

Computer Organization & Assembly Language

Assignment 05

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Task 1: Effective Address Calculation

What is the effective address generated by each of the following instruction?

Initially, $Bx = 0100H$, $label = 0234H$, $[label] = 0010H$
 $Si = 00E1H$.

a.) `mov ax, [bx+40]`

$$\begin{aligned}\text{Effective address} &= bx + 40 \\ &= 0100H + 0028H \\ &= 0128H\end{aligned}$$

b.) `mov ax, [bx+label]`

$$\begin{aligned}\text{Effective Address} &= bx + label \\ &= 0100H + 0234H \\ &= 0334H\end{aligned}$$

c.) `mov ax, [bx+Si]`

$$\begin{aligned}\text{Effective Address} &= bx + Si \\ &= 0100H + 00E1H \\ &= 01E1H\end{aligned}$$

Task 2 : Conditional jumps, Unconditional jumps, Relative Address

Analyze the given relative addressing and explain the reason behind the value 0110H
ie. jnz 0110

$$PC = 011E$$

$$\text{offset} = F2$$

$$\text{two's complement } F2 = E$$

$$\begin{aligned}\text{Jump Address} &= 011E + (-000E) \\ &= 011E - 000E \\ &= 0110\end{aligned}$$

Reason:

The number 0110 lies in range of short jump (00H to 7FH). Since, it is a short jump, we will subtract 2's complement of offset and get 0110.

Task 3: Bit Manipulation

Suppose AL contains 10011011b and CF=0. Give the new contents of AL after each of the following instructions is executed. Assume the preceding initial condition for each part of this question is AL contains 10011011b and CF=0.

a.) SHL, AL, 1

AL = 00110110 CF = 1

b.) SHR AL, CL ; CL contains 3

AL = 00010011 CF = 0

c.) ROL AL, 1

AL = 00110111 CF = 1

d.) SAR, AL, CL ; CL = 3

AL = 11110011 CF = 0

e.) RCR AL, CL ; CL = 2

AL = 10100110 CF = 1

Need to turn on Bit 4 and Bit 7 of a byte. Define the mask and logical operator and show your result.

	7	6	5	4	3	2	1	0	Position
	0	0	0	0	0	0	0	0	data
OR	1	0	0	1	0	0	0	0	Mask
Operator	<div>10010000</div>								