Pointers and Functions
Lab F

TA teaching instructions can be found at the end of this document.

The labs, for this course, are designed to be completed on your own at home or in the 3rd floor Trottier labs. These labs are not graded. You do not hand in these labs. If you prefer to work on a lab with your TA tutorial group, then check the schedule for your TA's tutorial session. You will find this schedule in our MyCourses page under Content/Course Information/TA Information. Since the university has limited lab space, your TA might ask you to bring your laptop and work in a classroom instead of a lab.

This lab is about programming with pointers and functions.

Some labs will have a question zero. These questions will not be covered by the TA during the tutorial. It is extra content meant for you to do on your own.

QUESTION ZERO: Optional problem

Check out this link about pointers: https://www.guru99.com/c-pointers.html

QUESTION ONE: Pointers

Given the following program:

```
#include <stdio.h>
#include <string.h>

int main() {
        char *str="Hello World!";
        char *p;

        p=str;
        printf("First character is:%c\n",*p);

        p =p+1;
        printf("Next character is:%c\n",*p);

        printf("Printing all the characters in a string\n");
        p=str;  //reset the pointer

        for(int i=0;i<strlen(str);i++) {
                printf("%c\n",*p);
                p++;
        }

        return 0;
}
```

Do the following:

a) Get the above program running
b) Make sure you understand what each line of code is doing exactly (ask TA)
c) Change the for-loop into a while-loop. Do not use strlen(). Instead, stop printing when we reach the '\0' character.
d) Change char*str into an array, char array[30]. Put into that array the characters Hello World! But without a '\0' character. Run the program. What output do you get? Depending on your computer you might not see anything different, run it a couple of times to see if anything changes.

QUESTION TWO: Functions

Write the recursive function: int factorial(int n), as seen in class. Call it from the main() function. The main() functions asks the user to input a single integer number. That number is passed to your recursive function. The recursive function returns an integer number to the function main(). The function main prints out the result returned by the factorial function. The factorial function cannot have a print statement within itself.

You have completed your lab.

TA Teaching Instructions

The lab time is divided into two 30-minute periods. The first period is a lecture. The second period is the lab. The lab period is conducted in a TA directed setting where students do the above lab together with the TA. The first period is conducted as a lecture and covers the following material:

- Review pointers in terms of strings and arrays.
- Review call-by-reference.
- Review function signatures.
- Review: swap() and factorial() functions. We did this in class, but review them again, if needed.
- Invite students to ask questions about pointers.