VIT®

Vellore Institute of Technology

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CSE2006
Microprocessor and Interfacing

Lab Assignment 3

Slot: L39+L40

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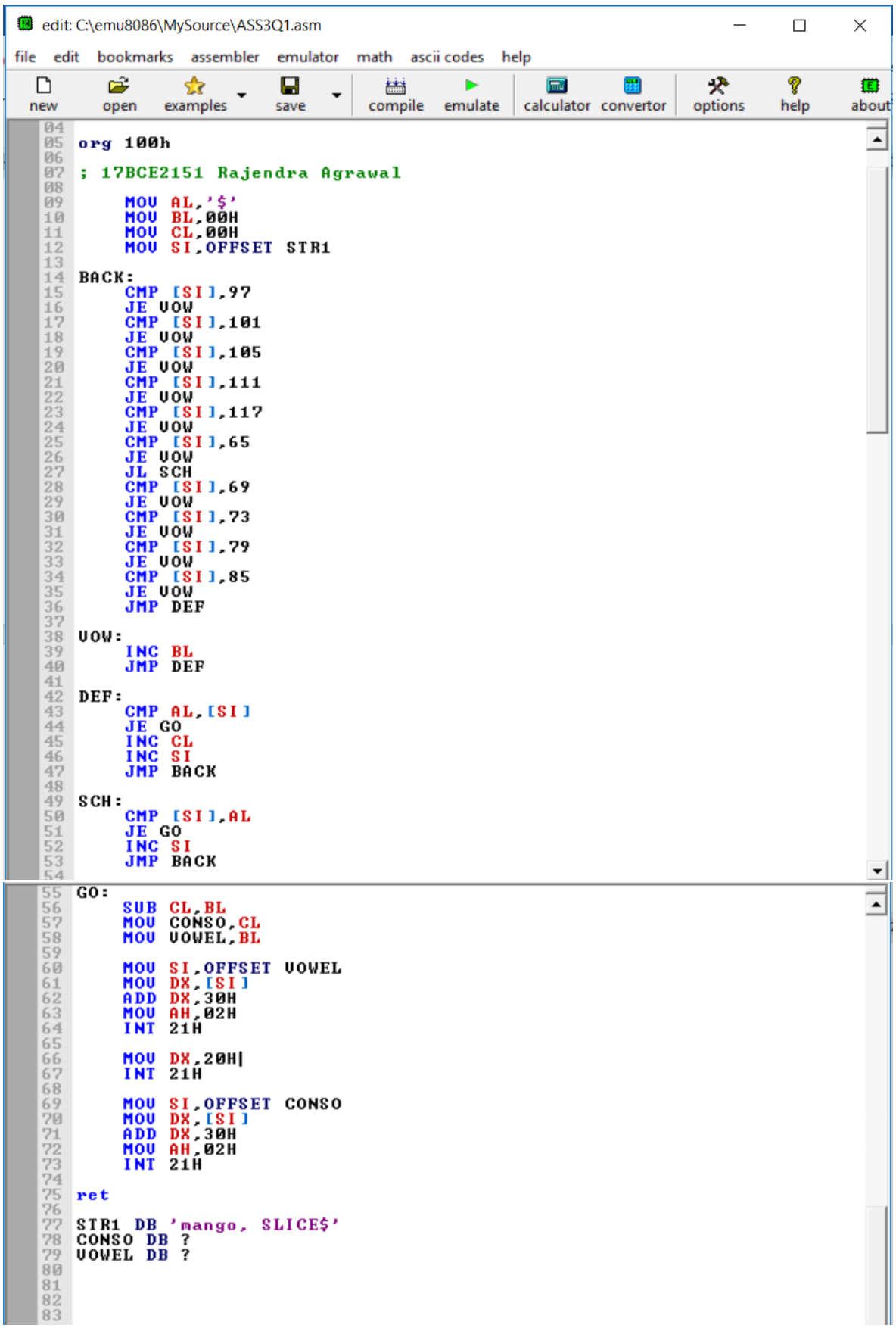
Question 1. Write an 8086 Assembly Language Program to count a) vowels b) consonants in a given string.

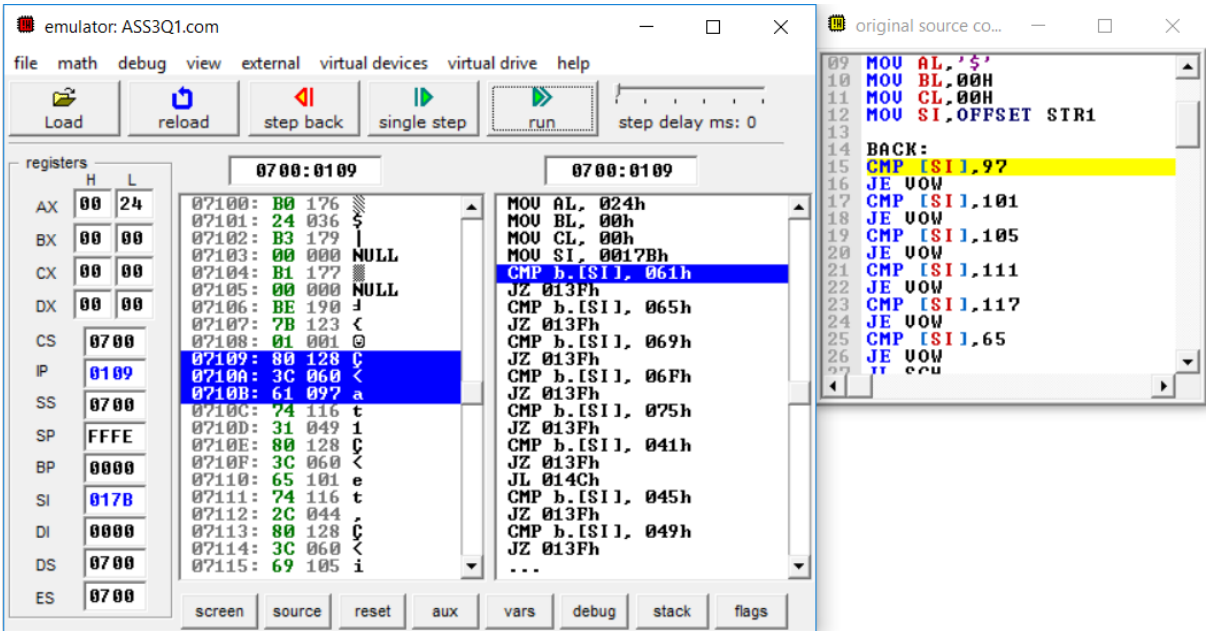
Code:



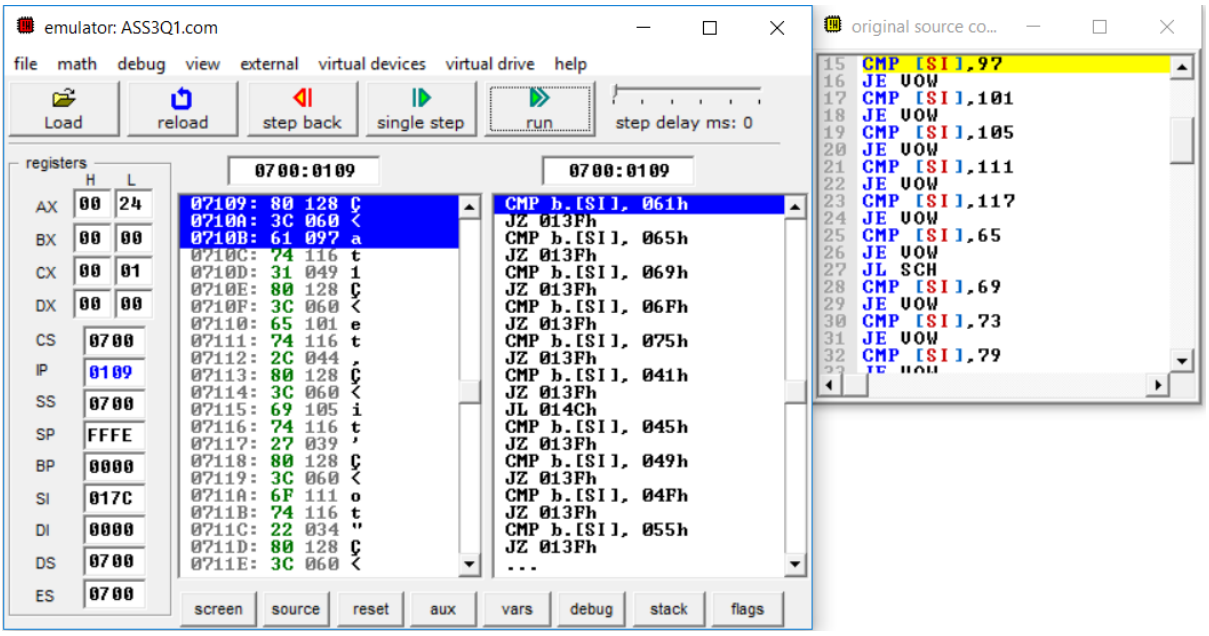
Here we compare the character with ascii codes for all vowels, in small case as well as upper case. We also check is character is special character. So we count number of vowels in BL and total number of letters in CL. Later, we find the number of vowels BL and number of consonants as difference of Cl and BL.

Step by Step Execution:

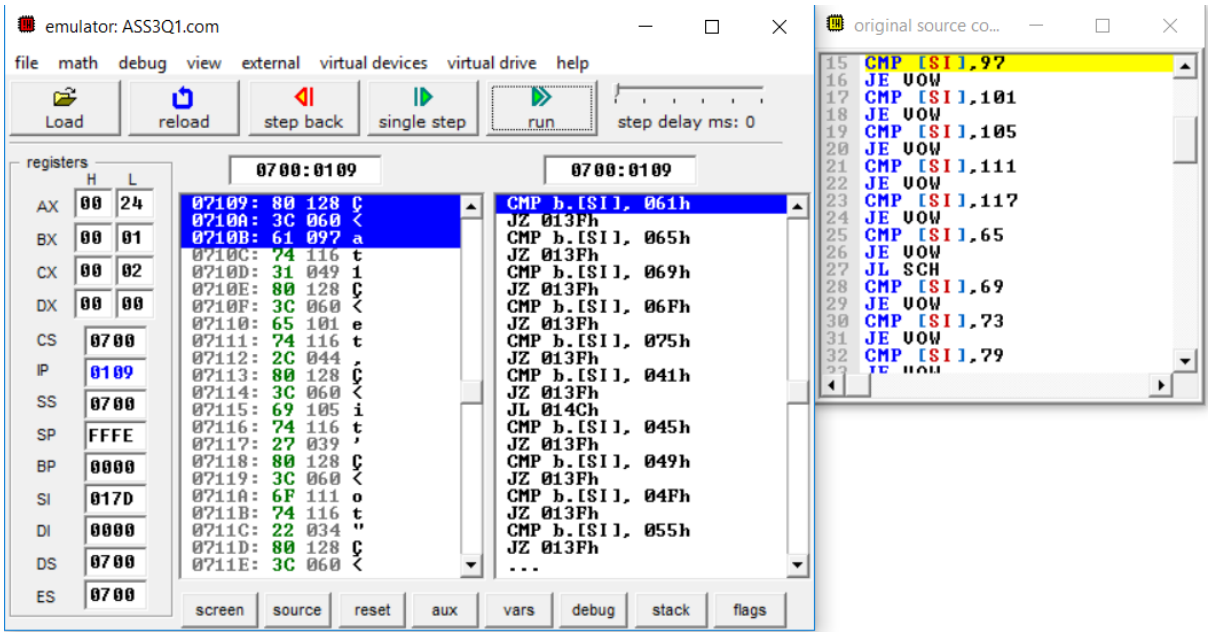
1. Initialize all the registers. AL with ascii of $. BL and CL to be 0.



