EXPERIMENT – 3

Program -1

Aim: Write a program to perform selective set operation on data stored at 4000H with the data stored at 4001H and store the result at 4002H. Verify the result and write bite wise operation of this program. (OR)

Code:

```
; You may customize this and other start-up templates;
; The location of this template is c:\emu8086\inc\0_com_template.txt

org 100h

; add your code here
MOV AX, 0400H ; 4000 is base address stored in AX
MOV DS, AX
MOV DI, 0000H ; offset is set to zero
MOV [DI], 0001B ; binary of one is moved in DI
MOV BX, [DI] ; value is moved to BX

MOV DI, 0001H
MOV [DI], 0010B ; binary value of two is moved to DI
MOV CX, [DI]

OR BX, CX ; Destination(BX) will store the result of OR operation
```

MOV DI, 0002H

MOV [DI], BX

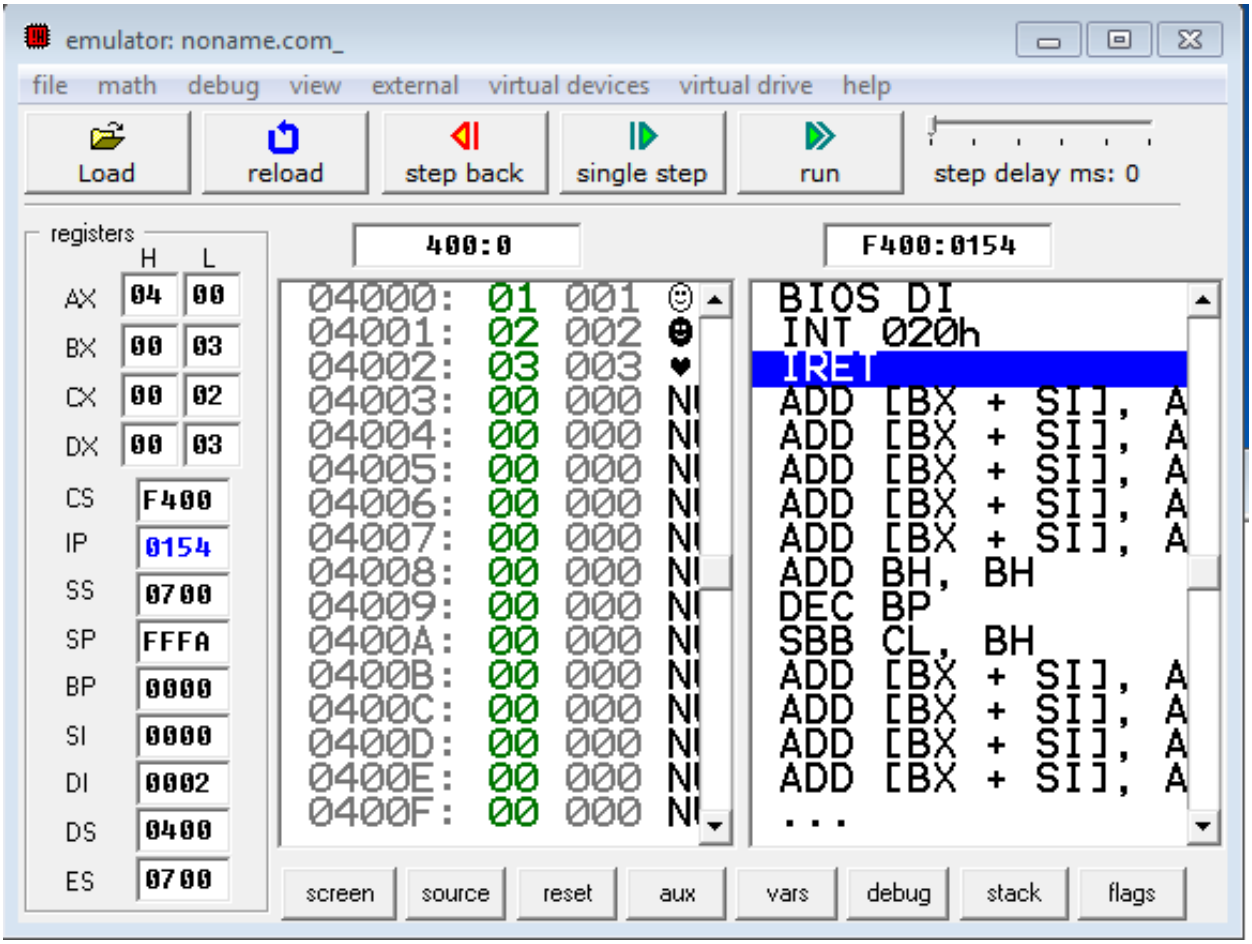
MOV DX, [DI] ; result is stored in DX

ret

Input / Output:

Input: BX: 0001B , CX: 0010B

Output: DX: 3



EXPERIMENT – 3

Program -2

Aim: Write a program to perform selective compliment operation on data stored at 4000H corresponding to the data stored at 4001H and store the result at 4002H. Verify the result and write bite wise operation of this program. (XOR)

