

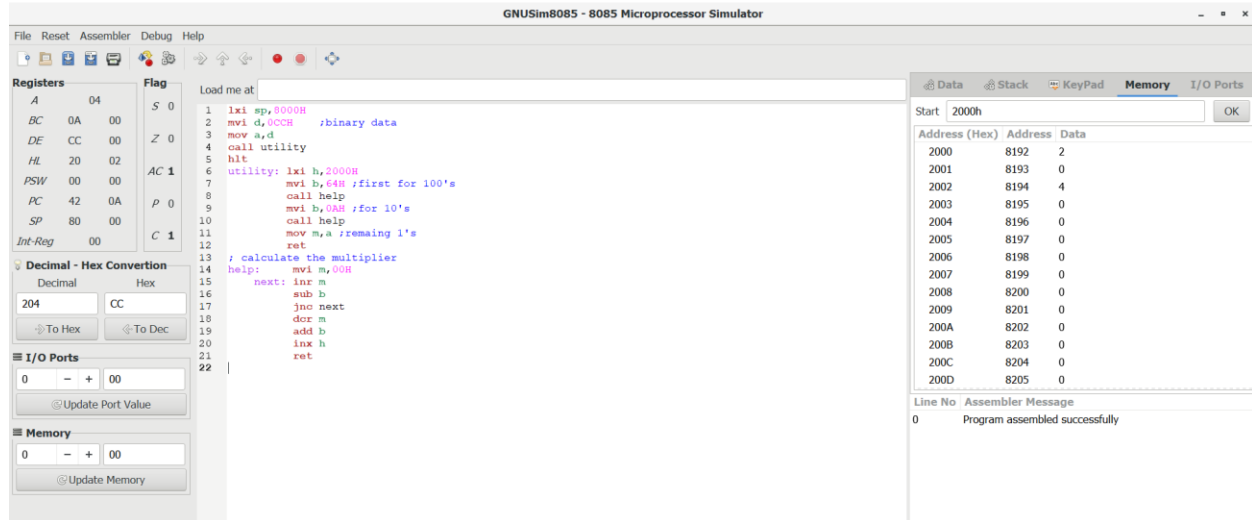
U18CO018
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Assignment – 7

1-> 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.

Code:-

```
lxi sp,8000H
mvi d,0CCH ;binary data
mov a,d
call utility
hlt
utility: lxi h,2000H
         mvi b,64H ;first for 100's
         call help
         mvi b,0AH ;for 10's
         call help
         mov m,a ;remaing 1's
         ret
; calculate the multiplier
help:    mvi m,00H
         next: inr m
         sub b
         jnc next
         dcr m
         add b
         inx h
         ret
```

Output:-



2-> 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.

Code:-

lxi sp,8000H ;stack pointer

lxi h,2000H ;input buffer

lxi b,200AH ; output buffer

mvi e,00H

mvi d,0AH

next: mov a,m

call help

stax b

add e ; add value

mov e,a

jnc go

lda 2014H

inr a ; if carry then increment carry

sta 2014H

go: inx h

inx b

dcr d

jnz next

sta 2015H ;store the result

hlt

help: push b ;convert into the BCD to binary argument and return in A

```

push d
mov b,a
ani 00FH           ; lower order in c
mov c,a
mov a,b
ani 0F0H           ;higer order
jz utility
rrc
rrc
rrc                 ; rotate 4 times to get the value
rrc
mov d,a
xra a
mvi e,0AH          ; 10*higher order
sum: add e
    dcr d
    jnz sum
utility: add c       ; 10*higher order + lower order
    pop d
    pop b
ret

```

Before Executing :-

GNUSim8085 - 8085 Microprocessor Simulator

File Reset Assembler Debug Help

Registers

Register	Value
A	20
AD	14
BC	00
DE	AD
HL	0A
PSW	00
PC	28
SP	00
Int-Reg	00

Flag

Flag	Value
S	0
Z	1
AC	0
P	1
C	0

Decimal - Hex Conversion

Decimal: 80 Hex: 50

I/O Ports

0 - + 00

Memory

0 - + 00

Address (Hex) Address Data

Address (Hex)	Address	Data
2000	8192	144
2001	8193	16
2002	8194	32
2003	8195	115
2004	8196	64
2005	8197	68
2006	8198	80
2007	8199	20
2008	8200	128
2009	8201	8
200A	8202	0
200B	8203	0
200C	8204	0
200D	8205	0