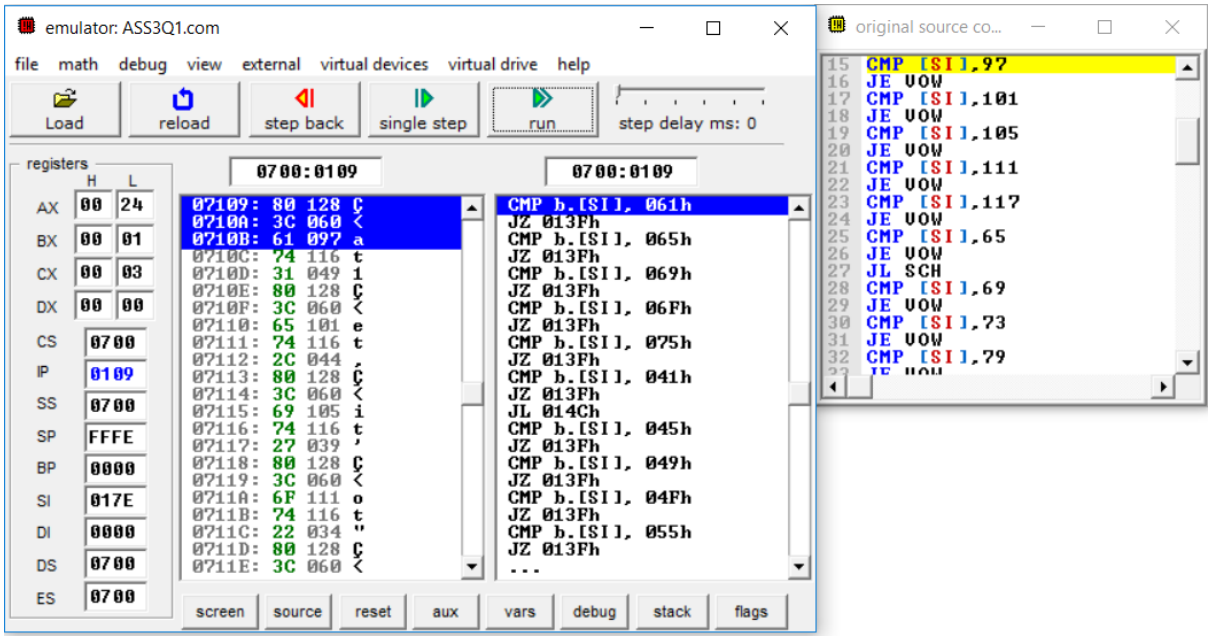
2. "**m**ango, SLICE" since letter 'm' is under scan BL will be 0 and CL will be incremented to 1.



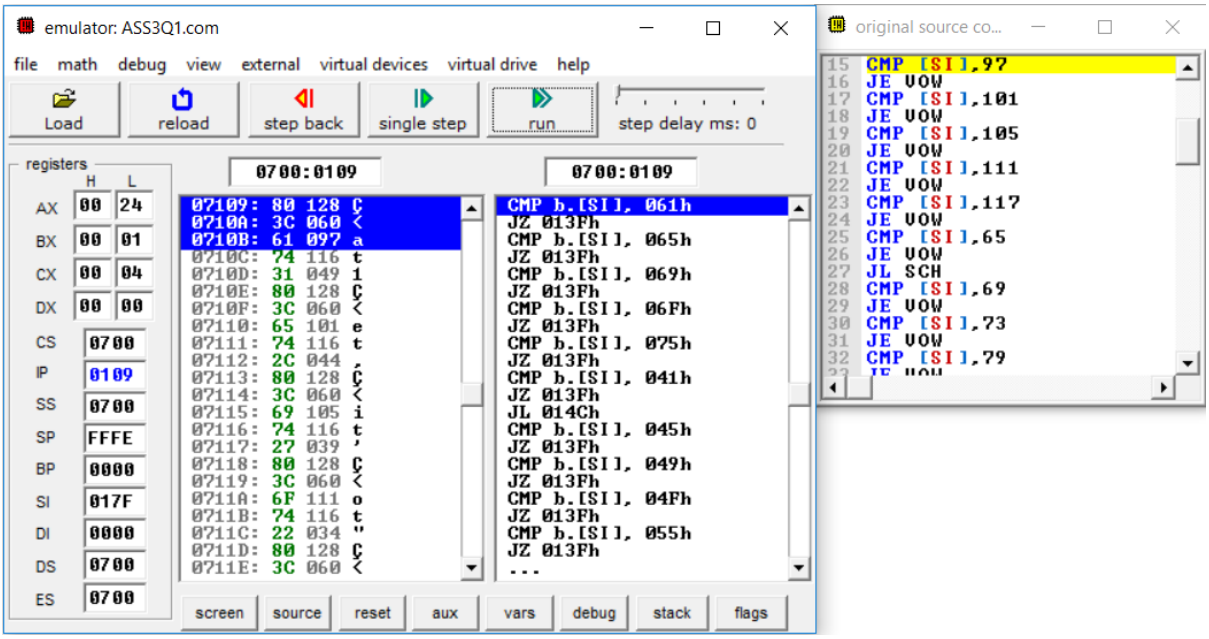
3. “m**a**ngo, SLICE” since vowel ‘a’ is under scan BL will be incremented to 1 and CL will also be incremented to 2.



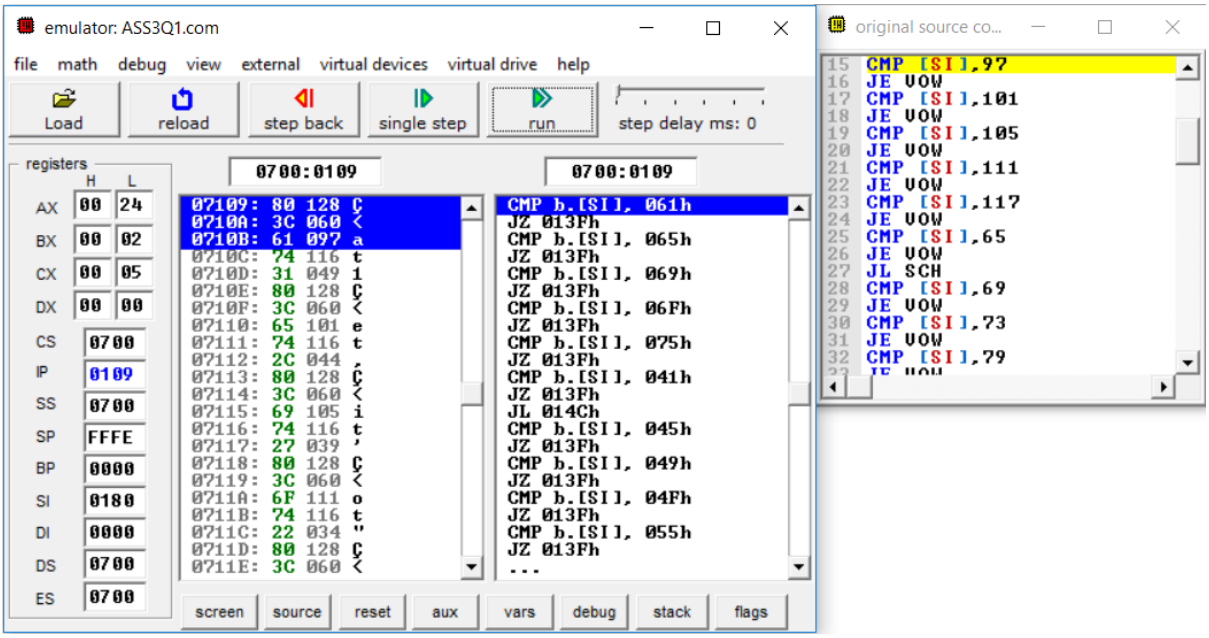
4. “ma**n**go, SLICE” since letter ‘n’ is under scan BL will be 1 and CL will be incremented to 3.



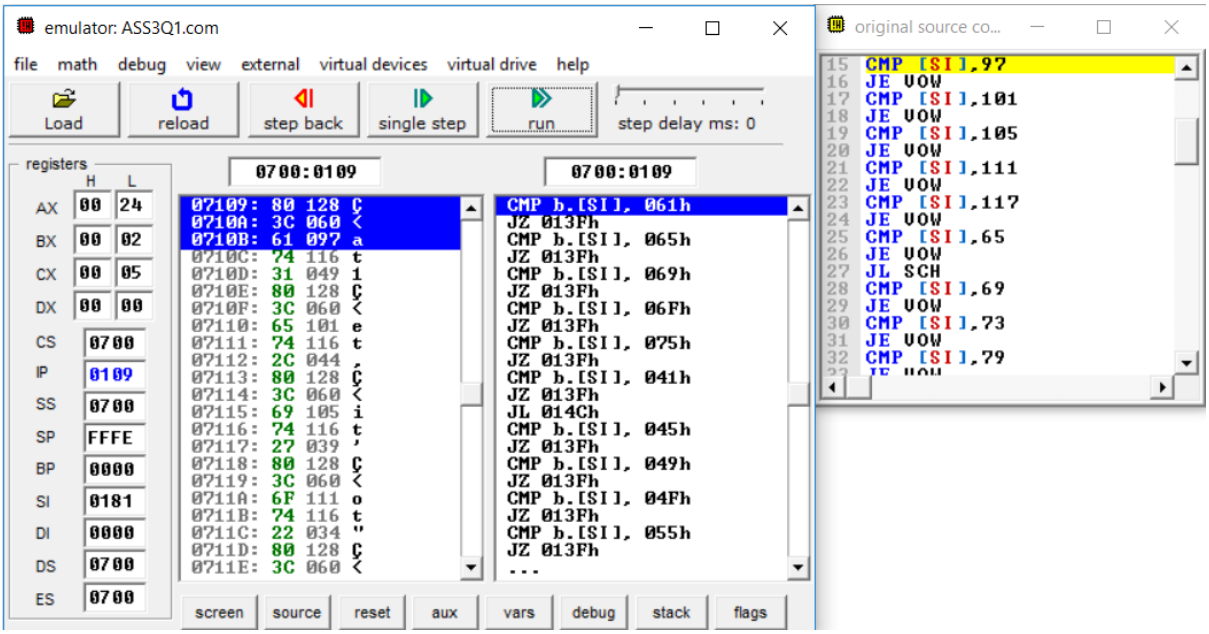
5. “man**g**o, SLICE” since letter ‘g’ is under scan BL will be 1 and CL will be incremented to 4.



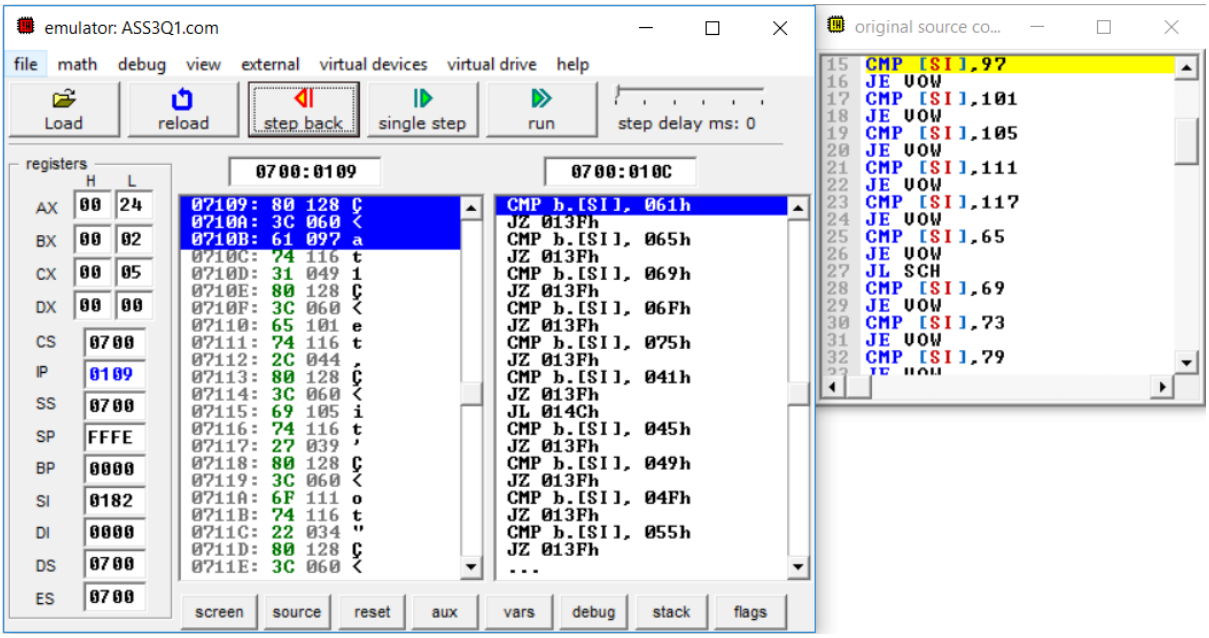
6. “mang**o**, SLICE” since vowel ‘o’ is under scan BL will be incremented to 2 and CL will also be incremented to 5.



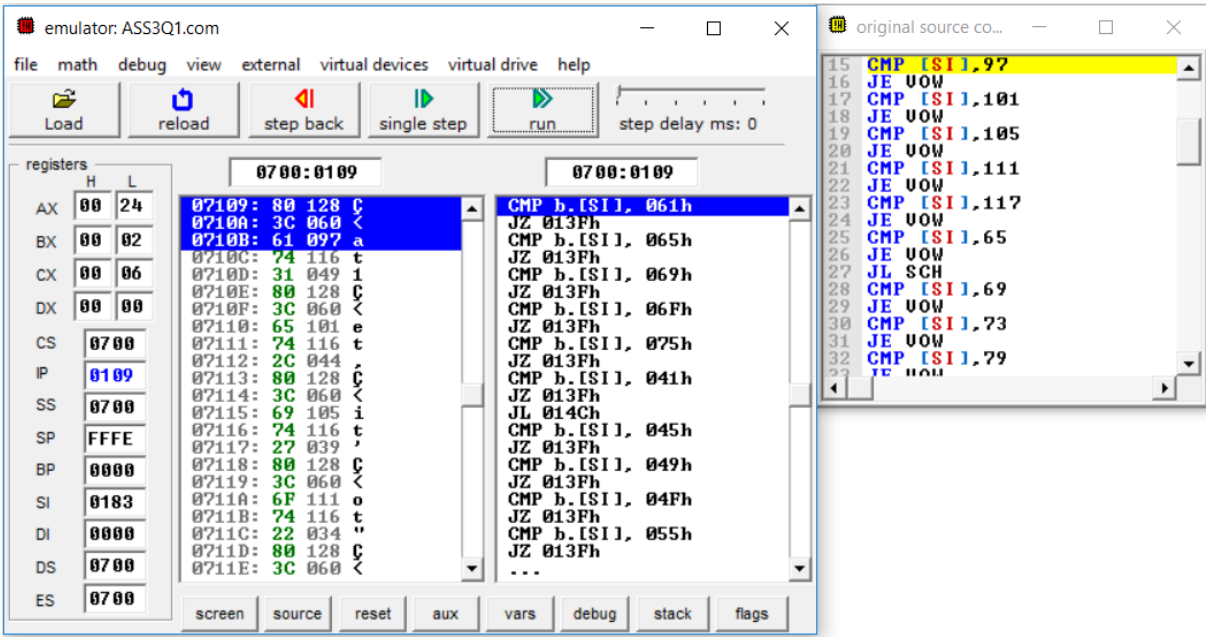
7. “mango**,** SLICE” since special character ‘,’ is under scan BL and CL both will be same.



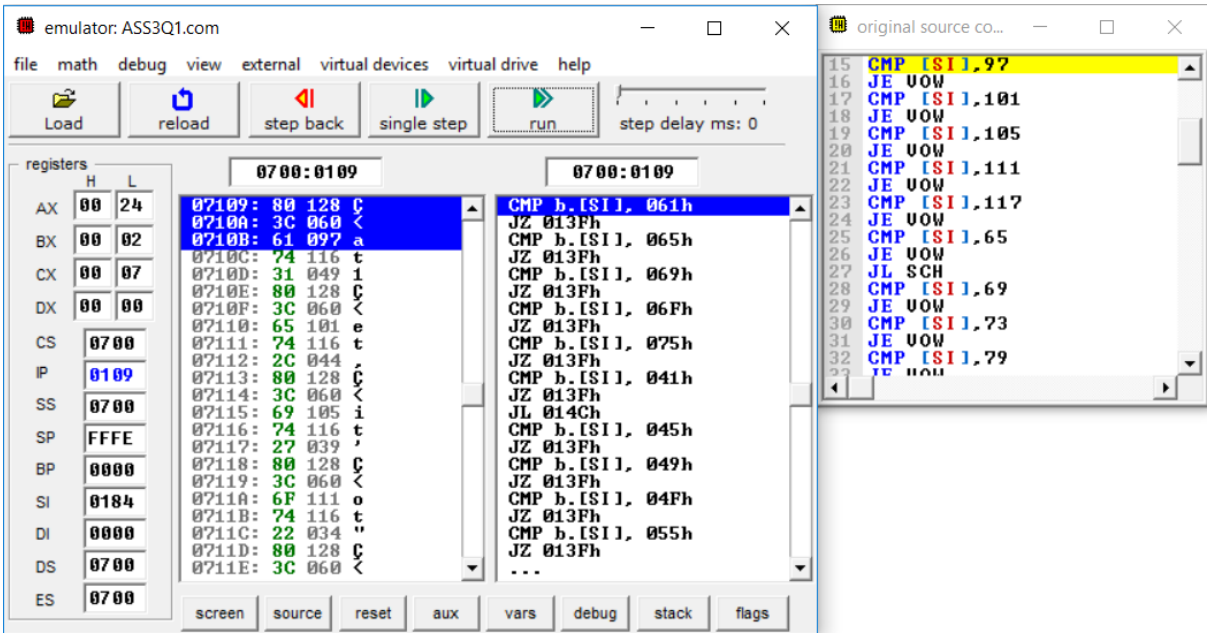
8. “mango, SLICE” since space character ‘ ’ is under scan BL and CL both will be same.



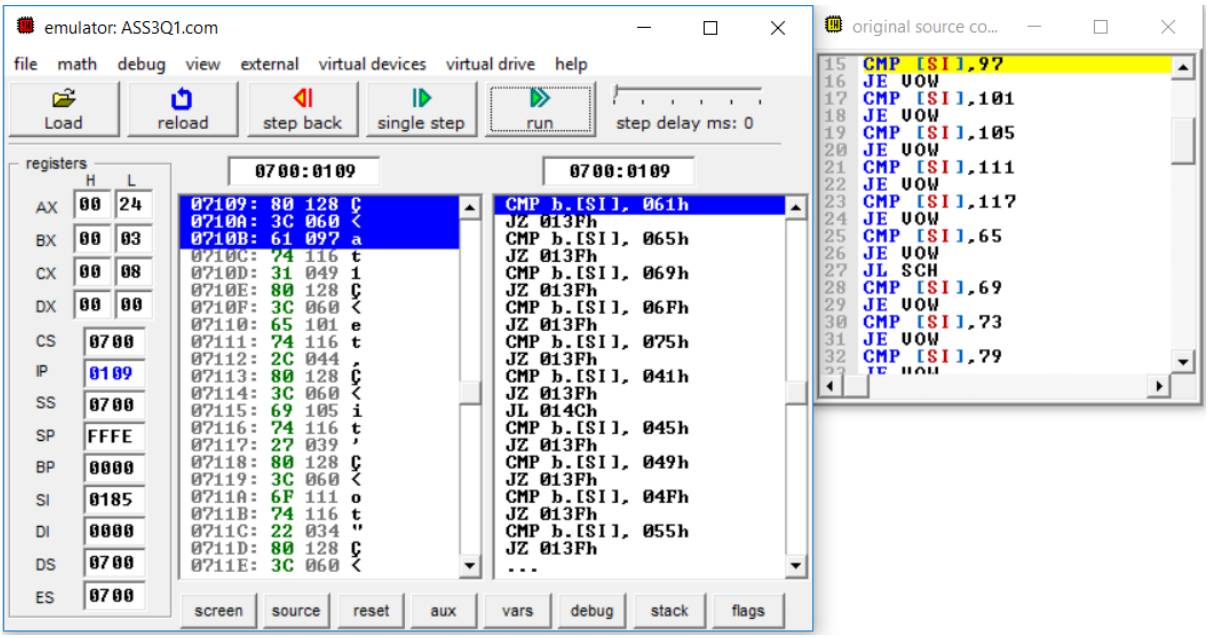
9. “mango, **S**LICE” since letter ‘S’ is under scan BL will be 2 and CL will be incremented to 6.



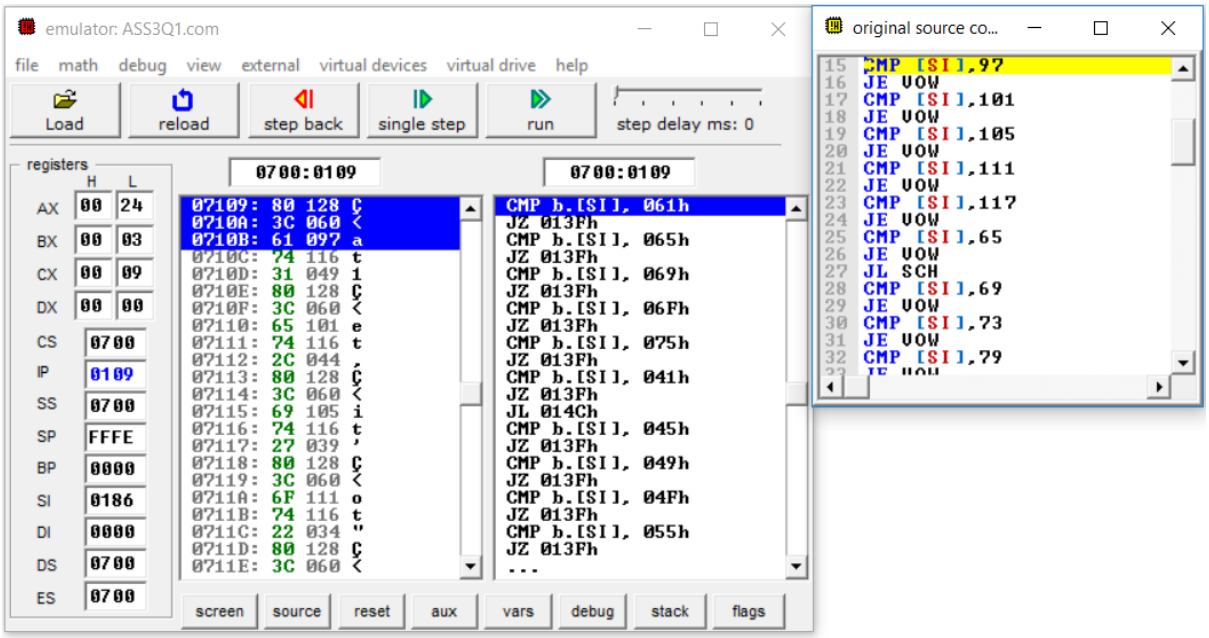
10. “mango, S**L**ICE” since letter ‘L’ is under scan BL will be 2 and CL will be incremented to 7.



