

LAB ASSIGNMENT 1

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Question 1: Finding smallest number among three numbers in registers.

Algorithm: Just like in C Language, I am comparing two numbers and then again two numbers (the less one with the remaining one) and then I am storing the variable name in "SMALLEST" (It will be stored in ASCII)

Code:

```
JMP HERE
    A DB 016H
    B DB 00EH
    C DB 02AH
    SMALLEST DB ?
```

HERE:

```
    MOV AL, A
    MOV BL, B
    MOV DL, C
    CMP AL, BL
    JL AL_SMALL
```

BL_SMALL:

```
    CMP BL, DL
    JL B_MAIN
    JMP C_MAIN
```

AL_SMALL:

```
    CMP AL, DL
    JL A_MAIN
    JMP C_MAIN
```

A_MAIN:

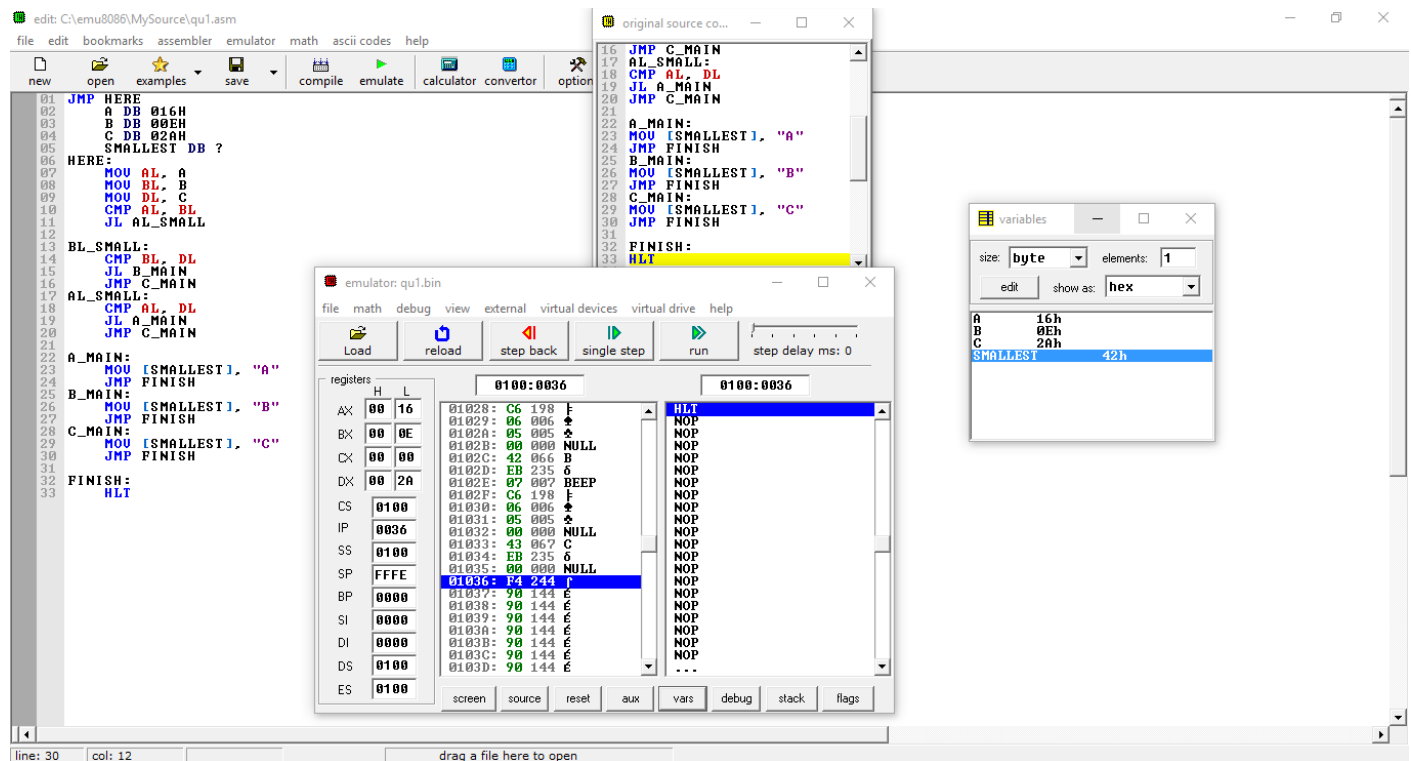
```

MOV [SMALLEST], "A"
JMP FINISH
B_MAIN:
MOV [SMALLEST], "B"
JMP FINISH
C_MAIN:
MOV [SMALLEST], "C"
JMP FINISH

FINISH:
HLT

