CSC405 MICROPROCESSORS

8086 ADDRESSING MODES

OBJECTIVE

1. To understand 8086 Addressing Modes

01

8086 Addressing Modes

Instruction

Opcode + Operand

Addressing Mode → operands specified in an instruction

1. Immediate addressing mode
2. Register addr. mode
3. Direct addressing mode
4. Indirect addressing mode
5. Implied addressing mode

Instruction

Opcode Operand

MOV AH, 05h

ADD AX, BX

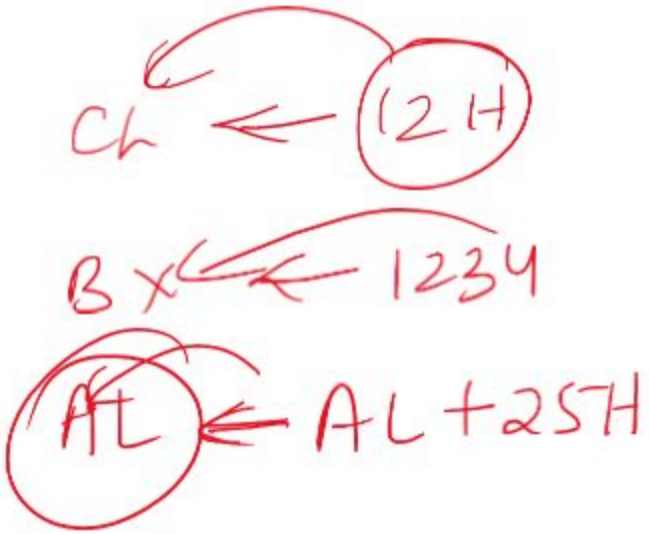
SUB (AX), [4000]

Immediate Addressing mode

eg. MOV CL, 12H

MOV BX, 1234H

ADD AL, 25H



Register Addressing Mode

operands → registers

eg -

```
MOV  CL, BL
MOV  AX, BX
INC  BX
```

CH ← BL

AX ← BX

BX ← BX + 1

Direct Addressing Mode :→ Address is specified in the instruction

DS

eg:- MOV CL, [2000H]

CL ← DS:[2000]

CH ← 78

MOV CX, [2000H]

