U19CS076 MIT ASSIGNMENT 8

Q1. Write a program to convert a given number of binary data bytes into their BCD equivalents, and store them as unpacked BCDs in the output buffer. The number of data bytes is specified in register D in the main program. The converted numbers should be stored in groups of three consecutive memory locations. If the number is not large enough to occupy all three locations, Zeros should be loaded in those locations.

```
;q1

mvi C,05h    ; FOR 5 SONCSECUTIVE NUMBERS FROM 3000H

lxi H,3000h    ; source address

lxi D,3050h    ; destination address

loop:    mov A,M ; A carries binary input

          call bcd; convert from binary to bcd unpacked,

          ; store at location indicated by DE register pair

         inx h

         dcr c

         jnz loop

         hlt


;binary to bcd unpacked occupying 3 bytes

;for representing the place values: 100s, 10s and 1s

bcd:    push H

         lxi H,0


;H register for representing 100s

l1:    cpi 64h

      jc l2
```

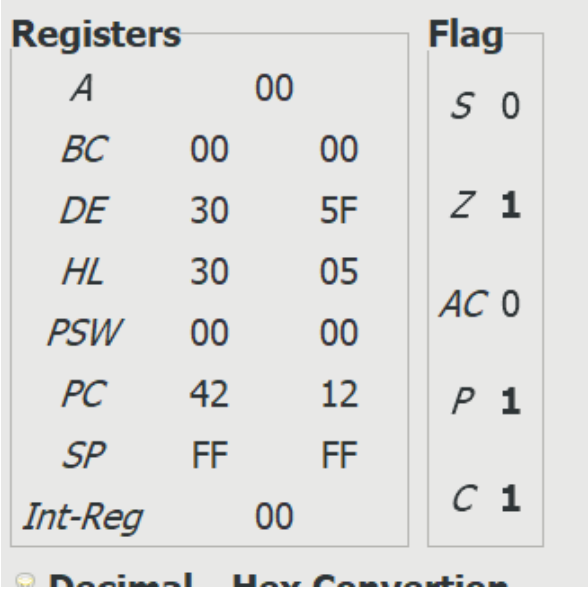
```
    sui 64h
    inr H
    jmp l1

;L register for representing 10s
l2:  cpi 0Ah
     jc l3
     sui 0Ah
     inr L
     jmp l2

;remainder is stored directly as 1s place value
l3:  stax D   ; store 1s place
     inx D
     mov A,L
     stax D   ; store 10s place
     inx D
     mov A,H
     stax D   ; store 100s place
     inx D
     pop H
ret
```

