THE UNIVERSITY OF WESTERN ONTARIO

DEPARTMENT OF COMPUTER SCIENCE
LONDON   CANADA

Software Tools and Systems Programming
(Computer Science 2211a)

ASSIGNMENT 3
Due date: Wednesday, October 20, 2021
11:55 pm Eastern Daylight Time – 3:55 am Greenwich Mean Time)
allow up to one day late ONLY – assignment closed Oct. 21, 2021 11:55pm EDT : 3:55am GMT

Assignment overview

The purpose of this assignment is to provide the student with experience with pointers and variable addresses in memory.

PREPERATION:

For this assignment, create a new directory under the assignments directory created in the first assignment. Label this new directory: asn3

Copy the supplied main.c file to the asn3 directory.

All work should be performed in this directory. Use a UNIX editor like vi to create and compile the C code.

The code MUST compile in the UNIX environment to be considered correct.

Again, this assignment will be contained within a single main.c program.

This program will perform a set of operations on scalar and aggregate variables.

As this assignment is due in the middle of the semester and many students have midterms and papers due, it has been intentionally set as a lighter assignment. The learning outcome of providing insight and practice utilizing computer memory manipulation through address required for the assignment is still achieved.

A main.c file has been provided that contains six parts dealing with pointers. Imbedded in the code are places that the student is to complete.

These are indicated by the symbol: X-XXX-X.
The student is to go through the code and change all the X-XXX-X to the correct code.
Some are single variable usage and others are complete set of C statements.

A copy of the completed executable is also provided so the student can inspect the exact expected output. The X-XXX-X is to be replaced so the output matches exactly (except for the actual address which will vary from computer to computer and sometimes from one run to the next).

The student is not to use explicit array indexes in any of the substitutions. This means that the replaced variables must all have a reference use (& or * or both).

Example of disallowed code:

    source_arr[i] = i5;

because, even though this works there is no pointer mechanism used.

note: arithmetic operations on a pointer variable is allowed.
    int *pVariable;
    ...
    ...
    pVariable = pVariable + 3;

is an operation on a pointer variable and uses the reference (address) in the statement.

The code is to run all six parts, exactly as seen in the supplied executable.
It is recommended you comment out what ever parts you are not working on (or contain required variable declarations) and work on one part at a time.

Any questions or ambiguities are to be asked through the Forums only. Any individual emails containing questions on this assignment will be replied to with a request to restate the question in the Forums in Owl where they will be addressed.

Required Coding Standards
All code is to be indented correctly.
Comments at the very beginning (top – first lines) of each of the C code files must be:

```
/* CS2211a 2021 */
/* Assignment 03 */
/* your name */
/* your student number */
/* your UWO User Name */
/* Date Completed */
```

Your program is to be submitted as C code file.
Your script will be a script file created in UNIX.

Replace the professor's name (MAGGUILLI) with your full name (first name and last name) in both lines of code where the name MAGGUILLI is found.

All variables MUST have a comment describing their intended use(s) demonstrating an understanding of what each variable is used for.

A comment describing the code for each major part of the code is already included. Comment(s) can be added to describe any complete statements you create. They can be brief but must convey what that section of code performs.

ALSO – very important standard!
You are **NOT** to use the code
> **break**

-or-
> **continue**

anywhere in your code (except if you have a `switch` statement in your code).

This is bad coding practice and leads to 'spaghetti code' (with apologies to my Italian heritage…) where program execution control can go any which where.
We do not want to get into the habit of using these constructs. All the code can be written in a fluid manner without terminating the processes with a break or continue.

Working in UNIX.

Save this file and name it: **yourUserName_asn3.c**
> (see the end of this document for a detailed explanation of **yourUserName**).

NEXT: Follow the steps below to complete Part 2.

1. Type the following to begin recording your session in a file called yourUserName_asn3.output

> **script YourUserName_asn3.output**

> note - (using your actual user name).

2. Display the current date and time using the appropriate command

3. Display your username using the appropriate command

4. Display the contents of the current working directory using the 'l' switch (lower case L).
5. Display the contents of the file yourUserName_asn3.c (i.e. show the C program)

6. Compile the program again ensuring the executable is labeled: **asn3**

7. Run the program.

8. Type **exit** to stop your screen capture session.

9. Compress the listed required submission files into a single .tar.gz file.
   (Ensure have a complete of the Asn3_SubmissionForm in your asn3 directory.)
   > *YourUserName*_asn3.c
   > *YourUserName*_asn3.output
   > Asn3_SubmissionForm.txt (or .pdf)

10. Copy (i.e. using an FTP or any method of your choice) the .tar.gz file to your computer so you can upload it through OWL for submission.

Submission Instructions:

Complete the *CS2211 Assignment Submission Form* Name (or rename) that form to **Asn3_SubmissionForm.txt (or Asn3_SubmissionForm.pdf)**

Save this form in your asn3 directory as a text file or as **PDF** (most word processors have this option).

Submit via the CS2211 OWL Web Site the files in your asn3 directory using the instructions on how to compress and submit the single compressed .tar.gz file.

Submit via the CS2211 OWL Web Site the following three files inside your compressed submission file:
 *YourUserName*_asn3.c
 *YourUserName*_asn3.output
 Asn3_SubmissionForm.txt (or .pdf)

note: do NOT include your executable file: asn3
note: you are submitting one tar file (and only one file).
 this is a compressed file that contains the files listed above.
 do NOT send any of the three above files separately.
note: If you have elected to use an SRA – it must be denoted in the Asn3_SubmissionForm or the SRA
 will not be applied.
note: marks will deducted if the Asn3_SubmissionForm is omitted.

It is the student's responsibility to ensure the work was submitted and posted in OWL.
OWL replies with a summation verification email (every time).

Submission date and time is based on the last file submitted. So if you re-submit after the due date, the entire assignment will be graded as late based on that timestamp.

The teaching assistant grading your assignment will compile and run your program.
If the program does not compile under UNIX, the TA will NOT attempt to correct or fix your program so it will run.

(*yourUserName* - example: assume my UWO email is kdoit373@uwo.ca
 i.e. if my email is – **kdoit373@uwo.ca** then my user name will be – **kdoit373**
 So, my UWO User Name is: **kdoit373** and this assignment is **asn1**
 therefore, one of the file names that is to be used for submission is:
  kdoit373_asn1.c

It is the student's responsibility to ensure the work was submitted and posted in OWL.
OWL replies with a summation verification email (every time).

Any assignment **not** submitted correctly will **not** be graded.

PS: remember: do your own work – you will need to know all this for the exam to pass !!!!

Please check CS2211 Assignment Submission Guidelines.
note: Guidelines mention the example for assignment 1 – please substitute a 3 for the 1.