CX ← DS:[2000] 8bit

[2001] 8bit

MOV CH, BL

BL = 78

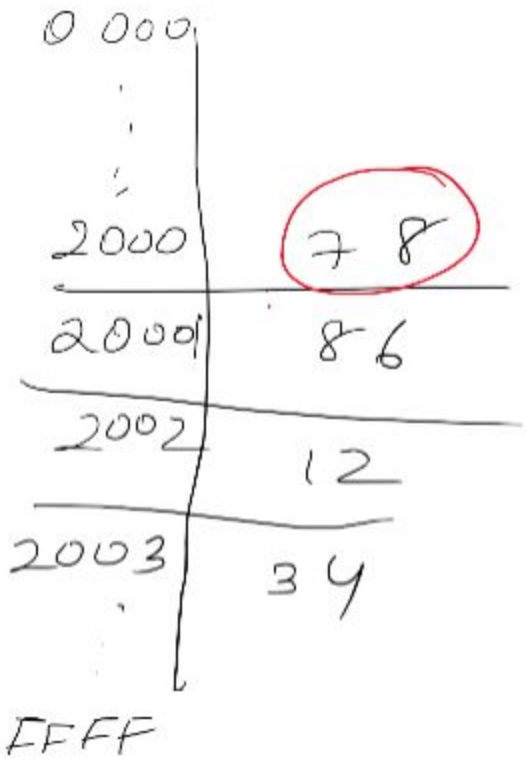
MOV CH, 78

CH + CL

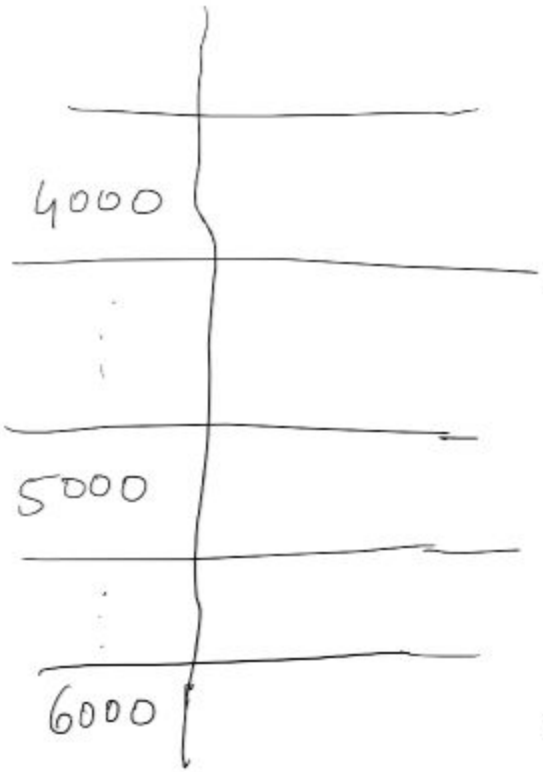
Little endian Rule.

CL ← DS:[2000]

CH ← DS:[2001]



Write instructions for following and indicate the addressing modes



Take the data of location 4000 into BL

MOV BH, [4000H] ← direct

Take the data of location 5000 into CL

MOV CH, [5000H] ← direct

Add the 2 nos and store result in BL.

ADD BL, CL ← register

Add 25H, so that result comes in BH. ADD BL, 25H ← immediate

Store the result at location 6000

MOV [6000H], BL ← direct

source

Indirect Addressing Mode

1) Register Indirect Addressing Mode

BX, BP

SI, DI

DS

SS

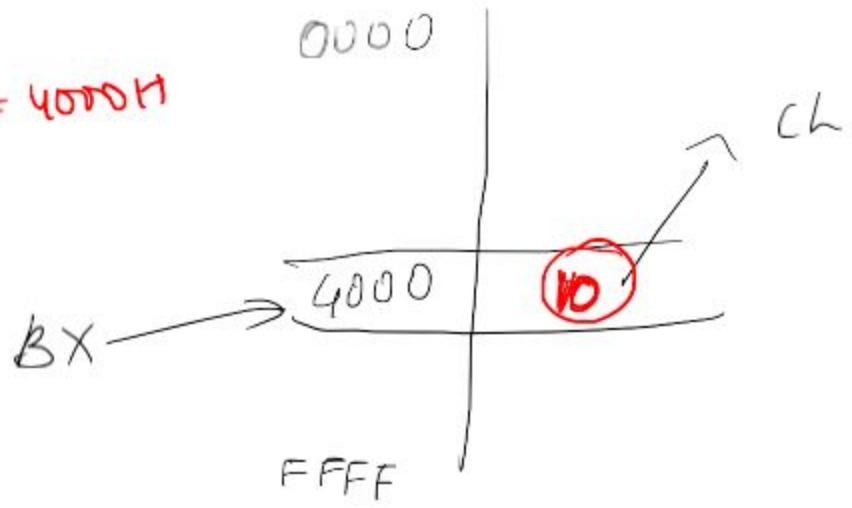
Eg:- MOV CL, [BX]

BX = 4000H

MOV CL, [4000H]

Is direct ?

Or indirect ?



MOV CL, [4000H]

CL ← 10

MOV BX, 4000H

BX ← 4000H

MOV CL, [BX]

CL ← 10

In most of the programming tasks (95% of the time) indirect addressing mode is used

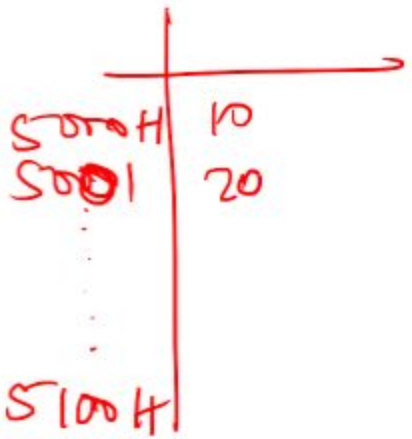
MOV CH, [4000H] ← direct

MOV CL, [5000H]

MOV CL, [5001H]

MOV CL, [5002H]

MOV CL, [5100H]