Code:

```
; You may customize this and other start-up templates;
; The location of this template is c:\emu8086\inc\0_com_template.txt

org 100h

; add your code here
MOV AX, 0400H ; 4000 is base address stored in AX
MOV DS, AX
MOV DI, 0000H ; offset is set to zero
MOV [DI], 0101B ; binary of five is moved in DI
MOV BX, [DI] ; value is moved to BX

MOV DI, 0001H
MOV [DI], 0110B ; binary value of six is moved to DI
MOV CX, [DI]

XOR BX, CX ; Destination(BX) will store the result of XOR operation

MOV DI, 0002H
```

MOV [DI], BX

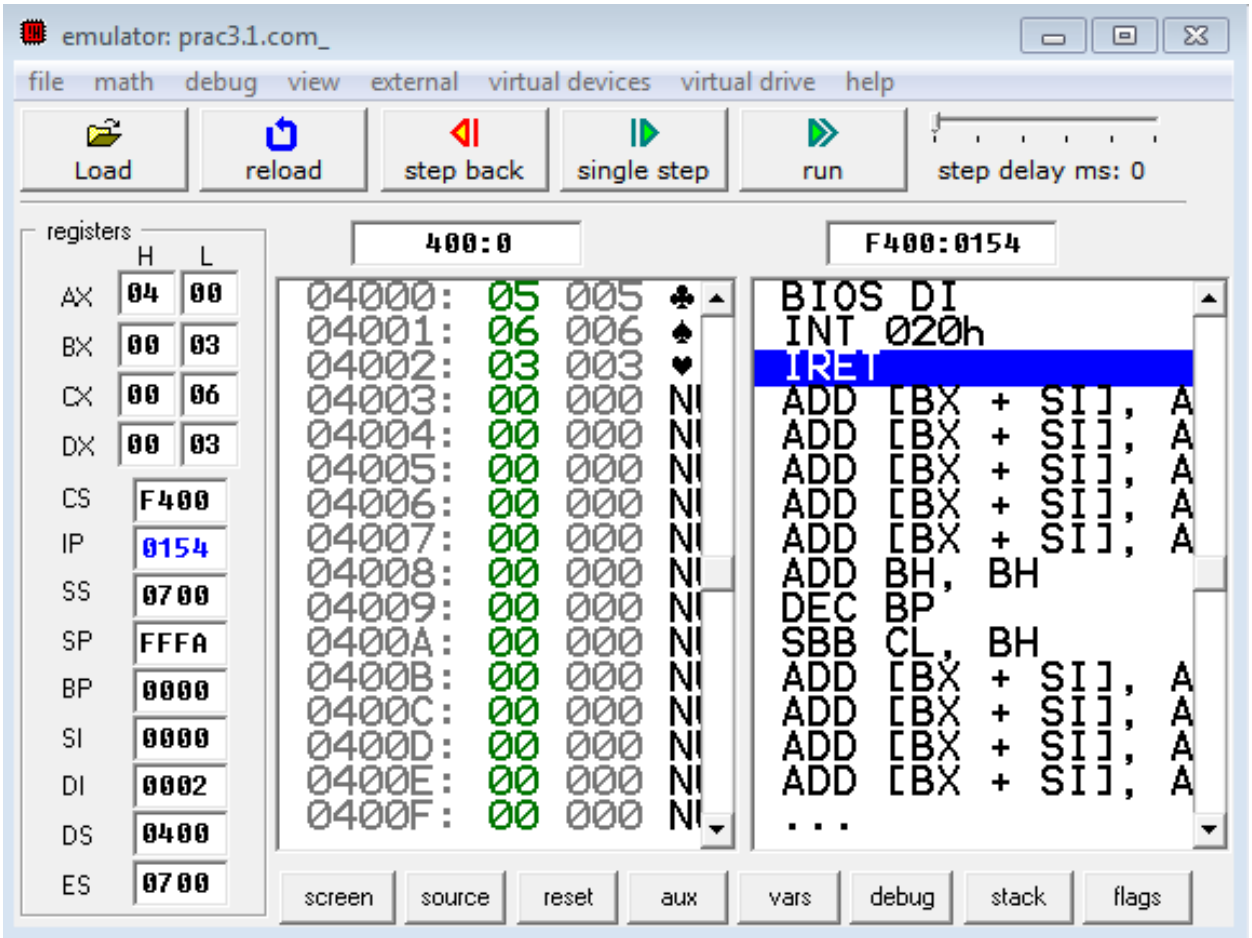
MOV DX, [DI] ; result is stored in DX

ret

Input / Output:

Input: BX: 0101B , CX: 0110B

Output: DX: 3



EXPERIMENT – 3

Program -3

Aim: Write a program to perform selective clear operation on data stored at 4000H corresponding to the data stored at 4001H and store the result at 4002H.Verify the result and write bite wise operation of this program. (A AND B')

