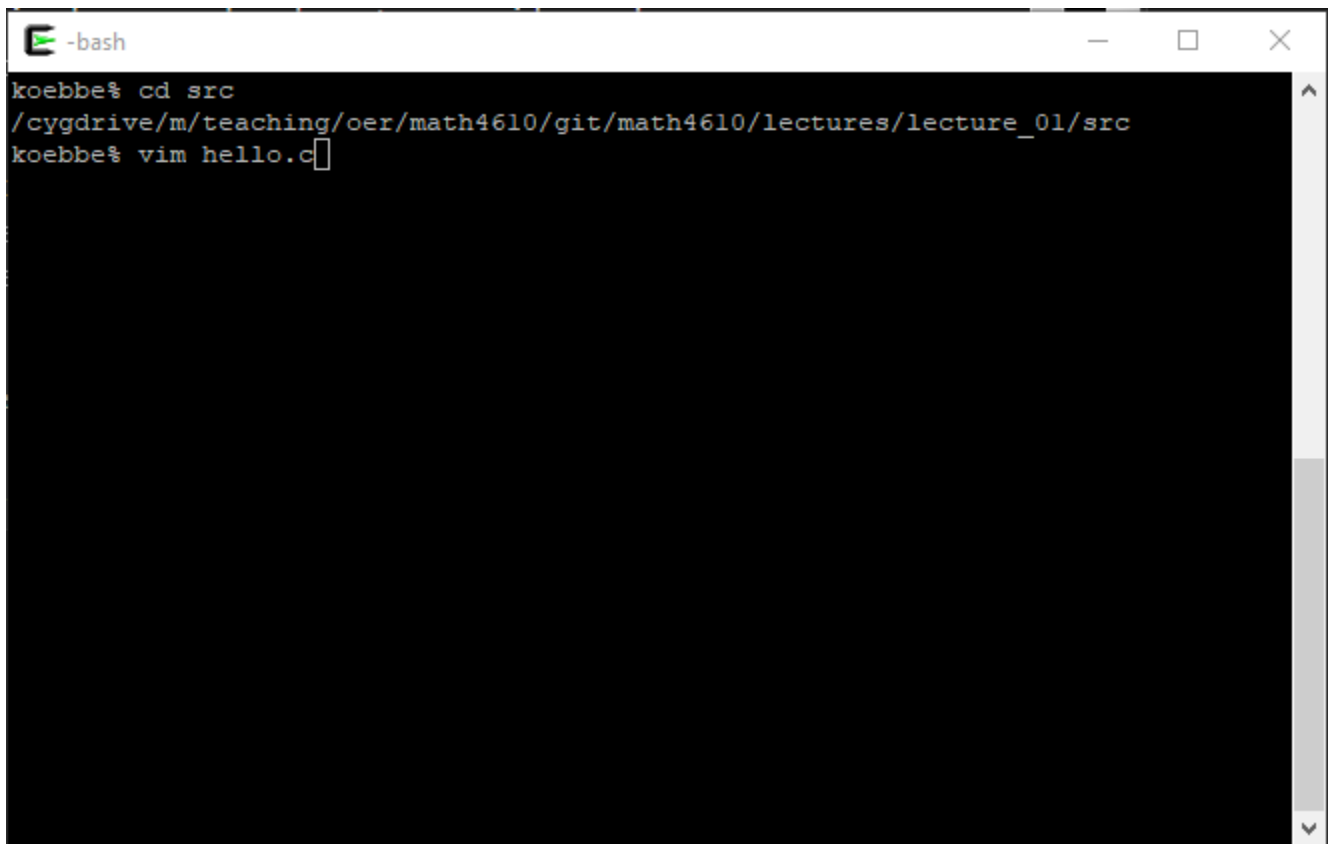


Figure 2: Screenshot taken using **Snip & Sketch**. This is an app on my Windows 10 box

Coding Example for Math 4610 at USU: Typing in a Program in C

The lines in the terminal shown below define a C program for doing a very simple task. Namely, to print the string

```
hello world!
```

to the screen.

A screenshot of a terminal window titled "-bash". The terminal displays the following C code:

```
#include <stdio.h>

int main() {
    printf("hello world!\n");
}

~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
```

The cursor is at the end of the last tilde (~) line. At the bottom left, it says "hello.c" 5L, 63C. At the bottom right, it shows "1, 1" and "All". There are also some small icons on the far right.

Figure 3: Screenshot taken using **Snip & Sketch**. This is an app on my Windows 10 box

Coding Example for Math 4610 at USU: Getting Back to the Command Prompt

To exit the vim session and save the file, type in a colon character “:” followed by x and return. The terminal will revert to a command terminal ready to type in commands.