Rule:-

BX

BP, SI, DI

MOV BX, 5000H

MOV CH, [BX] } loop

INC BX

CL ← 10

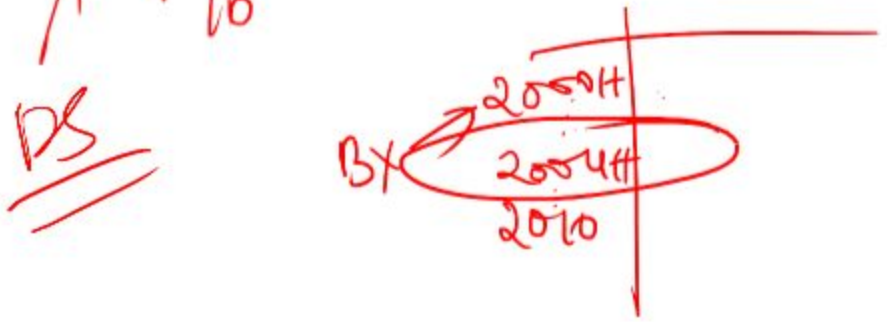
MOV CH, [BP]

MOV CL, [BX]

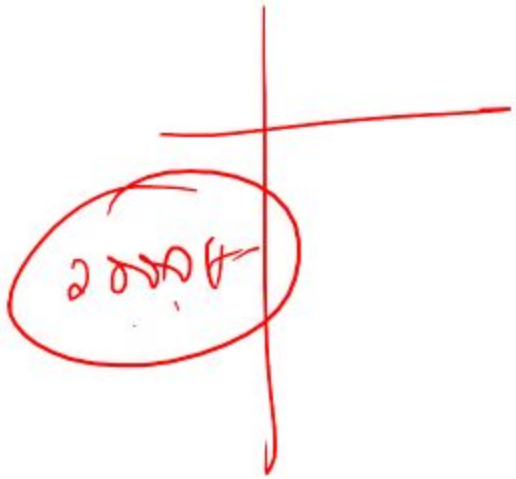
Register Relative

Address ← Register + Displacement

Eg. MOV CL, [BX+4] ← displacement

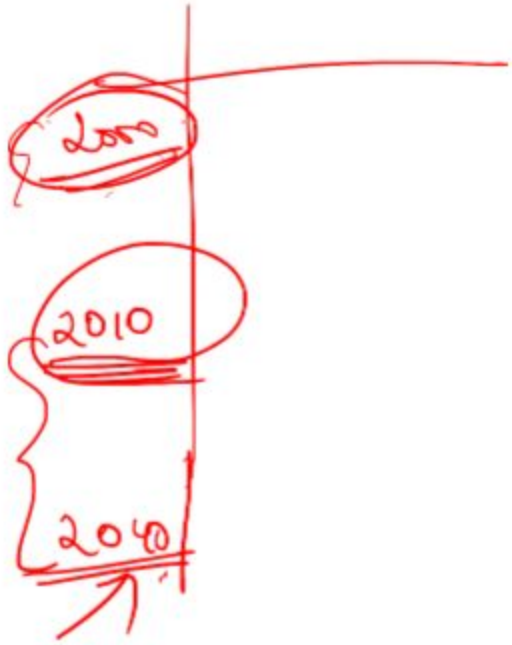


Eg.- MOV CL, [BP+05H]



Base Indexed

Eg:- MOV CL , [BX + SI]



BX = 2000H

SI = 10H

MOV CL, [BX+10H]

MOV CL, [BX+11H]

MOV CL, [BX+12H]

MOV CL, [BX+SI] } Loop

INC SI

2010 H

2011

2011 H

Based Relative plus Indexed.

