

# **INSTRUCTION SET OF 8085**

- **3<sup>rd</sup> Class of Medical  
Instrumentation  
Engineering/MTU/EETC**

# BINARY TO DECIMAL NUMBER FORMAT

8	4	2	1	DECIMAL
0	0	0	0	= 0
0	0	0	1	= 1
0	0	1	0	= 2
0	0	1	1	= 3
0	1	0	0	= 4
0	1	0	1	= 5
0	1	1	0	= 6
0	1	1	1	= 7

8	4	2	1	DECIMAL
1	0	0	0	= 8
1	0	0	1	= 9
1	0	1	0	= 10 = A
1	0	1	1	= 11 = B
1	1	0	0	= 12 = C
1	1	0	1	= 13 = D
1	1	1	0	= 14 = E
1	1	1	1	= 15 = F

# What is Instruction ??????

- An instruction is a binary pattern designed inside a microprocessor to perform a specific function.
- 8085 has **246 instructions**.
- Each instruction is represented by an 8-bit binary value.

# Classification Of Instruction Set

- **There are 5 Types,**
- **(1) Data Transfer Instruction,**
- **(2) Arithmetic Instructions,**
- **(3) Logical Instructions,**
- **(4) Branching Instructions,**
- **(5) Control Instructions,**

## (1) Data Transfer Instructions

- **MOV Rd, Rs**
- **MOV M, Rs**
- **MOV Rd, M**
- **This instruction copies the contents of the source register into the destination register.**
- **The contents of the source register are not altered.**
- **Example: MOV B,A or MOV M,B or MOV C,M**

## BEFORE EXECUTION

A	20	B	
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MOV B,A

## AFTER EXECUTION

A	20	B	20
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A		F		
B	30	C		
D		E		
H	20	L	50	

MOV M,B

A		F		
B	30	C		
D		E		
H	20	L	50	30

A		F		
B		C		
D		E		
H	20	L	50	40

MOV C,M

A		F		
B		C	40	
D		E		
H	20	L	50	40

## (2) Data Transfer Instructions

- **MVI R, Data(8-bit)**
- **MVI M, Data(8-bit)**
- **The 8-bit immediate data is stored in the destination register (R) or memory (M), R is general purpose 8 bit register such as A,B,C,D,E,H and L.**
- **Example: MVI B, 60H or MVI M, 40H**

### BEFORE EXECUTION

A		F	
B		C	
D		E	
H		L	

**MVI B,60H**

### AFTER EXECUTION

A		F	
B	60	C	
D		E	
H		L	

### BEFORE EXECUTION

204FH	
HL=2050H	
2051H	

**MVI M,40H**

### AFTER EXECUTION

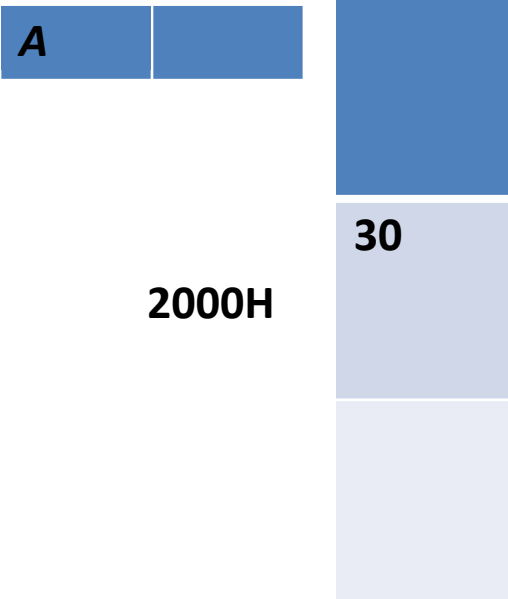
204FH	
HL=2050H	40
2051H	



### (3) Data Transfer Instructions

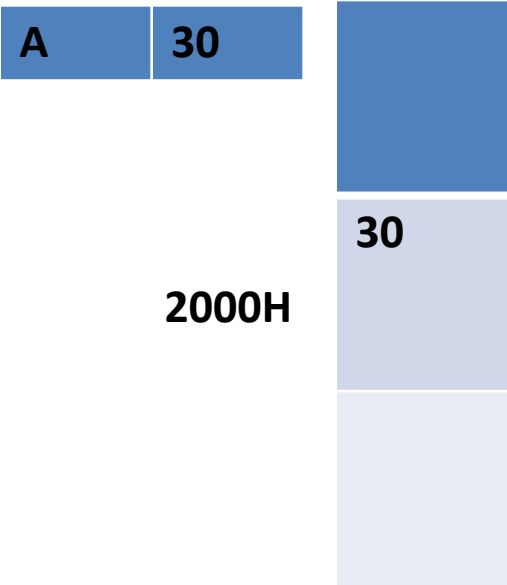
- **LDA 16-bit address**
- **The contents of a memory location, specified by a 16-bit address in the operand, are copied to the accumulator (A).**
- **The contents of the source are not altered.**
- **Example: LDA 2000H**

**BEFORE EXECUTION**



**LDA 2000H**

**AFTER EXECUTION**



## (4) Data Transfer Instructions

- **LDAX Register Pair**
- Load accumulator (A) with the contents of memory location whose address is specified by BC or DE or register pair.
- The contents of either the register pair or the memory location are not altered.
- **Example: LDAX D**

## BEFORE EXECUTION

A		F	
B		C	
D	20	E	30

2030H

80

LDAX D

## AFTER EXECUTION

A	80	F	
B		C	
D	20	E	30

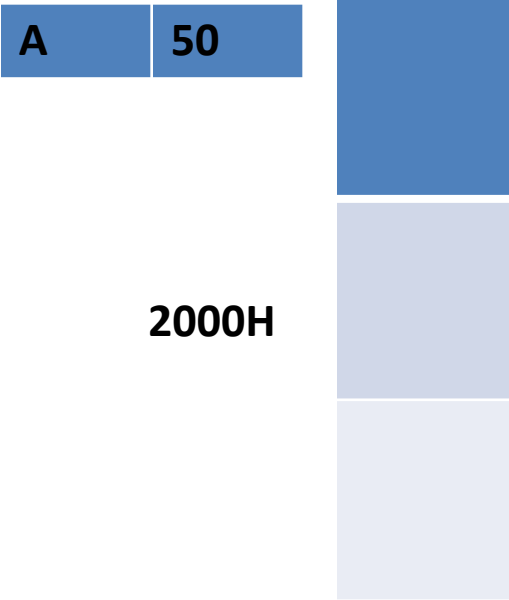
2030H

80

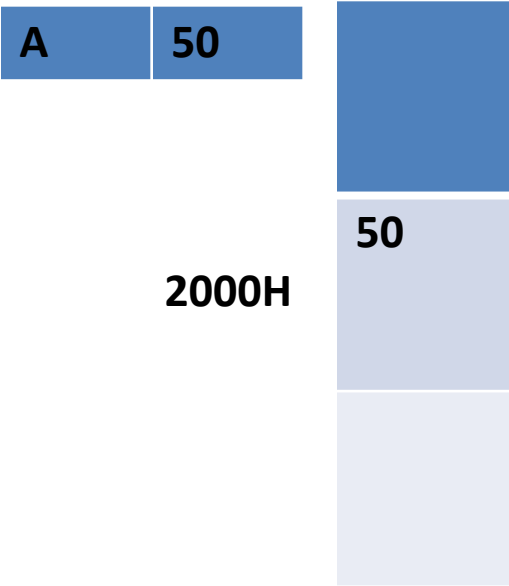
## (5) Data Transfer Instructions

- **STA 16-bit address**
- **The contents of accumulator are copied into the memory location i.e. address specified by the operand in the instruction.**
- **Example: STA 2000 H**

**BEFORE EXECUTION**



**AFTER EXECUTION**

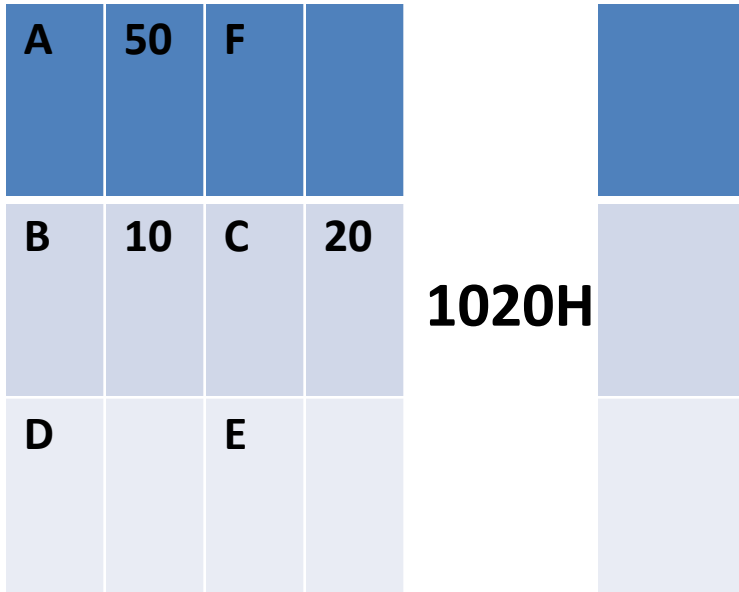


**STA 2000H**

## (6) Data Transfer Instructions

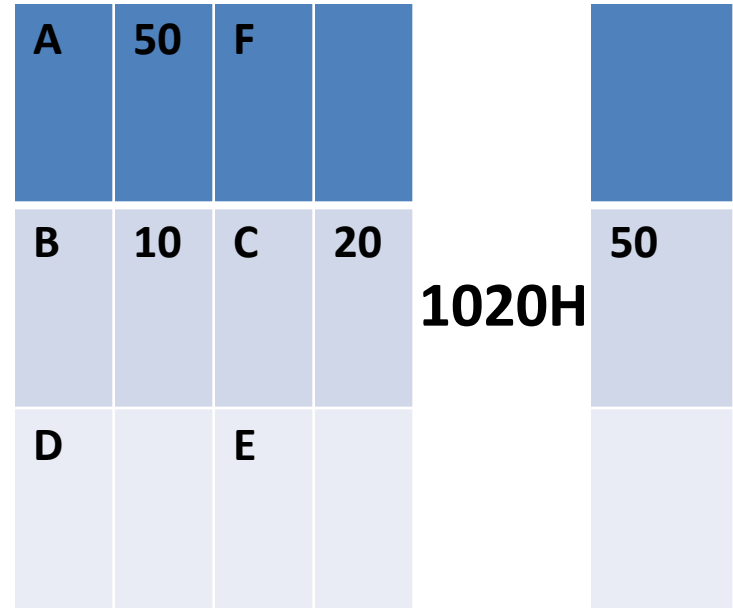
- **STAX Register Pair**
- **Store the contents of accumulator (A) into the memory location whose address is specified by BC Or DE register pair.**
- **Example: STAX B**

## BEFORE EXECUTION



**STAX B**

## AFTER EXECUTION





## (7) Data Transfer Instructions

- **SHLD 16-bit address**
- **Store H-L register pair in memory.**
- **The contents of register L are stored into memory location specified by the 16-bit address.**
- **The contents of register H are stored into the next memory location.**
- **Example: SHLD 2500 H**

## Direct Data Transfer Instructions

2A 00 10  
22 00 12  
2A 02 10  
22 02 12  
2A 04 10  
22 04 12

LHLD 1000H  
SHLD 1200H  
LHLD 1002H  
SHLD 1202H  
LHLD 1004H  
SHLD 1204H

;load HL from 1000H and 1001H  
;store HL in 1200H and 1201H  
;load HL from 1002H and 1003H  
;store HL in 1202H and 1203H  
;load HL from 1004H and 1005H  
;store HL in 1204H and 1205H

Copies the contents of location 1000H into the L register and the contents of location 1001 H into the H register

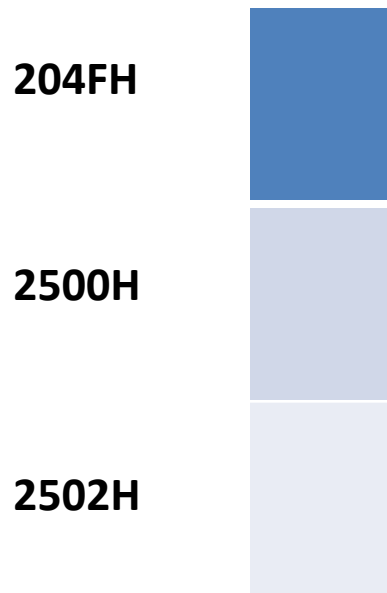
stores the contents of the L register at memory location 1200H and the H register at location 1201H

Example: SHLD 2500 H

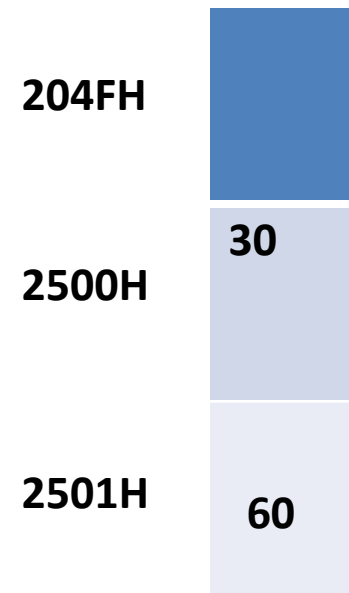
**BEFORE EXECUTION**



**AFTER EXECUTION**



**SHLD 2500H**



## (8) Data Transfer Instructions

- **XCHG**
- **The contents of register H are exchanged with the contents of register D.**
- **The contents of register L are exchanged with the contents of register E.**
- **Example: XCHG**

## BEFORE EXECUTION

D	20	E	40
H	70	L	80

**XCHG**

## AFTER EXECUTION

D	70	E	80
H	20	L	40

## (9) Data Transfer Instructions

- **SPHL**
- **Move data from H-L pair to the Stack Pointer (SP)**
- **This instruction loads the contents of H-L pair into SP.**
- **Example: SPHL**

