

COMP-2660 Assignment 4

Due date: 28 February, 2021

Section 1

Question 1 (10 points)

1. List the 3 operands types. (1 point)
2. What are the four essential status flags? (2 points)
3. All two-operand instructions are in the form: OpCode Destination, Source (1 point)
4. How can we scale an indirect or indexed operand to the offset of an array element? (2 points)
5. What are the two situations in which the overflow flag is set? (2 points)
6. What does the LENGTHOF operator do: (2 points)

Question 2 (20 points)

1. What will be the value in EDX after each of the lines marked (a) and (b) execute? (4 points)

```
.data
one WORD 8002h
two WORD 4321h
.code
mov edx,21348041h
movsx edx,one ; (a)
movsx edx,two ; (b)
```
2. What will be the value of the Parity flag after the following lines execute? (2 points)

```
mov al,1
add al,3
```
3. Explain briefly one difference between direct and indirect addressing. (5 points)
4. Explain why each of the following MOV statements are invalid: (5 points)

```
.data
bVal BYTE 100b
Val2 BYTE ?
wVal WORD 2
dVal DWORD 5
.code
mov ds,45
mov ah,wVal
mov eip,dVal
mov 25,bVal
mov bVal2,bVal
```
5. What are the four main tasks of the LABEL Directive? (4 points)

Section 2: Programming

Problems (20 points)

- Write a program that uses a loop to calculate the first seven values of the Fibonacci number sequence, described by the following formula: $\text{Fib}(1) = 1$, $\text{Fib}(2) = 1$, $\text{Fib}(n) = \text{Fib}(n-1) + \text{Fib}(n-2)$. Place each value in the EAX register and display it with a call DumpRegs statement inside the loop. (10 points)
 - Write a program that uses addition and subtraction to set and clear the Carry flag. After each instruction, insert the call DumpRegs statement to display the registers and flags. Using comments, explain how and why the Carry flag was affected by each instruction. (10 points)
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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.