



Homework # 2

CHAPTER 3: ADDRESSING MODES - Part#1

Notes:

- In the 80386 through the Core2 microprocessors, the extended registers also are used for register addressing; they consist of EAX, EBX, ECX, EDX, ESP, EBP, EDI, and ESI. Also available to the 80386 and above are the FS and GS segment registers.
- In the 64-bit mode, the registers are RAX, RBX, RCX, RDX, RSP, RBP, RDI, RSI, and R8 through R15.

1. What do the following MOV instructions accomplish?

- MOV AX,BX
- MOV BX,AX
- MOV BL,CH
- MOV ESP,EBP
- MOV RAX,RCX

(a) the contents of BX is copied into AX (b) The contents of AX are copied into BX (c) the contents of CH are copied into BL (d) the contents of EBP are copied into ESP (e) the contents of RCX are copied into RAX

2. List the 8-bit registers that are used for register addressing.

AL, BL, CL, DL, AH, BH, CH, DH,

3. List the 16-bit registers that are used for register addressing.

AX, BX, CX, DX, SP, BP, SI, DI, CS, DS, ES, SS

6. List the 16-bit segment registers used with register addressing by MOV, PUSH, and POP.

CS, DS, ES, SS

7. What is wrong with the MOV BL,CX instruction?

The CX register is a 16-bit register whereas BL register is an 8-bit register. Thus the instruction is wrong because of size mismatch

8. What is wrong with the MOV DS,SS instruction?

Not allowed: segment register to segment register forbidden

9. Select an instruction for each of the following tasks:

- copy BX into DX
- copy BL into CL
- copy SI into BX
- copy DS into AX
- copy AL into AH
- copy R8 into R10

(a) MOV DX,BX (b) MOV CL,BL (c) MOV BX,SI (d) MOV AX,DS (e) MOV AH,AL (f) MOV R10,R8

10. Select an instruction for each of the following tasks:

(a) move 12H into AL ==> MOV AL,12H

- (b) move 123AH into AX ==> MOV AX,123AH
 (c) move 0CDH into CL ==> MOV CL,0CDH
 (d) move 1000H into RAX ==> MOV RAX,1000H
 (e) move 1200A2H into EBX ==> MOV EBX,1200A2H

13. What assembly language directive indicates the start of the CODE segment?

.CODE

14. What is a label?

Used to store a symbolic name for the memory location it represents

15. The MOV instruction is placed in what field of a statement?

Opcode

16. A label may begin with what characters?

All labels may any length from 1 to 35 characters and must begin with a letter or one of the following special characters: @, \$, -, or ?.

20. What is a displacement? How does it determine the memory address in a MOV DS:[2000H],AL instruction?

It is a 16 or 8 bit number that expresses the operand's distance in bytes from the beginning of the segment in which it resides. Otherwise, the displacement can be an offset address or a number added-to / subtracted-from the register within the [].

MOV DS:[2000H],AL Is three bytes instruction which move the internal register AL into the memory location with offset 2000 in the current data segment. ($PA = DS*10H + 2000$)

21. What do the symbols [] indicate?

The symbol [] mean contents of the memory. (Addressing modes for memory data)

22. Suppose that DS = 0200H, BX = 0300H, and DI = 400H. Determine the memory address accessed by each of the following instructions, assuming real mode operation:

(a) MOV AL,[1234H] ==> $PA = DS*10H + 1234H = 3234H$

(b) MOV EAX,[BX] ==> $PA = DS*10H + BX = 2300H \ \& \ 2301H \ \& \ 2302H \ \& \ 2303H$

(c) MOV [DI],AL ==> $PA = DS*10H + DI = 2400H$

23. What is wrong with a MOV [BX],[DI] instruction?

Memory to memory transfers are not allowed with the MOV instruction

24. Choose an instruction that requires BYTE PTR.

MOV BYTE PTR [BX],12H

25. Choose an instruction that requires WORD PTR.

INC WORD PTR [DI]