VIT®

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CSE2006
Microprocessor and Interfacing

Lab Assignment 2

Slot: L39+L40

Name: Rajendra Agrawal

Reg. No: 17BCE2151

Question 1: Write an 8086 Assembly Language Program to find out the maximum number of continuous ones using Bitwise arithmetic?

Code Snippet:

edit: C:\emu8086\MySource\max-1-length.asm

file edit bookmarks assembler emulator math ascii codes help

new open examples save compile emulate calculator convertor options help about

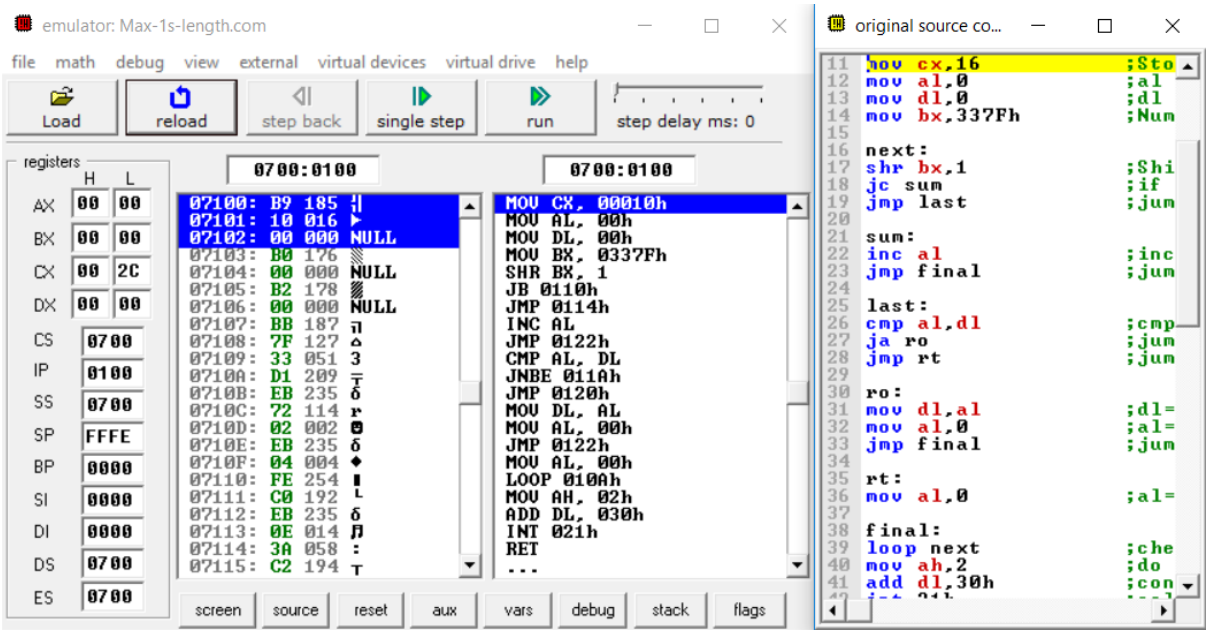
```
; You may customize this and other start-up templates;
; The location of this template is c:\emu8086\inc\0_com_template.txt

name "Max-1s-length"

org 100h

; 17BCE2151 Rajendra Agrawal

    mov cx,16           ;Stores Number of iterations
    mov al,0            ;al is used to store length of 1s
    mov dl,0            ;dl is used to store max length of 1s
    mov bx,337Fh        ;Number under test

next:
    shr bx,1            ;Shift bx by 1 bit and store bit in carry
    jc sum              ;if c is 1 then jump to sum
    jmp last            ;jump to last

sum:
    inc al              ;increment value of al
    jmp final           ;jump to final

last:
    cmp al,dl           ;cmp al and dl
    ja ro               ;jump to ro if al>dl
    jmp rt              ;jump to rt if al<=dl

ro:
    mov dl,al           ;dl=al
    mov al,0            ;al=0
    jmp final           ;jump to final

rt:
    mov al,0            ;al=0

final:
    loop next           ;check value of cx and loop
    mov ah,2            ;do ah=2,print function number
    add dl,30h          ;convert normal value to ASCII value
    int 21h             ;call DOS interrupt

ret
```

line: 39 col: 34 drag a file here to open

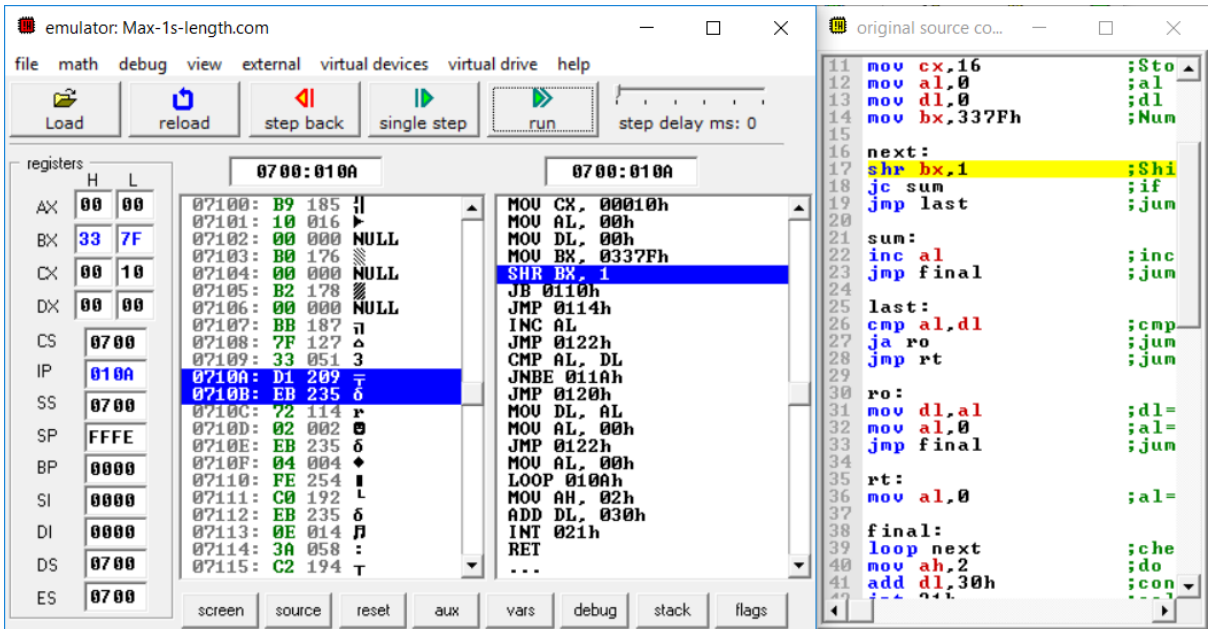
Here the number is 337F whose binary form is 0011 0011 0111 1111. So maximum length of continuous 1's is 7.

Loop by Loop Execution:

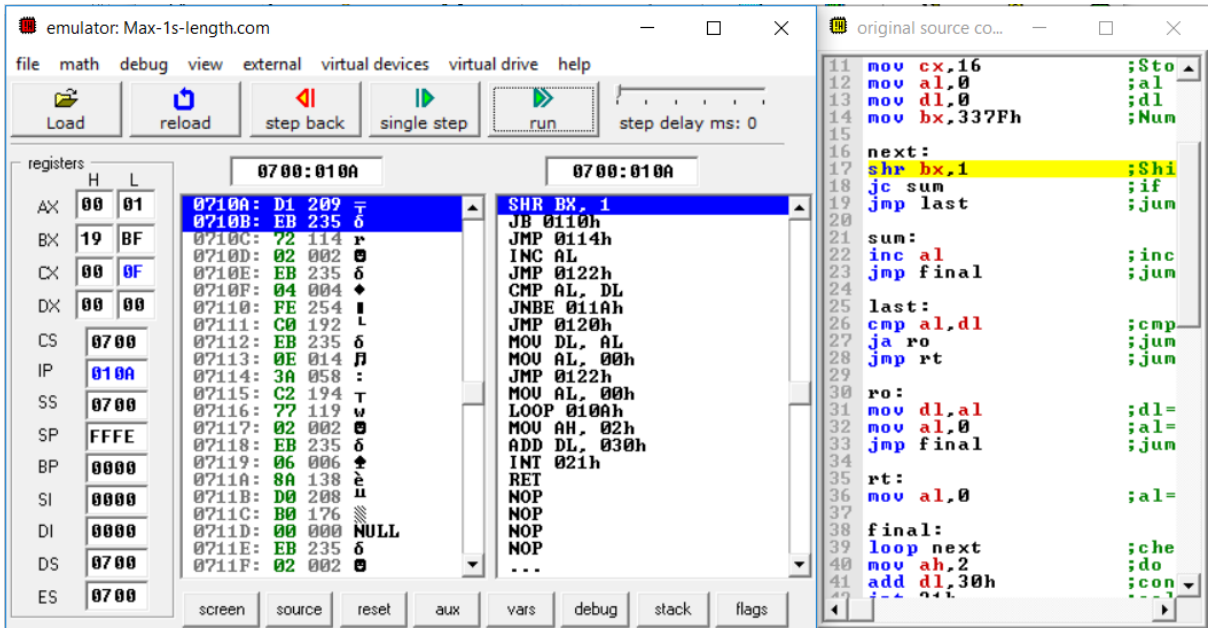
- Load the program.



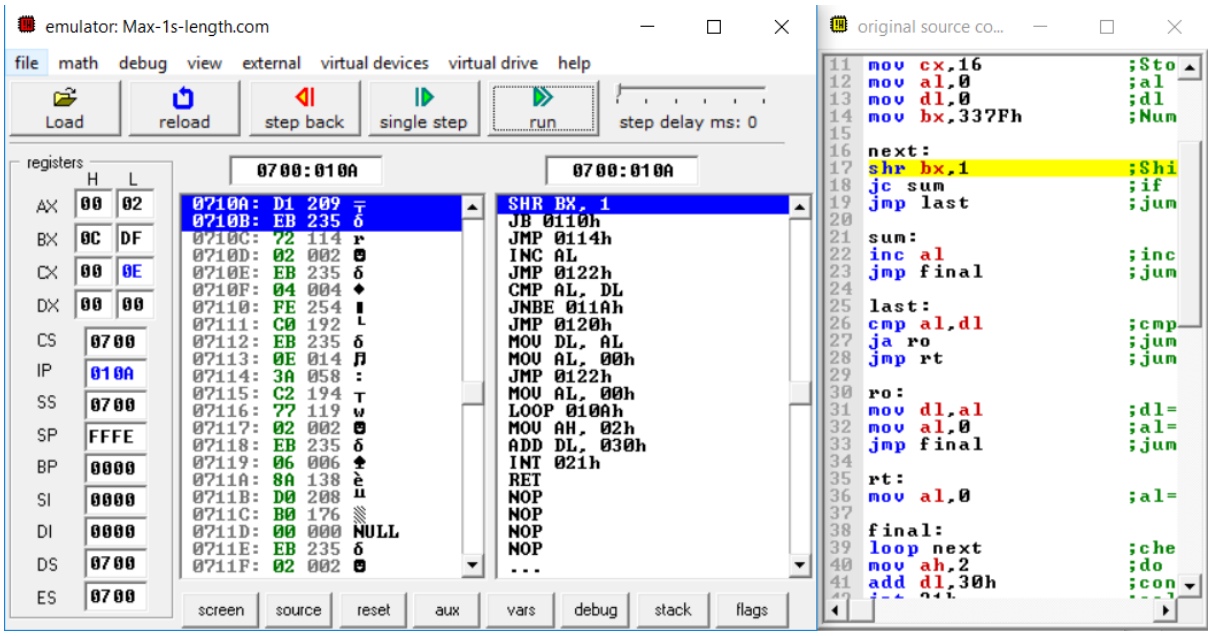
- Initializing CX, AL, DL and BX.