## BEFORE EXECUTION

SP			
H	25	L	00

## SPHL

## AFTER EXECUTION

SP	2500		
H	25	L	00

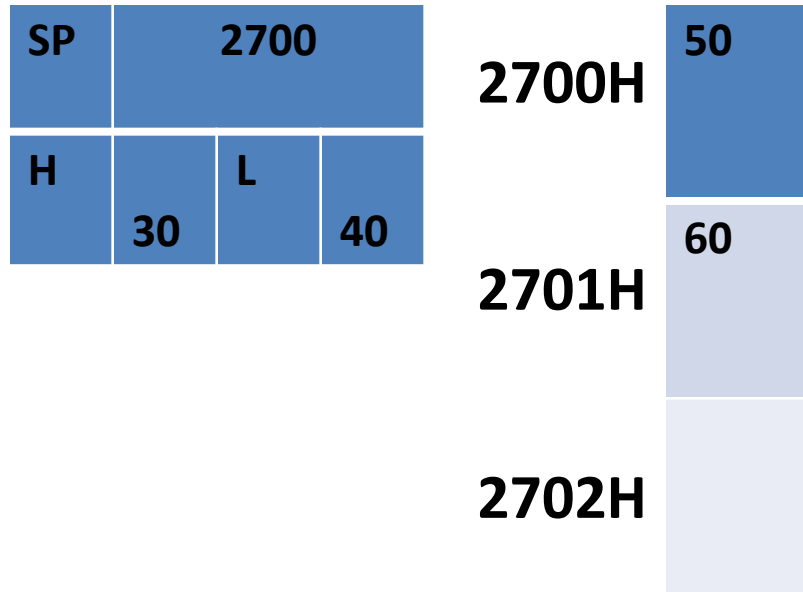
## (10) Data Transfer Instructions

- **XTHL**
- **Exchange H–L with top of stack**
- **The contents of L register are exchanged with the location pointed out by the contents of the SP.**
- **The contents of H register are exchanged with the next location (SP + 1).**
  
- **Example: XTHL**

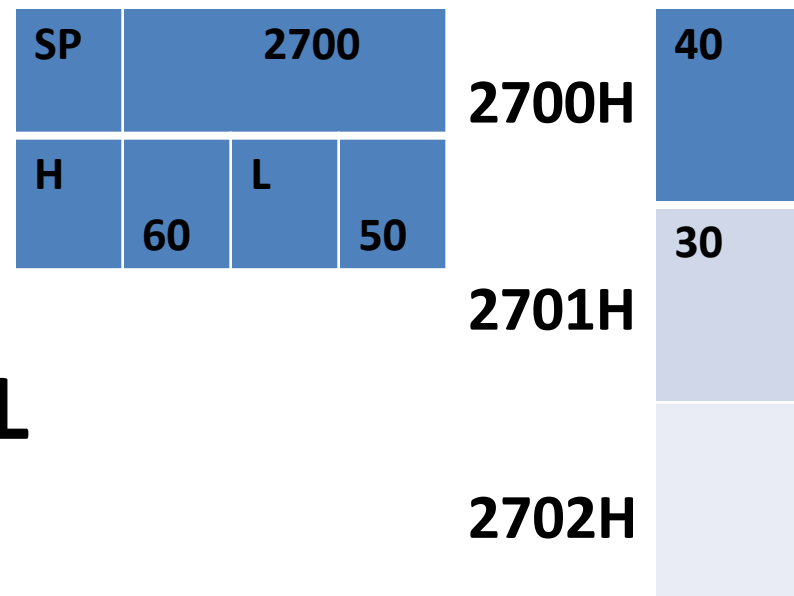


L=SP  
H=(SP+1)

### BEFORE EXECUTION



### AFTER EXECUTION



**XTHL**

## (11) Data Transfer Instructions

- **PCHL**
- **Load program counter with H-L contents**
- **The contents of registers H and L are copied into the program counter (PC).**
- **The contents of H are placed as the high-order byte and the contents of L as the low-order byte.**
- **Example: PCHL**

BEFORE EXECUTION

PC			
H	60	L	00

**PCHL**

**AFTER EXECUTION**

PC	6000		
H	60	L	00

## (12) Data Transfer Instructions

- **IN 8-bit port address**
- **Copy data to accumulator from a port with 8-bit address.**
- **The contents of I/O port are copied into accumulator.**
- **Example: IN 80 H**

## BEFORE EXECUTION

PORT 80H  A horizontal bar representing memory at PORT 80H, divided into two segments. The right segment contains the value 10.

A  A horizontal bar representing register A, divided into two segments. The left segment contains the value A.

# IN 80H

## AFTER EXECUTION

PORT 80H  A horizontal bar representing memory at PORT 80H, divided into two segments. The right segment contains the value 10.

A  A horizontal bar representing register A, divided into two segments. The left segment contains the value A and the right segment contains the value 10.

## (13) Data Transfer Instructions

- **OUT 8-bit port address**
- **Copy data from accumulator to a port with 8-bit address**
- **The contents of accumulator are copied into the I/O port.**
- **Example: OUT 50 H**

BEFORE EXECUTION

PORT 50H  10

A  40

**OUT 50H**

AFTER EXECUTION

PORT 50H  40

A  40