



Second Exam, First Semester: 2018/2019

Dept. of Computer Engineering

Course Title:	Microprocessors	Date:	26/12/2018
Course No:	0630313	Time Allowed:	50 minutes
Lecturer:	Dr. Qadri Hamarsheh	No. Of Pages:	4

Instructions:

- **ALLOWED:** pens and drawing tools (**no red color**).
- **NOT ALLOWED:** Papers, calculators, literatures and any handouts. Otherwise, it will lead to the non-approval of your examination.
- **Shut down** Telephones, and other communication devices.

Please note:

- This exam paper contains 4 questions totaling 20 marks
- Write your name and your matriculation number on every page of the solution sheets.
- All solutions together with solution methods (explanatory statement) must be inserted in the labelled position on the solution sheets.
- You can submit your exam after the first hour.

Basic notions: The aim of the questions in this part is to evaluate the required minimal student knowledge and skills. Answers in the pass category represent the minimum understanding of Assembly Language Fundamentals: Instructions, Directives, Addressing Modes, and Conditional and Unconditional instructions, Pointers, and Arrays.

Question 1 Multiple Choices

(6 marks)

Identify the choice that best completes the statement or answers the question.

- The instruction **MOV AX, X1[EDI]** is an example of
 - indexed addressing
 - indirect addressing
 - direct addressing
 - based addressing
- Which of the following is an **illegal** instruction?
 - add ax, [di]
 - mov ax, [bx]
 - INC [EDI]
 - aDd bx, [bx]
- Let **X1** be an array of **words**, one of the following is a correct code to set the **fifth** element in **X1** to **FF**
 - mov X1+5, FFh
 - mov X1+4, FFh
 - mov X1+10, FFh
 - mov X1+8, FFh
- What will be the contents of register **AL** after the following has been executed


```
MOV BX, F78C
MOV AL, 7E
ADD AL, BL
```

 - 6A and carry flag is set
 - 6A and carry flag is reset
 - 0A and carry flag is set
 - 0A and carry flag is reset
- If **CX =1234H** and **BX=75FDH** what is the value stored in **CX** after the execution of the following instruction.


```
TEST CX, BX
```

 - 1234H
 - 77FDH
 - 75FDH
 - 1032H
- Given that **AL** register contains the **ASCII** code of an uppercase letter, it can be converted to lowercase by
 - add AL, 30
 - or AL, 0010 0000
 - and AL, 0010 0000
 - sub AL, 30

Familiar and Unfamiliar problems solving: the aim of the questions in this part is to evaluate that the student has some basic knowledge of the key aspects of the lecture material and can attempt to solve familiar and unfamiliar problems of Assembly Language Fundamentals: Instructions, Directives, Addressing Modes, Conditional and Unconditional instructions, Pointers, and Arrays.

Question 2

(5 marks)

a) Use the following data definitions to answer this question:

(2 marks)

.DATA

```

num1    DW    100
num2    DB    225
char1   DB    'Y'
num3    DD    0, 10, 30, 40, 50
    
```

Identify whether the following instructions are **legal** or **illegal**. Explain the reason for each illegal instruction.

Ñ	Instruction	Answer	Reason
[1]	mov IP, num1		
[2]	xchg AL, num2		
[3]	sub char1, 'A'		
[4]	inc num3, 1		

b) For each part of this question, assume the **"before"** values when the given instruction is executed. Give the requested **"after"** values.

(3 marks)

Ñ	<i>Before</i>	<i>Instruction executed</i>	<i>After</i>
[1]	EAX: 00 00 00 75 h ECX: 00 00 01 A2 h	sub ecx, eax	EAX = ECX = SF = CF = OF =
[2]	AX: 77ACh CX: 4B35h	add ax, cx	AX = CX = SF = ZF = CF = OF =
[3]	EDX: 7F FF FF FF	inc edx	EDX = SF = ZF = OF =

Question 3

(4 marks)

Write an assembly language program that calculates the sum of five temperatures (array of bytes, initialize temperatures with suitable data) and writes the result in **BH**.

The program should:

- Use **Protected Mode Programming**.
- Use **Indirect Addressing Mode**.
- Be used for **Windows application**.

Solution

Question 4

(5 marks)

Write an Assembly Language program to **concatenate** two strings **STR1** and **STR2** and store the result in the string **STR3**.

The program should:

- Use **Real Mode Programming**.
- Use **Indexed Addressing Mode**.

Solution

Good Luck