COMP-2660 Assignment 3

Due date: 7 February, 2021

Section 1

Question 1 (10 points)

1. List four different instruction mnemonics. (2 points)
2. Name the four basic parts of an assembly language instruction. (2 points)
3. A command that is recognized and executed by the assembler while the source code is being assembled is a(n) _____. (1 point)
4. Use a TEXTEQU expression to redefine "PROC" as "PROCEDURE." (2 points)
5. Show a brief example of a block comment. (1 point)
6. Show the order of individual bytes in memory (lowest to highest) for the following doubleword variable: val DWORD 78563412h (2 points)

Question 2 (20 points)

1. What is the main difference between data labels and code labels? (4 points)
2. What is the main difference between source file and listing file. (4 points)
3. What is the main difference between big endian and little endian. Also, look up the origins of this term on the Internet. (4 points)
4. Explain using example the process of calculating the sizes of
   - Arrays
   - Strings
   - Word
   - Dword

Section 2: Programming

Objectives

- To learn the evaluation of the arithmetic expression with variables.
- To learn the use of direct-offset addressing.

Problems (20 points)

- Write a program that implements the following arithmetic expression:
  EAX = -val2 + 7 - val3 + val1
  Use the following data definitions:
  val1 SDWORD 8
  val2 SDWORD -15
  val3 SDWORD 20
  In comments next to each instruction, write the hexadecimal value of EAX. Insert a call DumpRegs statement at the end of the program. (10 Points)

- Insert the following variables in your program:
  .data
  Uarray WORD 1000h,2000h,3000h,4000h
  Sarray SWORD -1,-2,-3,-4

  Write instructions that use direct-offset addressing to move the four values in Uarray to the EAX, EBX, ECX, and EDX registers. When you follow this with a call DumpRegs statement, the following register values should display:
  EAX=00001000 EBX=00002000 ECX=00003000 EDX=00004000

  Next, write instructions that use direct-offset addressing to move the four values in Sarray to the EAX, EBX, ECX, and EDX registers. When you follow this with a call DumpRegs statement, the following register values should display:
  EAX=FFFFFFFF EBX=FFFFFFFE ECX=FFFFFFFD EDX=FFFFFFFC
  (10 Points)

Submission

- It is mandatory that students complete their own work and must be able to justify their answers when asked to do so by instructors and teaching staff
- Students are responsible for making sure that their assignments are received by or on the due dates.
- Submit the assignment ONLY on blackboard.
- Submissions by email will not be accepted.
- Add the following note at the beginning of your assignment: *"I confirm that I will keep the content of this assignment confidential. I confirm that I have not received any unauthorized assistance in preparing for or writing this assignment. I acknowledge that a mark of 0 may be assigned for copied work." + Name + SID*
- For Section 1, the file should be in word docx or pdf format.
- For Section 2 (programming assessment), submit your source code in .asm file (preferred) or .txt file. Include title, name, date, ID and description on the top of source code.

Additional Instructions for Programs

- Write your program in a .asm file on MS Visual Studio.
- Test and debug the program and make sure it runs without any issue before submission.
- Submit the *.asm file* or copy and paste your code into a *.txt file* and submit it.
- For the programs DO NOT SEND A PDF, A HANDWRITTEN PAPER, OR A ZIPPED FOLDER.
- Student may send a screen shot of the program execution.

Evaluation

- Any late submissions will lose 50% of the total mark and will be zero after the third day.
- Any programs submitted as PDF or handwritten notes, even if submitted on time, would receive an automatic zero.