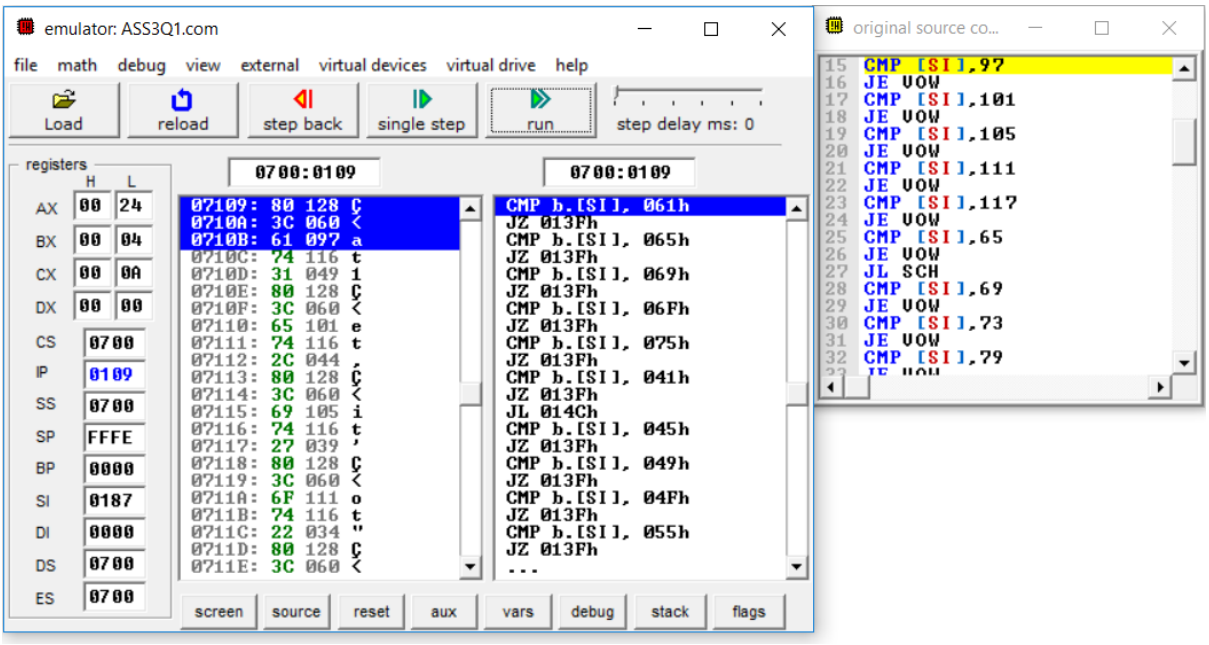
11. “mango, SL**I**CE” since vowel ‘I’ is under scan BL will be incremented to 3 and CL will also be incremented to 8.



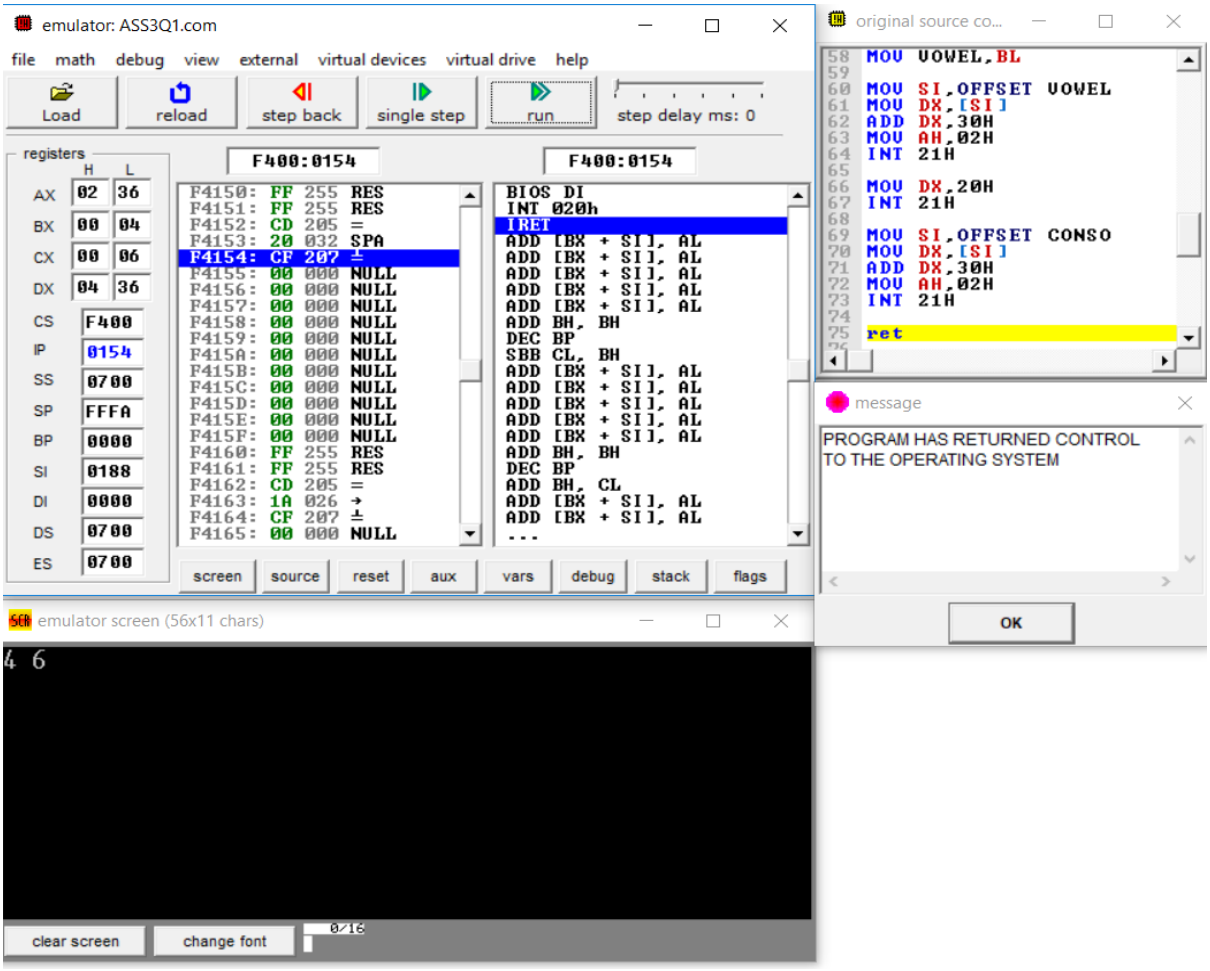
12. “mango, SLI**C**E” since letter ‘C’ is under scan BL will be 3 and CL will be incremented to 9.



13. “mango, SLICE” since vowel ‘o’ is under scan BL will be incremented to 4 and CL will also be incremented to 10.

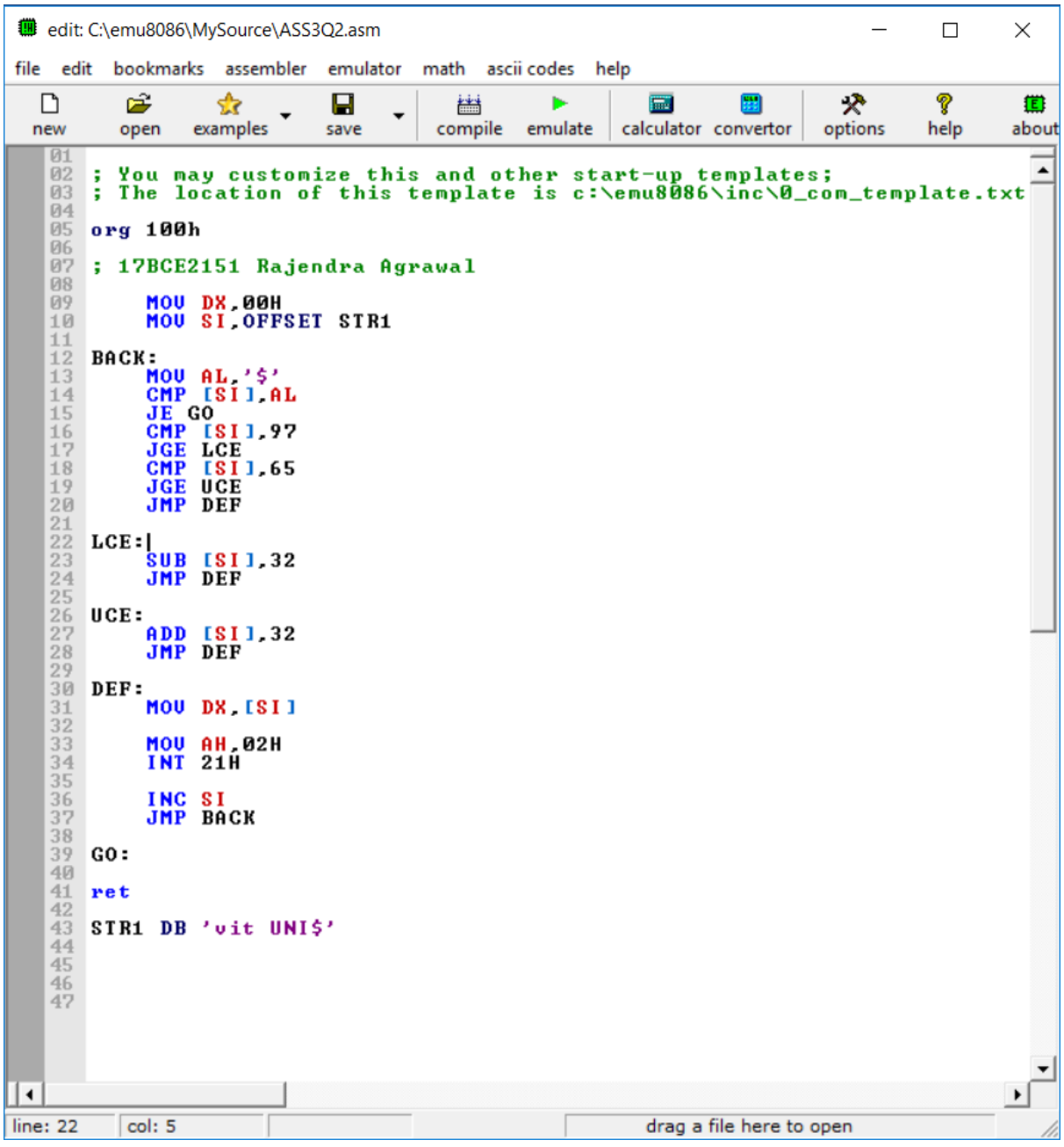


14. Now CL is subtracted from BL and result is stored in CL. Later Both are printed on screen with Number of vowels (4) first then a space and then number of consonants (6) as 4 6.



Question 2. Write an 8086 Assembly Language Program to change Lower to Upper Case and vice versa in a given string?

