**COSC2406SS15 – Assembly Language Programming**

 ***Assignment 6 – Chapters 7 & 8***

**Due: August 15th, 2015 by noon**

**Q1: [60]** Create a program that will generate 60 values in the range from +/-5000 and store these in an array of type SDWORD. Using these values, the program will present the user with the following menu:

**1 – Report the overall average, average of positive numbers, and average of negative numbers**

**2 – Shift the values left (Note: for this option, ask how many positions to shift using SHL)**

**3 – Shift the values right (Note: for this option, ask how many positions to shift using SHR)**

**4 – Rotate the values left (Note: for this option, ask how many positions to rotate using ROL)**

**5 – Rotate the values right (Note: for this option, ask how many positions to rotate using ROR)**

**6 – Signed multiply each value (Note: ask for the number)**

**7 – Signed division of each value (Note: ask for the divisor)**

**8 – Signed modulus of each value (Note: ask for the divisor)**

**9 – Report the values (Note: print them as 5 integers per line in neat columns)**

**0 – Exit**

***Additional Requirements:***

***A)*** Each menu option (except exit) should call a procedure which is passed the array of numbers. Some procedures may call other procedures. Use a separate procedure for each task.

***B)*** All values will be integers including the averages. The answer will be reported to the user with the appropriated message.

***C)*** When reporting any answer or displaying the array of values, include a WAIT message to allow the user to read the answer before displaying the menu again.

***D)*** All procedures must preserve register values whenever possible.

***E)*** Any procedure returning an answer must do so in either the EAX register or using an in-out stack parameter.

***F)*** No procedure can directly reference an array. Only use indirect operands with the offset and size of the array being passed as a **parameter on the stack**.

***G)*** Fully comment the code including header comments, comments at the start of each procedure, and line codes neatly in a right column. (Penalty of up to 10 marks for not doing this)

*H)* Your procedures must demonstrate both the use of parameter passing using unnamed parameter values (refer to these using only the EBP register) and named parameters created using a parameter list.

*I)* Your procedures must demonstrate creating local unnamed stack variables (referred to using EBP) and local variables created using LOCAL.

*J)* Your program must demonstrate both INVOKE and CALL operations for executing procedures.

***K)*** All INVOKE operations must have matching PROTO declarations.

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***Submission, demonstrating and grading:***

a) Submit your assignments in a Word file to CMS using the file name ASSIGN6\_YourName.docx where YourName is your last name followed by your first name. Ex. Using my name, the file would be ASSIGN6\_LajoieMichael.docx. This document will contain:

i. The source code for your solutions.

ii. A screen shot showing that the programs worked.

**b)** Demonstrate your working programs to Tyler no later than Tuesday August 18th. [20 mark penalty for not demonstrating.]