



First Exam, First Semester: 2018/2019
Dept. of Computer Engineering

Course Title:	Microprocessors	Date:	21/11/2018
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. 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 100 points
- 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.

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 basic concepts of IA-32 Processor Architecture, Assembly Language Fundamentals: Instructions, Directives, Identifiers, Defining Data, Symbolic Constants, Data Transfers, Addressing, and Arithmetic instructions.

Question 1 Multiple Choices

(35 points)

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

- 1) Actual execution of instructions in a computer takes place in
 - a) **Control Unit**
 - b) **Storage unit**
 - c) **ALU**
 - d) **None of the above**
- 2) The first processor that includes **Virtual Memory** in the Intel microprocessor family was:
 - a) **4004**
 - b) **80286**
 - c) **80486**
 - d) **Pentium Pro**
- 3) If **DS = 90A3H**, then the range of physical addresses for the data segment is:
 - a) **90A30H – 9FA30H**
 - b) **00000H – 090A3H**
 - c) **090A3 – 190A2H**
 - d) **90A30 – A0A2FH**
- 4) Which utility program reads an assembly language source file and produces an object file?
 - a) **assembler**
 - b) **compiler**
 - c) **loader**
 - d) **linker**
- 5) One of the following **memory models** combines the data and code parts:
 - a) **Flat**
 - b) **Meduim**
 - c) **Small**
 - d) **Huge**
- 6) Which of the following is an **invalid** instruction?
 - a) **add dx, dx**
 - b) **MOV AX, CS**
 - c) **sub bar,5**
 - d) **MOV AH, DI**
- 7) In the following data definition, assume that **Marks** begins at offset **2100h**. What is the offset of the value (**77**)?

	Marks WORD	88, 44, 55, 90, 77
a)	2104h	b) 2105
c)	2108	d) None of above

Question 2

(35 points)

a) Put \surd in front of correct statement and \times in front of wrong one

(10 points)

N	statement	Answer
1.	Data transfer instructions can affect the flag bits	
2.	In real-mode addressing if the beginning segment address is 028FH the memory location having an effective address of 03FFFH lies within the segment.	
3.	The maximum size of memory segment is 640K bytes of memory	
4.	The combinations (DS:BX) locates the next instruction executed by the microprocessor.	

b) Describe the special uses for each of the following registers.

(12.5 points)

Register	Typical Uses
EAX	
EDX	
ESP	
ESI	
EIP	

c) List five steps of Instruction Execution Cycle.

(12.5 points)

Solution

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 IA-32 Processor Architecture, Assembly Language Fundamentals: Instructions, Directives, Identifiers, Defining Data, Symbolic Constants, Data Transfers, Addressing, and Arithmetic instructions.

Question 3

(10 points)

Write assembly code to do the following

- a)** Array of **10 unsigned double words** initialized to **1, 2, ..., 10**.

Solution

- b)** Null-terminated string with a message **“Please enter a string”**

Solution

- c)** Declare an uninitialized byte labeled **“var2”**.

Solution

- d)** Declare **100** 4-bytes words, all initialized to **0**, starting at memory location **“arr”**.

Solution

Question 4

(20 points)

Write complete assembly program that computes the following equations

$$L = J + K$$

and

$$W = W - Y - Z + 10$$

In your code:

- Define the **2-byte signed integer** variables **J, K** and **L**.
; Initialize **J** to **50** and **K** to **-20**.
- Define the **2-byte unsigned integer** variables **W, Y** and **Z**.
; Initialize **W** to **254**, **Y** to **200** and **Z=100**.

Solution

Good Luck