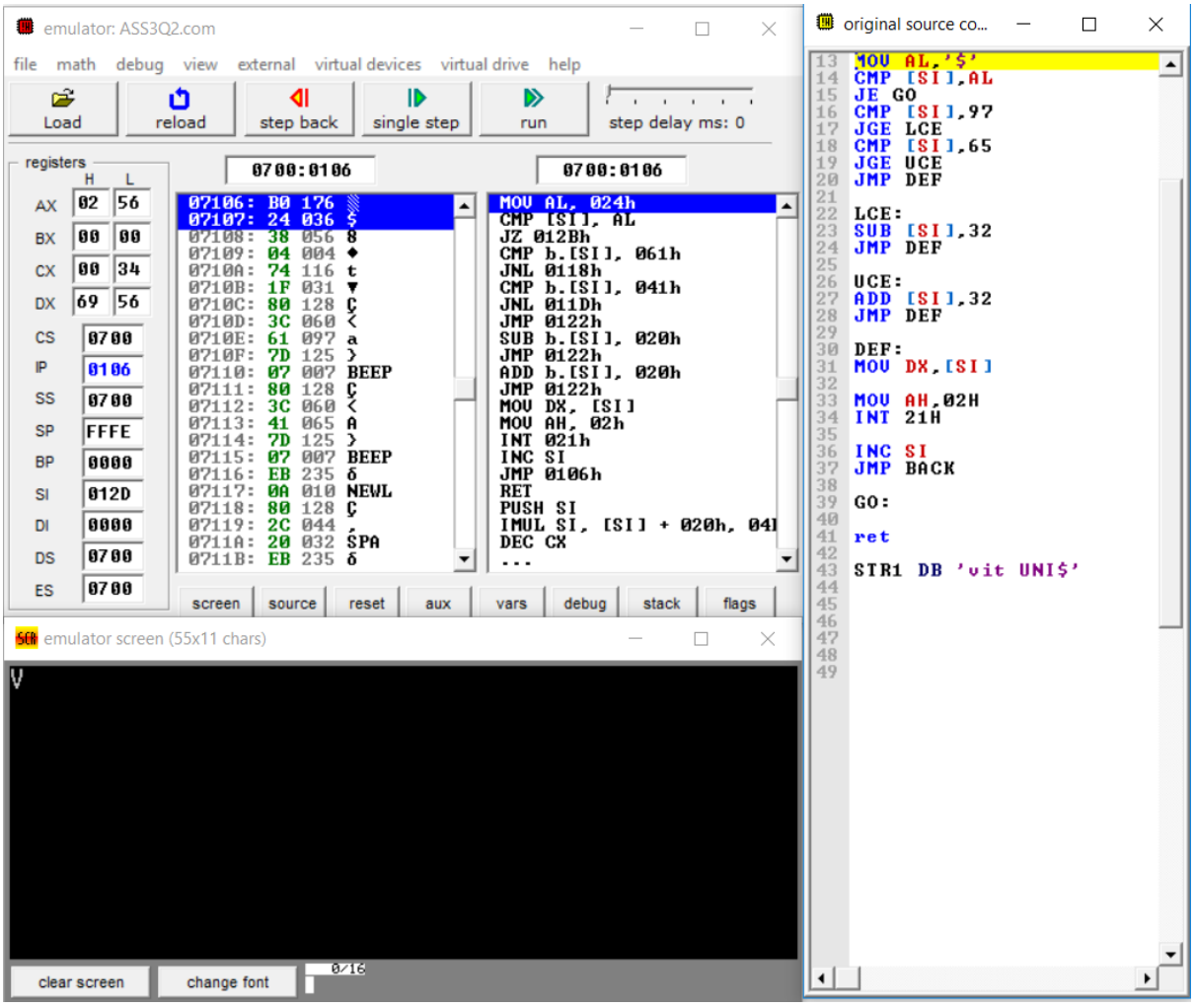
Code:



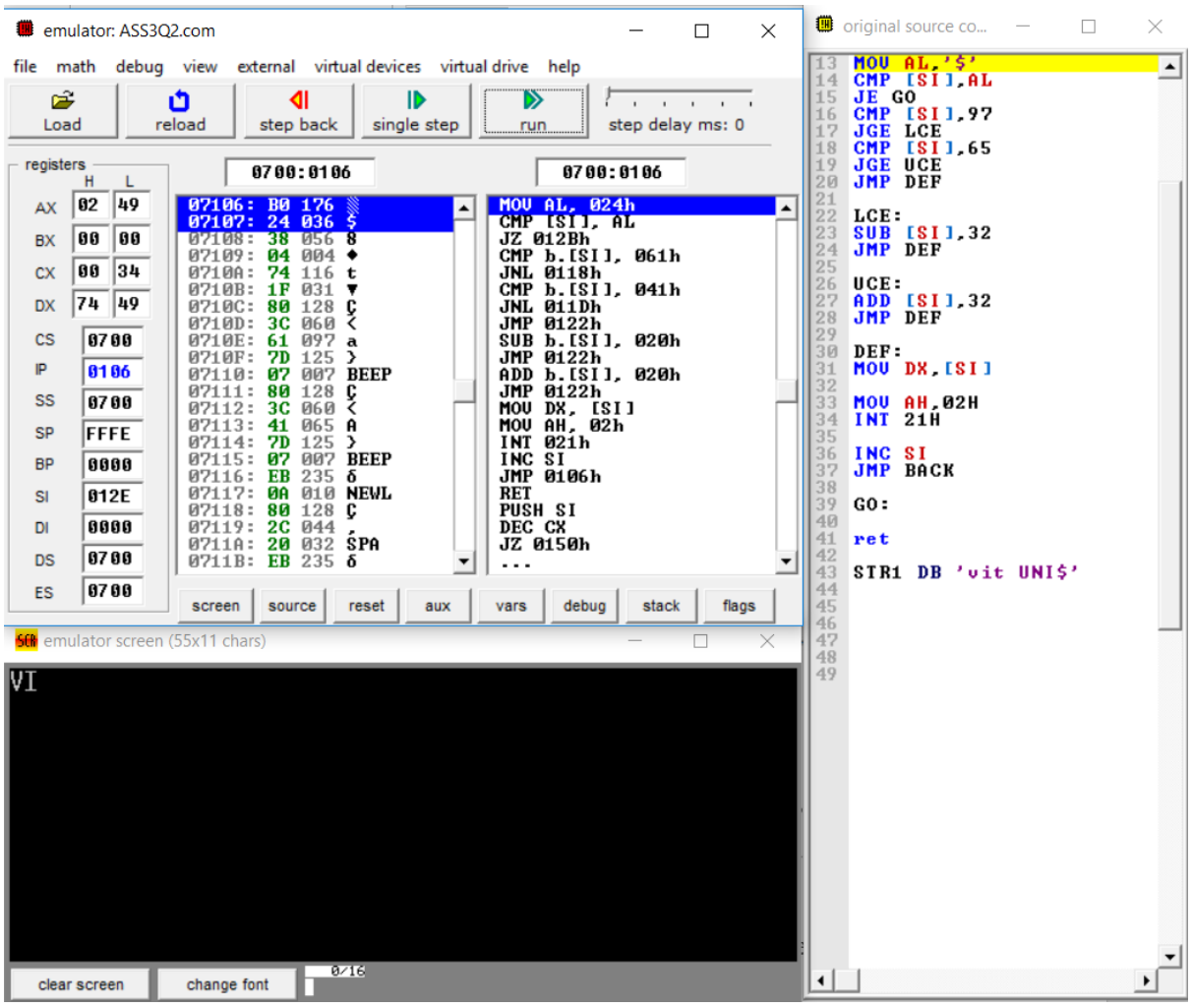
Here we analyse the ASCII value of letter under scan and then branch into lower case (LCE) and decrease ASCII by 32 or into upper case (UCE) and increase ASCII by 32 or into default case (includes special character also). In DEF, we also print the value of [SI] or changed character.

Step By Step Execution:

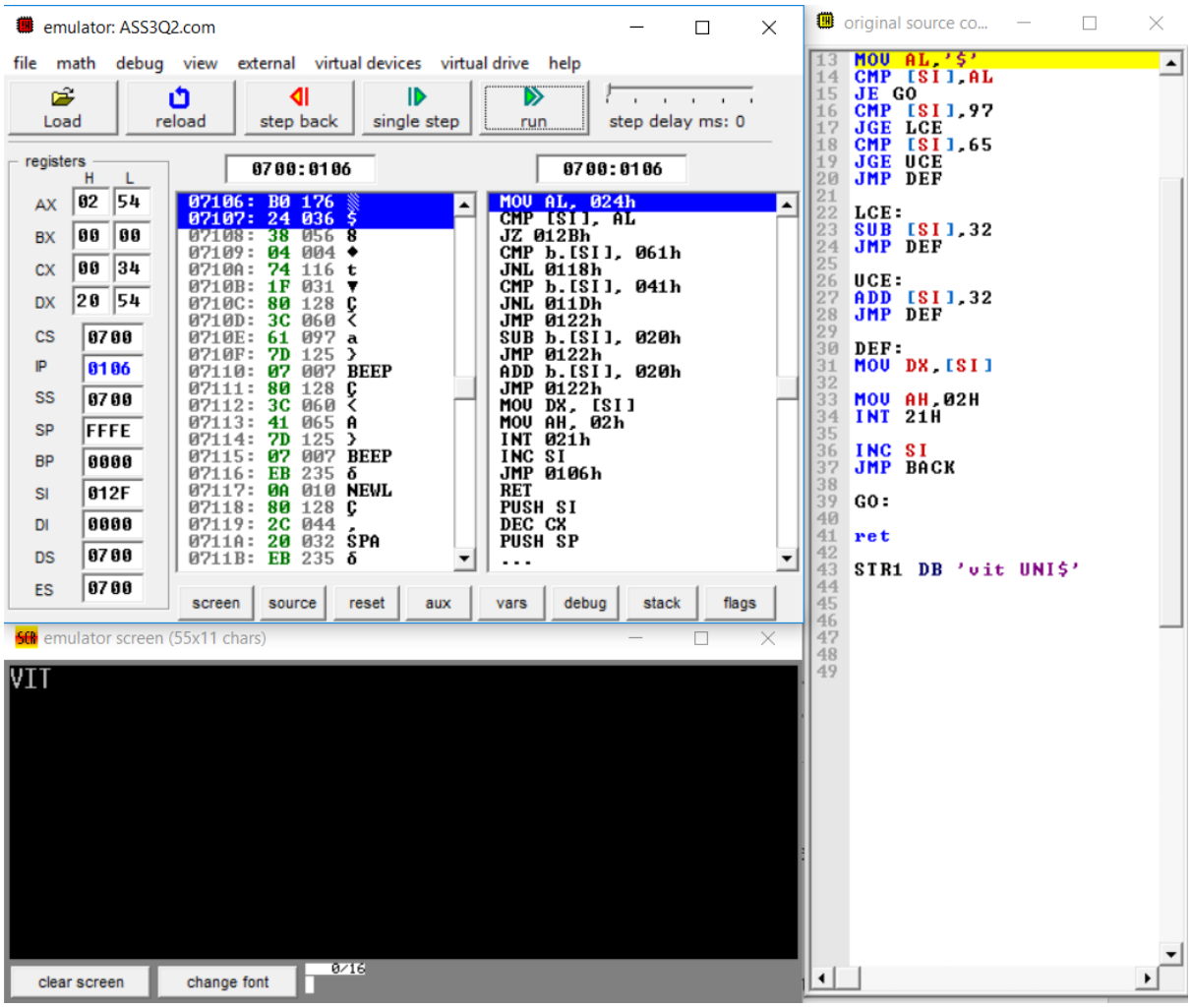
1. ‘**v**it UNI’ since letter ‘v’ under scan is lower case letter, it’s ASCII value will be decreased by 32 and upper case ‘V’ will be printed.



