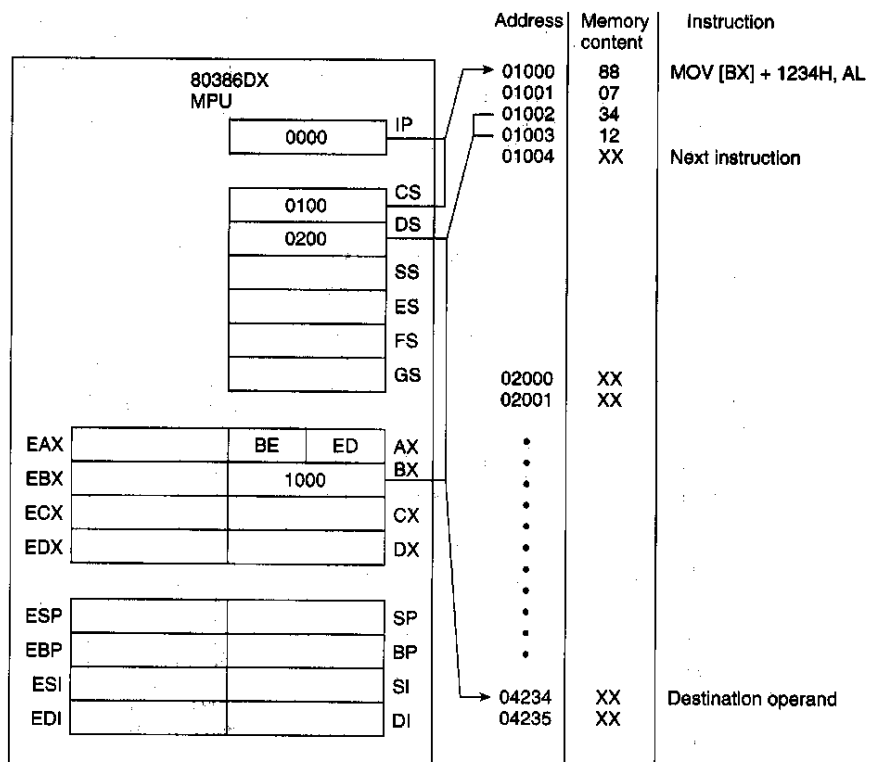# 16.317: Microprocessor Systems Design I

Spring 2012

Lecture 7: Key Questions
February 6, 2012
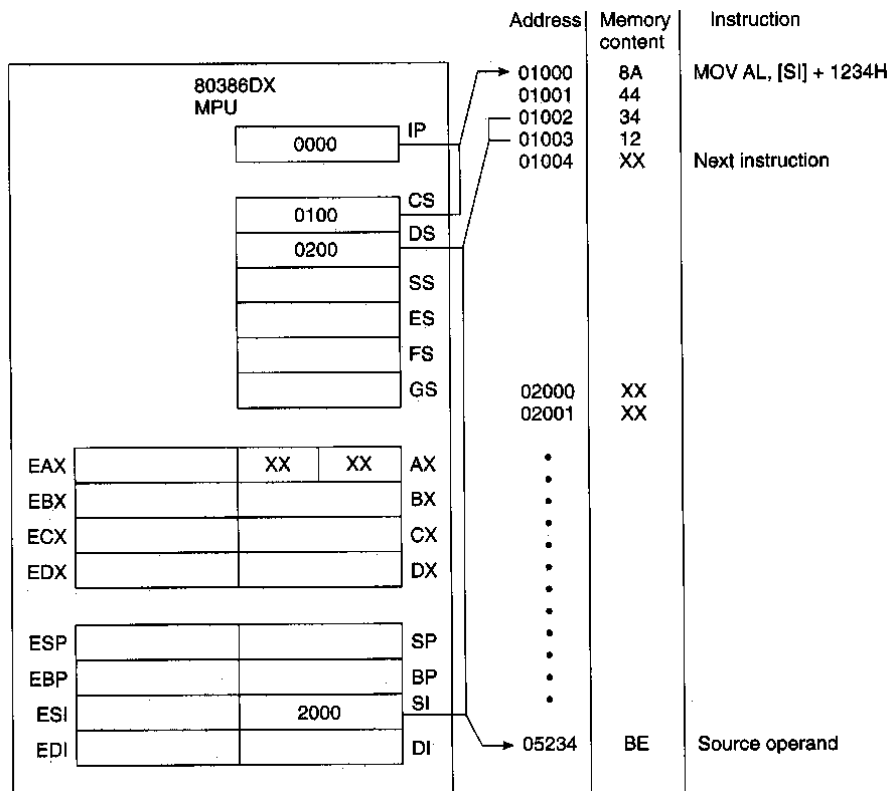
1. Explain based addressing mode. What is the benefit of this addressing mode?