```

Screenshot:



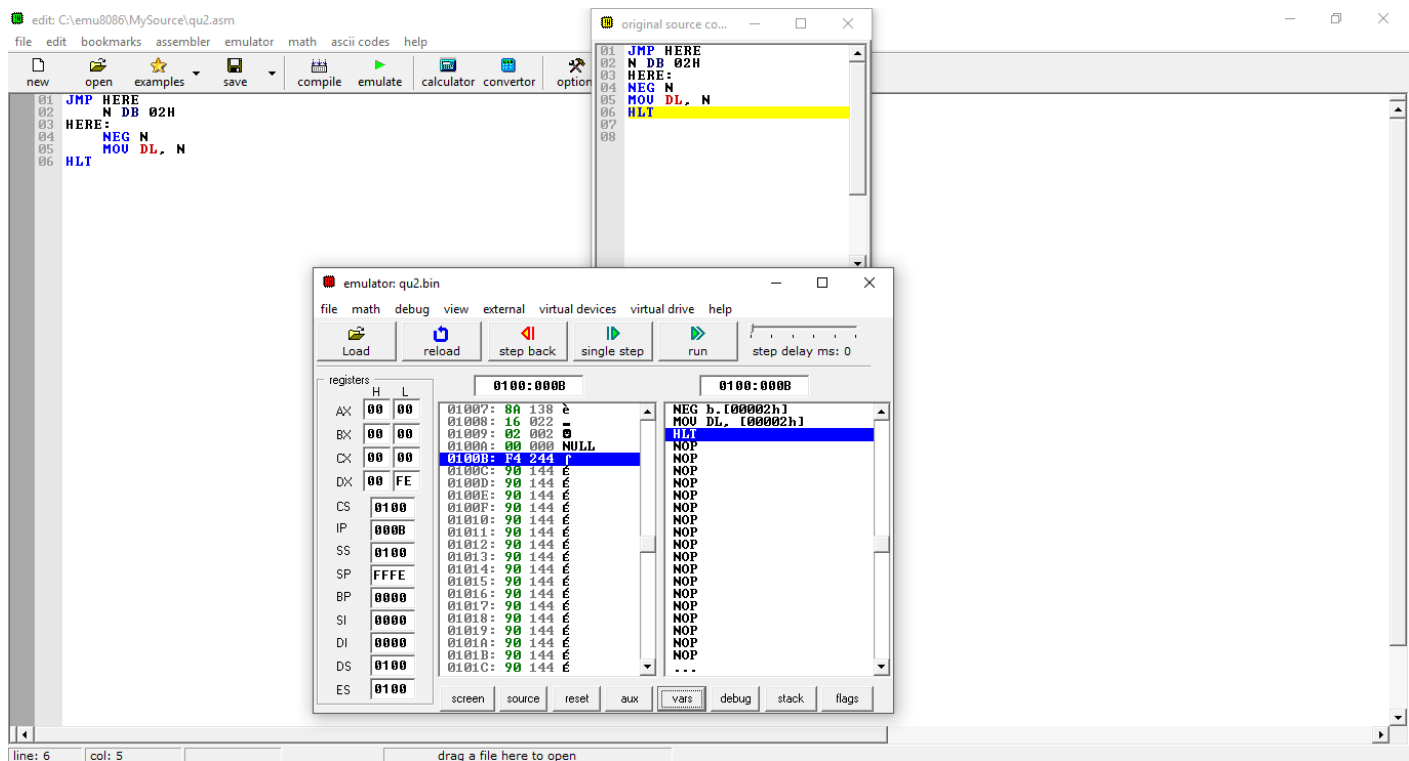
Question 2: Changing the sign of a number.

Algorithm: In the CAT 1 Reference Material, in the instruction set PDF, there is an instruction given as NEG which in simpler words multiplies the number by -1. So, I used that. The MOV instruction is just for checking.

Code:

```
JMP HERE
    N DB 02H
HERE:
    NEG N
    MOV DL, N
HLT
```

Screenshot:



Question 3: Checking for even or odd.

