

University of Jordan  
 Faculty of Engineering & Technology  
 Computer Engineering Department  
 Microprocessors & Assembly Language

Mid-term exam

Date: Sat 4/4/2009

Student name (Arabic)	Student number	Section number	Instructor

**IMPORTANT NOTES:**

- Make sure you have 11 questions on 5 pages numbered from 1 to 5.
- Start your exam in writing your name and number first.
- Calculators are forbidden.
- All your numeric answers should be in Hexadecimal.
- Any cheating attempt will be severely penalized.

**Q1) 4 marks**

Assume that registers contain the following values:

Reg.	Value (hex)	Reg.	Value (hex)
AX	0111	DI	0023
BX	0022	BP	0014
CX	0003	ES	0109
DX	0400	SI	0001

Analyze the following code and determine the final values for SI, DI, BP, and ES.

```

PUSH ES
PUSH DI
POP ES
PUSH BP
POP DI
PUSH ES
POP SI
POP SI
    
```

SI=	<b>0109</b>	DI=	<b>0014</b>
BP=	<b>0014</b>	ES=	<b>0023</b>

**Q2) 4 marks**

For the following instructions, decide which instructions are valid and which are invalid. Fill the box opposite to each instruction with V if valid and I if invalid. In case of invalid state the reason

Instruction	Valid or Invalid	Reason
MOV CX, [BX + SI]	<b>V</b>	
XCHG DI, [BP+DI+56H]	<b>V</b>	
ADD DS, 786FH	<b>I</b>	
POP CL	<b>I</b>	

**Q3 ) 3 marks**

If the contents of AL equal **-2** and the contents of CL are **-4**, what will be the result produced in AX by executing the instruction?

a) **MUL CL**

AX=	<b>FA08</b>
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b) **IMUL CL**

AX=	<b>0008</b>
-----	-------------

c) **CBW**

AX=	<b>FFFE</b>
-----	-------------

**Q4 ) 2 marks**

Consider the following fragment of a code.

**MOV AL, 5CH** ; first instruction  
**ADD AL, D2H** ; second instruction  
**ADC AL, 02** ; third instruction

A) What are the contents of AX after the second instruction?

AX=	<b>002E</b>
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B) What are the contents of AX after the third instruction?

AX=	<b>0031</b>
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**Q5) 4 marks**

Using the register values listed below, determine the *physical* memory address (or addresses) of the byte or bytes read or written in each of the instructions.

Reg.	Value(hex)	Reg.	Value(hex)	Reg.	Value(hex)
BX	E222	DI	3000	CS	2555
BP	CADD	SI	0004	DS	1010
ES	1114	SS	5500	SP	1331

A) **MOV AX, [DI]**

	High address	Low address
The memory address(es) of the byte(s) is (are)	<b>13101</b>	<b>13100</b>

B) **XOR ES:[SI], CL**

The memory address(es) of the byte(s) is (are)	<b>11144</b>
--	--------------

C) **SUB CX, [BP+6]**

The memory address(es) of the byte(s) is (are)	<b>61AE4</b>	<b>61AE3</b>
--	--------------	--------------

**D) POP BP**

The memory address(es) of the byte(s) is (are)

**56331**

**56330**

**Q6 ) 3 marks**

Develop a sequence of instructions that copies 20 bytes of data from an area of memory addressed by DATAS into an area of memory addressed by DATAD.

**MOV SI, OFFSET DATAS  
MOV DI, OFFSET DATAD  
CLD  
MOV CX, 20  
REP MOVS**

**Q7 ) 1 marks**

If DI = 1000H. What will be the value stored in register DI after the execution of the following instructions

**STD  
MOV CX , 35  
REP INSB**

DI= **0FDD**

**Q8 ) 2 marks**

If memory locations labeled LIST1 contain 023CEC5B7718H. What will be the value stored in the following registers after the execution of the following instruction

**LDS EDI , LIST1**

DS= **18 77**

EDI= **5B EC 3C 02**

**Q9 ) 3 marks**

What are the values in AX,BX,CX, and DX after executing the following set of instructions?

**MOV AX, 1  
MOV CX, 6**

**Count:**

**ADD AX, CX  
MOV BX, AX  
ADD AX, BX  
LOOP Count**

AX	BX	CX
02C2H(706)	0161H(353)	0

**Q10 ) 2 marks**

Write the value stored in AL, SI, CX after the execution of the following code.

```
. DATA
GRADES DW 15,12,14,10, 18, 16,11,17,19,9
.CODE
MOV AX,0
MOV SI,4
MOV CX, 6
L1:
    ADD AX,GRADES[SI]
    ADD SI,2
LOOP L1
```

AX= **56H(86)**

SI= **0010H(16)**

**Q11) 4 marks**

This question consists of 4 parts. For all parts, assume that the data segment content is as follows:

Memory Address	Memory Contents
1461:0000	AB
1461:0001	90
1461:0002	EF
1461:0003	CD
1461:0004	44
1461:0005	12
1461:0006	78
1461:0007	56
1461:0008	-03
1461:0009	01
1461:000A	04
1461:000B	00
1461:000C	02
1461:000D	00
1461:000E	02
1461:000F	00

A- Find the value of AX after executing the following code

```
MOV AX, 1461h
MOV DS, AX
MOV AL, 01
MOV AH, EFH
```

AX= **EF01**

B- Find the value of AX after executing the following code

```
MOV AL, [0006h]
MOV AH, [0009h]
```

AX=	0178
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C- Find the value of AX after executing the following code  
**MOV AX, [0004h]**

AX=	1244
-----	------

D- Find the value of AX after executing the following code:

```
MOV BX, [000Eh]
MOV DI, [000Eh]
MOV AX, [BX+DI]
```

AX=	1244
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