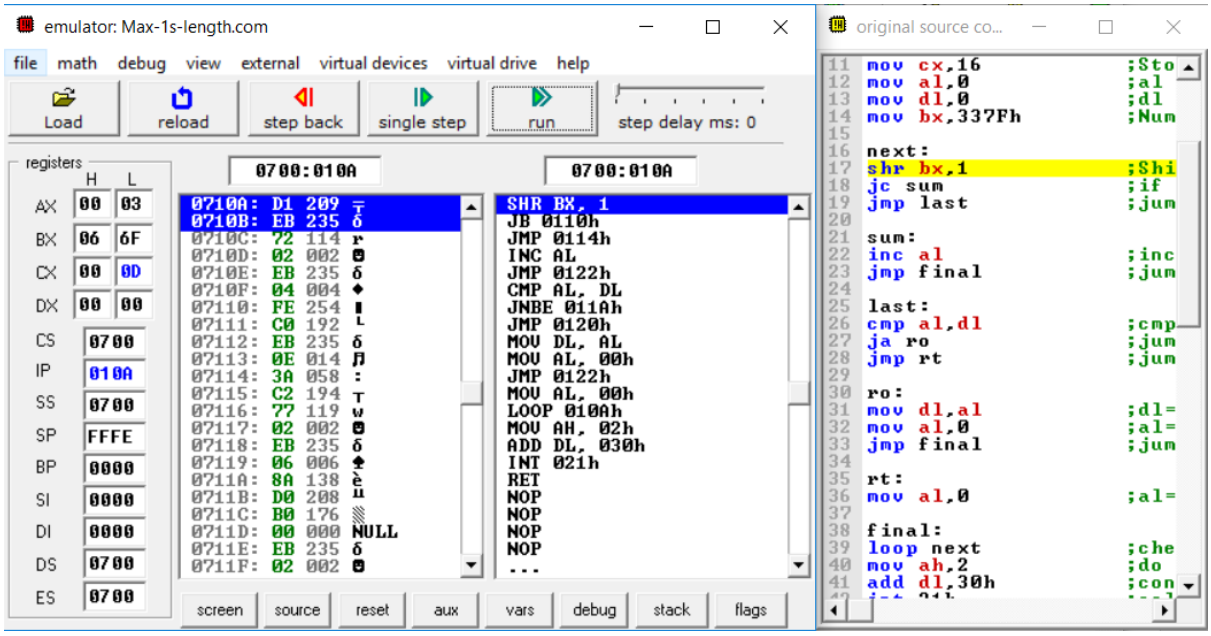
Cycle 1: 0011 0011 0111 111**1**. As carry was set to 1, AL was incremented.



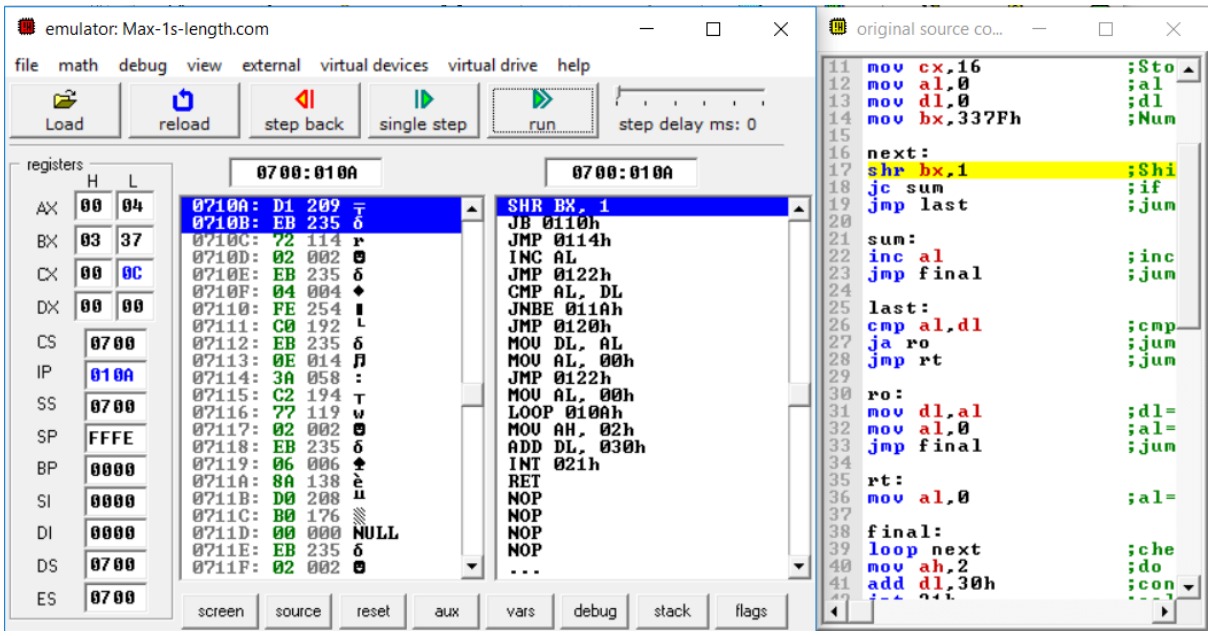
Cycle 2: 0011 0011 0111 11**1**1. As carry was set to 1, AL was incremented.



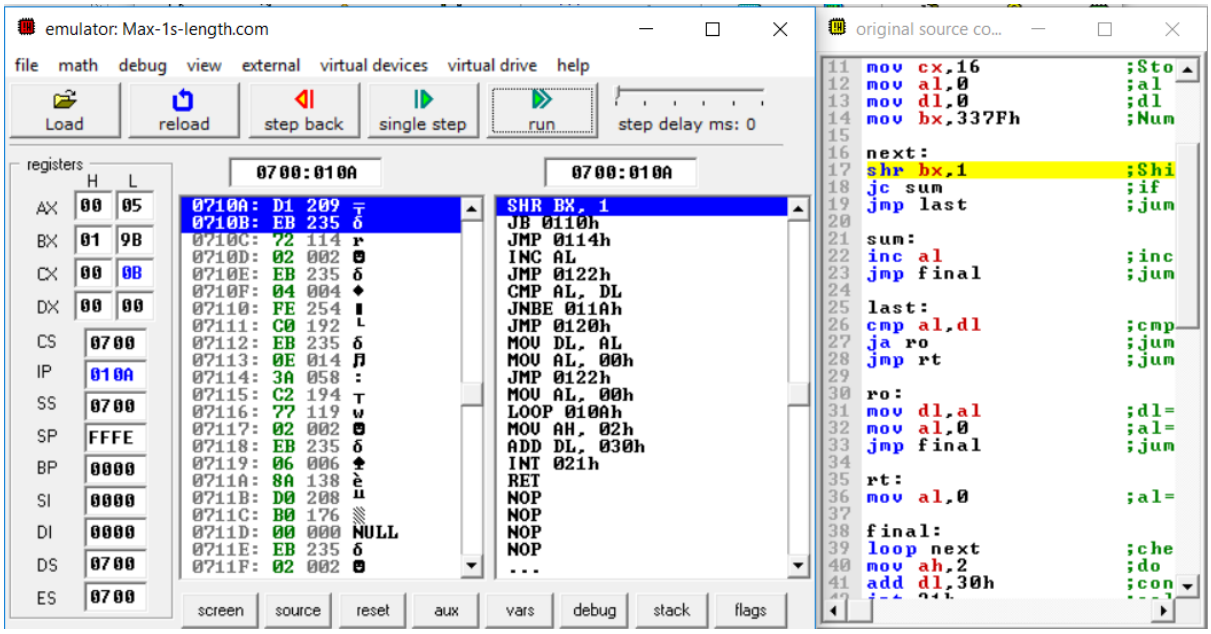
Cycle 3: 0011 0011 0111 1**1**11. As carry was set to 1, AL was incremented.



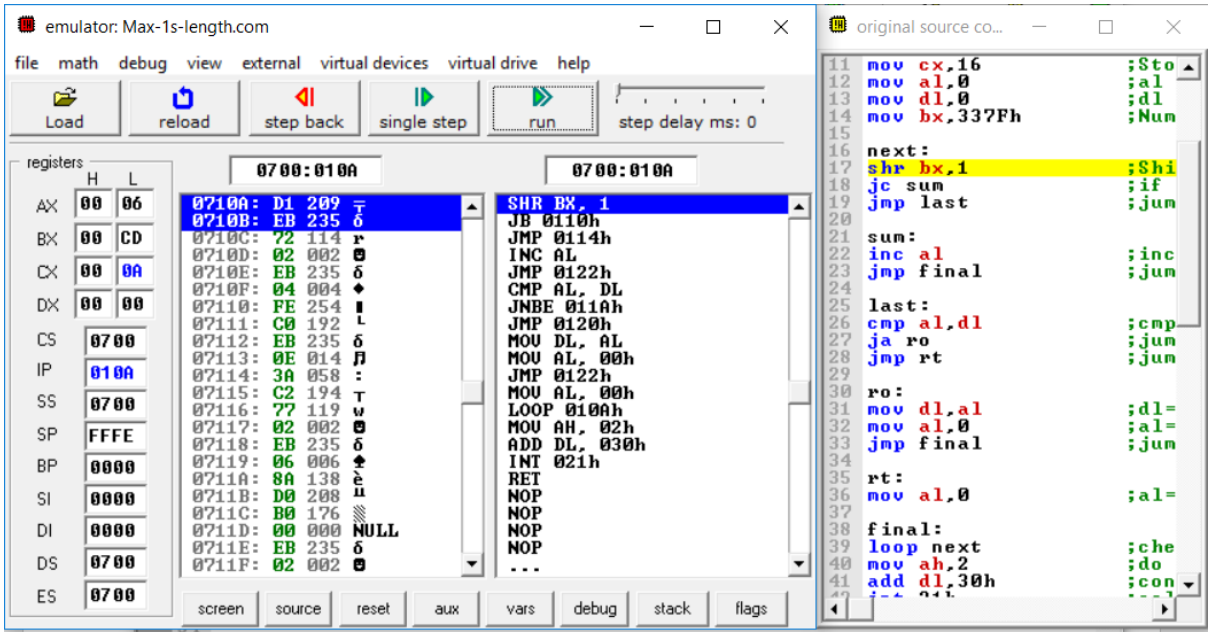
Cycle 4: 0011 0011 0111 **1**111. As carry was set to 1, AL was incremented.



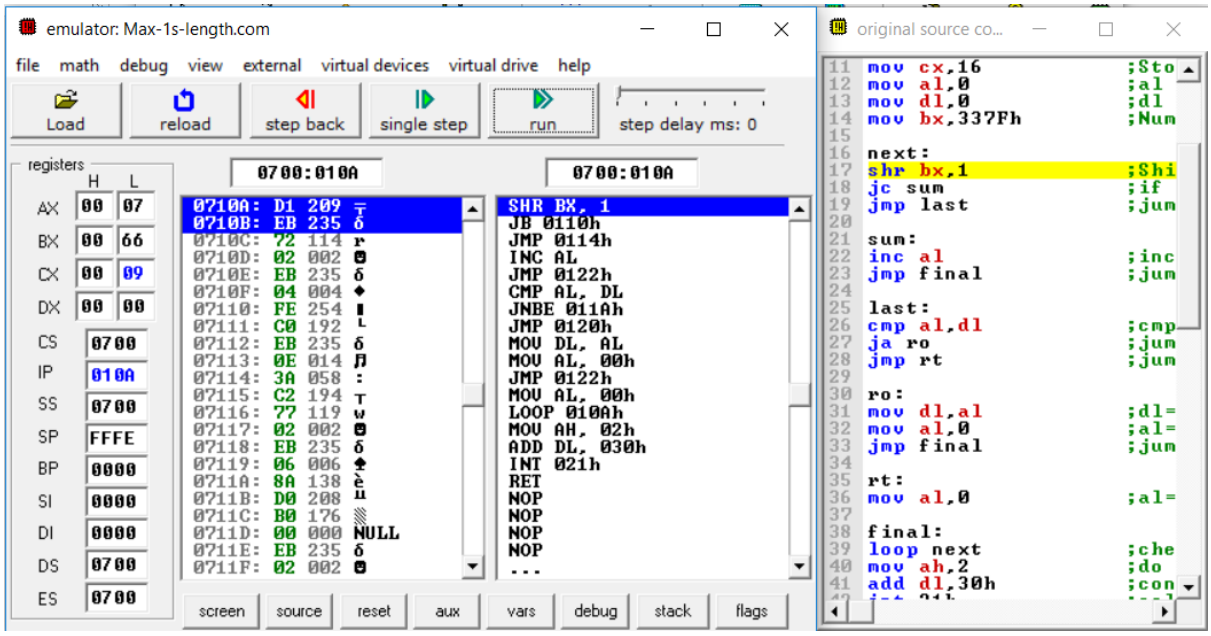
Cycle 5: 0011 0011 011**1** 1111. As carry was set to 1, AL was incremented.



