



Dept. of Computer Engineering
First Exam, Second Semester: 2010/2011

Course Title: Microprocessors	Date: 10/04/2011
Course No: 0630371	Time Allowed: 1 Hour
Lecturer: Dr. Qadri Hamarsheh	No. Of Pages: 2

Information for Candidates

1. This examination paper contains 5 questions totaling 15 marks.
2. The marks for the questions are : Question 1 (5 marks), Question 2 (2.5 marks),
 Question 3 (2.5 marks), Question 4 (2 marks), Question 5 (3 marks)

Advice to Candidates

1. You should attempt ALL requested parts.
2. You should write your answers clearly.

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**(5 marks)**

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

1. What are the names of the 4 segment registers?
 - a) Data, Index, Code, Stack
 - b) Stack, Data, Base, Counter
 - c) Stack, Extra, Code, Data
 - d) Stack, Index, Extra, Code
2. If **DS = 90A3H**, then the range of physical addresses for the data segment is:
 - a) 90A30H - 9FA30H
 - b) 090A3 - 190A2H
 - c) 00000H - 090A3H
 - d) 90A30 - A0A2FH
3. The 8086/8088 used two processing logical units which were known as:
 - a) Segment and Offset Units
 - b) Bus Interface Unit and Execution Unit
 - c) Bus Unit and Execution Interface Unit
 - d) ALU and Control Unit
4. In the following data definition, assume that **List2** begins at offset **2000h**. What is the offset of the third value (5)?

List2 WORD 3,4,5,6,7

 - a) 2004h
 - b) 2006
 - c) 2002
 - d) 2003
5. The EQU directive permits a constant to be redefined at any point in a program.
 - a) True
 - b) False

Question 2 Explain why each of the following MOV statements is invalid:**(2.5 marks)**

```
.data
bVal BYTE 100
bVal2 BYTE ?
wVal WORD 2
dVal DWORD 5
.code
mov ds,45 ;
mov esi,wVal ;
mov eip,dVal ;
mov 25,bVal ;
mov bVal2,bVal ;
```

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

(2.5 marks)

For each of the following marked entries, show the values of the destination operand and the Sign, Zero, and Carry flags:

```
mov ax,00FFh
add ax,1      ;AX=      SF=      ZF=      CF=
sub ax,1      ;AX=      SF=      ZF=      CF=
add al,1      ;AL=      SF=      ZF=      CF=
mov bh,6Ch
add bh,95h    ;BH=      SF=      ZF=      CF=
mov al,2
sub al,3      ;AL=      SF=      ZF=      CF=
```

Question 4

(2 marks)

List four types of registers used in Intel-based microprocessors

Solution

Question 5

(3 marks)

Write a complete **80x86** assembly language program to evaluate the expression

$$R = X - (-2 * Y + Z)$$

The program must contain the following parts:

- Give directives to allocate space for four variables (variable declarations): **X, Y, Z and R**. You should initialize these variables to decimal 23, hexadecimal 3FCE, decimal 42, and uninitialized value, respectively.
- Assume that all values are signed double words.
- Assume that the FLAT memory model is used.
- reserve 4096-byte stack
- Don't use any shift or multiplication instructions.

Good Luck