Line No Assembler Message

0 Program assembled successfully

After Executing :-

The screenshot shows the GNUSim8085 - 8085 Microprocessor Simulator. The main window displays the following assembly code:

```

1  lxi sp,8000H ;stack pointer
2  lxi h,2000H ;input buffer
3  lxi b,200AH ; output buffer
4  mvi e,00H
5  mvi d,0AH
6  next: mov a,m
7      call help
8      stax b
9      add e ; add value
10     mov e,a
11     jnc go
12     lda 2014H
13     inr a ; if carry then increment carry
14     sta 2014H
15     go: inx h
16     inx b
17     dcr d
18     jnz next
19     sta 2015H ;store the result
20     hlt
21     help: push b ;convert into the BCD to binary argument and return in accumulator
22           push d
23           mov b,a
24           ani 00FH ; lower order in c
25           mov c,a
26           mov a,b
27           ani 0F0H ;higher order
28           jz utility
29           rrc
30           rrc
31           rrc ; rotate 4 times to get the value
32           rrc
33           mov d,a
34           xra a
35           mvi a,0AH ; 10*higher order
36           sum: add e
37           dcr d
38           jnz sum
39           utility: add c ; 10*higher order + lower order
40                   pop d
41                   pop b
42     ret

```

The Registers panel shows the following values:

Register	Value
A	AD
BC	20 14
DE	00 AD
HL	20 0A
PSW	00 00
PC	42 28
SP	80 00
Int-Reg	00

The Flag panel shows the following values:

Flag	Value
S	0
Z	1
AC	0
P	1
C	0

The Memory panel shows the following values:

Address (Hex)	Address	Data
200A	8202	90
200B	8203	10
200C	8204	20
200D	8205	73
200E	8206	40
200F	8207	44
2010	8208	50
2011	8209	14
2012	8210	80
2013	8211	8
2014	8212	2
2015	8213	173
2016	8214	0
2017	8215	0

The Data panel shows the following values:

Start	200Ah
8203	10

The I/O Ports panel shows the following values:

Port	Value
0	00

The Memory panel shows the following values:

Port	Value
0	00

The Assembler Message panel shows the following message:

```

Line No  Assembler Message
0        Program assembled successfully

```

3-> 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.

Code:-

lxi h,2000H ;input buffer

lxi b,200AH ;output buffer

mvi d,0AH ;Number of element

xra a ;clear cy and accumulator

mvi e,00H

next: mov a,m

call help ; convert Hex Ascii into the binart

stax b ; store into the output

add e

mov e,a ;do addition

inx b

inx h

dcr d

jnz next ;run loop till 0

stax b ; store sum of the number

hlt

help: sui 30H

 cpi 0AH ;check for 0 to 9

 RC

 sui 07H ;check for A to F

 ret

Before Executing :-

The screenshot shows the GNUSim8085 - 8085 Microprocessor Simulator interface. The registers window on the left shows initial values: A=00, BC=00, DE=00, HL=00, PSW=00, PC=00, SP=FF, Int-Reg=00. The flag window shows S=0, Z=0, AC=0, P=0, C=0. The assembly window in the center contains the following code:

```
1  lxi h,2000H ;input buffer
2  lxi b,200AH ;output buffer
3  mvi d,0AH ;Number of element
4  xra a ;clear cy and accumulator
5  mvi e,00H
6
7  next: mov a,m
8        call help ; convert Hex Ascii into the binart
9        stax b ; store into the output
10       add e
11       mov e,a ;do addition
12       inx b
13       inx h
14       dcr d
15       jnz next ;run loop till 0
16
17       stax b ; store sum of the number
18       hlt
19
20  help: sui 30H
21        cpi 0AH ;check for 0 to 9
22        RC
23        sui 07H ;check for A to F
24        ret
```

The memory window on the right shows the program code starting at address 2000h. The data window shows the initial values of the registers and flags.

After Executing :-

The screenshot shows the GNUSim8085 - 8085 Microprocessor Simulator interface after execution. The registers window on the left shows the results: A=42, BC=20, DE=00, HL=20, PSW=00, PC=42, SP=FF, Int-Reg=00. The flag window shows S=0, Z=1, AC=0, P=1, C=0. The assembly window in the center shows the same code as before. The memory window on the right shows the program code starting at address 200Ah. The data window shows the results of the program execution.