Eg:- MOV CH, [BX + DI + 03H]

2000 + 10

MOV CH, [2013H]

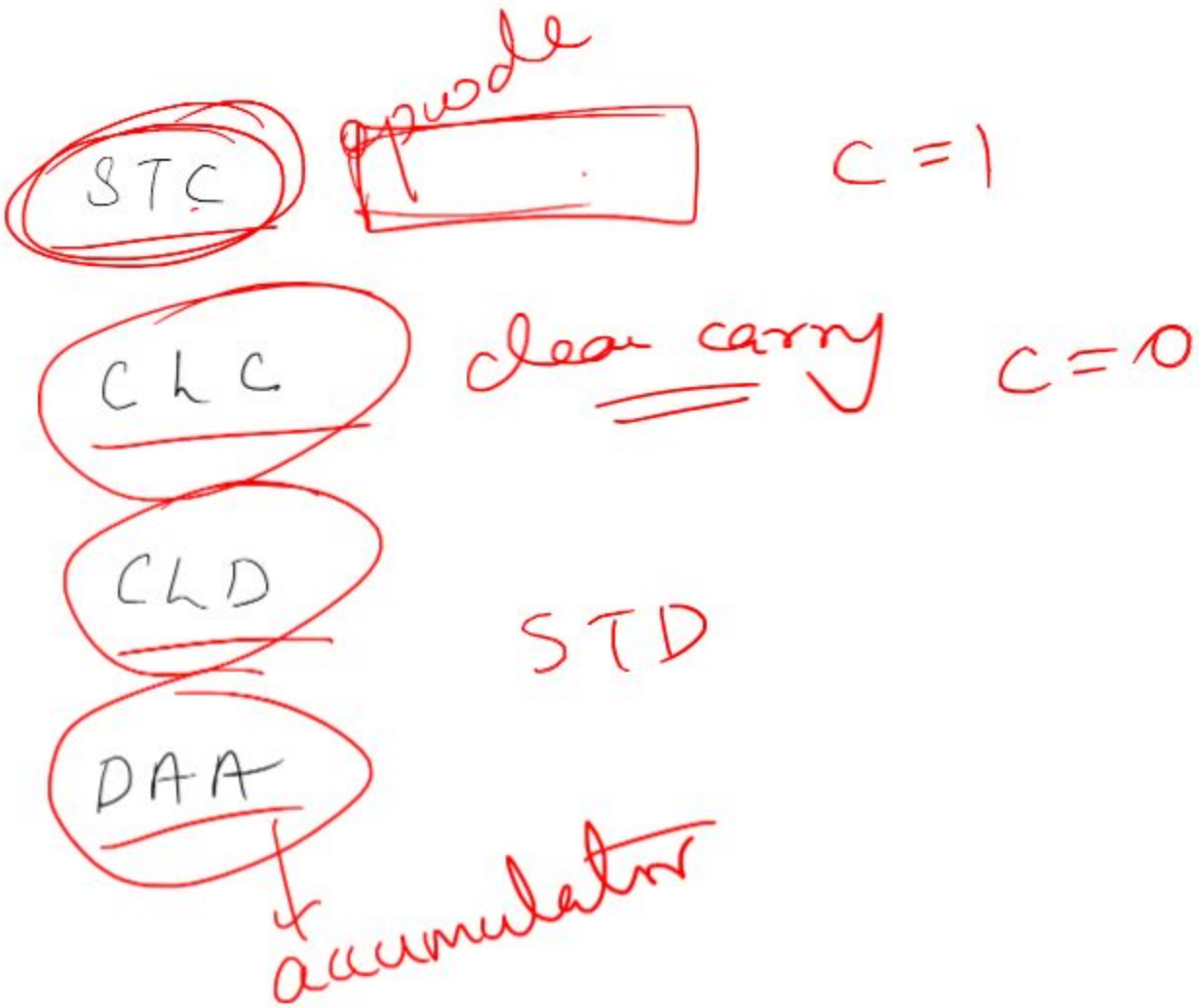
2013 H

Eg. MOV CH, [BP, SI+05H]

MOV CL, [DX]

Implied Addressing Mode :—

8086
16 bit
Flag register



MOV AX, @data
MOV DS, AX

Imm eg MOV BL, 05H

MOV [4000], 05H

Reg eg MOV BL, CL

Direct eg. MOV CL, [3000H]

Indir Reg indirect MOV CL, [BX]

BX, BP, SI, DI

Reg Relative MOV CL, [BX + 04]

Base Indexed MOV CL, [BX + SI]

Base Relative + Indexed MOV CL, [BX + SI + 03H]

Implied STC STD CLD

Thank you