Code:

```
; You may customize this and other start-up templates;
; The location of this template is c:\emu8086\inc\0_com_template.txt

org 100h

; add your code here
MOV AX, 0400H ; 4000 is base address stored in AX
MOV DS, AX
MOV DI, 0000H ; offset is set to zero
MOV [DI], 0101B ; binary of five is moved in DI
MOV BX, [DI] ; value is moved to BX

MOV DI, 0001H
MOV [DI], 0110B ; binary value of six is moved to DI
MOV CX, [DI]

NOT CX ; not of CX is performed

AND BX, CX ; Destination(BX) will store the result of AND operation
```

MOV DI, 0002H

MOV [DI], BX

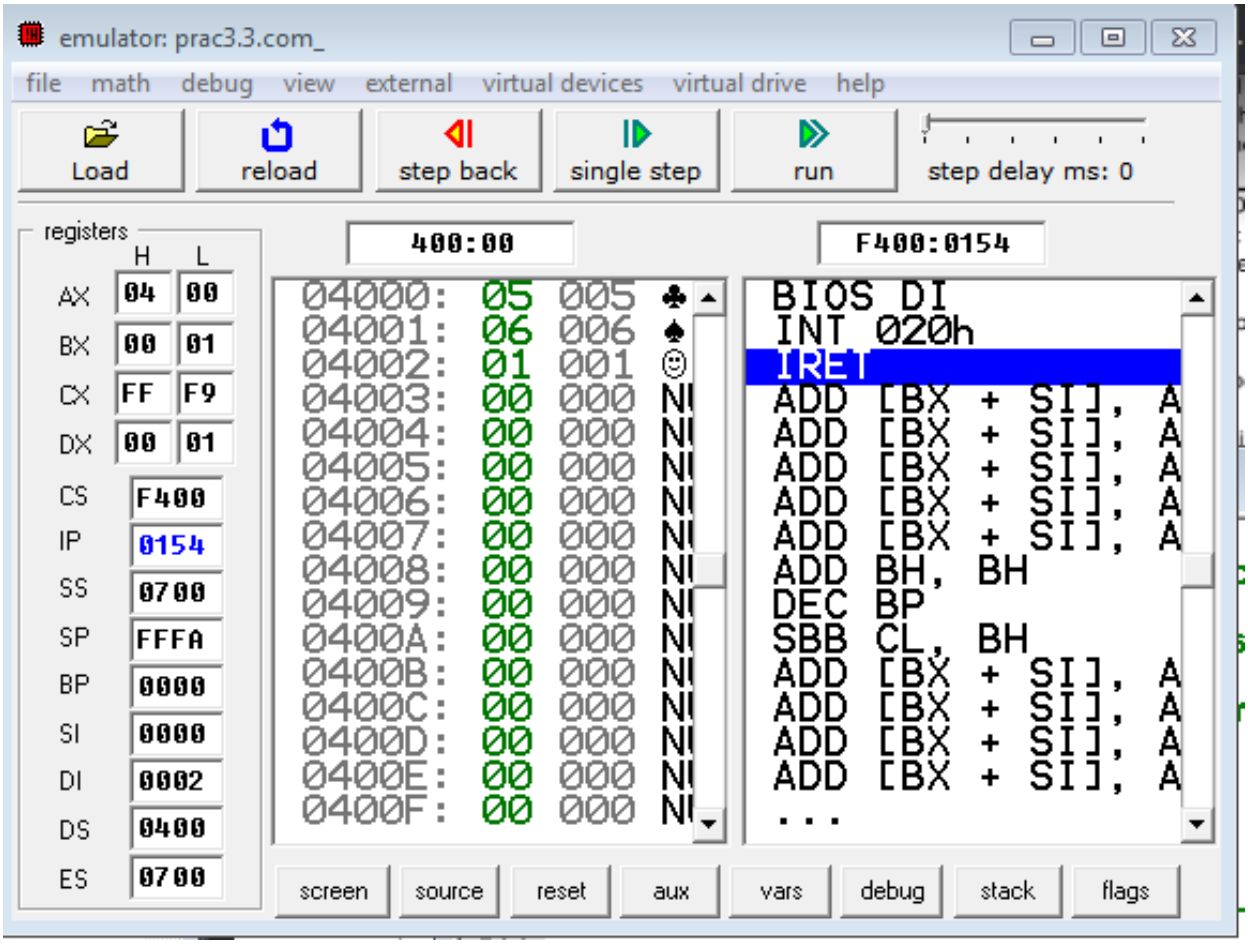
MOV DX, [DI] ; result is stored in DX

ret

Input / Output:

Input: BX: 0101B , CX: 0110B

Output: DX: 1



EXPERIMENT – 3

Program -5

Aim: Write a program to multiply & divide the number stored at 4000H by 2 and store the result at 4001H & 4002H .(Use Shift instructions).