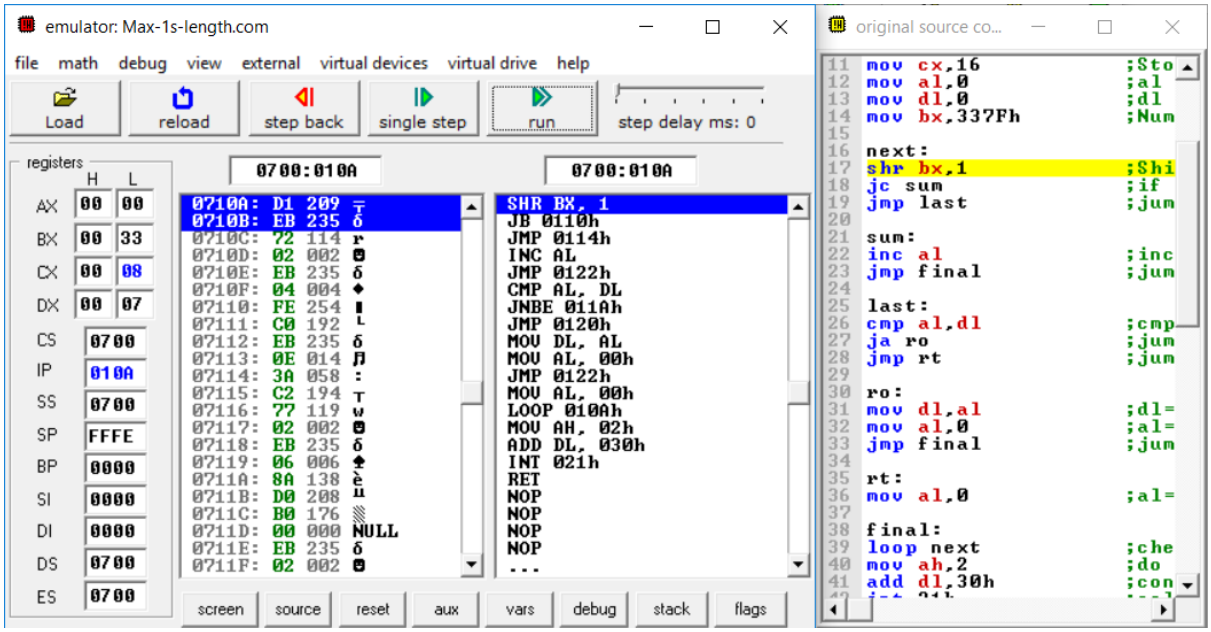
Cycle 6: 0011 0011 01**1**1 1111. As carry was set to 1, AL was incremented.



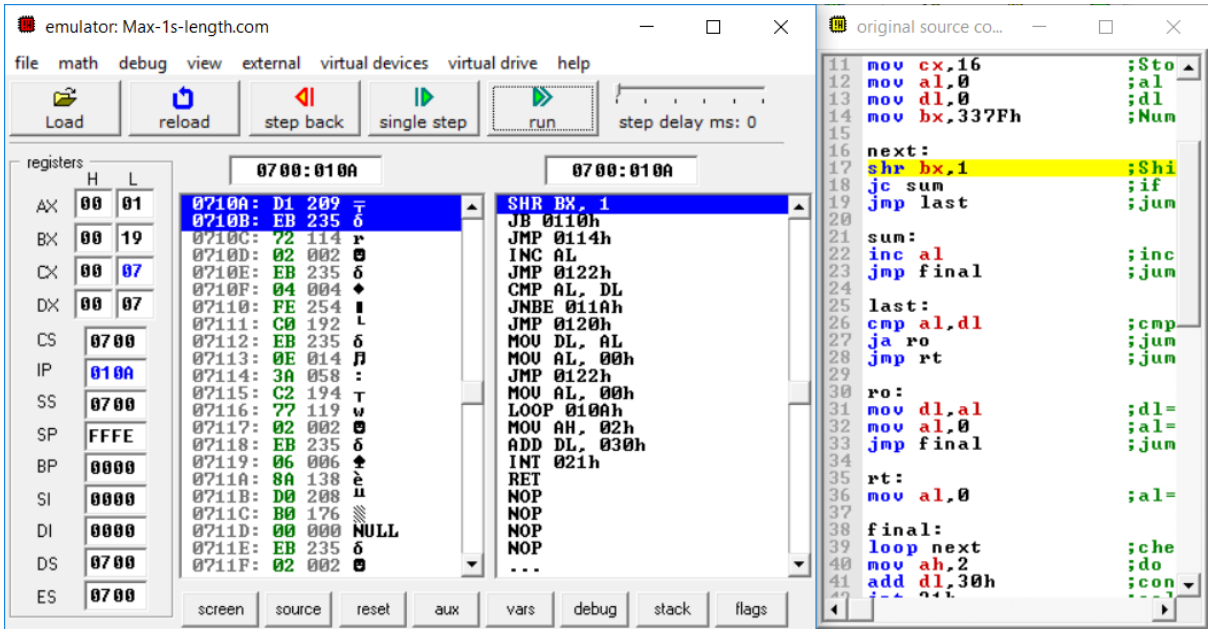
Cycle 7: 0011 0011 0**1**11 1111. As carry was set to 1, AL was incremented.



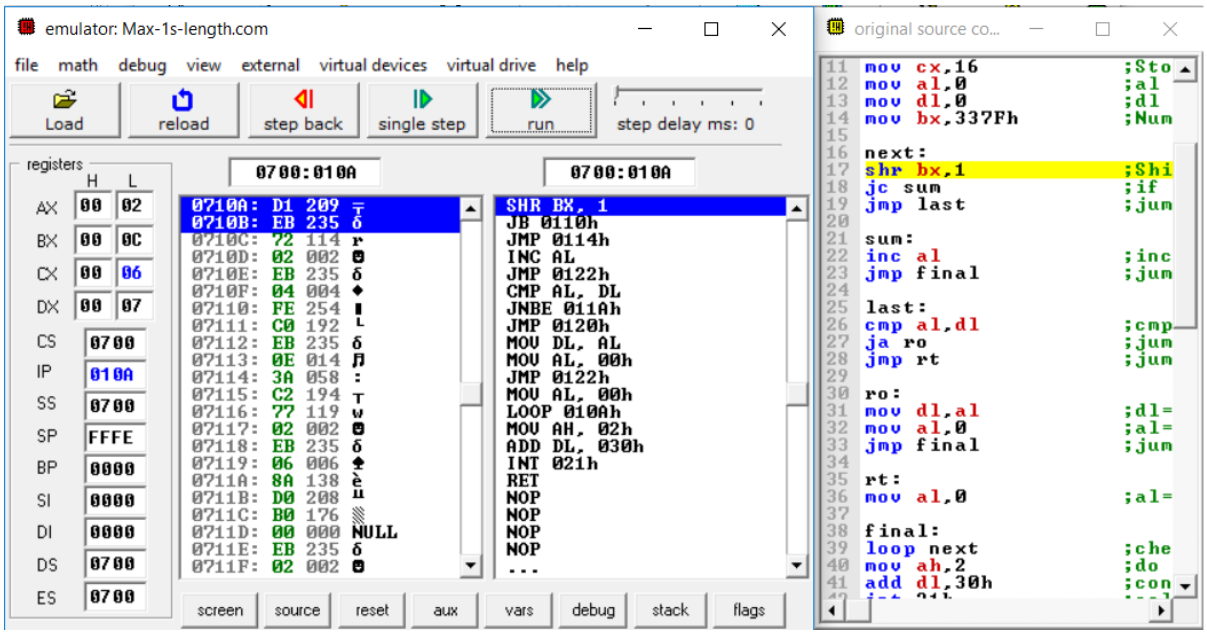
Cycle 8: 0011 0011 **0**111 1111. As carry was set to 0 and AL>DL, value AL was stored in DL and AL was made to 0.



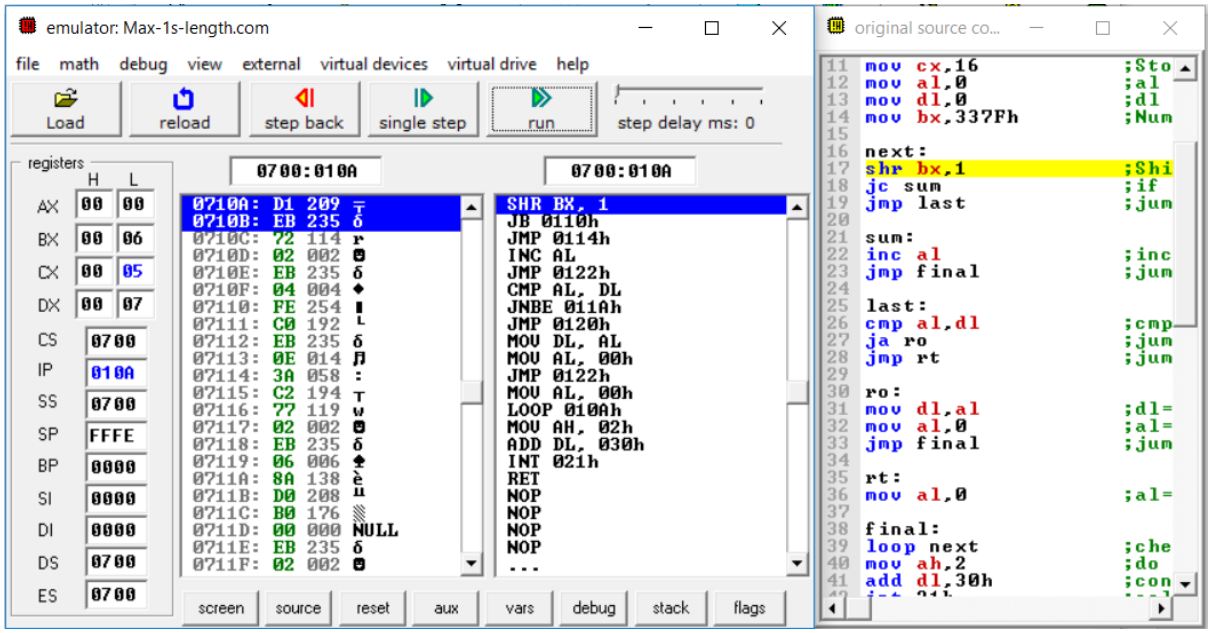
Cycle 9: 0011 001**1** 0111 1111. As carry was set to 1, AL was incremented.



