

# Code-Conversion-Using-8085

## Aim:

**To write 8085 microprocessor programs for converting:**

1. Hexadecimal to ASCII
2. ASCII to Hexadecimal

## Apparatus Required:

- Laptop with an internet connection

## Program 1: Hexadecimal to ASCII Conversion

### Algorithm:

1. Load the hexadecimal number from memory location 4200H.
2. Mask the upper nibble and check if it is less than 10H.
3. If it is less than 10H, add 30H to convert it to ASCII.
4. If it is greater than 10H, add 37H to convert it to ASCII.
5. Repeat the process for the lower nibble.
6. Store the ASCII equivalent in memory location 4300H and 4301H.

### Program:

```
ORG 00H
; Input : Port 00H (Hexadecimal number)
; Output: Port 01H (ASCII of upper nibble)
;        Port 02H (ASCII of lower nibble)

MVI A, 00H
IN 00H      ; Read hexadecimal number
MOV B, A    ; Save a copy of original number
```

```

ANI 0F0H    ; Mask lower nibble
RRC
RRC
RRC
RRC        ; Move upper nibble to lower position
CPI 0AH     ; Compare with 0AH
JC ADD30U   ; If less than 0AH, jump
ADI 37H     ; Add 37H for A-F
JMP STORE1

ADD30U: ADI 30H ; Add 30H for 0-9

STORE1: OUT 01H ; Send upper nibble ASCII to port 01H

; Process lower nibble
MOV A, B    ; Get original number
ANI 0FH     ; Mask upper nibble
CPI 0AH     ; Compare with 0AH
JC ADD30L   ; If less, jump
ADI 37H     ; Add 37H for A-F
JMP STORE2

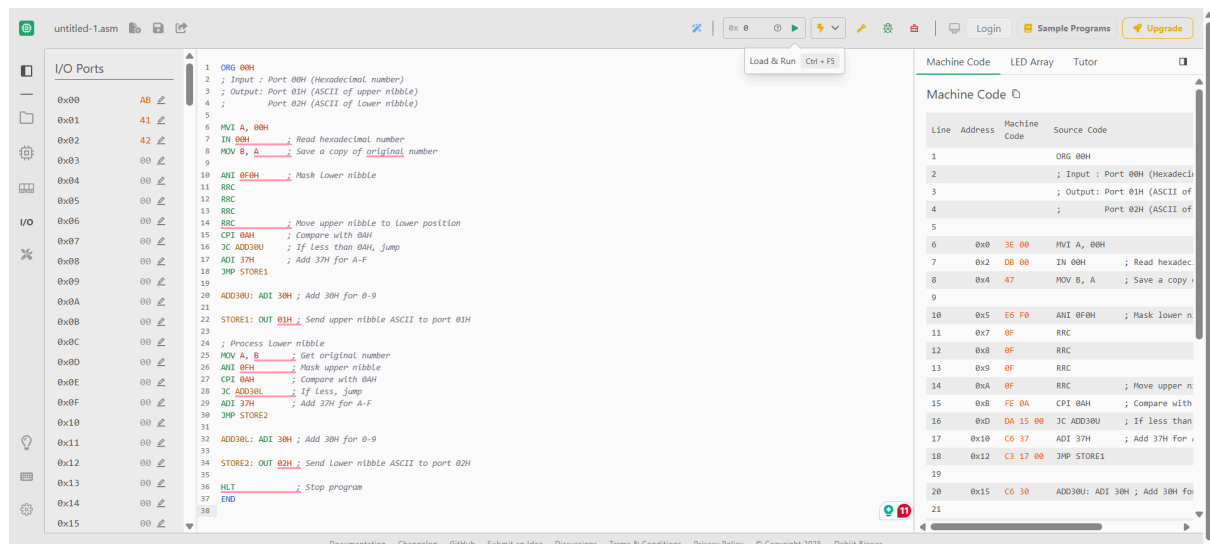
ADD30L: ADI 30H ; Add 30H for 0-9

STORE2: OUT 02H ; Send lower nibble ASCII to port 02H

HLT        ; Stop program
END

```

**Output:**



Input Ports (numbers are read from these ports):

00H → Input hexadecimal number

Output Ports (results are displayed on these ports):

01H → ASCII of upper nibble

02H → ASCII of lower nibble

## Program 2: ASCII to Hexadecimal Conversion

### Algorithm:

1. Load the first ASCII digit from memory location 4200H.
2. Convert it to hexadecimal by subtracting 30H (if it's a number) or 37H (if it's a letter A-F).
3. Load the second ASCII digit from memory location 4201H and repeat the process.
4. Combine the upper and lower nibbles to form a hexadecimal number.
5. Store the result in memory location 4300H.