Code:

```
; You may customise this and other start-up templates;
; The location of this template is c:\emu8086\inc\0_com_template.txt

org 100h

MOV BX,0400h

MOV DS,BX

MOV [00h],19h ; 4000H memory location will have 19h

MOV AL,[00h] ; AL will have 19h

SAL AL,1 ; Shift Arithmetic left will be applied on Al by 1 (multiply by 2)

MOV [01h],AL ; now result i.e. 36 is stored at 4001H memory location

MOV AL,00h

MOV AL,[00h]
```

SAR AL,1 ; Shift arithmetic right will divide 36 by 2

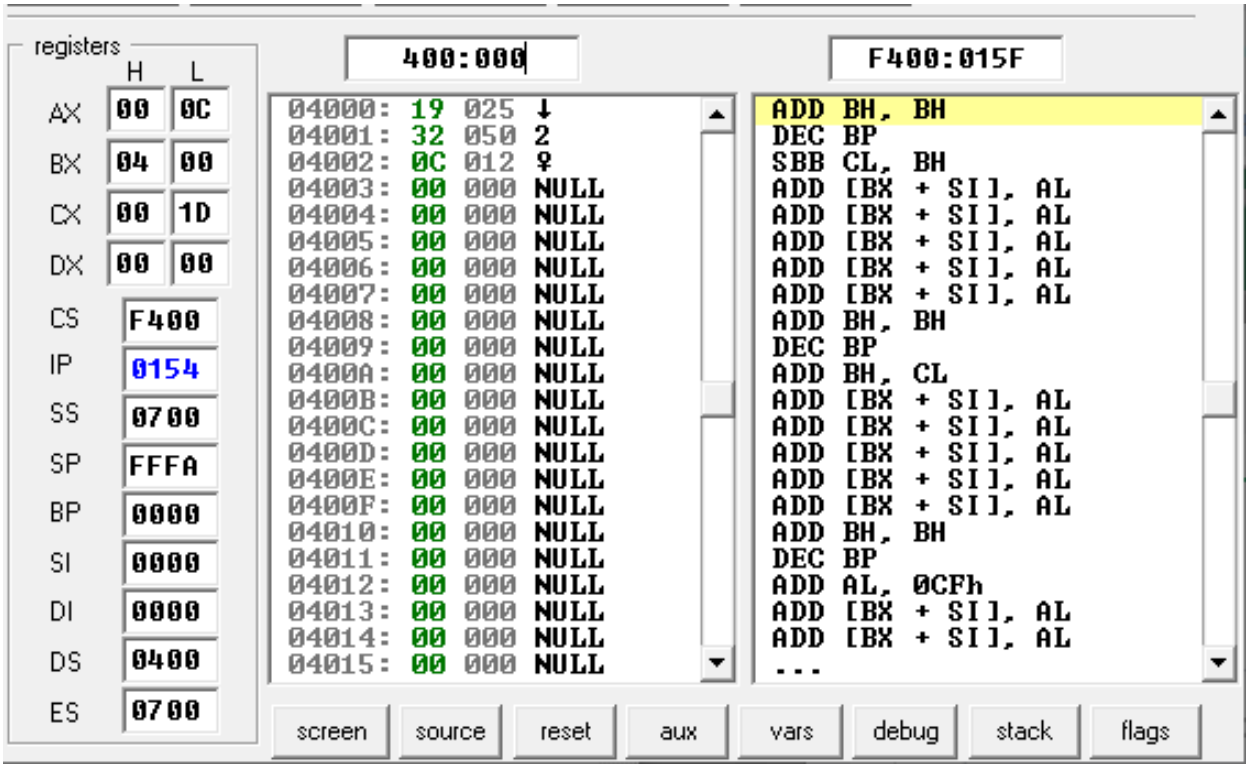
MOV [02h],AL ; memory location 4002H will have result of division stored in it

ret

Input / Output:

Input: AL:19h

Output: [4002h]: 0C



EXPERIMENT – 3

Program -6

Aim: Write a Program to subtract the contents of memory location 4001H from the memory location 4002H and place the result in memory location 4003H without SUB instruction.

Code:

```
; You may customise this and other start-up templates;
; The location of this template is c:\emu8086\inc\0_com_template.txt
org 100h

 ; COMPLEMENTING THE NUMBER AND THEN ADDING WILL GIVE RESULT SAME
AS SUBTRACTION
MOV AX, 0400H ; base address is stored here
MOV DS, AX
MOV DI, 0001H
MOV [DI], 9H
MOV AX, [DI]
NOT AX ; PERFORM 2'S COMPLEMENT OF 9H
INC AX

MOV DI,0002H
MOV [DI], 15H
MOV BX, [DI]

ADD AX,BX ; PERFORMS SUBTRACTION INDIRECTLY
```

```
MOV DI, 0003H
MOV [DI], AX

MOV DX, [DI] ; RESULT OF SUBTRACTION IS STORED IN DX
```

Input / Output:

Input: AX: 9H, BX: 15H

Output: DX: 0C

EXPERIMENT – 3

Program -7

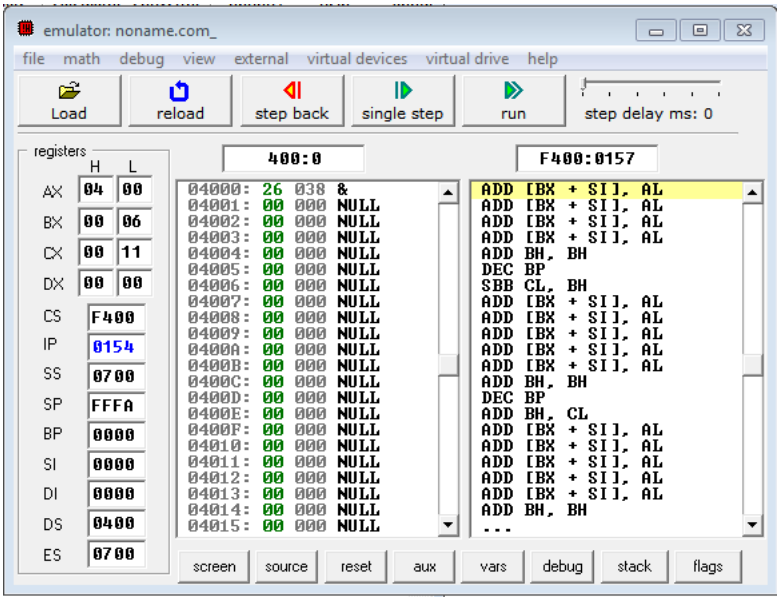
Aim: Implement a program to mask the lower four bits of content of the memory location.

Code:

```
; You may customize this and other start-up templates;
; The location of this template is c:\emu8086\inc\0_com_template.txt

org 100h

; add your code here

; Masking of four lower bits

MOV AX, 400H

MOV DS, AX

MOV DI, 000H

MOV [DI], 26H

MOV BL, [DI]

AND BL, 0FH ; here to make last four lower bits as the same digit as the last digit of the content we AND it with 0F
        ;       0010 0110
        ; AND   0000 1111


ret
```

Input/Output:

Input: AX: 26h , mask value(0F)
Output: BL: 06h



EXPERIMENT – 3

Program -8

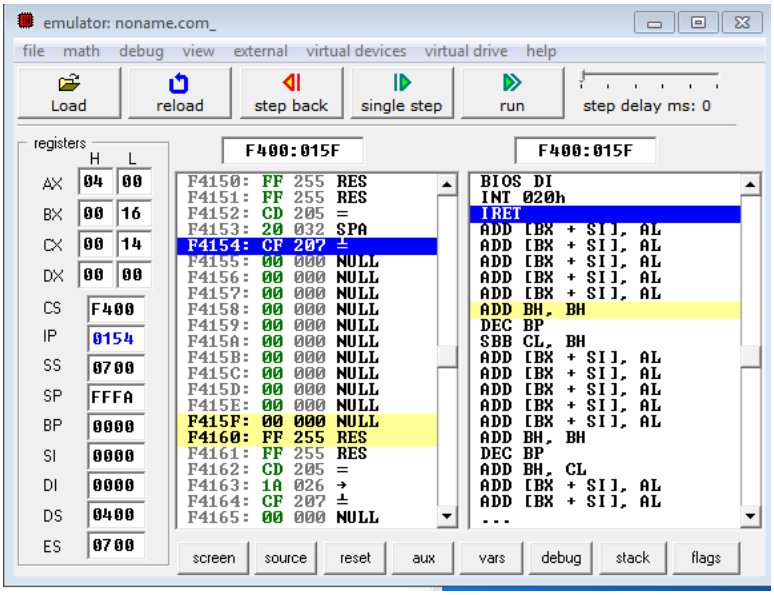
Aim: Implement a program to set higher four bits of content of the memory location to 1.

Code:

```
; You may customize this and other start-up templates;
; The location of this template is c:\emu8086\inc\0_com_template.txt

org 100h

; add your code here

MOV AX, 400H

MOV DS, AX

MOV DI, 000H

MOV [DI], 26H

MOV BL, [DI]

AND BL, 0FH ; TO MASK LOWER BIT AS THE SAME OF LASTDIGIT OF THE CONTENT

OR BL, 10H ; TO GET ONE ON HIGHER FOUR BYTE

;    0010 0110
;AND 0000 1111
;OR  0001 0000

ret
```

Input/Output:

Input: AX: 26h
Output: BL:16h



EXPERIMENT – 3

Program -9

Aim: Calculate the sum of series of numbers (Data set-1) from the memory location listed below & store the result at 400AH location.

