Marking Scheme

Examination Paper
Department of CE

Module: Microprocessors (630313)

First Exam Second Semester Date: 01/04/2014

Section 1
Weighting 20% of the module total

Lecturer: Dr. Qadri Hamarsheh
Coordinator: Dr. Qadri Hamarsheh
Internal Examiner: Eng. Anis Nazer
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The presented exam questions are organized to overcome course material, the exam contains 4 questions; all questions are compulsory requested to be answered. Thus, the student is permitted to answer any question out of the existing ones in this section.

Marking Assignments
The following scheme shows the marks assignments for each question. They show also the steps for which a student can get marks along the related procedure he/she achieves.

**Question 1** This question is attributed with 8 marks if answered properly
The answer for this question as the following:

1) If ES = D321H, then the range of physical addresses for the extra segment is:
   a) 00000H – 0D321H
   b) D3210H – D321FH
   c) D3210H – E320FH
   d) 0D321H - 1D320H

2) The **BX** register is used in multiplication operation to hold the upper 16-bits of the result.
   a) True
   b) False

3) What is the largest signed integer that may be stored in **32 bits**?
   a) \(2^{32} - 1\)
   b) \(2^{32}\)
   c) \(2^{31} - 1\)
   d) \(2^{31}\)

4) The **---------** allows the program to single step (execute one instruction at a time).
   a) Carry Flag
   b) Direction Flag
   c) Trap Flag
   d) Parity Flag

5) The output of the **MASM** is stored in a file with the extension **---------**
   a) .asm
   b) .obj
   c) .lnk
   d) .exe

6) Which of the following will generate assembly errors?
   a) var1 BYTE 1101b, 22, 35
   b) var2 BYTE "ABCDE", 18
   c) var4 BYTE 256, 19, 40
   d) None of the above

7) Which of the following variables uses the most amount of **RAM**?
   a) X DB 300 dup('A')
   b) Y DQ 255
   c) Z DD 40 dup (0)
   d) W DW 200 dup (0)

8) To reserve **32-bits** in memory **___** directive is used.
   a) db
   b) dw
   c) dn
   d) dd

**Question 2** This question is attributed with 7 marks if answered properly.
The answer for this question as the following:

a) (1 mark)

**Solution**
The 8086 was a 16-bit microprocessor chip. It gave its name to the x86 architecture. It was the main CPU of the computer. The 8087 was the first math coprocessor for 16 bit processors. It was the first of the x87 architecture chips. It couldn't act as the main CPU in a computer, it was dedicated to doing floating point mathematical computations.

b) (1 mark)

**Solution**
Memory segmentation in the 8086/8088 is used to allow the processor to access more than 64kb of memory, even though it is only a 16-bit processor. Each segment register allows access to one of 64k 64kb segments, each overlapping by 16 bytes, with the total addressibility being 1mb.
Solution

P (parity) is the count of '1's in the last 8 bits of any binary number expressed as even or odd. Logic 0 for odd parity; logic 1 for even parity.
- If a number contains three binary one bits, it has odd parity
- If a number contains no one bits, it has even parity

Solution

The advantages of 8086 microprocessor over 8085A microprocessor is that
- It is a 16 bit microprocessor
- The disadvantages in 8085 microprocessor like low speed, limited number of registers, low memory addressing capability, less powerful instruction set have been overcome in 8086 registers
- Using pipeline mechanism

Solution

1. The EQU directive can be used to declare arbitrary text, the = directive cannot.
2. Symbolic constant using EQU cannot be redefined, using = they can.

Question 3 This question is attributed with 1.5 marks, if answered properly.
The code for this question as the following:

Solution

COUNT = 25 (or COUNT EQU 25)
myArray DWORD COUNT DUP(?)
ArraySize = ($ - newArray)/4

Question 4 This question is attributed with 3.5 marks, if answered properly.
The complete code for this question as the following:

Solution

Title Simple Arithmetic
.data
J   sword ?
K   sword ?
L   sword ?
U1  word ?
U2  word ?
U3  word ?
(1 mark)
.code
mov J, 3
mov K, -2
mov U1, 254
mov U2, 22
mov ax, J
add ax, K
mov L, ax
mov ax, U1
add ax, U2
mov u3, ax
main PROC
main ENDP
END main
(1.5 marks)