The screenshot shows a terminal window titled "-bash". The user has entered the following C code:

```
#include <stdio.h>

int main() {
    printf("hello world!\n");
}
```

The prompt character is '~'. The user has pressed Ctrl+C, resulting in the prompt ':X'.

Figure 4: Screenshot taken using **Snip & Sketch**. This is an app on my Windows 10 box

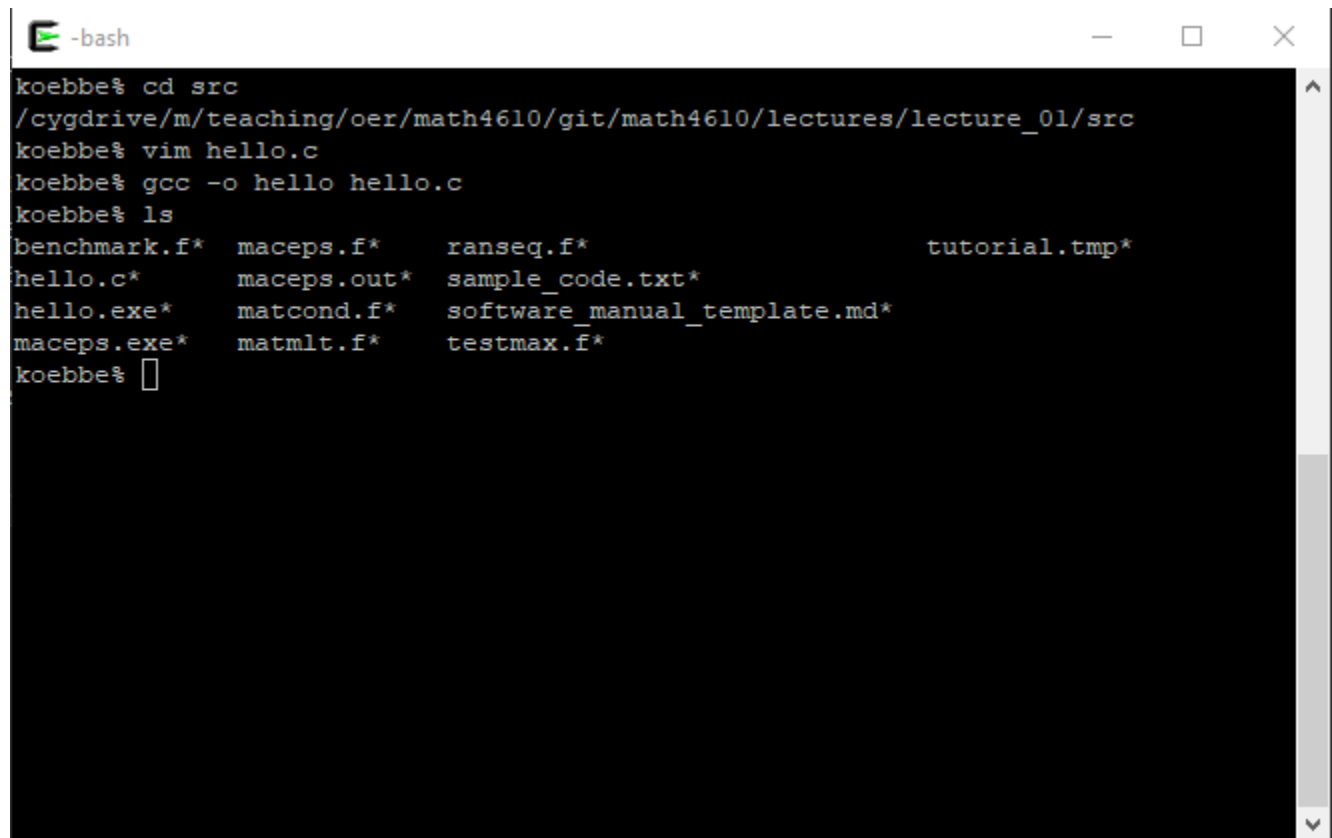
Coding Example for Math 4610 at USU: Compiling the Code

At the command prompt, the first two lines will be as they were to start. The next line is used to compile the code. That is,

```
gcc -o hello hello.c
```

will compile the program and create an executable file for you. The last part below is used to see what is in the directory. The executable file is

```
hello.exe
```



```
-bash
koebbe% cd src
/cygdrive/m/teaching/oer/math4610/git/math4610/lectures/lecture_01/src
koebbe% vim hello.c
koebbe% gcc -o hello hello.c
koebbe% ls
benchmark.f*  maceps.f*      ranseq.f*      tutorial.tmp*
hello.c*      maceps.out*    sample_code.txt*
hello.exe*    matcond.f*     software_manual_template.md*
maceps.exe*   matmlt.f*      testmax.f*
```

