CIS*1500 Lab 3

Introduction to Programming
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Today's Lab

- Review gcc with and without flags(-std=c99 -Wall -pedantic)
- Review variables and identifiers
- Review printf
- Review scanf
- scanf and printf exercises
- Style matters!!
- A bit of debugging practice
- ***Side-Quest #1 for those interested in a fun challenge!***

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!

Warm-up Exercise (5 min)

1. Change directories into your cis1500 folder
2. Change directories into your labs folder
3. Create a directory named lab3
4. Change directories into lab3 folder
5. create a new file named testingWorld.c
6. Open testingWorld.c with nano
7. Recreate your helloWorld program! (Let's see how much you actually remember)
8. Compile your testingWorld.c and run it!

1. cd cis1500
2. cd labs
3. mkdir lab3
4. cd lab3
5. touch testingWorld.c
6. nano testingWorld.c
7. Some witchcraft(coding)
8. gcc testingWorld.c -Wall -std=c99 -pedantic -o test
9. ./test

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

Review helloWorld.c

```
/*This is the rosetta stone of programming,
    It will simply output Hello World to standard output
*/
#include <stdio.h>
int main(void)
{
    printf("Hello World\n"); //prints hello world
    return(0);
}
```

Bonus Exercise for those comfortable with if-statements already!

Create a basic calculator.(+,-,*,/,^)

Allow the user to select an operation and have them enter the required inputs and then display the answer.

Hint: What data type will be more precise?

Any libraries you might need?

Bonus: Do you know loops? Allow the user to return to the menu after receiving their answer

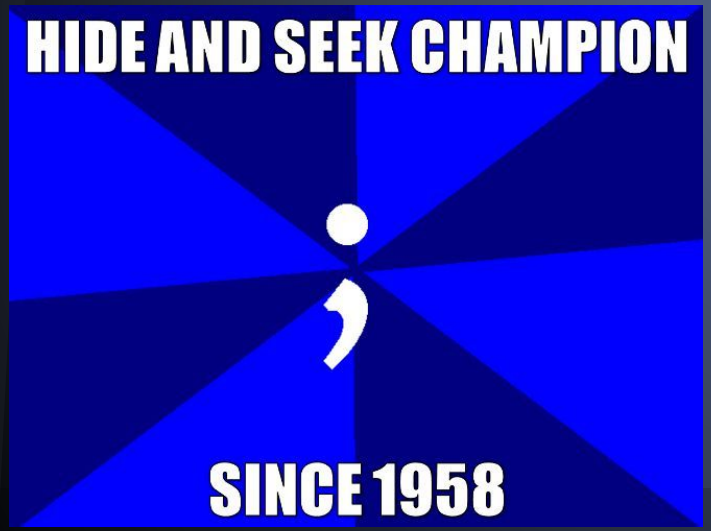
Review Hello world (Quick game of I-Spy)

```
#include <stdio >

    main(void)
{
    print (“Hello world”)
return(0);
```

```
#include <stdlib.h>

int main(void)
{
    print (“Hello world”)
    return(0)
}
```

The semicolon!

Each program statement ends with a semicolon ";"



How well do you know GCC?

1. gcc file.c -wall -pedantic -std=c90 -o hello
2. gcc file.c -pedantic -wall -std=c99 -o file.c
3. gcc file.c -Wall -std=c99 -o hello
4. gcc file -std=c99 -Wall -pedantic -o hello.c
5. gcc file.c -Wall -Pedantic -Std=c99 -O hello
6. gcc file.txt -Wall -pedantic -std=c99 -o hello
7. gcc -Wall -pedantic -std=c99 -o hello

Yeah… It was none, But maybe one of these?

- gcc test.c -Wall -pedantic -std=c99 -o test.c

- gcc test.c -Wall -pedantic -std=c99 -o test

Variables

```
char letter;      //character
int number;       //integer
float decimal;  //floating point number(3.145)
double longerDec;     //longer floating number(more precise than a float)
```