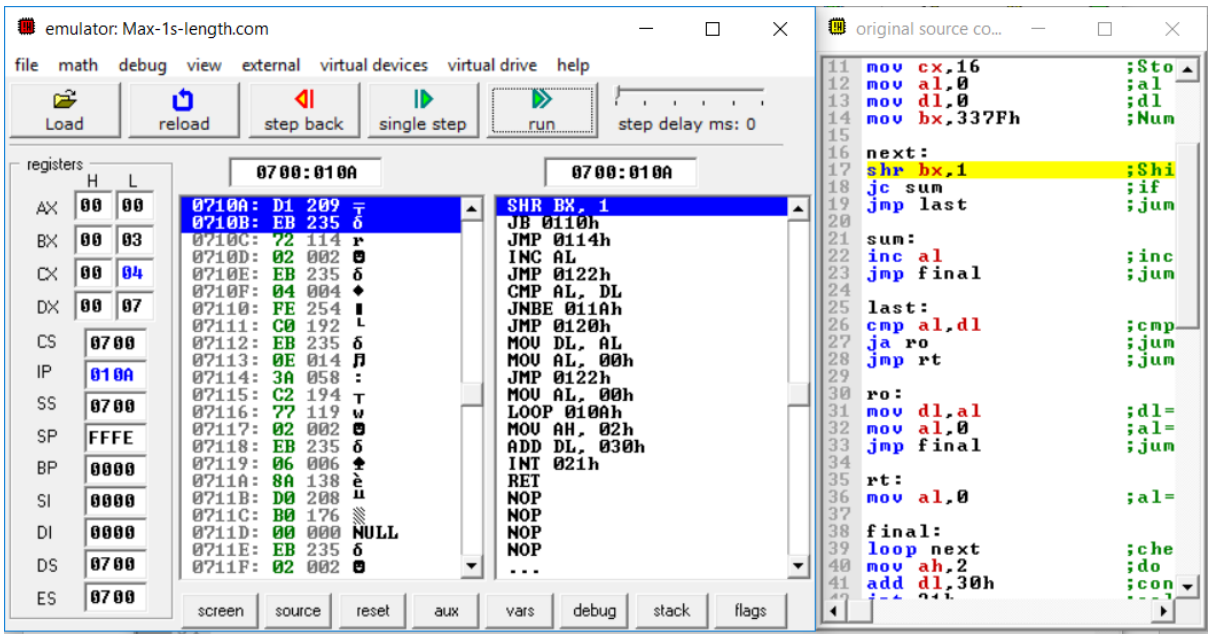
Cycle 10: 0011 00**1**1 0111 1111. As carry was set to 1, AL was incremented.



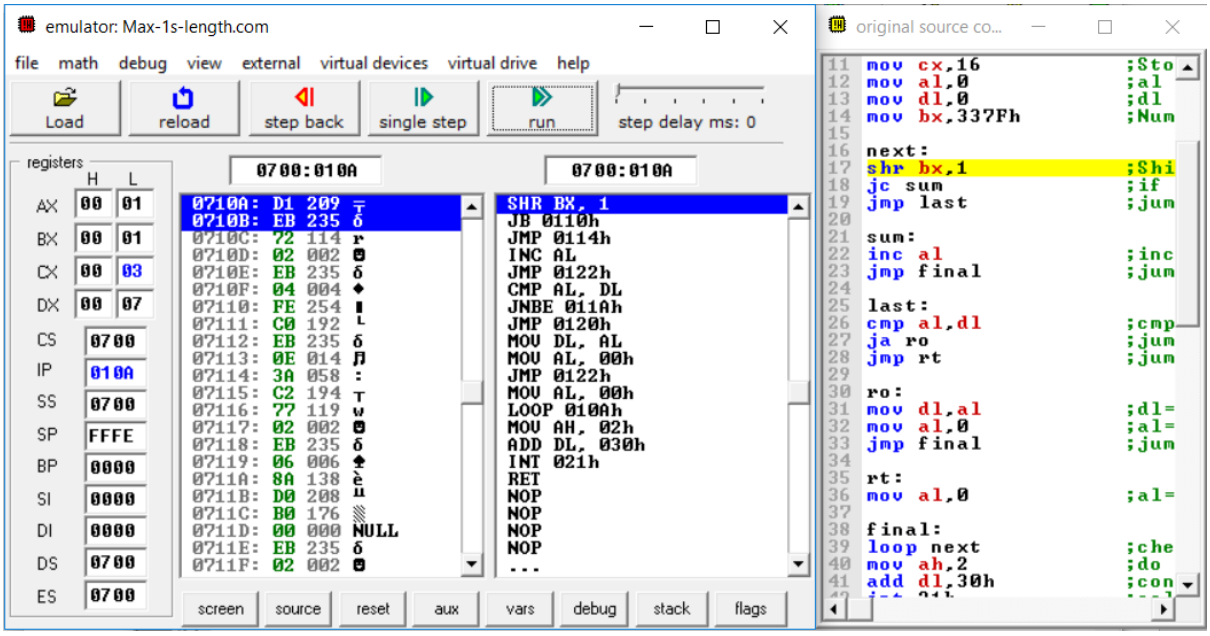
Cycle 11: 0011 0**0**11 0111 1111. As carry was set to 0 and AL<DL, AL was made to 0.



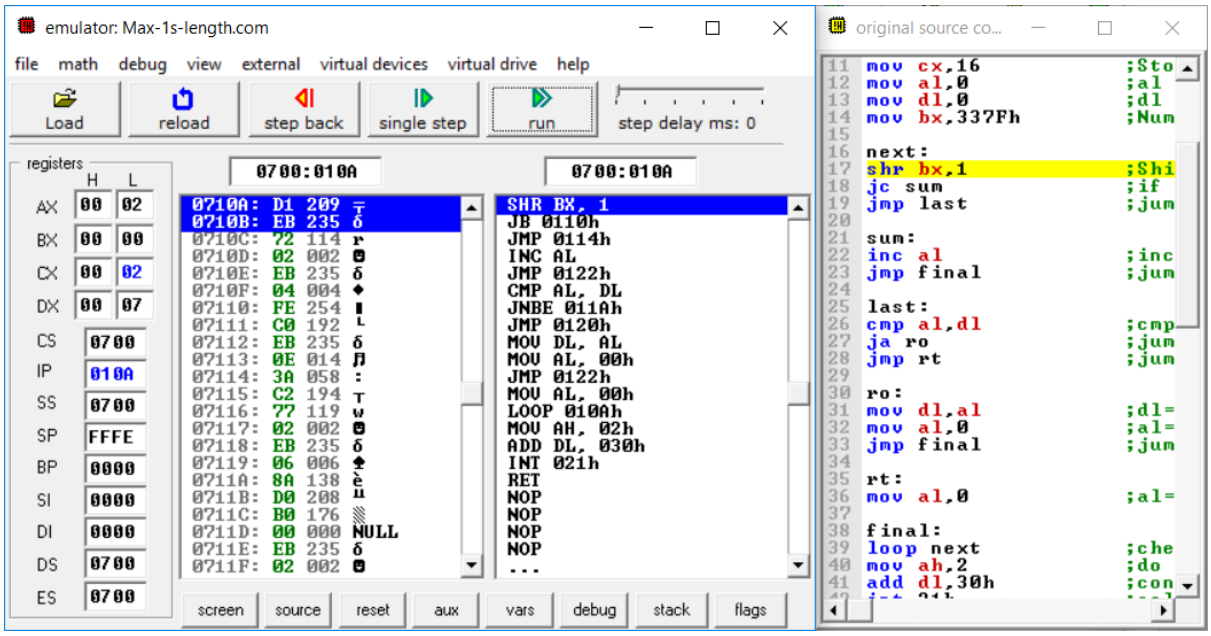
Cycle 12: 0011 **0**011 0111 1111. As carry was set to 0 and AL<DL, AL was made to 0.



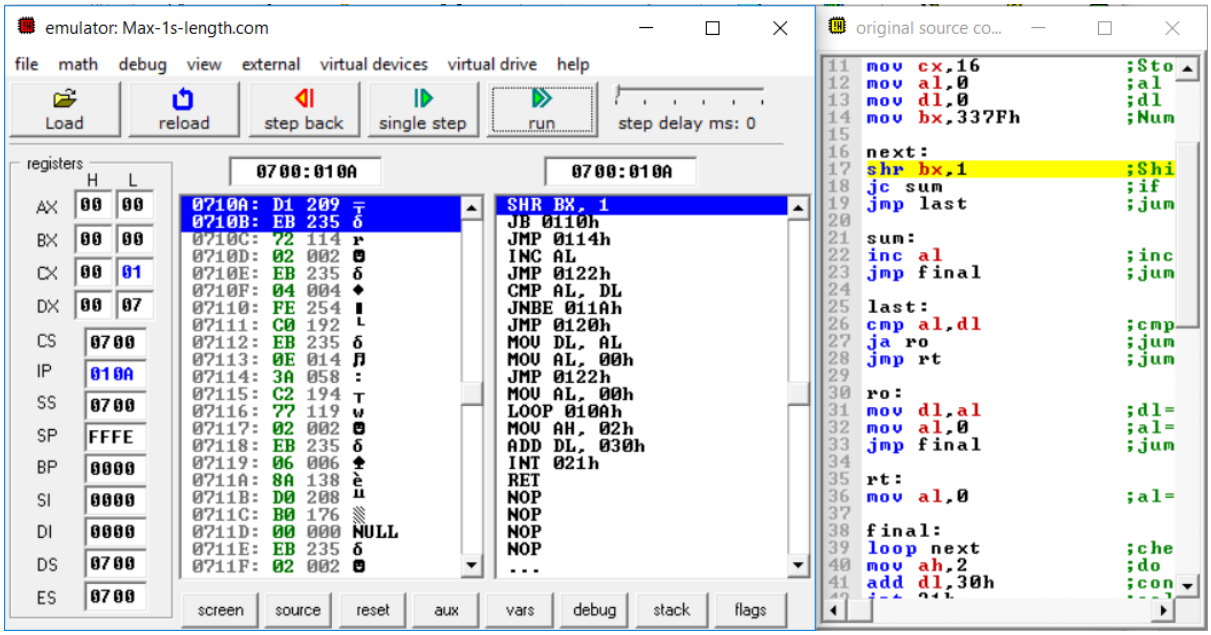
Cycle 13: 001**1** 0011 0111 1111. As carry was set to 1 AL was incremented.



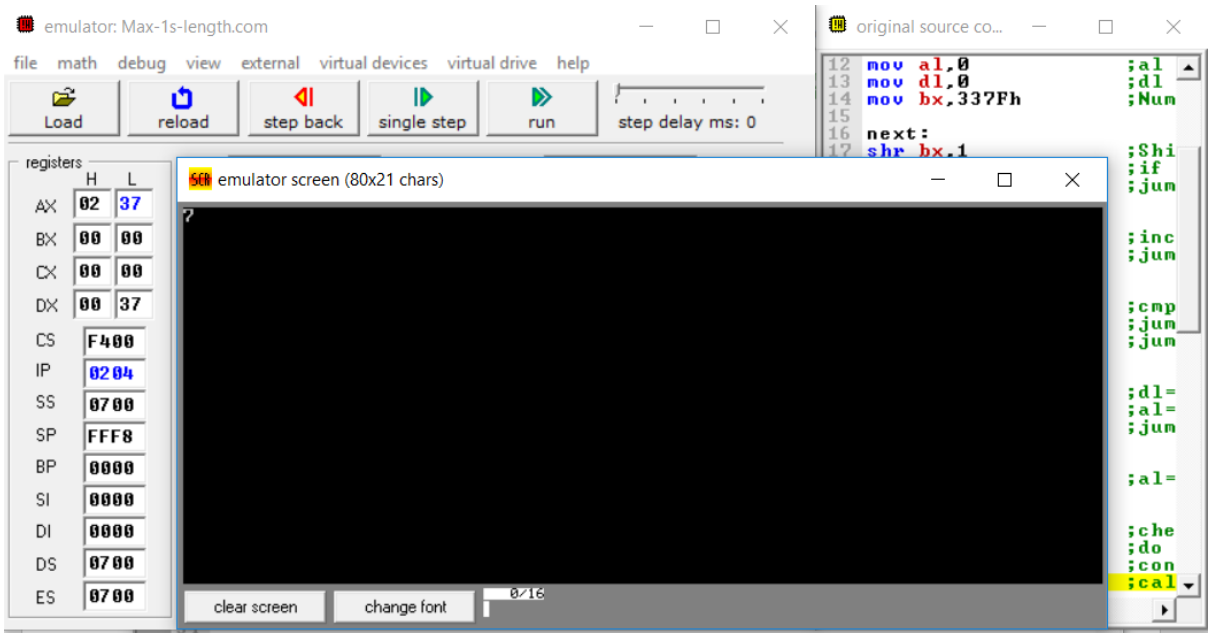
Cycle 14: 00**1**1 0011 0111 1111. As carry was set to 1AL was incremented.



Cycle 15: 0**0**11 0011 0111 1111. As carry was set to 0 and AL<DL, AL was made to 0.