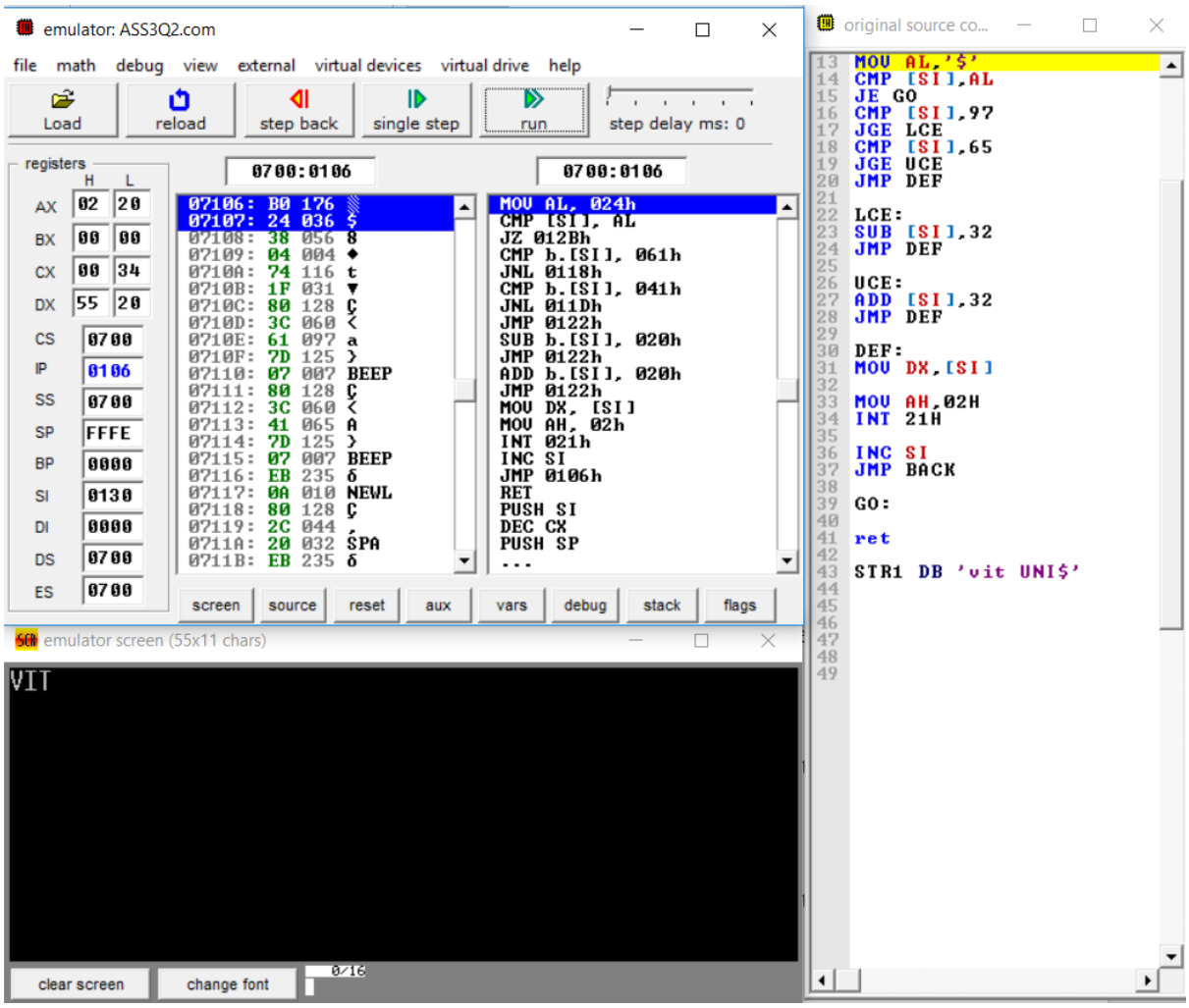
2. ‘v**i**t UNI’ since letter ‘i’ under scan is lower case letter, it’s ASCII value will be decreased by 32 and upper case ‘I’ will be printed.



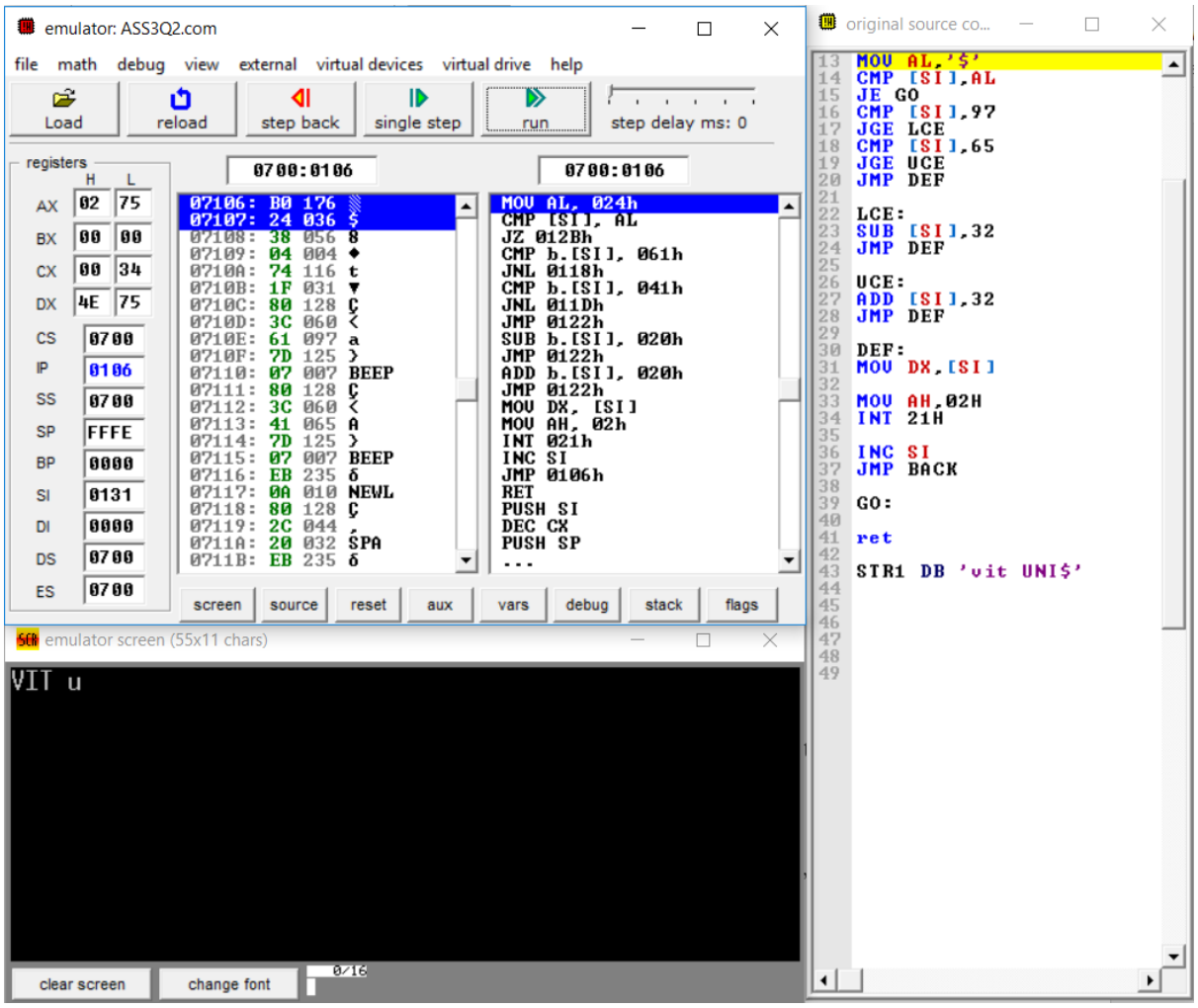
3. ‘vi**t** UNI’ since letter ‘t’ under scan is lower case letter, it’s ASCII value will be decreased by 32 and upper case ‘T’ will be printed.



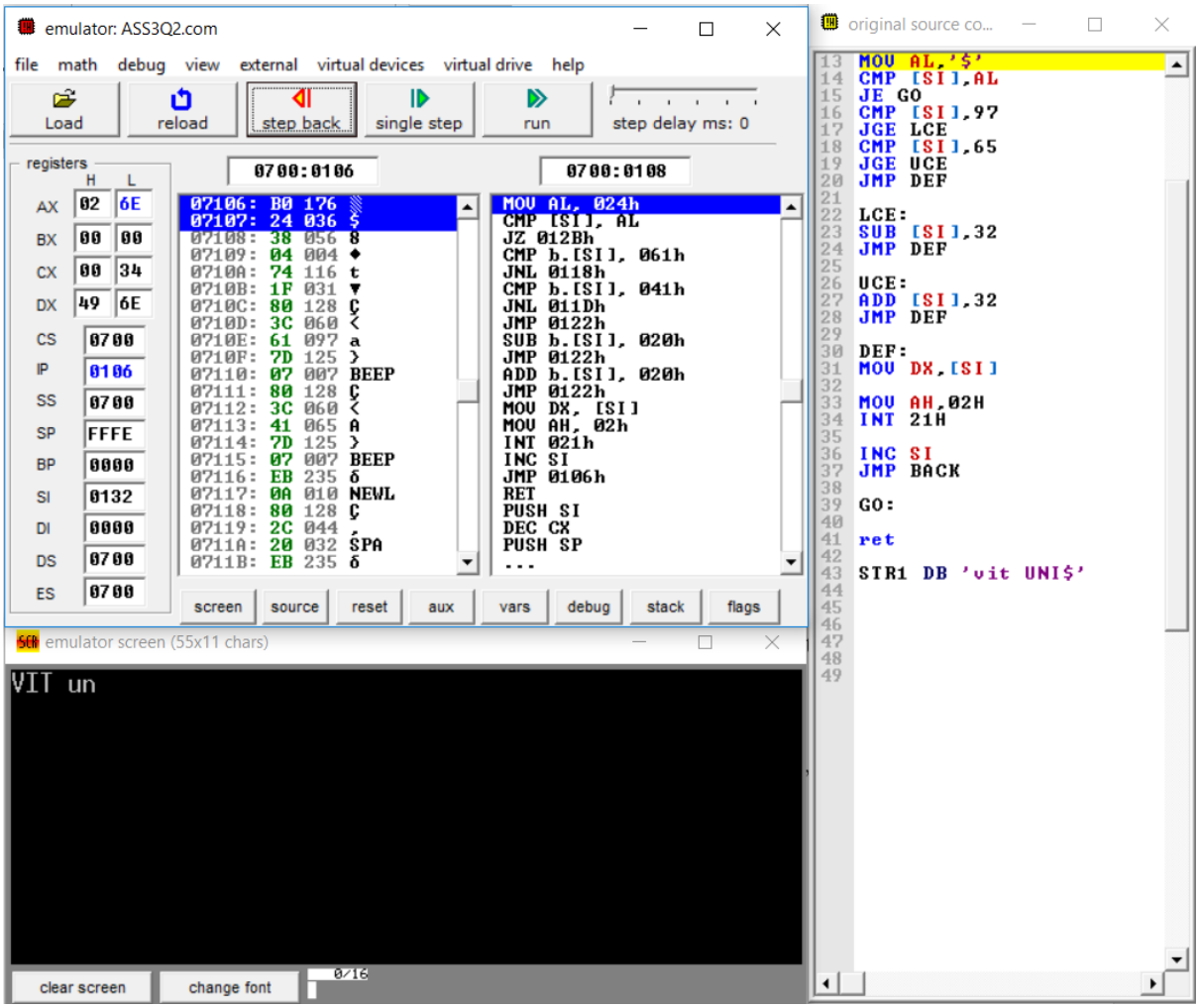
4. ‘vit UNI’ since space character ‘ ‘ is under scan no change will take place and it will be printed as it is.



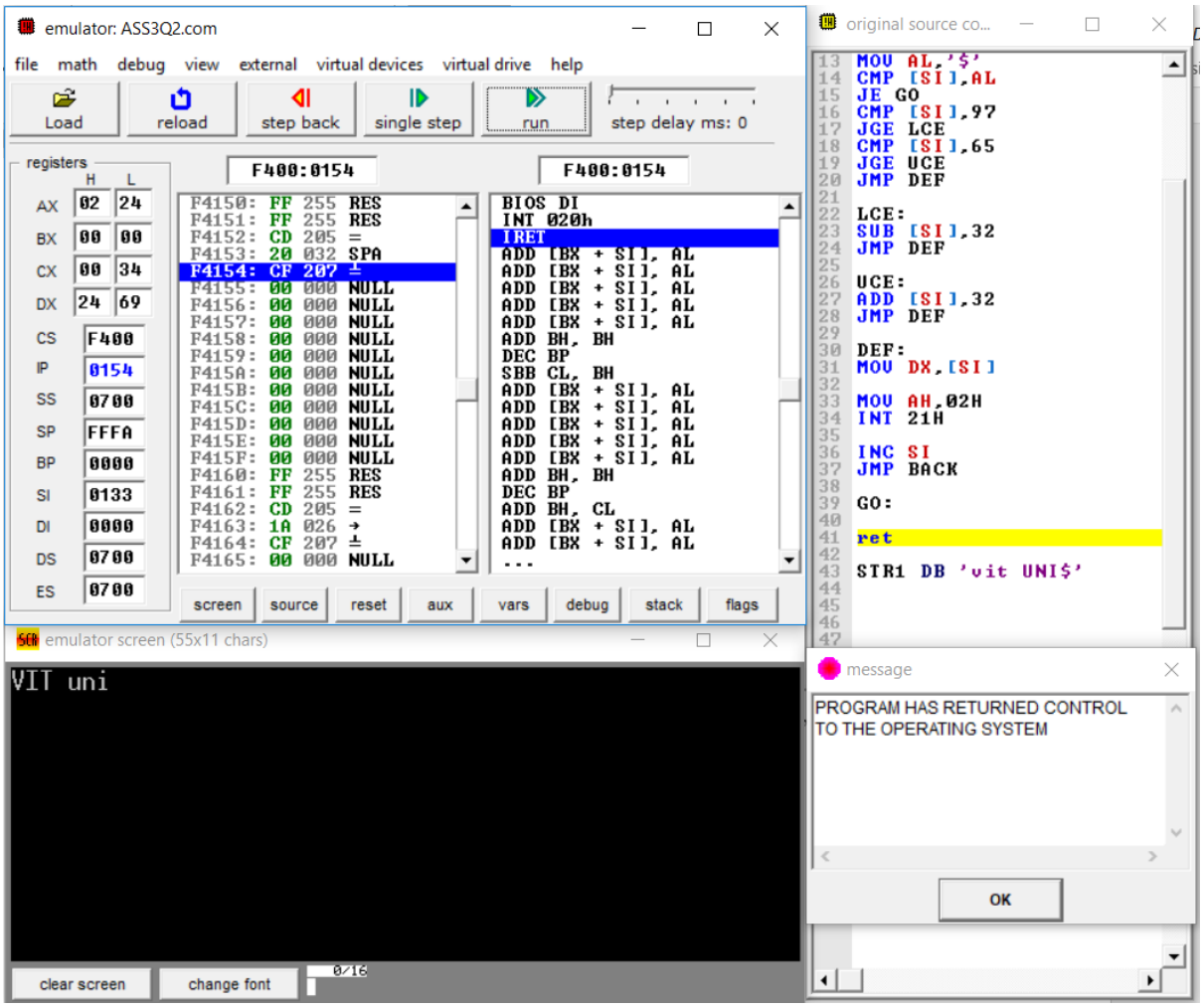
5. ‘vit **U**NI’ since letter ’U’ under scan is upper case letter, it’s ASCII value will be increased by 32 and lower case ‘u’ will be printed.



6. ‘vit U**N**I’ since letter ’N’ under scan is upper case letter, it’s ASCII value will be increased by 32 and lower case ‘n’ will be printed.

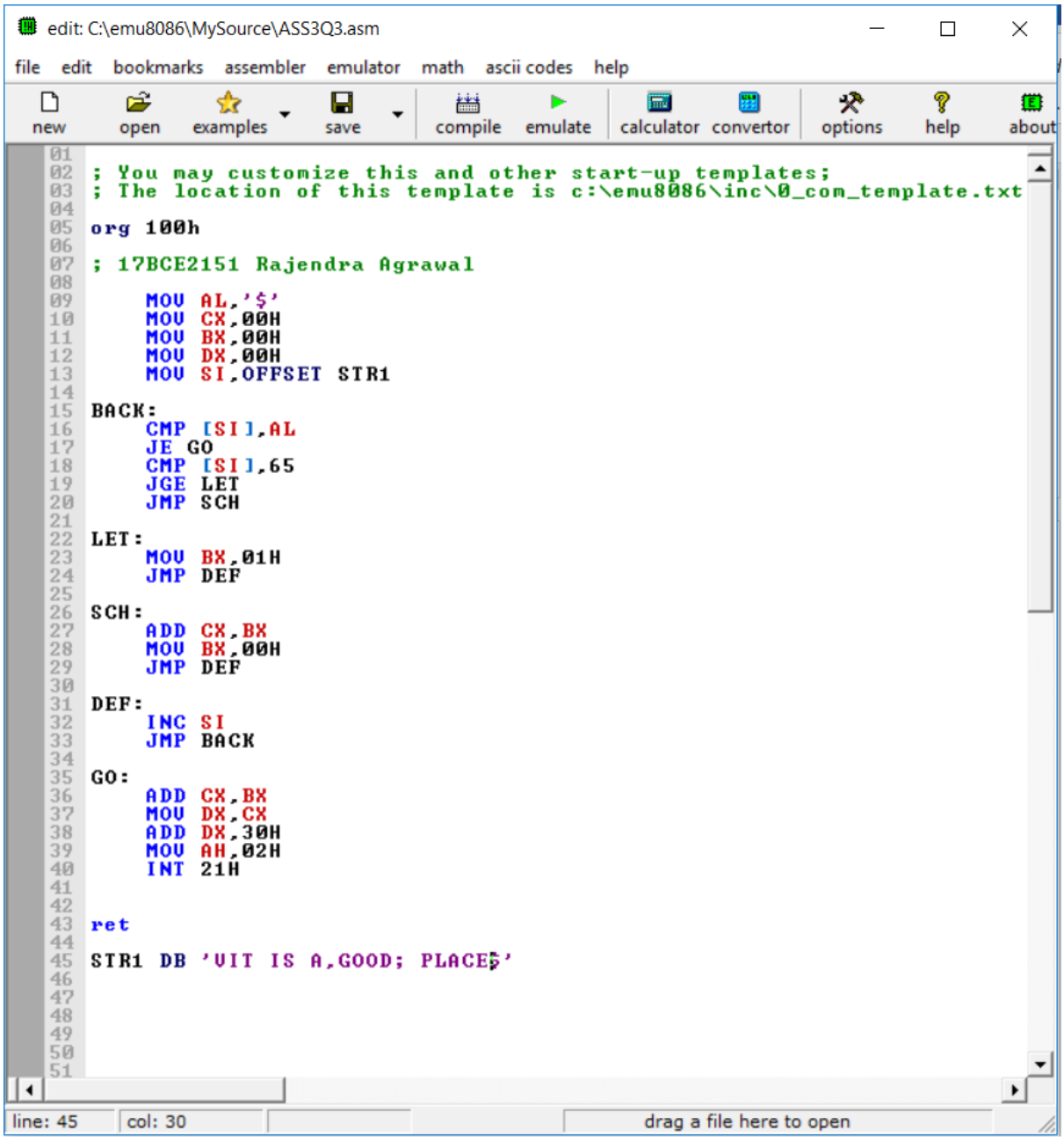


7. ‘vit UN**I**’ since letter ’I’ under scan is upper case letter, it’s ASCII value will be increased by 32 and lower case ‘i’ will be printed.



Question 3: Write an assembly program to count the number of words in a given string. String may have comma, space, colon as delimiter.

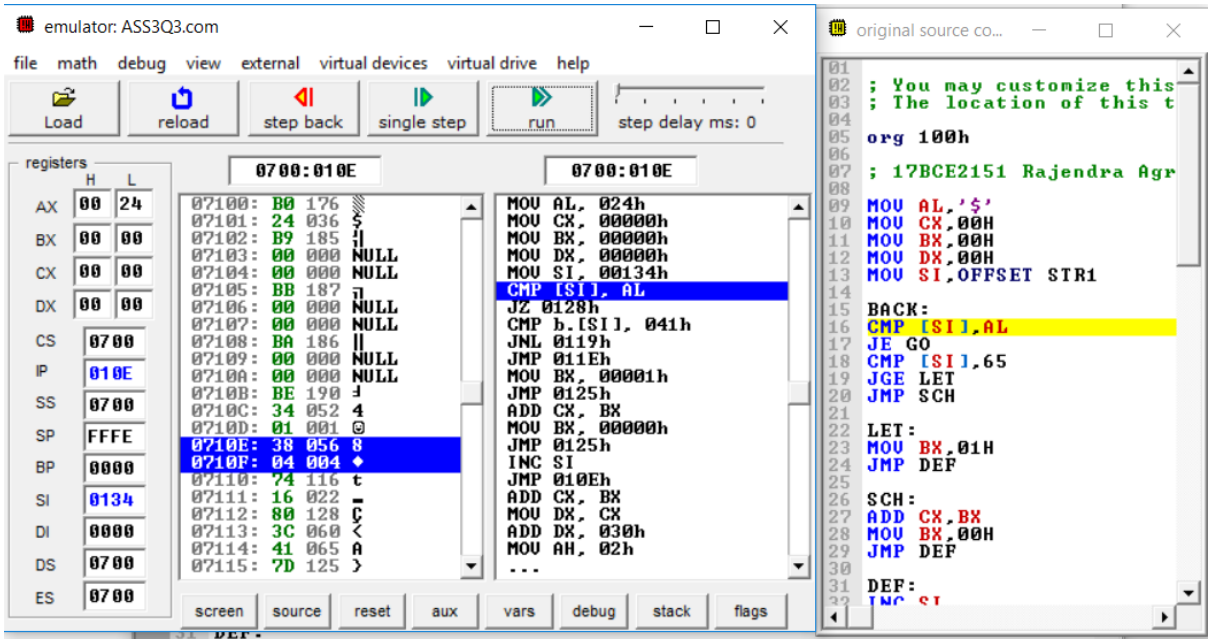
Code:



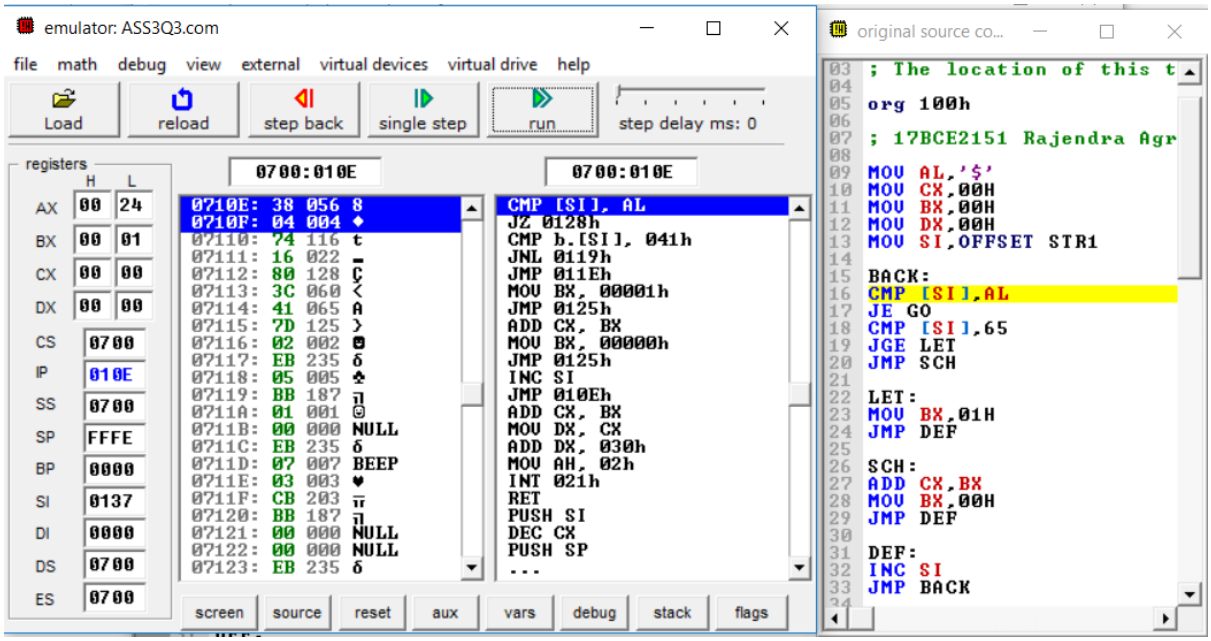
Here we use two registers BX and CX. CX counts the number of words. If we encounter a character, we change BX to 1 and if we encounter a delimiter we add BX to CX and change BX back to 0. At last we get total number of words in CX and print it. In our algorithm we take care of two delimiters occurring together and also of missing delimiter at end of sentence.