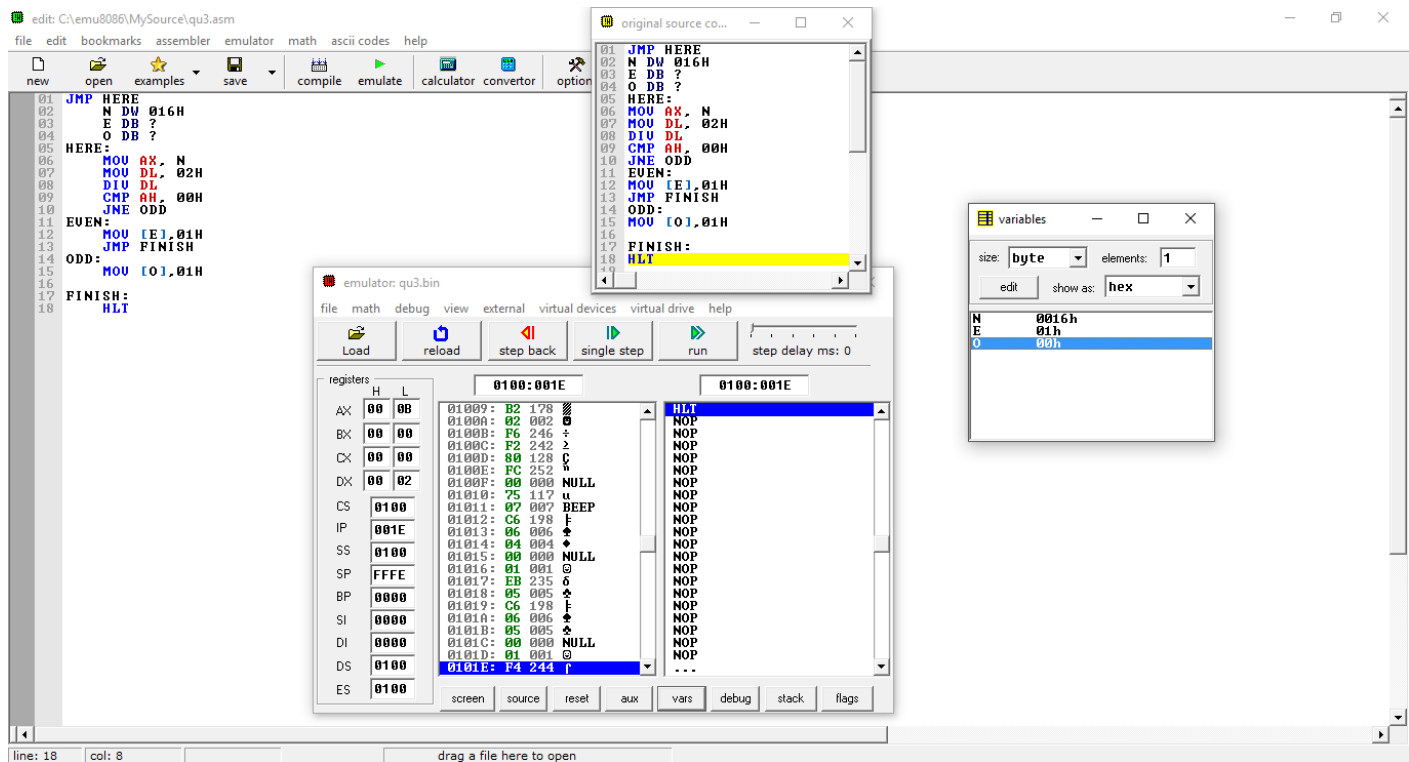
Algorithm: Rather than using the AND instruction, I am dividing the given number by 2 and then if the number is odd, the value of "ODD" variable is 1 and if the number is even the value of "EVEN" variable is 1.

Code:

```
JMP HERE
    N DW 016H
    E DB ?
    O DB ?
HERE:
    MOV AX, N
    MOV DL, 02H
    DIV DL
    CMP AH, 00H
    JNE ODD
EVEN:
    MOV [E],01H
    JMP FINISH
ODD:
    MOV [O],01H

FINISH:
    HLT
```

Screenshot:



Question 4: Getting factors of a number.

Algorithm: Dividing and then comparing, maintaining array for factors and count for divisibility check.

Code:

```
JMP HERE
    N DW 0CH
    COUNT DW 01H
    ARR DB 20 DUP(1)
HERE:
    MOV CX, N
    LEA DX, ARR
```

NEXT:

```
MOV AX, N
INC COUNT
DIV COUNT
CMP AH, 00H
JE YES
LOOP NEXT
```

YES:

```
MOV DX, COUNT
INC DX
LOOP NEXT
```

HLT

Screenshot:

