CIS*1500 Lab 2

Introduction to Programming
TA: Alliyya Mo

Today's Lab

- Review Linux commands
- Pi Setup
- Create your first Hello World program
- Compile gcc with and without flags(-std=c99 -Wall -pedantic)
- Run your first program
- Explore printf(w. variables if time permits)
- Also how many did textbook readings!

Raspberry Pi Setup

1. Put the SD card into the SD card slot on the Raspberry Pi (fits one way)
2. Plug in keyboard and mouse into PI
3. Turn on the monitor and connect your HDMI cable from your Pi to your monitor
4. Plug in the Ethernet cable into the Ethernet
5. Finally plug in the micro USB power supply. This will turn on and boot your Raspberry Pi.

NOTE: Make sure you have NOOBS preinstalled on the SD card otherwise come see me!

Quick Review

- ls   -   list files in a directory
- cd   -   change directories
- pwd   -   print working directory(where am I?)
- cp   -   copy files(dest/src?)
- mv   -   move(rename) files
- rm   -   remove files/directories(rm -r)
- touch   -   new file
- man   -   manual pages

Touched upon in Lecture not in Lab + Extra!

- history (!)
- grep
- mv (to rename files)
- more

Try man -k directory

Warm-up Exercise

1. Change directories into your ricky folder (if it doesn't exist, create it)
2. Create a folder, name it joe
3. Create another folder named mo
4. Move joe folder to mo
5. Go into joe's directory
6. create a new file named helloWorld.c
7. Open helloWorld.c with nano

1. cd cis1500
2. mkdir labs
3. mkdir lab2
4. mv lab2 labs
5. cd labs/lab2

   or

   cd labs

   cd lab2
6. touch helloWorld.c
7. nano helloWorld.c

```c
#include <stdio.h>
int main()
{
    printf("hello world!\n");
    return 0;
}
```

#include <stdio.h>

- How we include libraries into your program
- Libraries contain functions and instructions for common tasks like printing or sqrts
- This one is called standard I/O (input/output)
- It contains printing, file reading and keyboard input functions that are vital to most programs in C

int main(void) { return(0);}

The program starts by executing a function called main. A function is a list of statements

"{" and "}" are called braces, denoting a list of statements. main's statements appear between braces.

A statement is a program instruction. Each statement usually appears on its own line.

return(0);

Each program statement ends with a semicolon ";"

The main function and hence the program ends when the return statement executes. The 0 in return 0; tells the operating system that the program is ending without an error.

printf("Hello World\n");

PrintFormatted function is simply going to print out text , "Hello World", to our screen

The \n means a newline will be printed after Hello World

\t means a tab will be printed

Commenting!

- As you write more complex code you're going to want to document your code to avoid future confusion
- Code tells you how, comments will tell you why
- // is for a single line comment(everything after till the end of that line will be ignored)
- /**/ is for multiline comments (everything between /* and */ will be ignored by the

Our Source code(helloWorld.c)

```c
/*This is our hello world program*/
#include <stdio.h>
int main(void)
{
    printf("Hello World!!\n"); // will print hello world
    return 0;
}
```

Compiling your first program! (basic)

gcc <files> <options>

gcc helloWorld.c
- this will compile it and create an executable named a.out (type ls and cat a.out)

Code **hello.c**

```
include <stdio.h>
int main()
{
    printf("hello world");
    return 0;
}
```

Binary file (executable)

```
<CF><FA><ED><FE>^G^@^@^A^C^
@^@<80>^B^@^@^@^P^@^@^@<B0>
 ^E^@^@<85>^@ ^@^@^@^@^@^Y
^@^@^@H^@^@^@__PAGEZERO^@^@
^@^@^@^@^@^@^@^@^@^@^@^@^@^
 @^@^@^A^@^@^@^@^@^@^@^@^@
^@^@^@^@^@^@^@^@^@^@^@^@^@^
    @^@^@^@^@^@^@^@^@^
```

```
gcc -Wall -pedantic -std=c99 hello.c
```
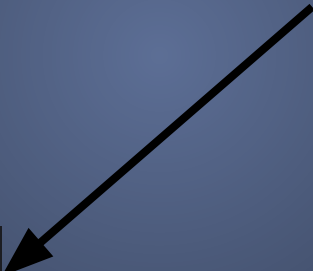
Compiler

Running your first program

Just type:

./a.out

```
./a.out
```

Our Program running!
This is its output!

```
Hello World!!
```

Remember hitting tab to autocomplete is your friend!

CIS*1500 standards for compilation

gcc <files> <options>

gcc helloWorld.c -std=c99 -Wall -pedantic -o hello

-std=c99: C99 standards that we will be using in C

-Wall: List all the warning generated during compilation

-pedantic: more warnings!(From being more pedantic)

-o: renames our executable something else

Lab Exercise

1. If you haven't done already, type your Hello World program! (Don't forget anything!)
2. Compile with just gcc
3. cat ./a.out (That's our executable!)
4. Run with ./a.out
5. Compile with flags this time, and rename your executable Hello(-o hello)
6. Run with ./hello

Try playing around with code!

- Make it print out whatever you want
- use /t and /n in your printf
- do multiple printfs
- try compiling missing a semicolon, what happens?
- add comments (multi and single)

Bonus Exercise

Play around with unix commands and man pages

Look up 3 different commands and try an assortment of the options listed in the man pages
ex. ls -l -a   also can be written as ls -la

More Exercises

Go onto bucky and go through Intro to C Syntax lesson

If time permits we'll talk about Variables and play more with printf

Need Extra help?

- Free tutoring offered by TAs! (Book an appointment on bucky) (also see me after Lab)
- Drop-in help hours (right after your Lecture!) (11:30,2:30 and 5:30) (Tuesday & Thursday)

All meetings will take place in room 001/002 in the basement of Reynolds.

Got a question?

- Ask me! :)
- Post on the Forums: forum.socs.uoguelph.ca
- Email us: cis1500@socs.uoguelph.ca

Protip: Search the forums and bucky before making a post or sending an email!

Or are you Incredibly Bored?

And looking for a Challenge? Or something new?

Come see me after lab!

Sites To Check To Stay up to Date

Course Website: bucky.socs.uoguelph.ca

SOCS Forums: forum.socs.uoguelph.ca

Textbook: zybooks.com

Reminders!

- **Complete assigned textbook readings** before 9 am Tomorrow(Tuesday)!
- Complete academic integrity quiz on Moodle(see bucky for instructions!)
  - must be completed by October 10th
- **Protip: Finish assigned readings before your Lab!** (The lab will feel like a light breeze if you do that)