ENCM 339: Programming Fundamentals

Lab 6, Fall 2017 – October 26th

M. Moussavi

Department of Electrical & Computer Engineering

University of Calgary

Objective:

The main objective of this lab is to practice the subjects of dynamic allocation of memory, and file I/O manipulation in C.

Important Notes:

- Due to midterm exam periods this is a smaller lab assignment.
- Considering that we will not be able to mark and return the marked assignments before the upcoming midterm on Wednesday Nov 1st, the exercises in this lab will not be marked. **However, since the material related to this lab will be covered in the upcoming midterm, you are strongly recommended to complete these exercises, and check your answers with the solutions that will be posted on the D2L by Monday October 30th.**

Exercise A: Allocation of Memory on the Heap

Read This First:

Before doing this exercise, you should review lecture notes or a C textbook to be sure you know exactly how C library function `malloc` works.

What to Do:

Download the file `lab6exe_A.c` and `lab6exe_A.h` from D2L. Read these files carefully and draw a memory diagram for point one, assuming that all the calls to the library function `malloc` succeed.

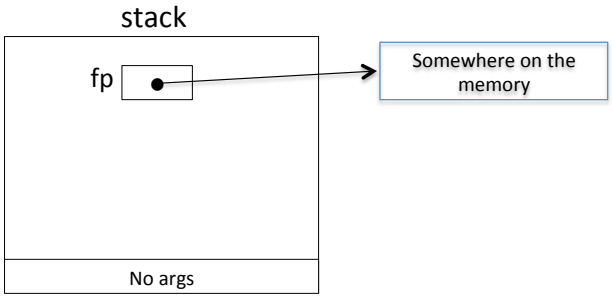
Exercise B: Draw AR Diagrams

What to Do:

Download file `lab6exe_B.c, lab6exe_B.h,` and `lab6EXB.txt,` from D2L. This exercise receives its input from text file, `lab6EXB.txt`, and populates an array of structure called Bits_Pattern with the available data in this file. Study the content of the downloaded files carefully to understand what the program does. Then draw a memory when the program reaches point one **for the second time**.

Note: in your AR diagram you don't need to show where exactly a FILE pointer points. Just mention it points to "somewhere on the memory" as following figure shows:

```
FILE * fp = fopen("a_file_name", "r");
```



Exercise C: Writing into a Text File

What to Do:

Download file `lab6exe_C.c, lab6exe_C.h`, and `lab6exe_C.txt`, from D2L. If you read the given files carefully you will notice that this program reads the content of the file `lab6exe_C.txt` into an array of integers that is declared within the body of a structure called `IntVector`. Then, the program displays the stored values in the array on the screen in a single column format. Your task in this exercise is to complete the definition of the function called `display_multiple_column`. Please see the function interface comment for more details.