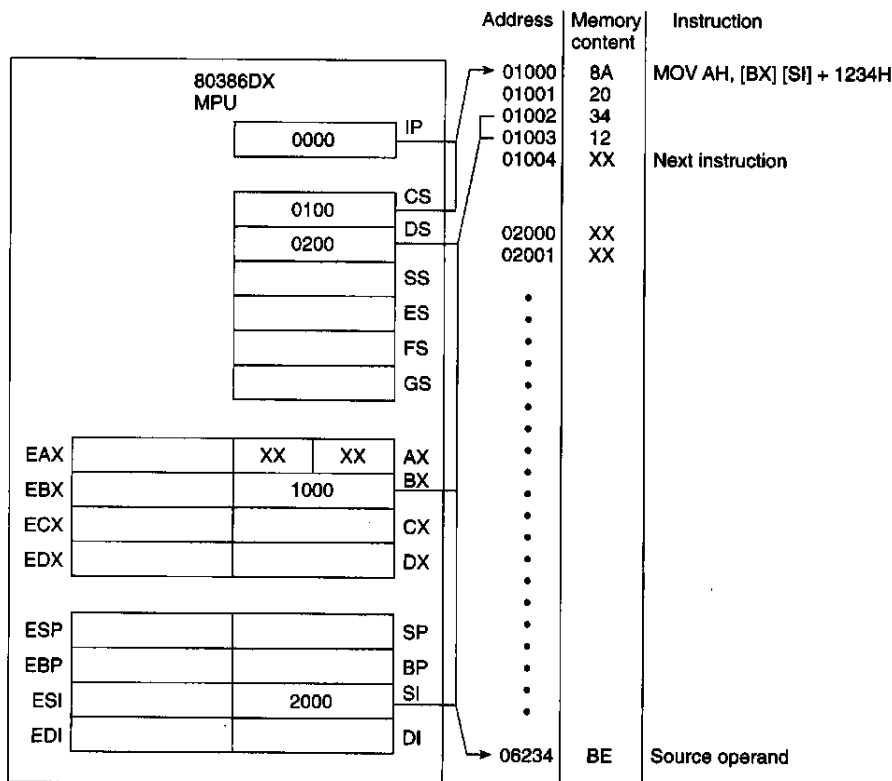Update the figure below to show the result of the instruction MOV [BX] + 1234H, AL

2. Explain indexed addressing mode. What is the benefit of this addressing mode? What
    are the key differences between indexed and based addressing mode?

Update the figure below to show the result of the instruction MOV AL,[SI] +1234H

Address	Memory content	Instruction
01000	8A	MOV AL, [SI] + 1234H
01001	44	
01002	34	
01003	12	
01004	XX	Next instruction

80386DX MPU

IP 0000

CS 0100
DS 0200
SS
ES
FS
GS

| 02000 | XX |
| 02001 | XX |

EAX | XX | XX | AX
EBX | | | BX
ECX | | | CX
EDX | | | DX

ESP | | | SP
EBP | | | BP
ESI | 2000 | SI
EDI | | | DI

| 05234 | BE | Source operand |

3. Explain based-indexed addressing mode. What is the benefit of this addressing mode?

Update the figure below to show the result of the instruction MOV AH,[BX][SI] +1234H

Address	Memory content	Instruction
01000	8A	MOV AH, [BX] [SI] + 1234H
01001	20	
01002	34	
01003	12	
01004	XX	Next instruction
02000	XX	
02001	XX	
06234	BE	Source operand

80386DX MPU

IP 0000
CS 0100
DS 0200
SS
ES
FS
GS

EAX	XX	XX	AX
EBX	1000		BX
ECX			CX
EDX			DX
ESP			SP
EBP			BP
ESI	2000		SI
EDI			DI

4. Explain the benefits and disadvantages of having variable length instructions.

5. What information is generally encoded in an instruction?