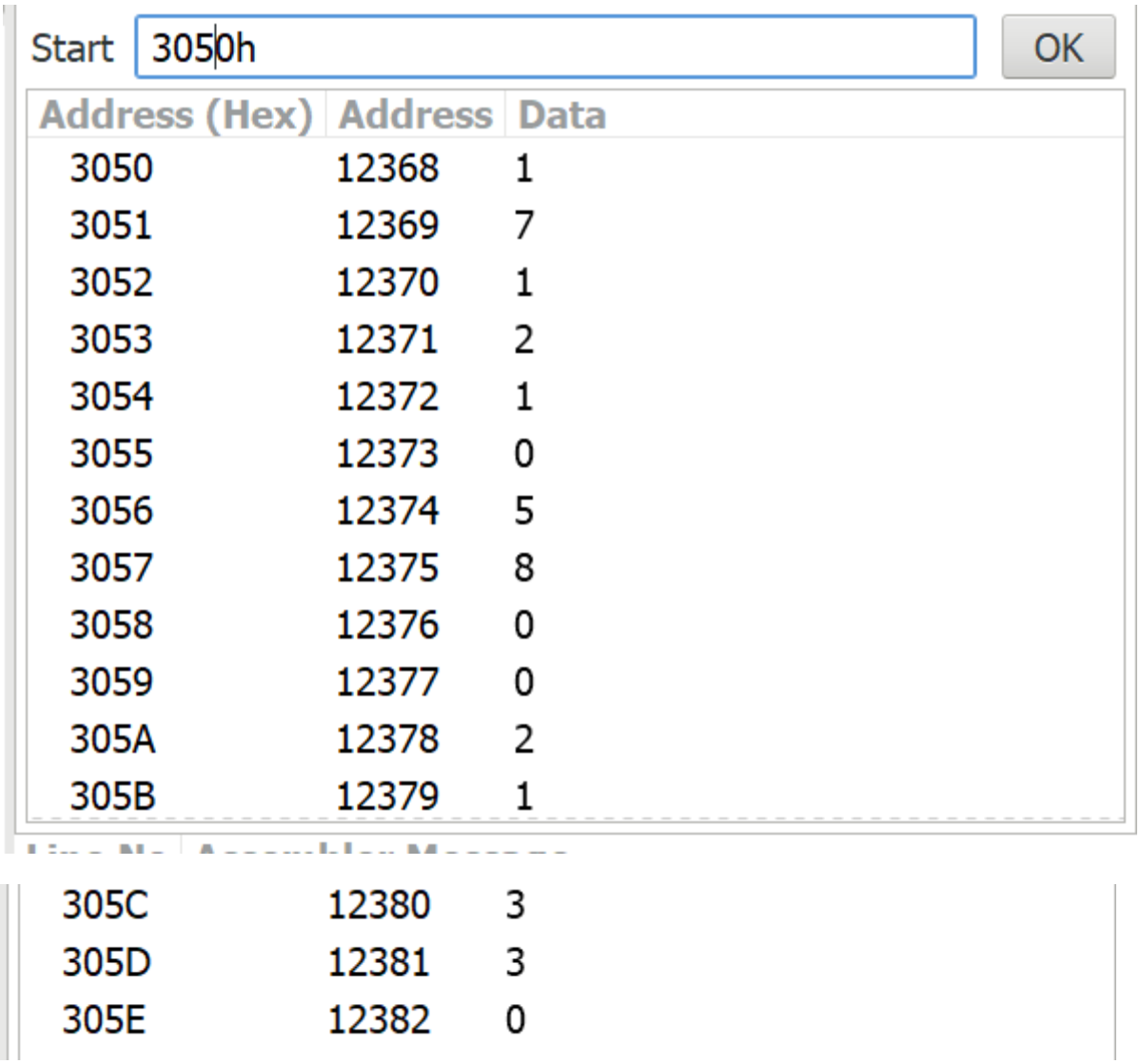
INPUT

Start 3000h OK

Address (Hex)	Address	Data
3000	12288	171
3001	12289	12
3002	12290	85
3003	12291	120
3004	12292	33
3005	12293	0

OUTPUT





Q2. A set of ten BCD readings is stored in the Input Buffer. Convert the numbers into binary and add the numbers. Store the sum in the Output Buffer, the sum can be larger than FFH.

```
MVI B,0AH       ;counts till 10
LXI D,2000H     ;source pointer
LXI H,0000H     ;sum register
LOOP:  CALL BIN
       MOV C,A
       MOV A,B
```

```
        MVI B,00H
        DAD B   ;add binary value
        INX D
        MOV B,A
        DCR B
        JNZ LOOP
        SHLD 2010H      ;store answer in 2010H
        hlt

;input is packed BCD
;output is binary equivalent of BCD
BIN:    PUSH B
        PUSH H
        LDAX D
        ANI 0FH                 ;unpacking BCD
        MOV B,A
        LDAX D
        ANI 0F0H
        RRC
        RRC
        RRC
        RRC
        MOV H,A
        MVI C,09H
MULTI:  ADD H  ;A*10+B
```