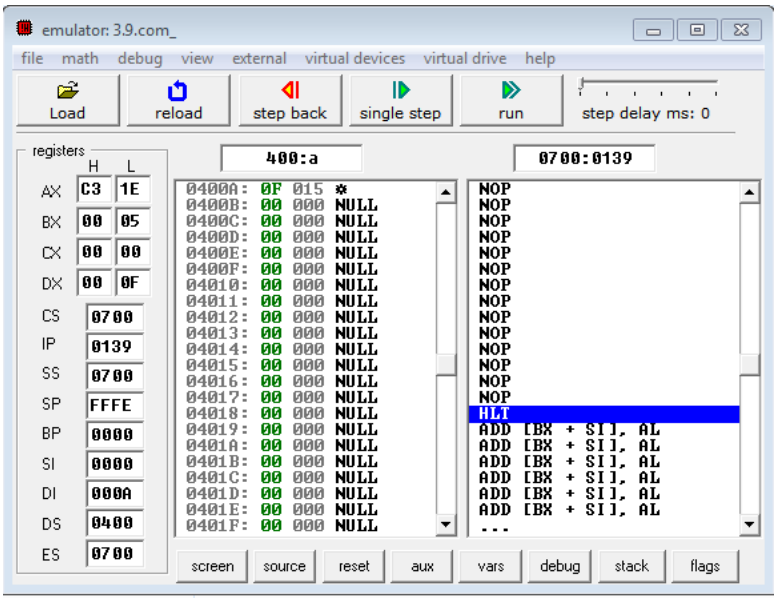
Code:

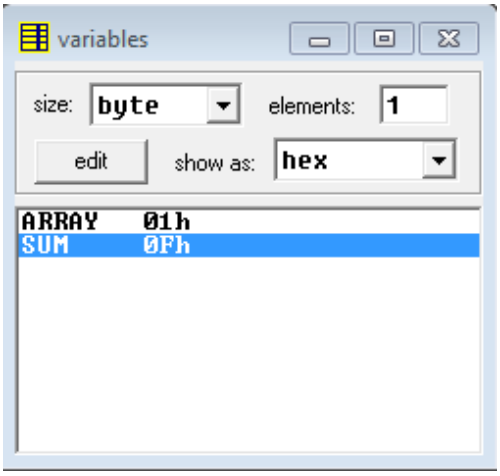
```
; You may customize this and other start-up templates;
; The location of this template is c:\emu8086\inc\0_com_template.txt

org 100h

; add your code here

MOV AL, 0

MOV BX, 0

MOV CX, 5 ; COUNTER VALUE OR LENGTH OF AN ARRAY

NEXT:
   ADD AL, ARRAY[BX]  ; ADDS EACH ELEMENT OF ARRAY
   INC BX             ; INCREMENTS BX

LOOP NEXT

MOV SUM, AL

MOV DX, 0400H

MOV DS, DX

MOV DI, 00AH

MOV [DI],  AL

MOV DX, [DI]  ; STORES RESULT IN 4000A LOCATION

array db 1,2,3,4,5  ; DEFINES ARRAY WITH 5 ELEMENTS
SUM db 0 ; INITAL VALUE OF SUM IS ZERO
```

ret

Input/Output:

Input: array: 1,2,3,4,5
Output: sum: 0F





EXPERIMENT – 3

Program -10

Aim: Modify above the program such a way that it halts the execution if carry generated & stores the intermediate result at 400AH location. (Data set-2) (Note: Student need to implement FOR loop in this program: initialization, Compare, Decrement/Increment; also need to use JMP, JMx instructions.)

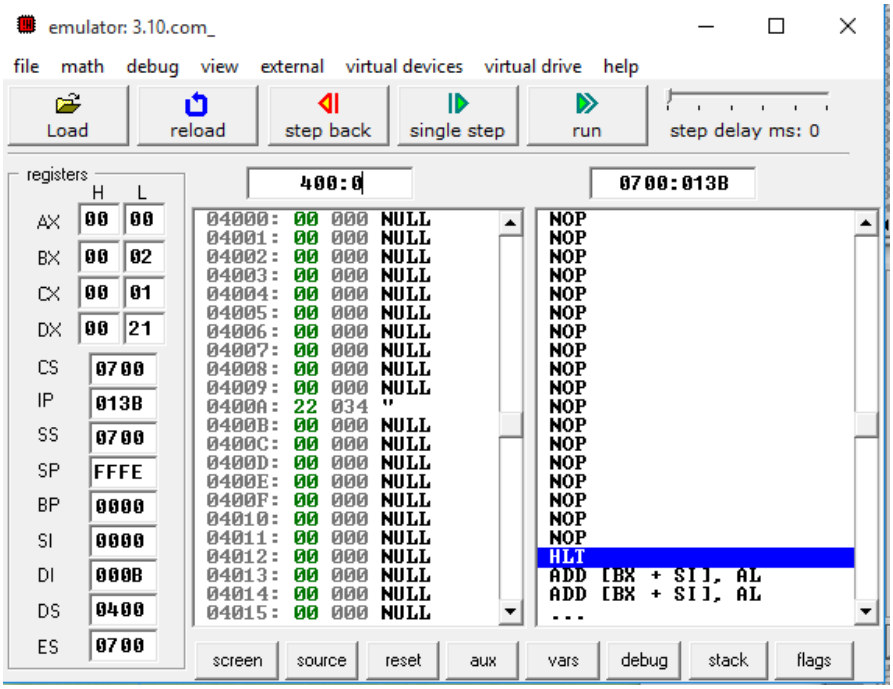
Code:

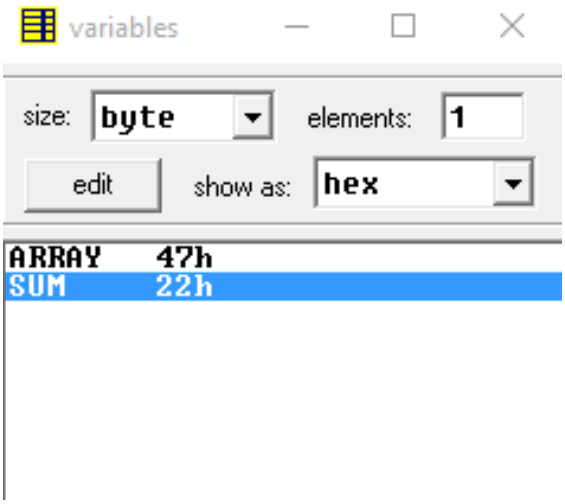
```
; You may customize this and other start-up templates;
; The location of this template is c:\emu8086\inc\0_com_template.txt

org 100h

; add your code here

MOV AL, 0

MOV BX, 0

MOV CX, 5 ; COUNTER VALUE OR LENGTH OF AN ARRAY

NEXT:
   ADD AL, ARRAY[BX]  ; ADDS EACH ELEMENT OF ARRAY
   JC CARRY
   INC BX          ; INCREMENTS BX

LOOP NEXT


CARRY:
      MOV SUM,AL

      MOV DX, 0400H

      MOV DS, DX

      MOV DI, 00AH
```

```
MOV [DI],  AL

MOV DX, [DI]  ; STORES RESULT IN 4000A LOCATION


array db 71,72,73,74,75  ; DEFINES ARRAY WITH 5 ELEMENTS
SUM db 0 ; INITAL VALUE OF SUM IS ZERO

ret
```

Input/Output:

Input: array: 71,72,73,74,75
Output: sum:22h




variables
size:
byte
elements:
1
edit
show as:
hex
ARRAY 47h
SUM 22h

EXPERIMENT – 3

Program -11

Aim: Multiply two 8-bit numbers stored in memory locations 4001H and 4006H by repetitive addition and store the result at 400AH location.(Use Data Set -3) (Note: Student need to implement FOR loop in this program: initialization, Compare, Decrement/Increment; also need to use JMP, JMx instructions.)

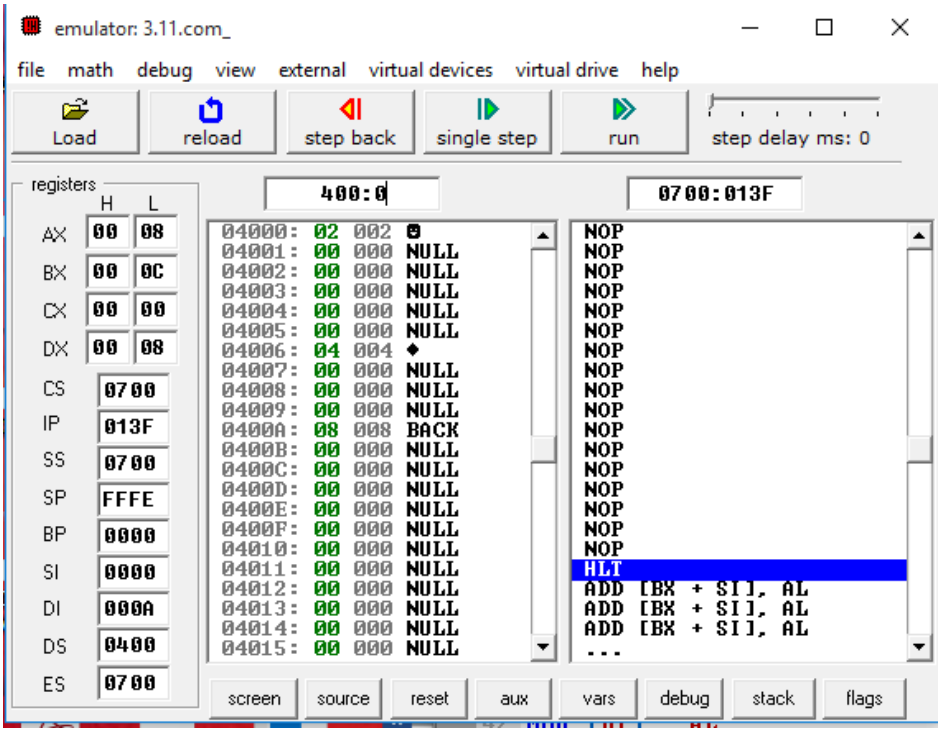
Code:

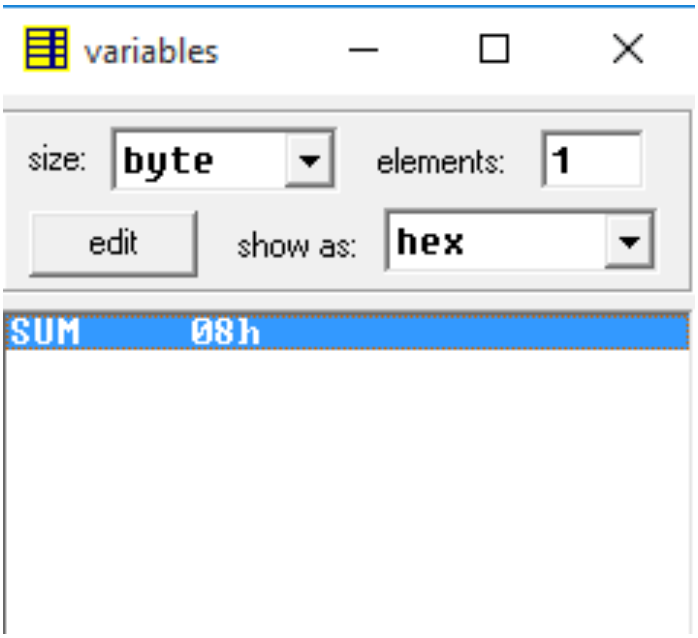
```
; You may customize this and other start-up templates;
; The location of this template is c:\emu8086\inc\0_com_template.txt

org 100h

; add your code here

MOV AL, 0

MOV BX, 0  ; INITALISING I=0

MOV DX, 0400H

MOV DS, DX

MOV DI, 000H

MOV [DI], 02H  ; VALUE 2 WILL BE STORED IN DL

MOV DL, [DI]


MOV DI, 006H ; 4006 WILL STORE CX VALUE OR COUNTER VALUE

MOV [DI], 04

MOV CX, [DI]  ; INITIALISING TH COUNTER


NEXT:
```

```
    ADD AL, DL

    INC BX

LOOP NEXT

MOV SUM,AL

SUM DB 0

MOV DI, 00AH

MOV [DI], AL

MOV DX, [DI]

ret
```

Input/Output:

Input: DL: 02h , CX: 04h
Output: AL: 08h




variables
size:
byte
elements:
1
edit
show as:
hex
SUM 08h

EXPERIMENT – 3

Program -12

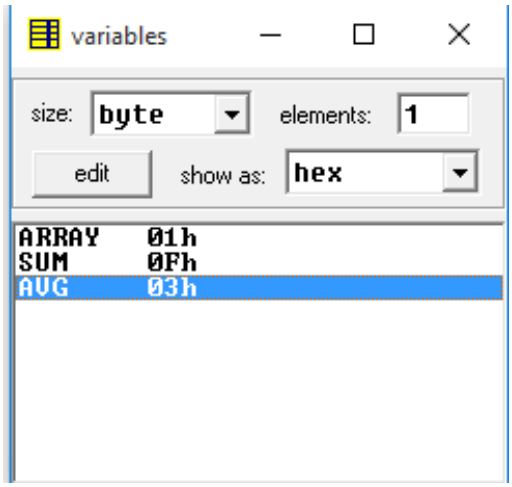
Aim: Program to find average of n numbers

Code:

```
; You may customize this and other start-up templates;
; The location of this template is c:\emu8086\inc\0_com_template.txt

org 100h

; add your code here

MOV AL, 0

MOV BX, 0

MOV CX, 5 ; COUNTER VALUE OR LENGTH OF AN ARRAY

NEXT:
   ADD AL, ARRAY[BX]  ; ADDS EACH ELEMENT OF ARRAY
   INC BX             ; INCREMENTS BX

LOOP NEXT

MOV SUM , AL

MOV CL, 05

DIV CL

MOV AVG, AL


array db 1,2,3,4,5  ; DEFINES ARRAY WITH 5 ELEMENTS
SUM db 0 ; INITAL VALUE OF SUM IS ZERO
AVG db 0 ; stores average value

ret
```

Input/Output:

Input: array: 1,2,3,4,5
Output: sum: 0Fh, avg: 03h



EXPERIMENT – 3

Program -13

Aim: Write an assembly language program to find the no. of odd numbers and even numbers, given an array of n numbers.

Code:

```
; You may customize this and other start-up templates;
; The location of this template is c:\emu8086\inc\0_com_template.txt

org 100h

; add your code here

 VECTOR DB 1,2,3,4,5,6,7,8,9,10
COUNTE DB 0 ; counter for even number
COUNTO DB 0 ; counter for odd number


MOV AL,0
MOV BX,0
MOV CX,10
MOV DL,02H

NEXT:
MOV AH,0
MOV AL,VECTOR[BX]
DIV DL ; check for even and odd
INC BX
CMP AH,0 ; if zero or not
JZ EVEN ; jump on zero if even
JNZ ODD ; jump on non zero if odd
LOOP NEXT


EVEN: ; for even no
INC COUNTE
DEC CX
JNZ NEXT
HLT
```

ODD: for odd number
INC COUNTO
DEC CX
JNZ NEXT

Input/Output:

Input: vector: 1,2,3,4,5,6,7,8,9,10
Output: counte: 5h, counto 5h