Microprocessors and Interfaces
Lecture 10
8086 Instructions Set : Part-4

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String Operations

mnemonic	meaning	operand(s) required
LODS	LOaD String	source
STOS	STOre String	destination
MOVS	MOVe String	source & destination
CMPS	CoMPare Strings	source & destination
SCAS	SCAn String	destination

MOVS

Source : Memory given by DS:SI ---- Destination : Memory given by ES:DI

During MOVS Flags are not

MOVSB : SI and DI auto increment or decrement by 1

MOVSW: SI and DI auto increment or decrement by 2

MOVSD: SI and DI increment or decrement by 4

MOVS with REP

C is auto decremented by 1

LODS

Source : Memory given by DS:SI

Destination : AL or AX or EAX

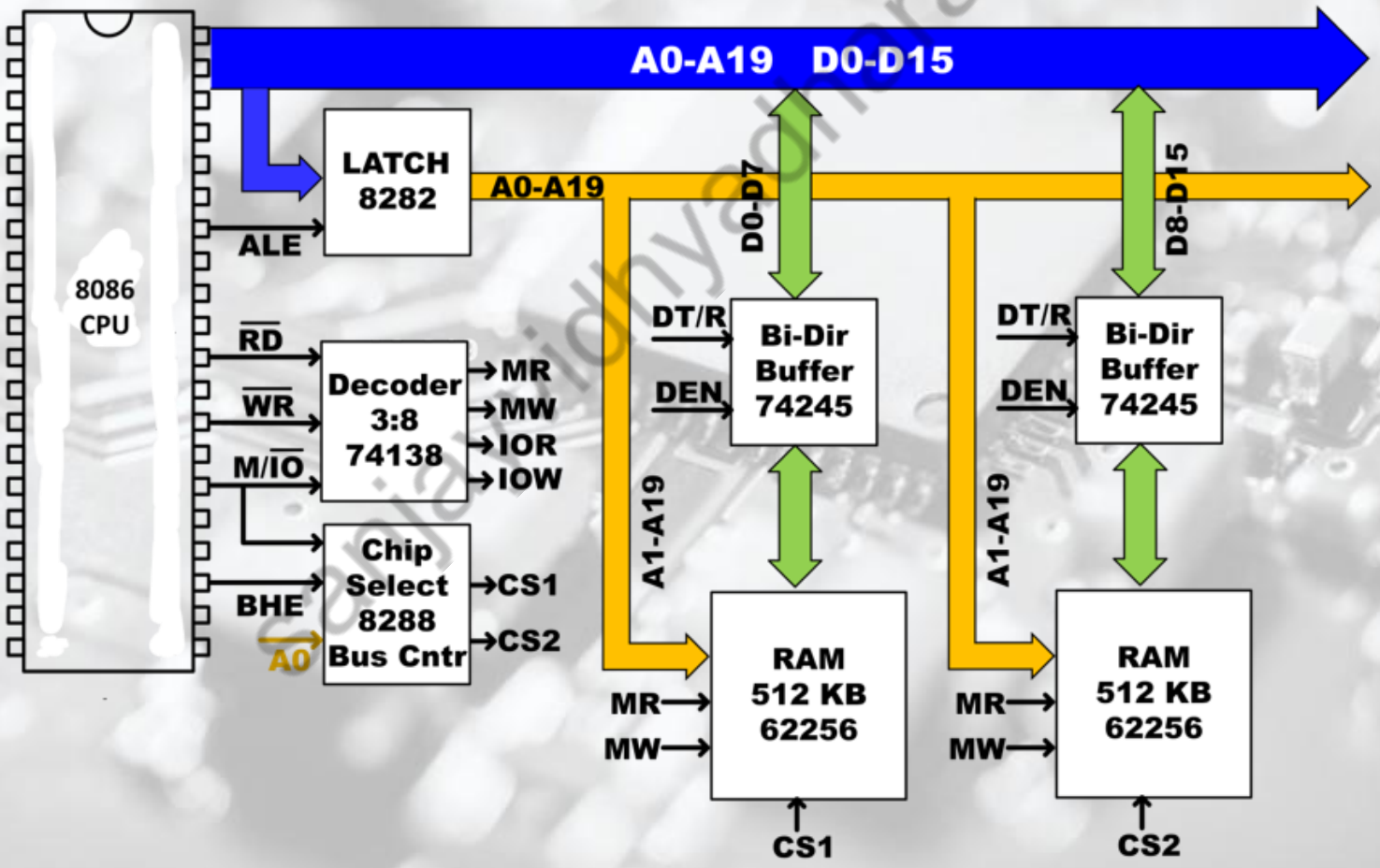
STOS

Source : AL or AX or EAX

Destination : Memory given by ES:DI

Input / Output

- IN : Input byte or word
- OUT : Output byte or word



IN/OUT OPERATION

IN transfers a byte or word from an input port to the AL register or AX register.

IN instruction has two formats:

Fixed port: port number is specified directly in the instruction (port no: 0-255).

Variable port: port number is loaded into the DX register before IN instruction (port no : 0 – 65535).

```
IN AL, 19 H
IN AX, 19 H
IN AL, DX
IN AX, DX
```

```
OUT 19H, AL
OUT 19H , AX
OUT DX, AL
OUT DX, AX
```

INS OPERATION

The **INS (input string)** instruction (not available on the 8086/8088 microprocessors) transfers a byte, word, or doubleword of data from an I/O device into the extra segment memory location addressed by the DI register. The I/O address is contained in the DX register. This instruction is useful for inputting a block of data from an external I/O device directly into the memory. One application transfers data from a disk drive to memory. Disks drives are often considered and interfaced as I/O devices in a computer system

INSB	ES:[DI] = [DX]; DI = DI ± 1 (byte transferred)
INSW	ES:[DI] = [DX]; DI = DI ± 2 (word transferred)
INSD	ES:[DI] = [DX]; DI = DI ± 4 (doubleword transferred)

```
MOV     DI,OFFSET LISTS      ;address array
MOV     DX,3ACH              ;address I/O
CLD                          ;auto-increment
MOV     CX,50                ;load count
REP INSB                     ;input data
```

OUTS OPERATION

OUTSB	[DX] = DS:[SI]; SI = SI ± 1 (byte transferred)
OUTSW	[DX] = DS:[SI]; SI = SI ± 2 (word transferred)
OUTSD	[DX] = DS:[SI]; SI = SI ± 4 (doubleword transferred)

```
MOV    SI,OFFSET ARRAY      ;address array
MOV    DX,3ACH              ;address I/O
CLD                         ;auto-increment
MOV    CX,100               ;load count
REP OUTSB
```

Thank you