DCR C

JNZ MULTI

ADD B

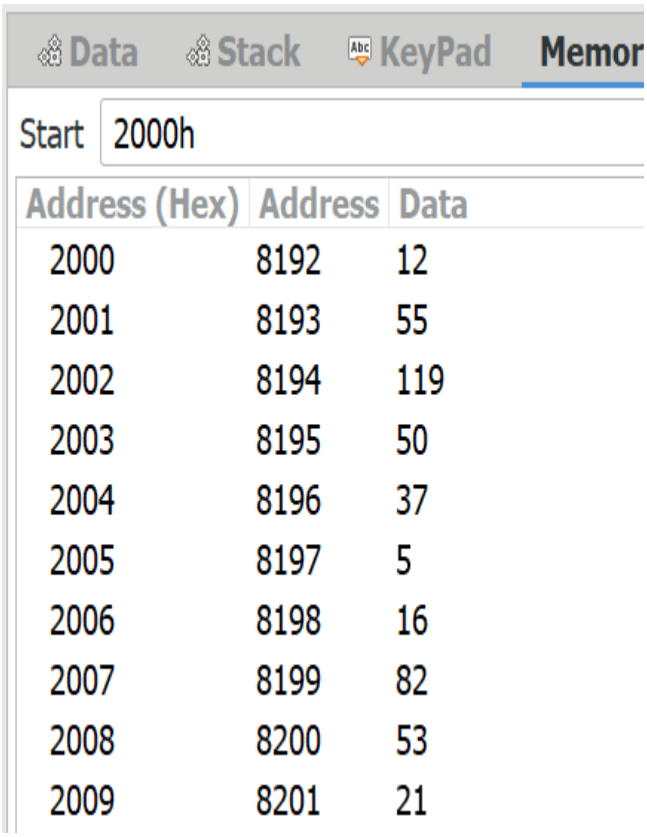
POP H

POP B

RET

HLT

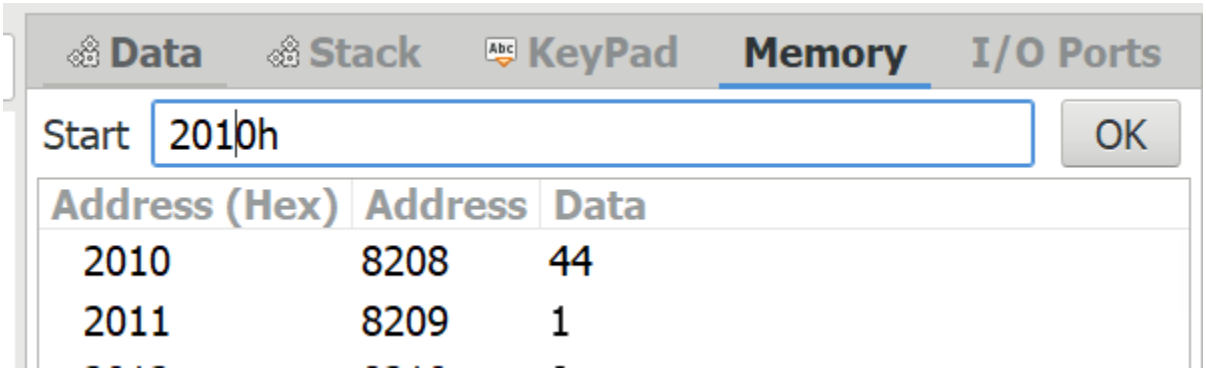
INPUT:



Data (in BCD)
12
37
77
32
25
5
10
52
35
15
SUM=300

Adding the decimal value of each we get sum =300 =12C (Hex)

OUTPUT:



44 dec = 2C Hex

So 12Chex=200 sum which is verified.

Q3. A set of ASCII Hex digits is stored in the Input Buffer memory. Write a program to convert these numbers into binary. Add these numbers in binary, and store the result in the Output- Buffer memory.

```
MVI B,0Ah       ;count till 10
MVI C,00H       ;sum register
LXI D,2000H     ;source pionter
LXI H,2010H     ;destination pointer
```

```
LOOP:   LDAX D
        CALL ASCBIN
        MOV M,A
        MOV A,C
        ADD M
        MOV C,A             ;adding
        INX H
        INX D
        DCR B
        JNZ LOOP
        MOV M,C             ;storing sum at end
        HLT

;input is ASCII and ouput is Binary
ASCBIN: SUI 30H             ;subtract input with 30H=48 to get
        CPI 0AH;if less then 10 return (carry flag is set)
        RC
        SUI 07H;for A-F
        RET
```

INPUT

Start 2000h OK

Address (Hex)	Address	Data
2000	8192	49
2001	8193	50
2002	8194	51
2003	8195	48
2004	8196	66
2005	8197	77
2006	8198	61
2007	8199	64
2008	8200	61
2009	8201	49

