

COAL (EE2003)

Computer organization and assembly language

Date: November 5th 2024

Course Instructor(s)

AA,AA,SF,SI,SM

Sessional-II Exam

Total Time (Hrs): 1

Total Marks: 40

Total Questions: 2

Solution

Roll No

Section

Student Signature

Instructions : Attempt all questions. It is an open book exam only Assembly Language Programming Lecture Notes are allowed. Calculators are allowed. You can use rough sheets.

CLO #:2 Describe the working of important x86 assembly primitives, including arithmetic, branching, bit manipulation, addressing modes and interrupt handling.

Q1: [marks 4x2 + 2x2 + 2 + 2 + 2 + 2 = 20]

<p>(a) The segment and offset of interrupt service routine of int 77h are placed at: offset: <u>77h * 4 = 01DC</u> segment: <u>77h * 4 + 2 = 01DE</u></p> <p>(b) what is the total size of the IVT table? <u>1024 bytes / 1Kb</u></p> <p>(c) Which registers are changed by the iret instruction? <u>sp, cs, ip, flags</u></p> <p>(d) Which interrupt is hooked by the instructions given on right side? (<u>64</u>)₁₆</p>	<p>Code for part (d)</p> <pre>mov ax, 0 mov es, ax mov [es:400], mySub mov [es:402], cs</pre>
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(e) Replace the following independent invalid instructions with a single instruction that has the same effect.

i) <code>mov ax, [ss:sp]</code> <code>add sp, 2</code>	Solution: <u>pop ax</u>
ii) <code>sub sp, 2</code> <code>mov [ss:sp], ax</code>	Solution: <u>push ax</u>

(f) Write a code to swap two registers ax and bx without using temporary space (local variable) on stack or memory. You are only allowed to use stack operations.

Solution: push ax
push bx
pop ax
pop bx

<p>(g) What would be the value of SP after execution of the following code? Initial value of SP = 0xFFFFE Solution: SP = <u>0xFFFF8</u></p>	<p>Jump start Routine: Ret start: Call routine Push ax Sub sp, 4</p> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;"> <p>ax</p> <p>0xFFFFE</p> </div> <div style="text-align: right;"> <p>FFFFE - 6 ----- FFFF8</p> </div> </div>
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(h) Complete the following code to place asterisk '*' character on the left diagonal of the screen.

1. `Mov ax, 0xb800`
2. `Mov es, ax`
3. `Mov ax, 0x0742`

4. Mov cx, 25
5. L1: Mov word [es: si], ax
6. add si, 162
7. Loop l1

(i)

Suppose the following declarations have been made

str1: db 'FGHIJ'

str2: db 'ABCDE00000'

Write instructions to move str1 to the end of str2, producing the string 'ABCDEFGHIJ' using string instructions

Solution:

```
push ds
pop es
mov si, str1
mov di, str2+5
mov cx, 5
rep movsb
```

CLO #:2 Describe the working of important x86 assembly primitives, including arithmetic, branching, bit manipulation, addressing modes and interrupt handling.

Q2: Write a subroutine to swap the odd rows with the even ones in the video memory i.e. swap row 0 with row 1. Row 2 with row 3 and so on using string instructions. [20 marks]

Solution: