BINARY TO BCD CONVERSION

Problem Statement

A binary number is stored in memory location BINBYT. Convert the number into BCD and store each BCD as two unpacked BCD digits in the output Buffer. To perform this task, write a main program & two subroutines: one to supply the powers of ten & the other to perform the conversion.

Program :- This program converts an 8 bit number into a BCD number; thus it requires 12 bits to represent three BCD digits. The result is stored as three unpacked BCD digits in three Output-Buffer memory locations.

```
START: LXI SP, STACK ; Initialize stack pointer
       LXI H, BINBYT ; Point HL index where
                       binary number is stored.
       MOV A, M      ; Transfer byte.
       CALL PWRTEN   ; Call Subroutine to load
                       power of 10
       HLT.

PWRTEN: LXI H, OUTBUF ; Point HL index to output
                        Buffer memory.
        MVI B, 64H    ; Load 100 in register B
        CALL BINBCD   ; Call Conversion.
        MVI B, 0AH    ; Load 10 in register B.
        CALL BINBCD
        MOV M, A      ; Store BCD 1
        RET
BINBCD: MVI M, FFH    ; Load buffer with (0-1)
        INR M         ; Clear buffer & increment
                        for each Substraction.
```

```
SUB B      ; Subtract power of 10 from binary number.
JNC NXTBUF ; Is number > power of 10? if yes, add 1 to
             buffer memory.
ADD B      ; if no, add power of 10 to get back remainder.
INX H      ; Go to next buffer location.
RET.
```

For example, assume the binary number is

$1111\ 1111_2$ (FFH) = 255$_{10}$.

to represent this number in BCD requires 12 bits or three BCD digits, labeled here as BCD_3 (MSB), BCD_2 & BCD_1 (LSB)

= 0010 0101 0101

BCD_3 BCD_2 BCD_1

The conversion can be performed as follows:-

Step 1 : If the number is less than 100, go to step 2 otherwise, divide by 100 or Subtract 100 repeatedly until the remainder is less than 100. the quotient is the most significant BCD digit BCD_3.

Step 2 :- If the number is less than 10, go to step 3; otherwise divide by 10 repeatedly until the remainder is less than 10. The quotient is BCD_2

Step 3 :- The remainder from Step 2 is BCD_1

Example	Quotient
255	
−100 = 155	1
−100 = 55	1
$BCD_3 = 2$	
55	
−10 = 45	1
−10 = 35	1
−10 25	1
−10 = 15	1
−10 = 05	1
$BCD_2 = 5$	
$BCD_1 = 5$	