CIS 123 Assembly Language & Computer Architecture

Assignment # 3 - Chapter 3

Date: 2/26/2020

Name: _____ Grade: _____ of 25 points

Instructions: The Canvas code upload is due @ 5 pm on 3/4/2020. The assignment printout is due upon start of the class @ 6 pm on 3/4/2020. I will NOT receive late code or assignments.

I. Circle True or False for the following statements (1 point each).

1. The multiplication operator "*" has a higher precedence than the division operator "/" within integer expressions.

   - True
   - False

2. An AL program can contain only one ".DATA" and one ".CODE" segment.

   - True
   - False

3. The PROC directive marks both the beginning and ending of a procedure.

   - True
   - False

4. MOV is an example of an instruction "mnemonic".

   - True
   - False

5. A link library is added to a program just before producing an Executable file.

   - True
   - False

6. The EQU directive permits a constant to be redefined at any point in a program.

   - True
   - False

7. In the following statement, "EAX" register is called the *source* operand:

```
mov EBX,EAX
```

- True
- False

II. Provide a short answer for the following statements (2 points each).

1. Provide examples of four AL instructions using different mnemonics with their operands.

a) _____ b) _____

c) _____ d) _____

2. Look up the origins of the terms "Big Endian" and "Little Endian" on the Web and explain the difference between them.

3. Which data directive creates a 16-bit **unsigned** integer variable and a 32-bit **signed** integer variable?

a) _____ b) _____

4. Create an **uninitialized** data declaration for an 8-bit **unsigned** integer and a 32-bit **signed** integer.

a) _____ b) _____

5. Declare a symbolic constant named 'SecondsInDay' using the equal-sign directive and assign it an arithmetic expression that calculates the number of seconds in a 24-hour period.

III. Programming Exercises (4 points each)

Your program must be coded for the Intel x86 architecture (IA-32). Code your solution using the provided template (AL_Template.asm) on Canvas in "Files > Resources". Debug your programs with VS2017/19 and when finished, print only your source files (code) and staple them to this assignment (these pages).

In addition, upload your source code, before the due date/time, to the "Assign. # 3 Code Upload" section in Canvas under "Assignments". If you do not upload your source code, I cannot grade your programming exercises and you will receive zero points for this section.

You will need to upload two different source code files to Canvas, one for each programming exercise. The source files must have all commands for the programs to execute and have single or block comments explaining the purpose or functionality of your code statements.

General Rubric:

- Comments:1 point
- Correct code syntax: 1 point
- Assembles and executes: 1 point
- Source code stapled and uploaded: 1 point

Program 1 - Integer Expression Calculation

Using the "AddTwo" program from Section 3.2 as a reference, write a program that calculates the following expression: A = (A + B) − (C + D). Consequently, assign integer values to the EAX, EBX, ECX, and EDX registers. The final result or output must be less than 10 decimal and contained in the EAX register. The program does not need to display output (console Window) at this point, just show implementation.

Program 2 - Data Definitions

Write a program that contain declarations for the following data types: BYTE, SBYTE, WORD, SWORD, DWORD, SDWORD, QWORD, and REAL4. Also, initialize each variable to a value that is consistent with its data type. The program does not need to display output (console Window) at this point, just show implementation.

[End of Assignment #3]