

# Lab 5

## Lab Assignments

1. Write an assembly language program in a 8085 microprocessor for the conversion of BCD to HEX or BCD to BINARY or DECIMAL to HEX or DECIMAL to BINARY.

- Input: \$25\_{10}\$
- Output: \$19H\$

**Ans:**

```
; Memory initialization
LXI H, 3000H
MVI A, 25H      ; Load the input number into the accumulator
MOV M, A        ; Move the input number to the memory location

; Initialization
LXI H, 3000H    ; Initialize the HL pair to point at the input address
MOV A, M        ; Load BCD number from 3000H into accumulator
MOV B, A        ; Copy BCD value to register B

; Extract and process the higher bit
ANI 0F0H        ; Do and with F0 to get the higher bit
RRC             ; Rotate accumulator 4 bits right
RRC
RRC
RRC             ; Now, higher bit is shifted to lower bit position
MOV C, A        ; Store higher bit in register C

; Multiply higher bit by 10 using repetitive addition
MVI D, 0AH      ; Load register D with multiplier as counter
MVI A, 00H      ; Clear accumulator for result of multiplication

MULTIPLY:
    ADD C        ; Add high bit repeatedly
    DCR D        ; Decrement multiplier counter
    JNZ MULTIPLY ; Repeat until counter becomes 0

MOV C, A        ; Store result (high bit × 10) in C

; Add the lower bit
MOV A, B        ; Reload original BCD value
ANI 0FH        ; Mask high bit to get low bit (A & 0FH)
ADD C           ; Add intermediate result (high bit × 10)
               ; Result is now complete in accumulator

; Store result
LXI H, 3010H    ; Load HL with output address 3010H
MOV M, A        ; Store the binary result in memory 3010H
```

```
HLT                ; Halt the program
```

2. Write an assembly language program in a 8085 microprocessor for the conversion of HEX to BCD.

- Input: \$(2200H) - 34H\$
- Output: \$(2210H) - 52H\$

**Ans:**

```
MEMORY_INITIALIZATION:
    LXI H, 2200H    ; Point the HL pair to the memory location
    MVI A, 34H      ; Insert the input value in accumulator
    MOV M, A        ; Move the value to the memory

INITIALIZATION:
    LXI H, 2200H    ; Point the HL pair to the memory location
    MOV A, M        ; Move the input value into accumulator
    MOV B, A        ; Store the value in register B for future
reference
    MVI C, 00H      ; Clear the register C to store Quotient
    MVI D, 0AH      ; Set the

DIVISION:
    CMP D            ; Compare accumulator with 10
    JC BCD_CALCULATION ; If value in accumulator is < 10 then do BCD
calculation
    SUB D            ; Subtract 10 from accumulator
    INR C            ; Increment the Quotient
    JMP DIVIDE       ; Continue division

BCD_CALCULATION:
    MOV E, A         ; Store the Remainder in E
    MOV A, C         ; Get the Quotient in accumulator
    RLC              ; Left shift 4 times
    RLC
    RLC
    RLC              ; To get the Quotient in 10s place
    MOV C, A         ; Store the value of accumulator in C

    MOV A, E         ; Take the Remainder in accumulator
    ADD C            ; Add value of C in it

STORE_ANSWER:
    LXI H, 2210H    ; Point the HL pair to memory location
    MOV M, A        ; Store value of accumulator in the memory

HLT                ; Stop the execution
```