APPROPRIATE IDENTIFIERS

- Both concise, and descriptive
- Short names are easier to type, but suffer from a lack of meaning (i, a, r)
- Descriptive names are more meaningful (index, array, ratio)
- Long names are too difficult to use and prone to errors when typing.
  - e.g. *boilingpointofwater*
- Two word identifiers can be created by using camelCase to join words together without spaces.
  - e.g. *countOdd, airTemperature, bacteriaGrowth*

printf and Format Specifiers

% Specifier	Description
%c	Single character
%d	Integer
%e	Float in exponential form
%f	Float
%lf	Double
%s	String (array of chars)

ex.

```
int num =5;
printf("%d\n",num);
```

scanf

```c
#include <stdio.h>

int main() {
    int x;
    printf("Enter a number: ");
    scanf("%d", &x);
    printf("You entered: %d\n", x);
    return 0;
}
```

printf and scanf warm-up

- create a new file in your lab3 folder(warmUp.c)
- create a program that asks the user:
  - Favourite letter
  - Their age
  - First 3 digits of pi

Formatting using printf & field width

Statement	Output(␣ == spaces)	Info
printf(%d”, i);	123	field width 3
printf(%05d”, i);	00123	field width 5; padded with 0
printf(%f”, x);	32.178658	precision 6 by default
printf(%.3f”, x);	32.179	precision 3
printf(%.3e”, x);	3.218e+01	same as f, but with e format
printf(%10.3f”, x);	␣␣␣␣32.179	precision 3, field width 10
printf(%-10.3f”, x);	32.179␣␣␣␣	precision 3, left field width 10

Try it yourself!

```c
#include <stdio.h>
int main()
{
    int i = 1337;
    float f = 1.234;
    printf("******", i); //How do I print "Int value: 133"
    printf("******", f); //How do I print "Float value: 1.23%"
    printf("******", f); //How do I print "    1.23400" (4 spaces)
    printf("******", f); //How do I print "1.2e+2   " (3 spaces)
    return 0;
}
```

```c
#include <stdio.h>
int main()
{
    int i = 1337;
    float f = 1.234;
    printf(">Int value: %3d<\n", i);       //Impossible. Outputs >Int value: 1234<
    printf(">Float value: %.2f%%<\n", f); //Outputs >Float value: 1.23%<
    printf(">%11.5f<\n", f);               //Outputs >    1.23400<
    printf(">%-10.1e<\n", f);              //Outputs >1.2e+2   <
    return 0;
}
```

Exercise #1: How fast can you finish this

- create a program that asks the user for the distance travelled and the amount of time taken
- then calculate the velocity and output it to the screen, with only 3 decimal places.
- *Think what data types will you need?*

Exercise #2: More math

- create a program that will ask the user for length of 2 sides of a right-angled triangle
- then calculate the length of the hypotenuse
- Output the length to 2 decimal places
- Bonus: calculate the perimeter and area as well.

Style matters!

- See style guide lines
- (https://bucky.socs.uoguelph.ca/mod/page/view.php?id=888)
- Your assignment must follow these guidelines or you will lose marks!
- This will help your code look more readable!

More Exercises

Go onto bucky and go through

Lesson: Variables and Identifiers &

Lesson: Expressions

In Independent Exercises, Lab 2: Variables and expressions

The only way to get better is to practice!!!

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.

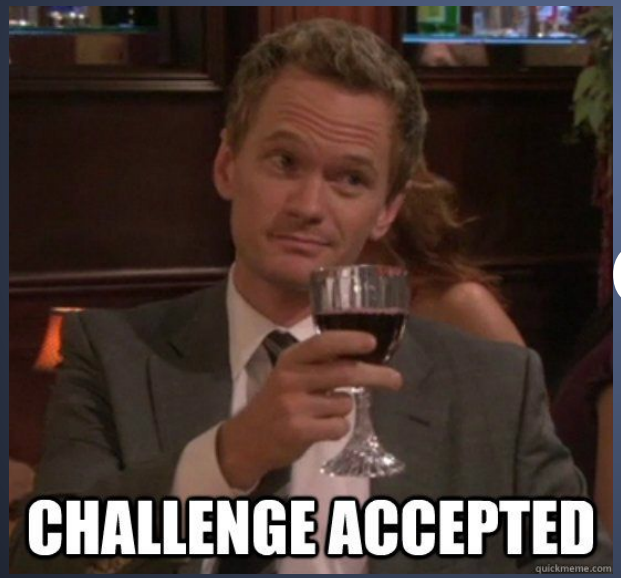
Got a question?

- 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!

See bucky for SideQuests!

Side-Quest study group

- Mondays from 2:30-4:00 in 1303 & 1305 Science Complex
- Labs in the hallway behind Second Cup
- Bring your pi and any project ideas you have
- sign up on bucky!

****If you want to come but there is a schedule conflict, Email cis1500@socs.uoguelph.ca so that we can plan more! :)****

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)