Cycle 16: **0**011 0011 0111 1111. As carry was set to 0 and AL<DL, AL was made to 0. Further, the maximum length of continuous 1's is printed from DL.



Question 2: Write an 8086 Assembly Language Program to find out the maximum number of continuous zeros using Bitwise arithmetic?

Code Snippet:

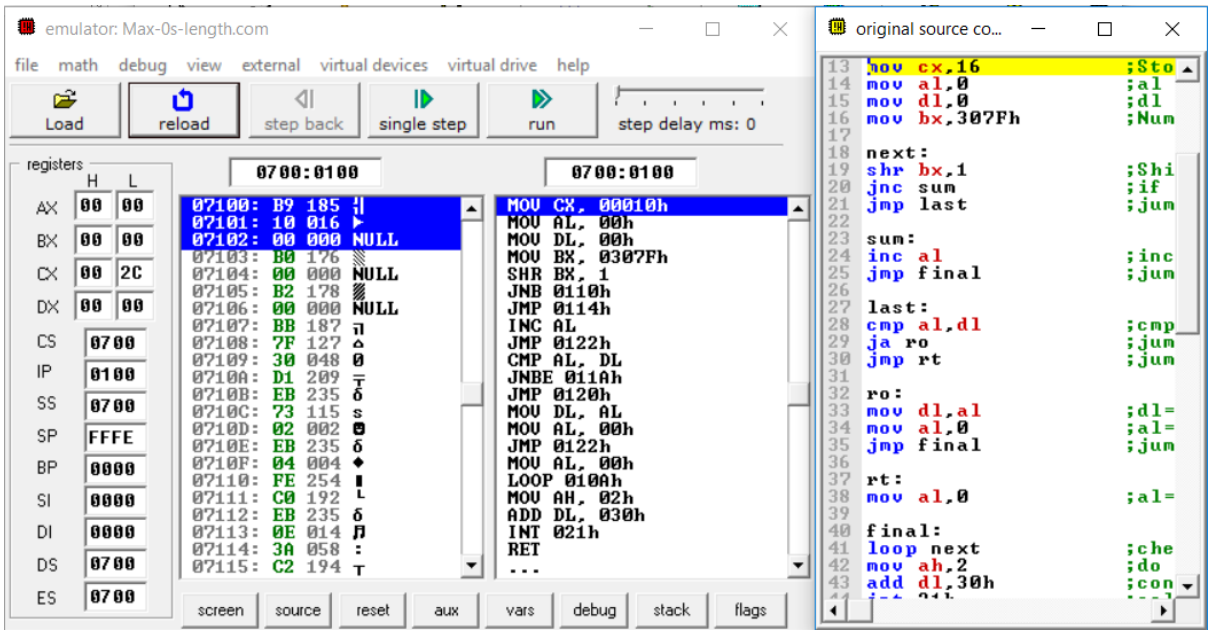
edit: C:\emu8086\MySource\max-0-length.asm

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

org 100h

name "Max-0s-length"

org 100h

; 17BCE2151 Rajendra Agrawal

    mov cx,16           ;Stores Number of iterations
    mov al,0            ;al is used to store length of 1s
    mov dl,0            ;dl is used to store max length of 1s
    mov bx,307Fh        ;Number under test

next:
    shr bx,1            ;Shift bx by 1 bit and store bit in carry
    jnc sum             ;if c is 0 then jump to sum
    jmp last            ;jump to last

sum:
    inc al              ;increment value of al
    jmp final           ;jump to final

last:
    cmp al,dl           ;cmp al and dl
    ja ro               ;jump to ro if al>dl
    jmp rt              ;jump to rt if al<=dl

ro:
    mov dl,al           ;dl=al
    mov al,0            ;al=0
    jmp final           ;jump to final

rt:
    mov al,0            ;al=0

final:
    loop next           ;check value of cx and loop
    mov ah,2            ;do ah=2,print function number
    add dl,30h          ;convert normal value to ASCII value
    int 21h             ;call DOS interrupt