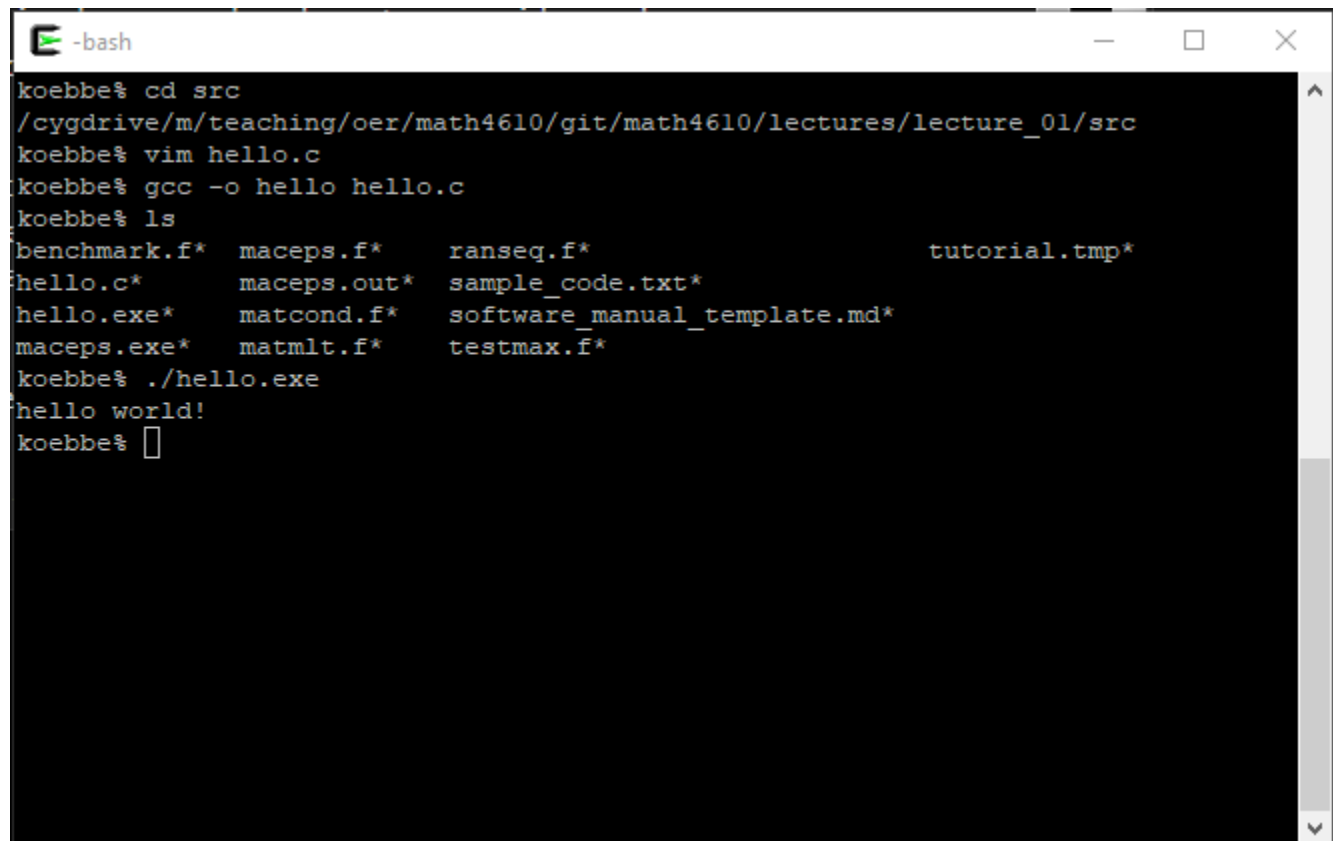
Figure 5: Screenshot taken using **Snip & Sketch**. This is an app on my Windows 10 box

Coding Example for Math 4610 at USU: Final Step - Run the Code

Once we have an executable file, hello.exe, the code can be run as follows.

```
./hello.exe
```

The output from this command will be as shown in the image below. The output is printed on the first line.



```
-bash
koebbe% cd src
/cygdrive/m/teaching/oer/math4610/git/math4610/lectures/lecture_01/src
koebbe% vim hello.c
koebbe% gcc -o hello hello.c
koebbe% ls
benchmark.f*  maceps.f*      ranseq.f*      tutorial.tmp*
hello.c*      maceps.out*    sample_code.txt*
hello.exe*    matcond.f*     software_manual_template.md*
maceps.exe*   matmlt.f*      testmax.f*
koebbe% ./hello.exe
hello world!
koebbe% 
```

Figure 6: Screenshot taken using **Snip & Sketch**. This is an app on my Windows 10 box