OUTPUT

Registers

A		3D
BC	00	3D
DE	20	0A
HL	20	1A
PSW	00	00
PC	42	1A
SP	FF	FF
Int-Reg		00

Flag

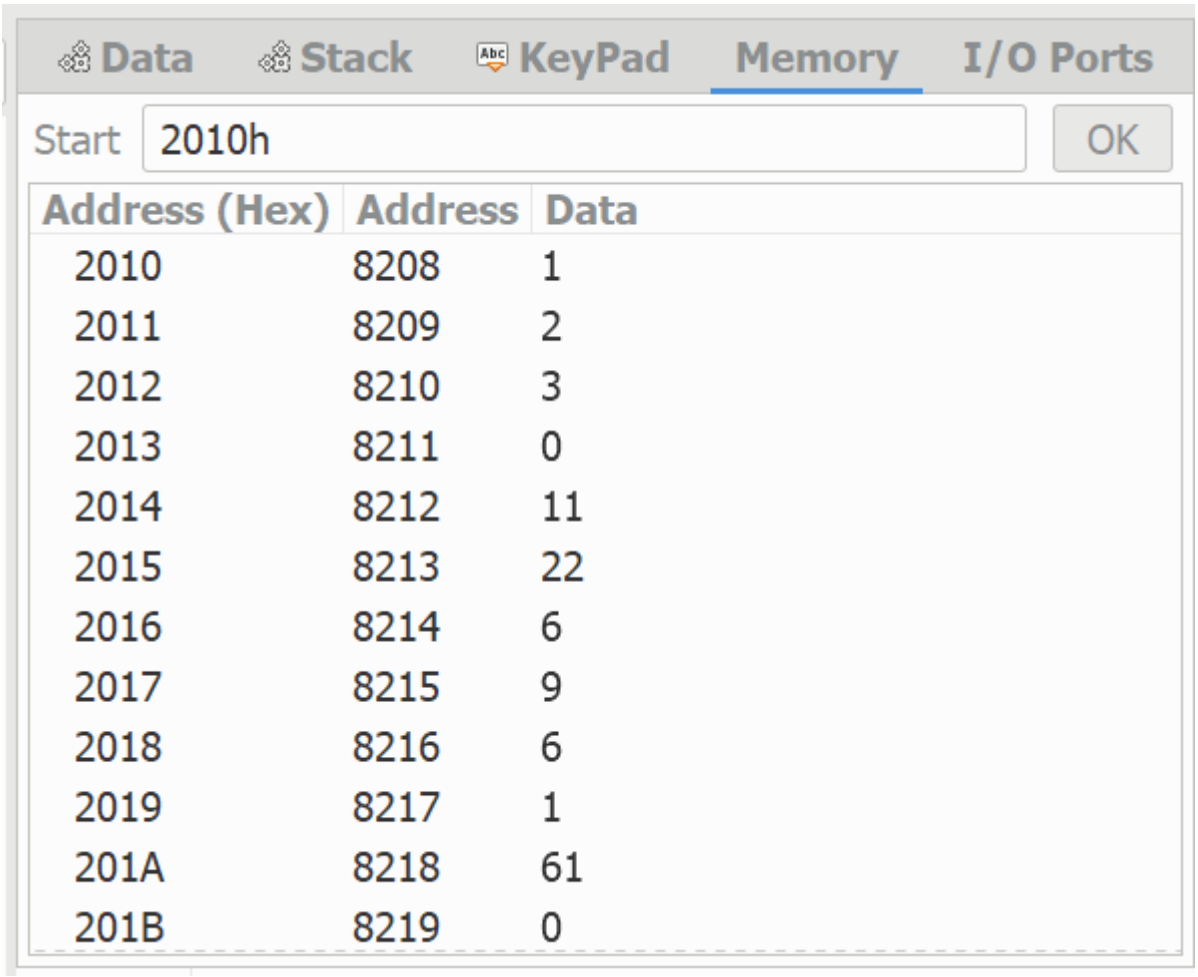
S 0

Z **1**

AC 0

P **1**

C 0



Address (Hex)	Address	Data
2010	8208	1
2011	8209	2
2012	8210	3
2013	8211	0
2014	8212	11
2015	8213	22
2016	8214	6
2017	8215	9
2018	8216	6
2019	8217	1
201A	8218	61
201B	8219	0

201A contains sum of all binary digits.