ret
```

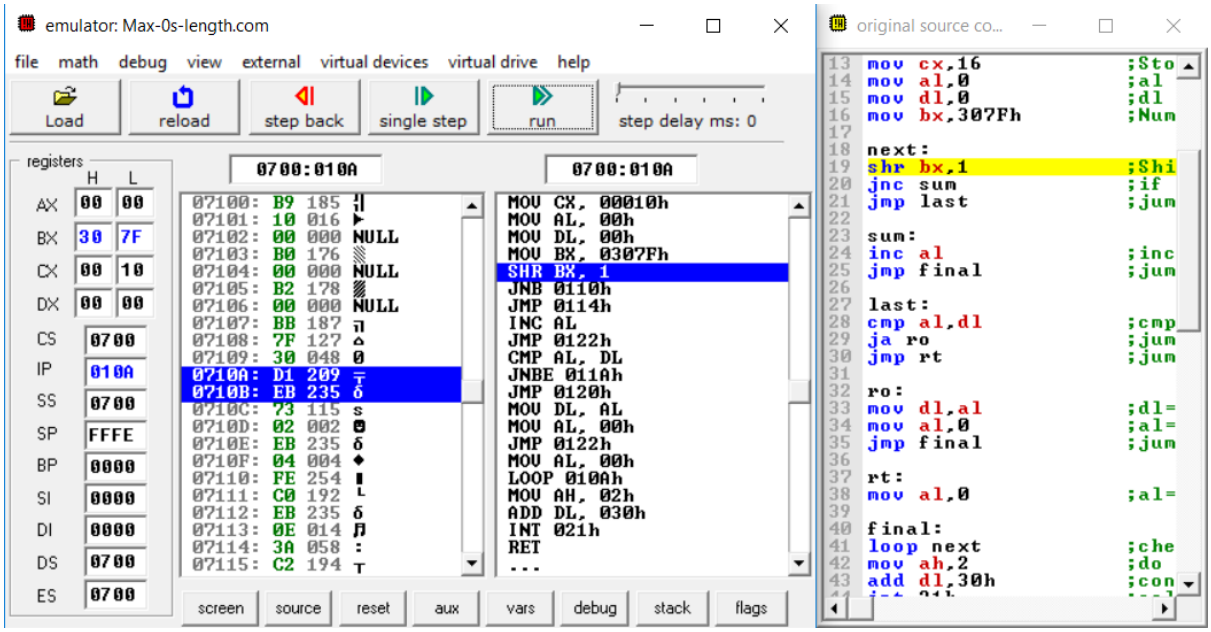
Here the number is 307F whose binary form is 0011 0000 0111 1111. So maximum length of continuous 0's is 5.

Loop by Loop Execution:

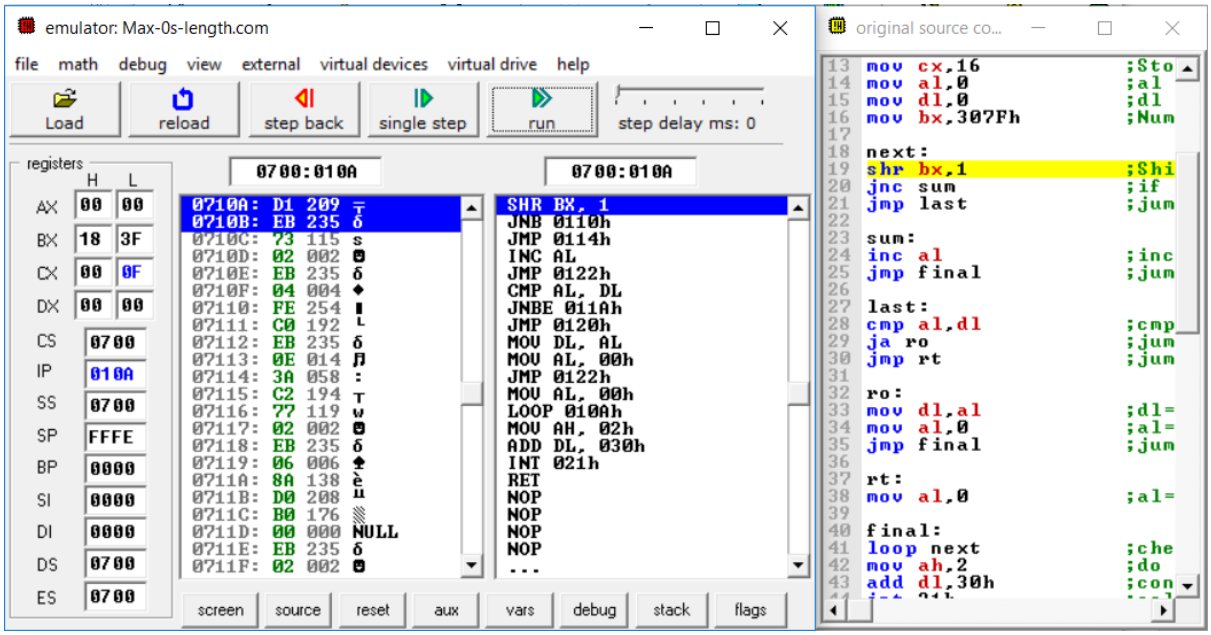
- Load the Program.



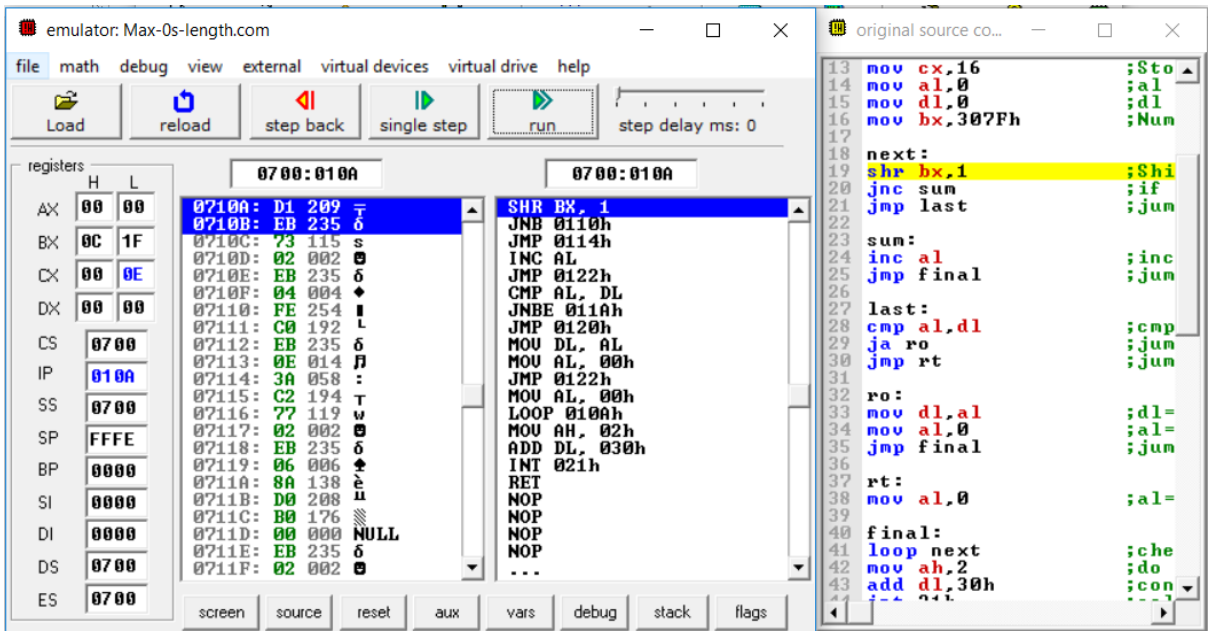
- Initializing CX, AL, DL and BX registers.



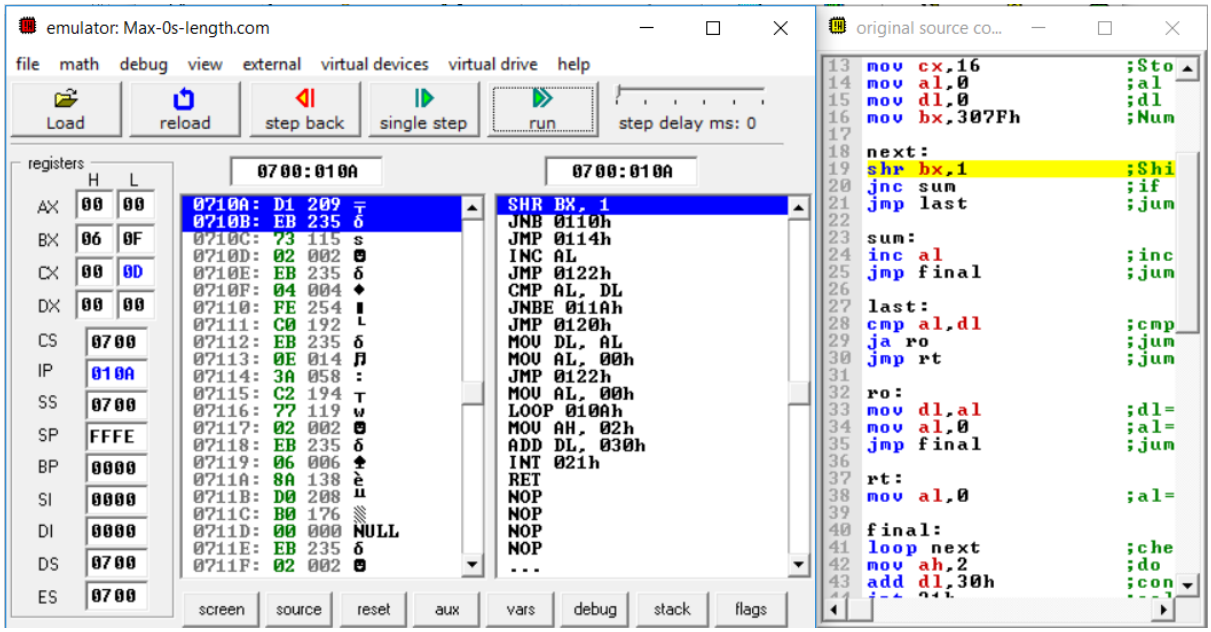
Cycle 1: 0011 0000 0111 111**1.** As carry was set to 1 and AL<=DL, AL was made to 0.



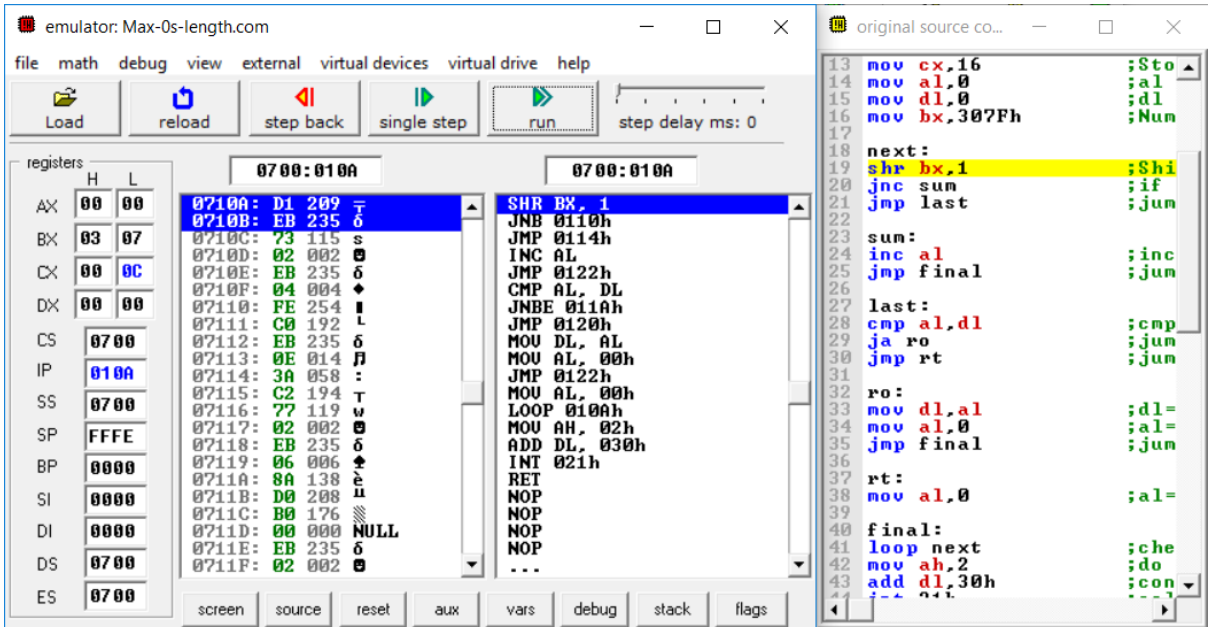
Cycle 2: 0011 0000 0111 11**1**1. As carry was set to 1 and AL<=DL, AL was made to 0.



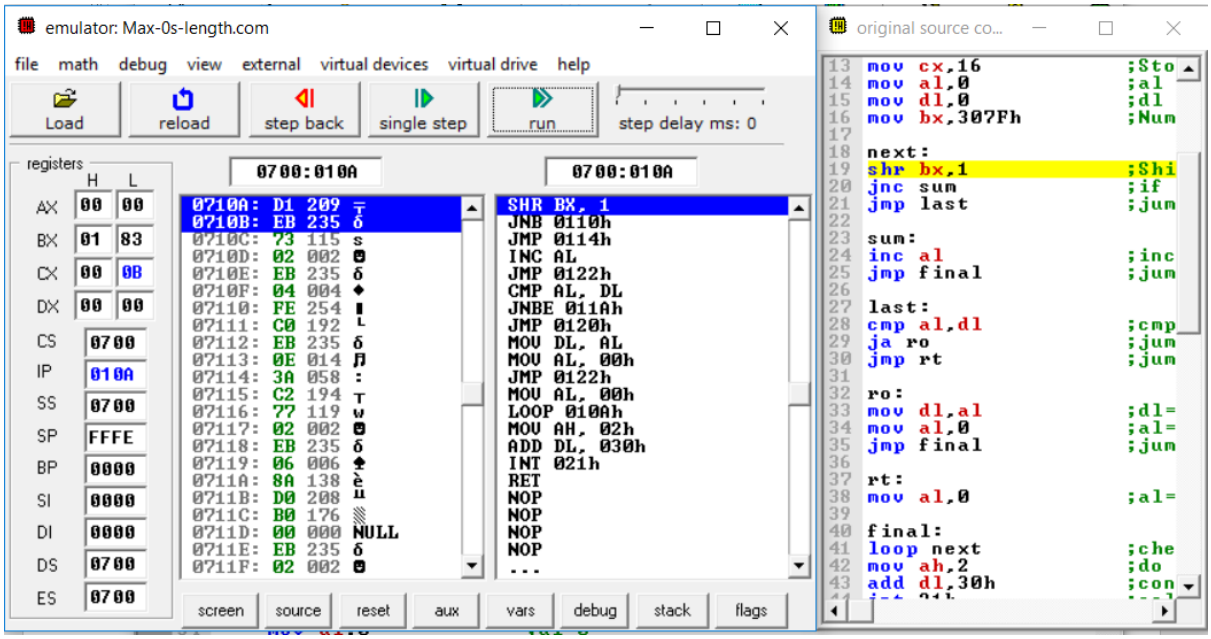
Cycle 3: 0011 0000 0111 1**1**11. As carry was set to 1 and AL<=DL, AL was made to 0.



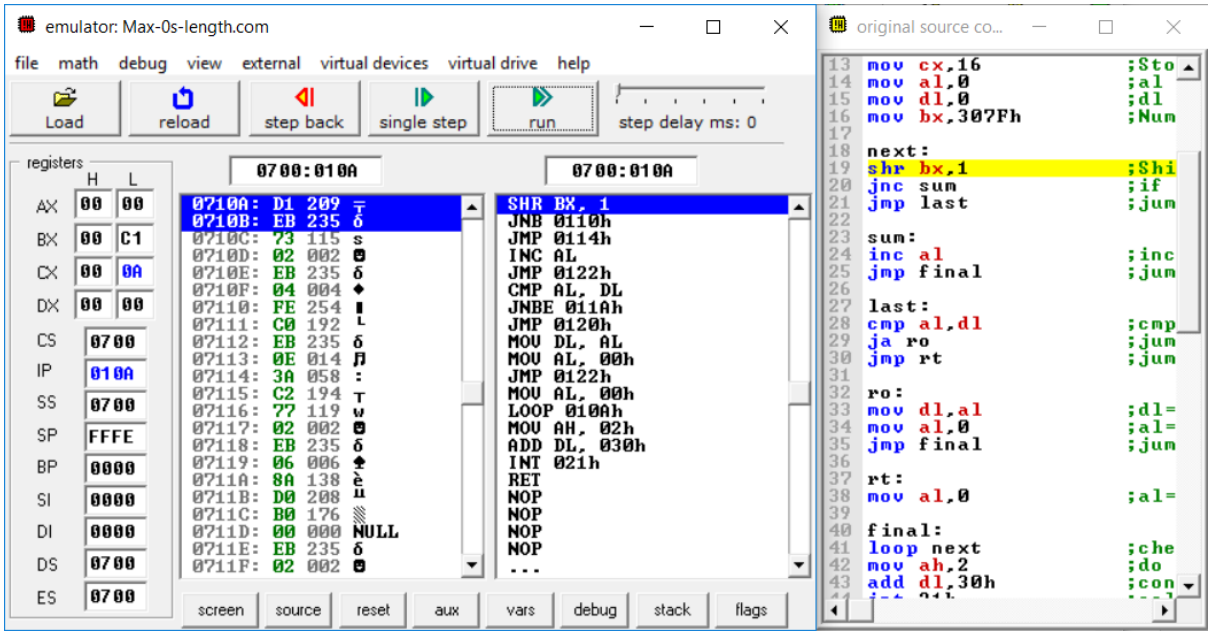
