KAFR-ELSHIEKH UNIVERSITY FACULTY OF ENGINEERING TIME ALLOWED: 3 HOURS



ELECTRICAL ENGINEERING DEPARTMENT COMPUTER ENGINEERING AND SYSTEMS BRANCH 2ND YEAR FINAL EXAM OF 1ST SEMESTER 2018 - 2019 MICROPROCESSOR SYSTEMS [CODE NO. ECS 2006]

The maximum mark for the examination paper is 60 marks, and the mark obtainable for each part of a question is shown in brackets alongside the question.

Instructions to the candidates:

- Clarify your answer with the suitable sketches as you can.
- Please use a pen or heavy pencil to ensure legibility.
- Please attempt all questions.

QUESTION NUMBER ONE [25 MARKS]

1. List all changed registers and/or memory locations and their final values, for each instruction in the sequence shown below. Also, indicate if each instruction performs a memory access or no memory access at all.

[5 Marks]

Initial state:		-
EAX = 00067340 h EBX = 11016FEB h	00067337 h	73
ECX = FFFFFFFD h	00067335 h	38
EOX = 00AFF321 h ESI = 00067330 h	00067335 h	62
EDI = 00000003 h	00067334 h	02
Instruction:	00067333 h	C0
MOV EBX, 00067334 h LEA EDI. [EBX+ECX]	00067332 h	AD
DEC Word Ptr [ESI+2*EDI]	00067331 h	08
NEG Byte Ptr [ESI+ECX] XCHG AX, [ESI+2*EDI]	00067330 h	01

2. Which of the following instruction is a correct and which is not? Why? Correct if possible.

[10 Marks]

a) PUSH AL

b) INC [SI]

c) MUL [0100_H]

d) MOV AX, [CX]

e) MOV DS. 2A3B_H

f) MOV AL, [SI+DI]

g) ADD [0100H], [0220H]

h) SUB [BX+BP+03H], AX

i) XCHG [0100_H], [0220_H]

j) MOV AL, [BX]

3. Write an assembly code that swap the content of two register AX and BX

[6 Marks]

- a) Using third register
- b) Using the stack
- c) Using ADD, SUB and NEG
- d) Using XOR
- 4. You have 1 GB of data that you would like to put in a memory segment of an Intel 80386 μ P starting at location 10000000H. What are the 32-bit base, 20-bit limit, and G-bit values of the descriptor? At what memory location your data ends?

[4 Marks]

Turn the page to see the rest of the questions

21 January 2019

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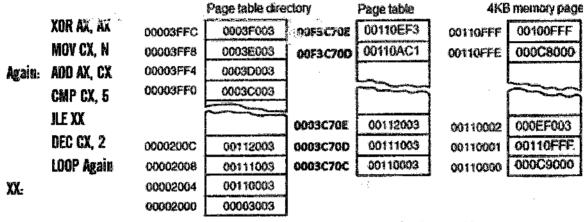
QUESTION NUMBER TWO [35 MARKS]

1. In Intel 8086 μ P, assume SS=1000 $_{H}$ and SP=0100 $_{H}$. How many additional bytes of data can put into stack until it is full? After the stack gets full, where does an extra byte pushed into the stack will be saved? Give the physical address.

[4 Marks]

2. Trace the following program where N=16, what is the purpose of the program. Then, copy a block of data (50 byte) from one memory area from $42000_{\rm H}$ to $44000_{\rm H}$.

[8 Marks]



3. Write explanatory notes on virtual memory. If the microprocessor sends linear address FFIC3FFE to the paging mechanism, which paging directory entry and which page table entry is accessed? Note that, the content of CRO = 8000FC2A_H and CR3: 00003AFB_H.

[8 Marks]

4. Specify the complete bit configuration of 8085 flag register. Which instruction places the contents of extended flag register onto the stack? The carry flag bit is not modified by which arithmetic operations?

[4 Marks]

5. Code a descriptor that describes a memory segment that begins at location 03000000_H and ends at location 05FFFFF_H. This memory segment is a data segment that grows upward in the memory system and can be written.

[5 Marks]

6. Is it possible to have two different machine codes for the same instruction? Convert a 67668B048BH from machine language to assembly language. Next, give the assembly instruction encoded by the following:

[6 Marks]