### Program:

ORG 00H

; Input : Port 00H → ASCII of upper nibble

; Port 01H → ASCII of lower nibble  
; Output: Port 02H → Combined hexadecimal number

; --- Convert upper ASCII nibble to HEX ---  
IN 00H ; Read upper ASCII digit  
CPI 3AH ; Compare with '9'+1 (3AH)  
JC SUB30U ; If less than 3AH, it's 0–9  
SUI 37H ; Else subtract 37H for A–F  
JMP STOREU

SUB30U: SUI 30H ; Subtract 30H for 0–9 conversion  
STOREU: MOV C, A ; Store upper nibble in C

; --- Convert lower ASCII nibble to HEX ---  
IN 01H ; Read lower ASCII digit  
CPI 3AH ; Compare with '9'+1 (3AH)  
JC SUB30L ; If less than 3AH, it's 0–9  
SUI 37H ; Else subtract 37H for A–F  
JMP STOREL

SUB30L: SUI 30H ; Subtract 30H for 0–9 conversion  
STOREL: MOV B, A ; Store lower nibble in B

; --- Combine upper and lower nibbles ---  
MOV A, C ; Get upper nibble  
RLC ; Shift left 4 times  
RLC  
RLC  
RLC  
ADD B ; Add lower nibble  
OUT 02H ; Output final hexadecimal number  
  
HLT ; Stop program  
END

**Output:**

The screenshot shows an 8085 assembly editor with the following components:

- I/O Ports Table:**

Port	Value
0x00	35
0x01	41
0x02	5A
0x03	00
0x04	00
0x05	00
0x06	00
0x07	00
0x08	00
0x09	00
0x0A	00
0x0B	00
0x0C	00
0x0D	00
0x0E	00
0x0F	00
0x10	00
0x11	00
0x12	00
0x13	00
0x14	00
0x15	00
- Assembly Code Editor:**

```

1  ORG 00H
2  ; Input : Port 00H → ASCII of upper nibble
3  ;      Port 01H → ASCII of Lower nibble
4  ; Output: Port 02H → Combined hexadecimal number
5
6  ; --- Convert upper ASCII nibble to HEX ---
7  IN 00H      ; Read upper ASCII digit
8  CPI 3AH     ; Compare with '9'+1 (3AH)
9  JC SUB30H   ; If less than 3AH, it's 0-9
10 SUI 37H     ; Else subtract 37H for A-F
11 JMP STOREU
12
13 SUB30H: SUI 30H ; Subtract 30H for 0-9 conversion
14 STOREU: MOV C, A ; Store upper nibble in C
15
16 ; --- Convert Lower ASCII nibble to HEX ---
17 IN 01H      ; Read Lower ASCII digit
18 CPI 3AH     ; Compare with '9'+1 (3AH)
19 JC SUB30L   ; If less than 3AH, it's 0-9
20 SUI 37H     ; Else subtract 37H for A-F
21 JMP STOREL
22
23 SUB30L: SUI 30H ; Subtract 30H for 0-9 conversion
24 STOREL: MOV B, A ; Store Lower nibble in B
25
26 ; --- Combine upper and Lower nibbles ---
27 MOV A, C     ; Get upper nibble
28 RLC         ; Shift Left 4 times
29 RLC
30 RLC
31 RLC
32 ADD B       ; Add Lower nibble
33 OUT 02H     ; Output final hexadecimal number
34
35 HLT         ; Stop program
36
37 END
38

```
- Machine Code Window:**

Line	Address	Machine Code	Source Code
1			ORG 00H
2			; Input : Port 00H → ASCII of upper nibble
3			; Port 01H → ASCII of Lower nibble
4			; Output: Port 02H → Combined hexadecimal number
5			
6			; --- Convert upper ASCII nibble to HEX ---
7	0x00	D8 00	IN 00H ; Read upper
8	0x02	FE 3A	CPI 3AH ; Compare with
9	0x04	DA 0C 00	JC SUB30H ; If less than
10	0x07	D6 37	SUI 37H ; Else subtract
11	0x09	C3 0E 00	JMP STOREU
12			
13	0x0C	D6 30	SUB30H: SUI 30H ; Subtract 30H
14	0x0E	4F	STOREU: MOV C, A ; Store upper nibble
15			
16			; --- Convert Lower ASCII nibble to HEX ---
17	0x0F	D8 01	IN 01H ; Read Lower
18	0x11	FE 3A	CPI 3AH ; Compare with
19	0x13	DA 18 00	JC SUB30L ; If less than
20	0x16	D6 37	SUI 37H ; Else subtract
21	0x18	C3 1D 00	JMP STOREL

## Input Ports:

00H → ASCII of upper nibble

01H → ASCII of lower nibble

## Output Port:

02H → Hexadecimal number (combined 8-bit value)

## Result:

The 8085 microprocessor successfully converts hexadecimal numbers to ASCII and vice versa, storing the results in memory.