Cycle 4: 0011 0000 0111 **1**111. As carry was set to 1 and AL<=DL, AL was made to 0.



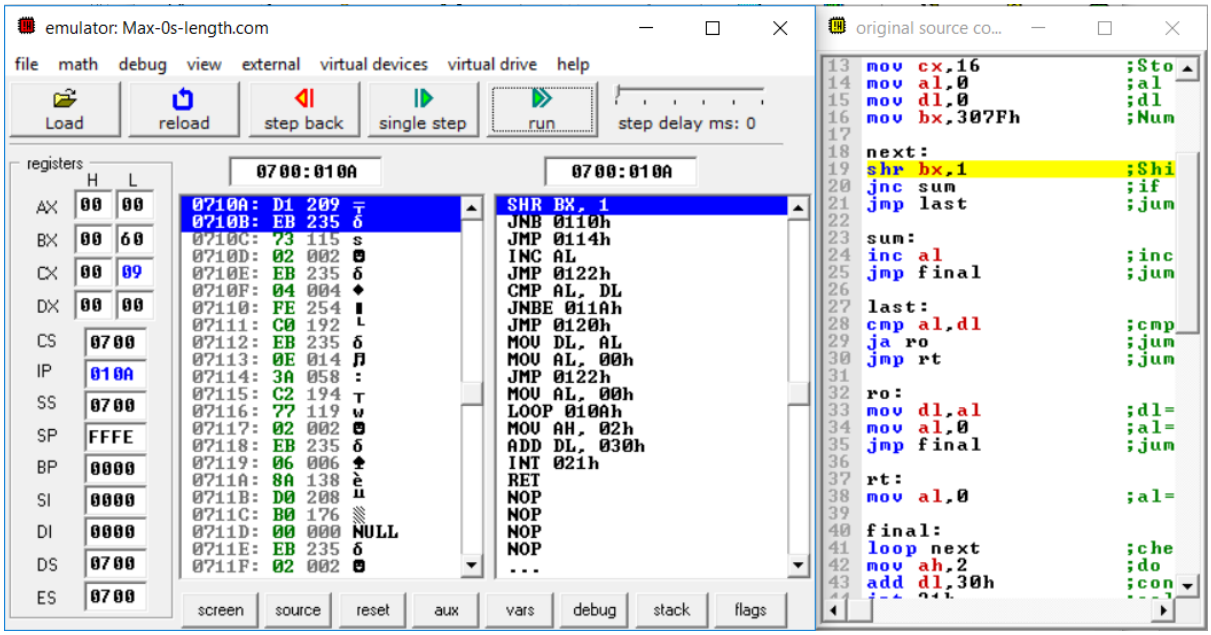
Cycle 5: 0011 0000 011**1** 1111. As carry was set to 1 and AL<=DL, AL was made to 0.



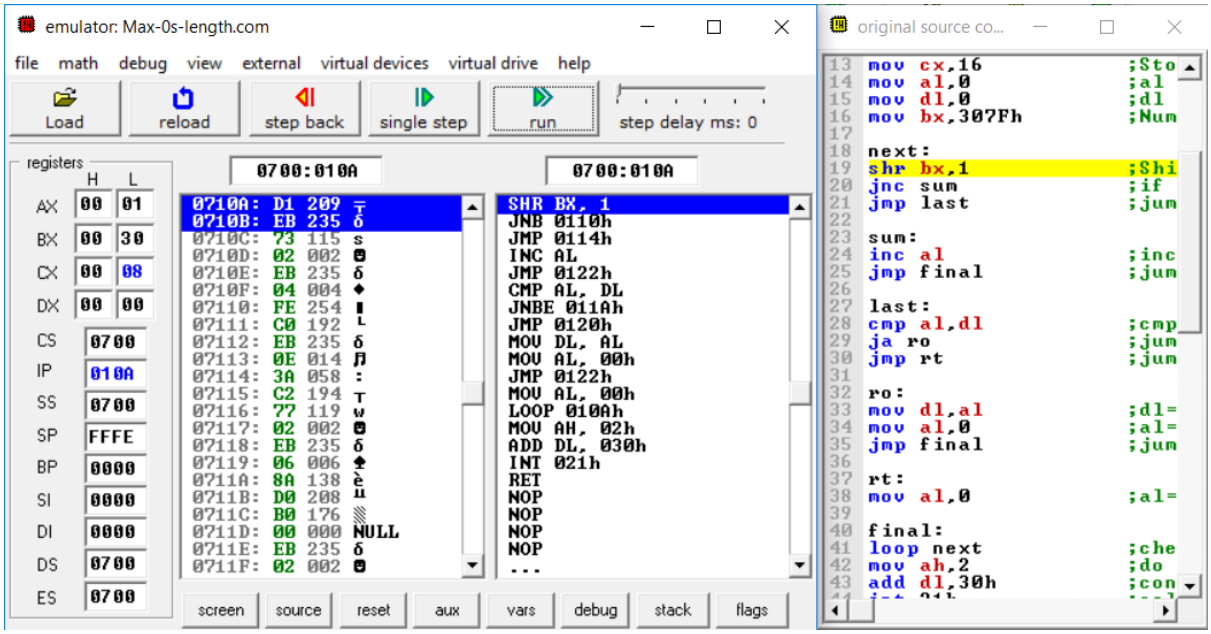
Cycle 6: 0011 0000 01**1**1 1111. As carry was set to 1 and AL<=DL, AL was made to 0.



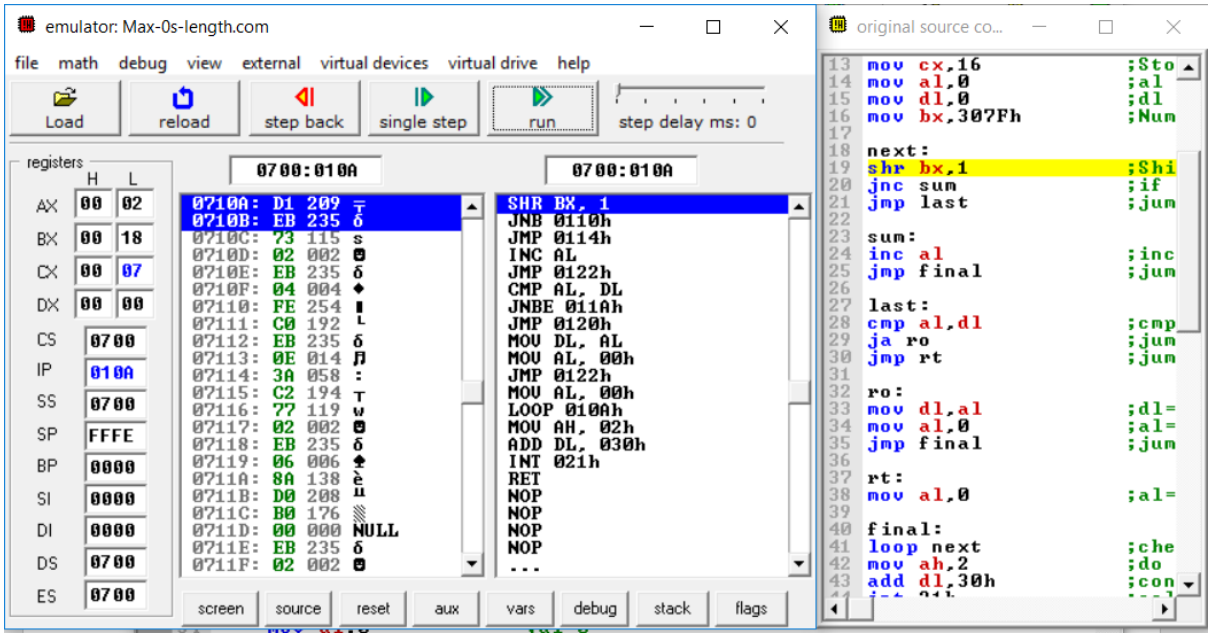
Cycle 7: 0011 0000 0**1**11 1111. As carry was set to 1 and AL<=DL, AL was made to 0.



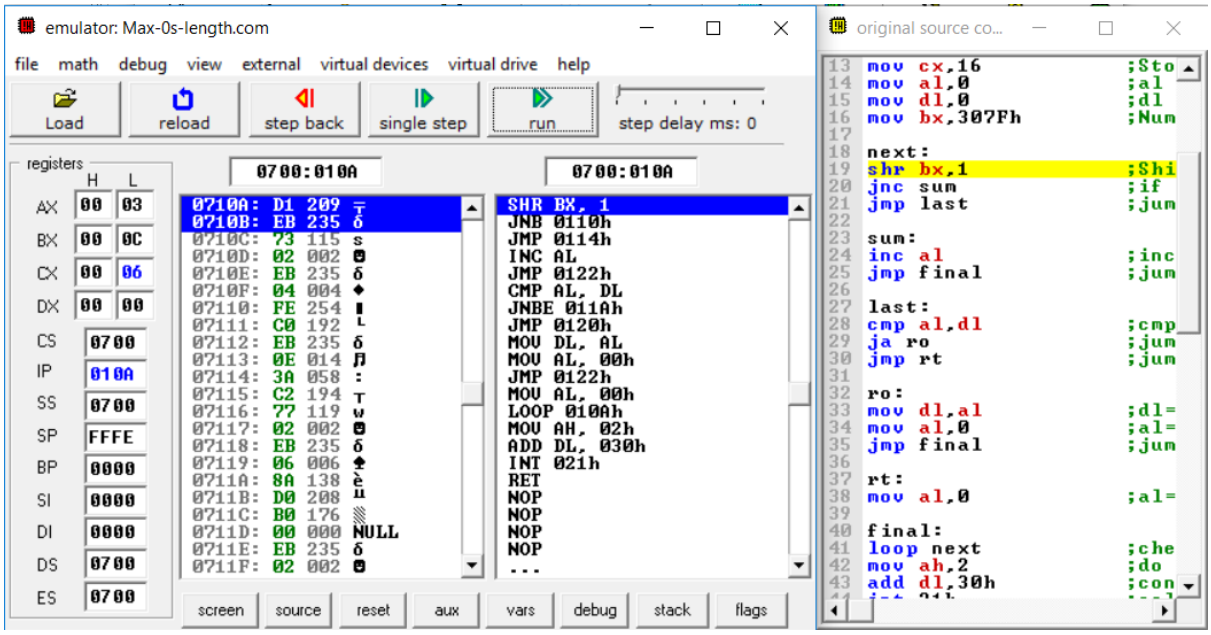
Cycle 8: 0011 0000 **0**111 1111. As carry was set to 0, AL was incremented.



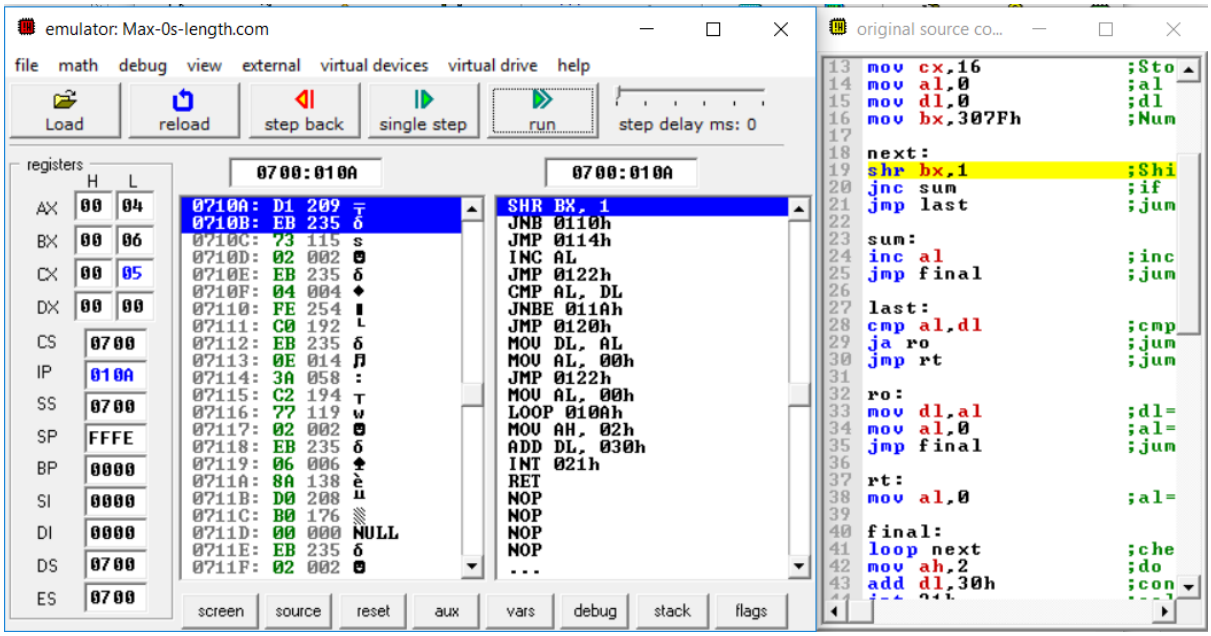
Cycle 9: 0011 000**0** 0111 1111. As carry was set to 0, AL was incremented.



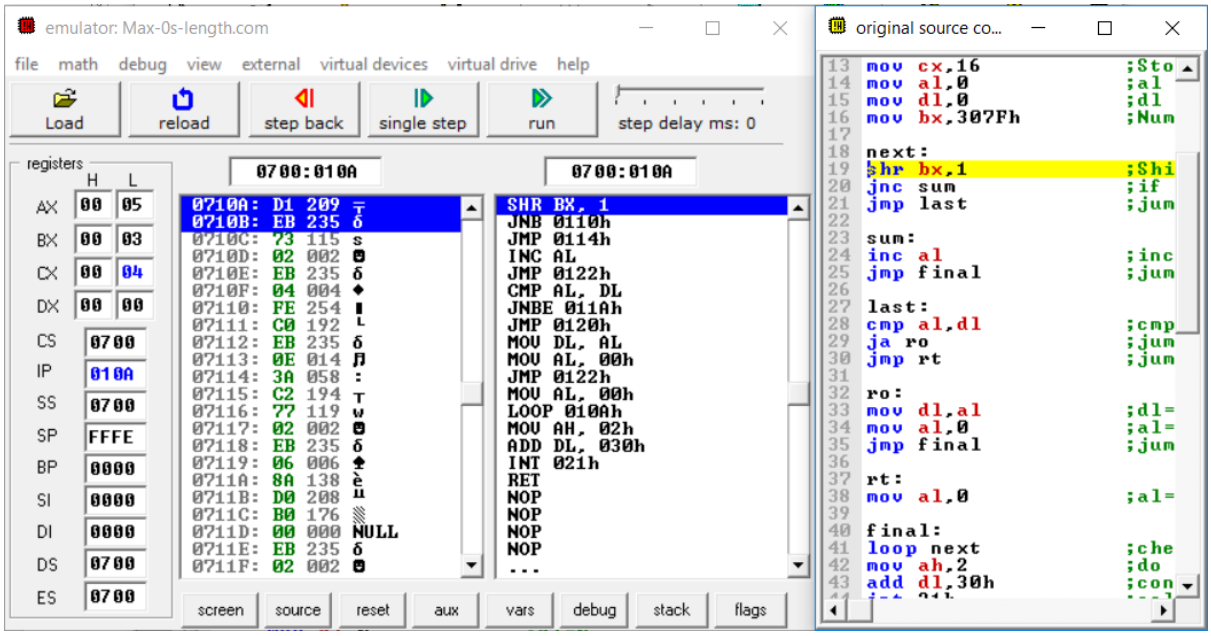
Cycle 10: 0011 00**0**0 0111 1111. As carry was set to 0, AL was incremented.



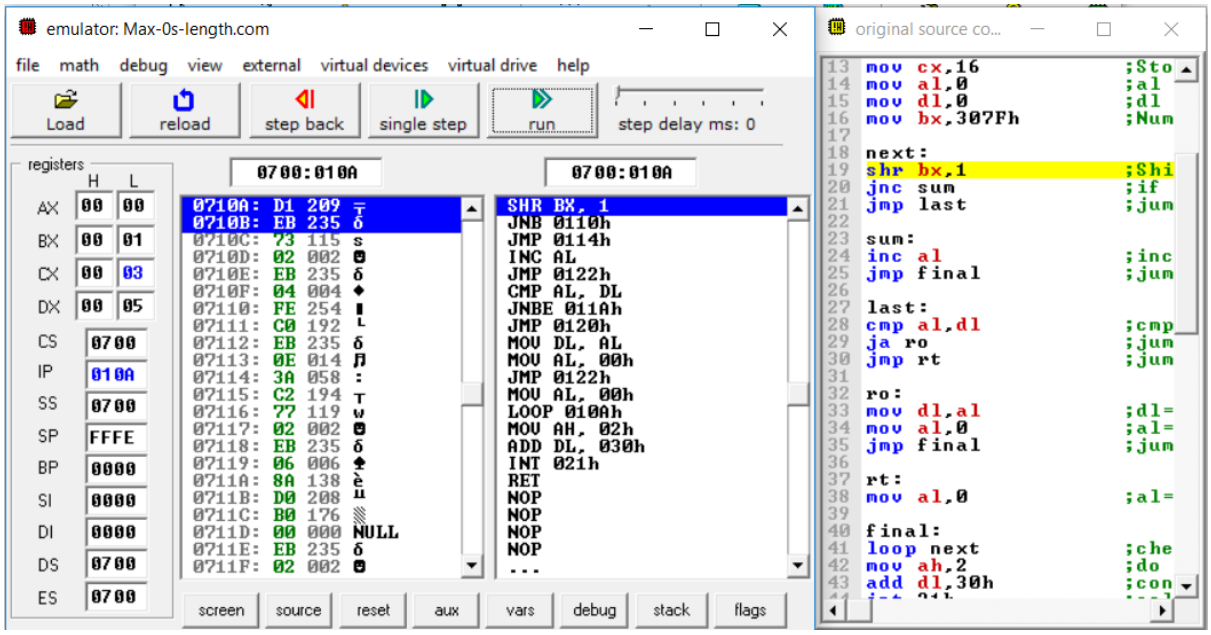
Cycle 11: 0011 0**0**00 0111 1111. As carry was set to 0, AL was incremented.



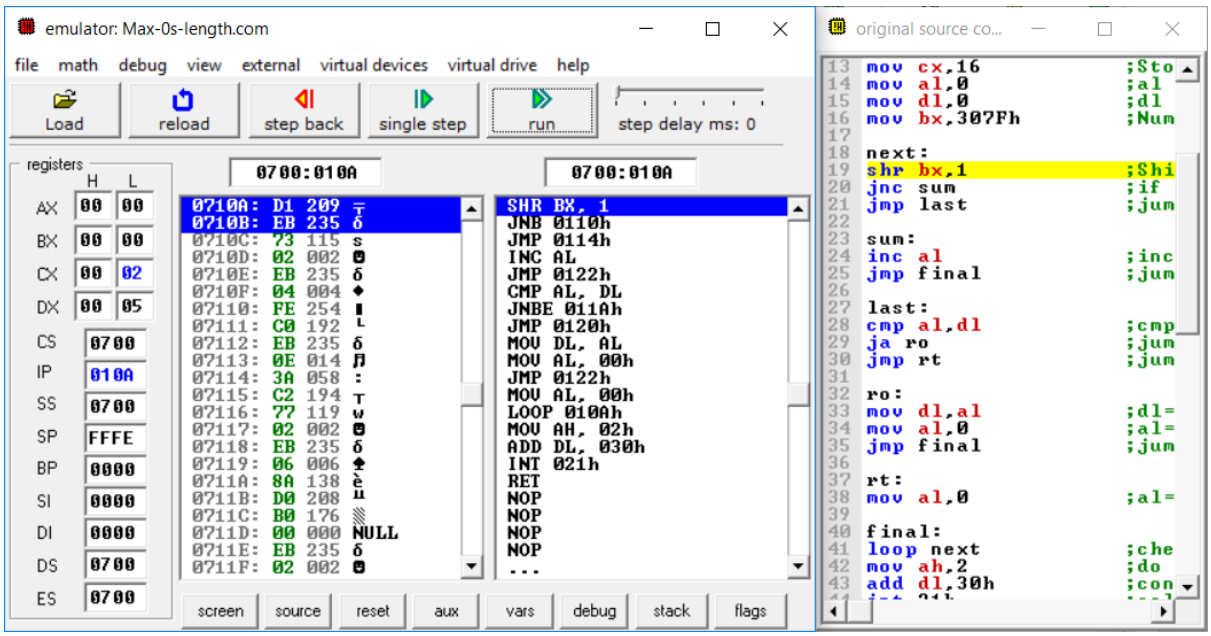
Cycle 12: 0011 **0**000 0111 1111. As carry was set to 0, AL was incremented.



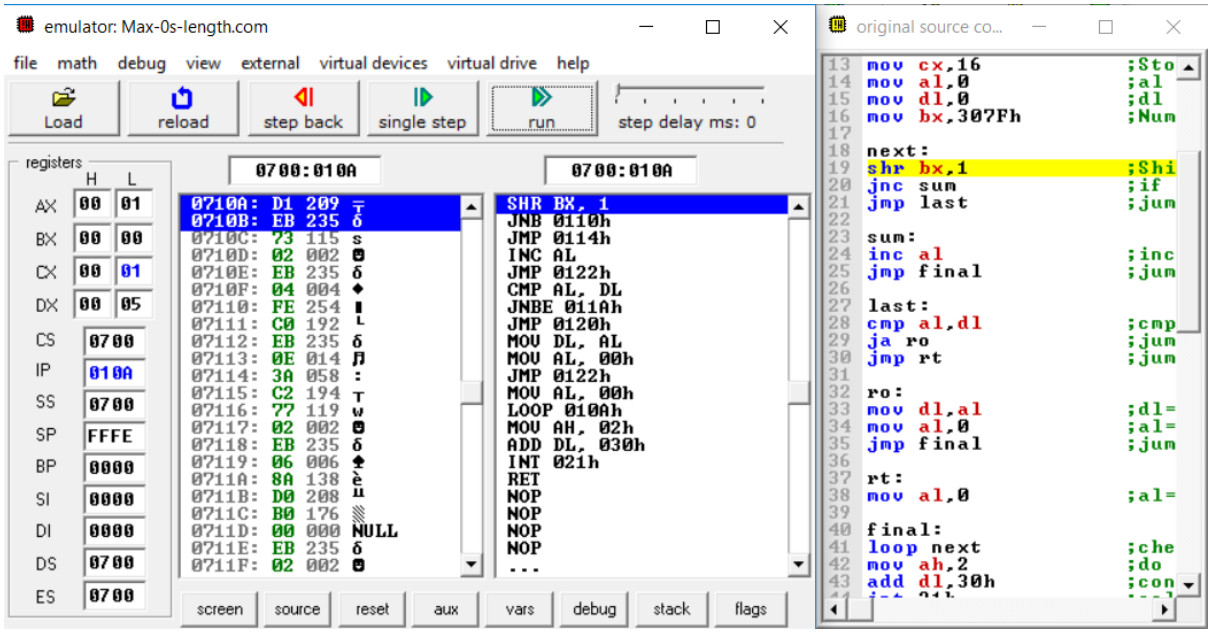
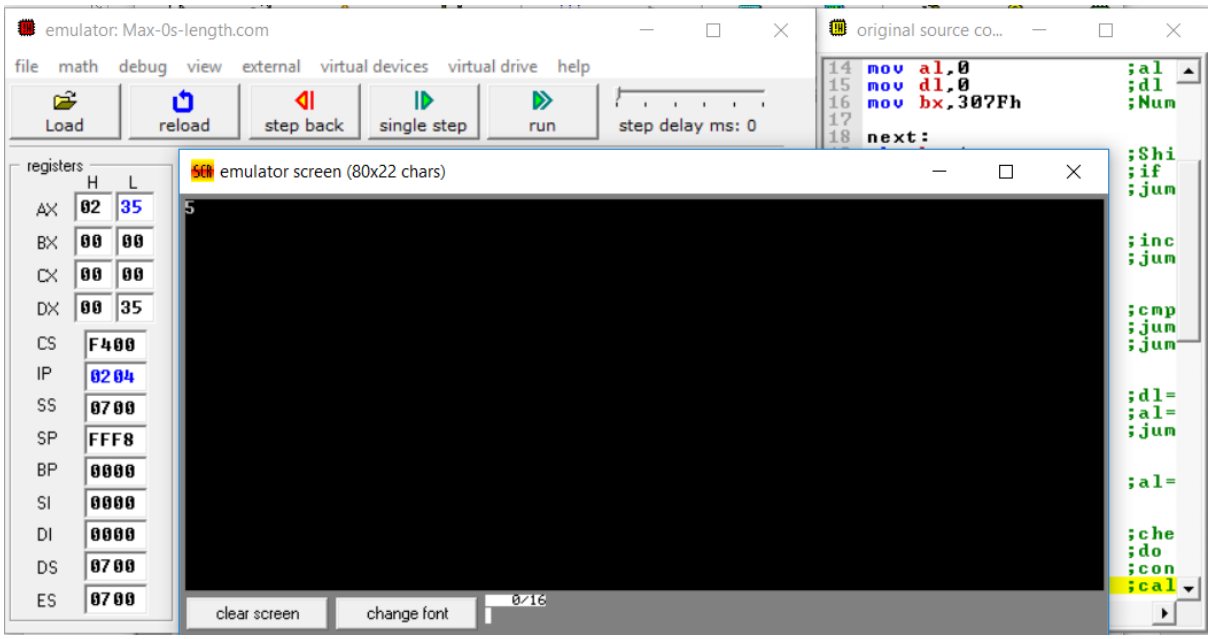
Cycle 13: 001**1** 0000 0111 1111. As carry was set to 1 and AL>DL, value of AL was stored in DL and AL was made to 0.



Cycle 14: 00**1**1 0000 0111 1111. As carry was set to 1 and AL<=DL, AL was made to 0.



Cycle 15: 0**0**11 0000 0111 1111. As carry was set to 0, AL was incremented.



Cycle 16: **0**011 0000 0111 1111. As carry was set to 0, AL was incremented. Further, the maximum length of continuous 0's is printed from DL