Step by Step Execution:

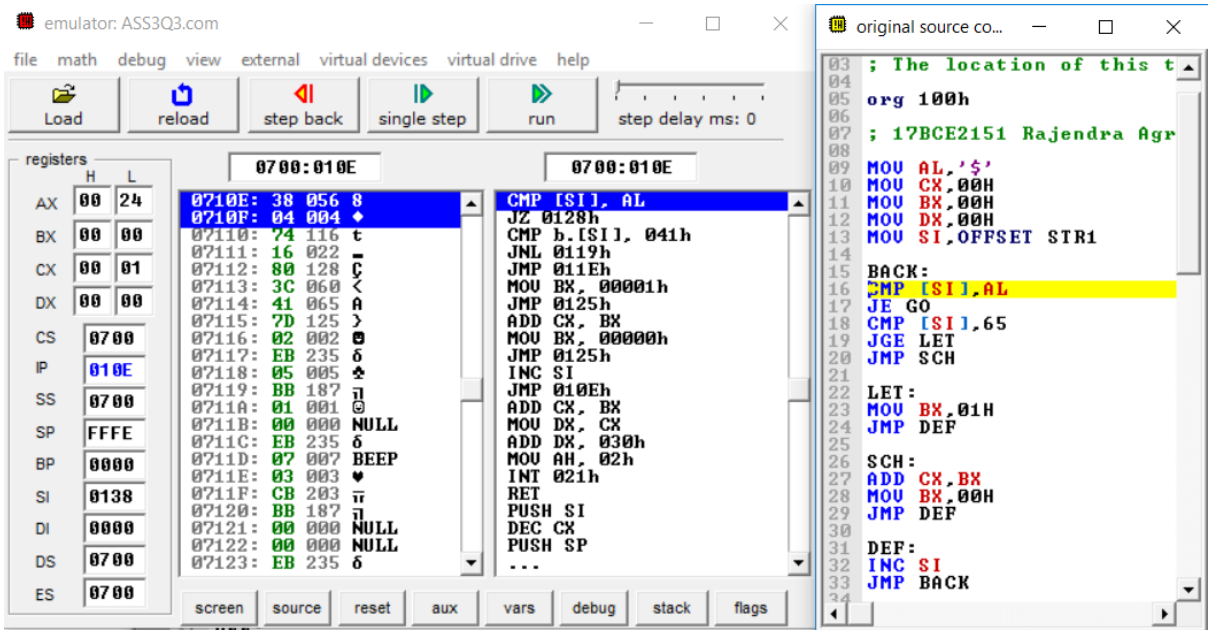
1. Initially BX and CX both are zero.



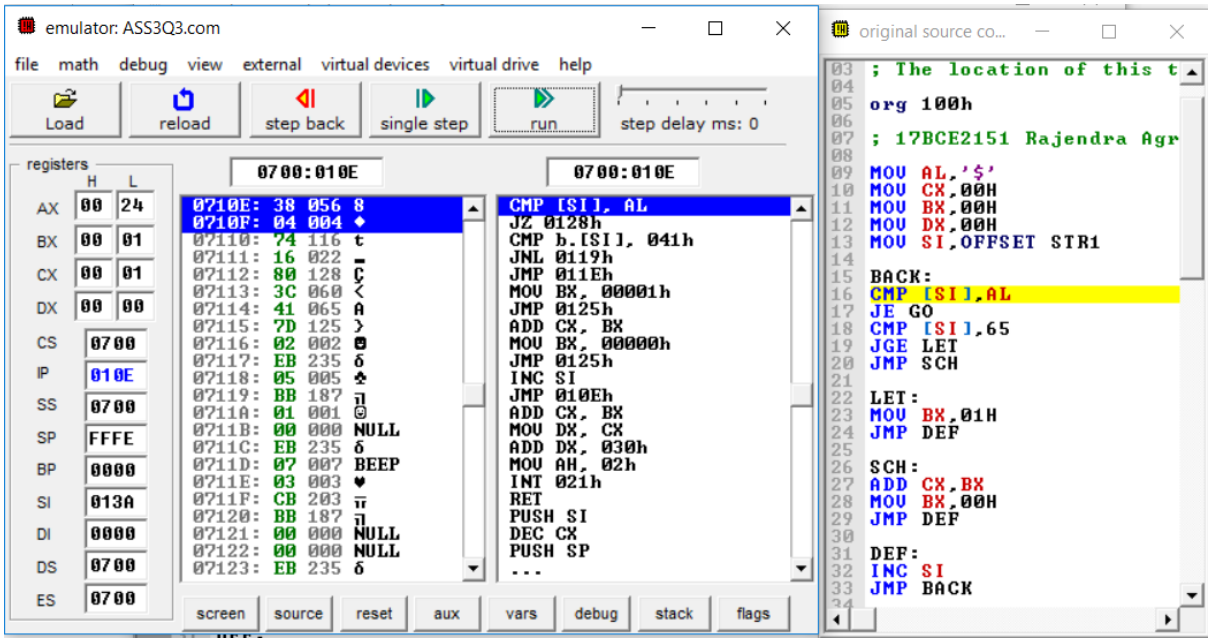
2. "**VIT** IS A,GOOD; PLACE" during scan of "VIT" value of BX will be 1 and CX is 0.



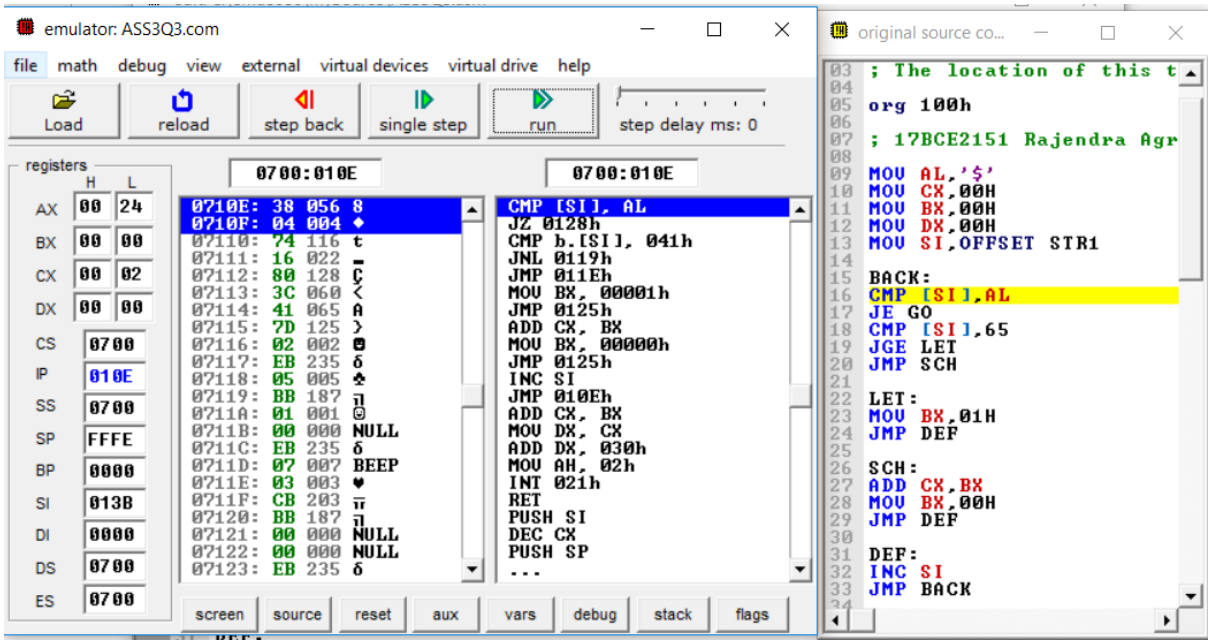
3. “VIT IS A,GOOD; PLACE” as we encounter a space, BX will be added to CX and so CX is 1 and BX will be made to 0.



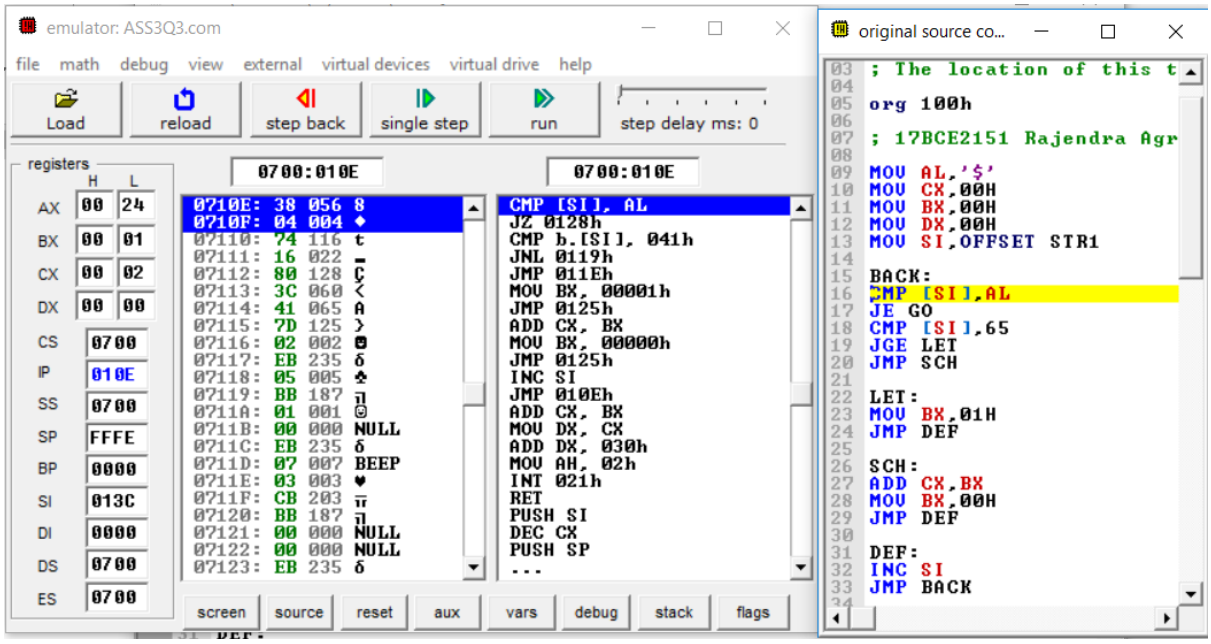
4. “VIT **IS** A,GOOD; PLACE” during scan of “IS” value of BX will be 1 and CX is 1.



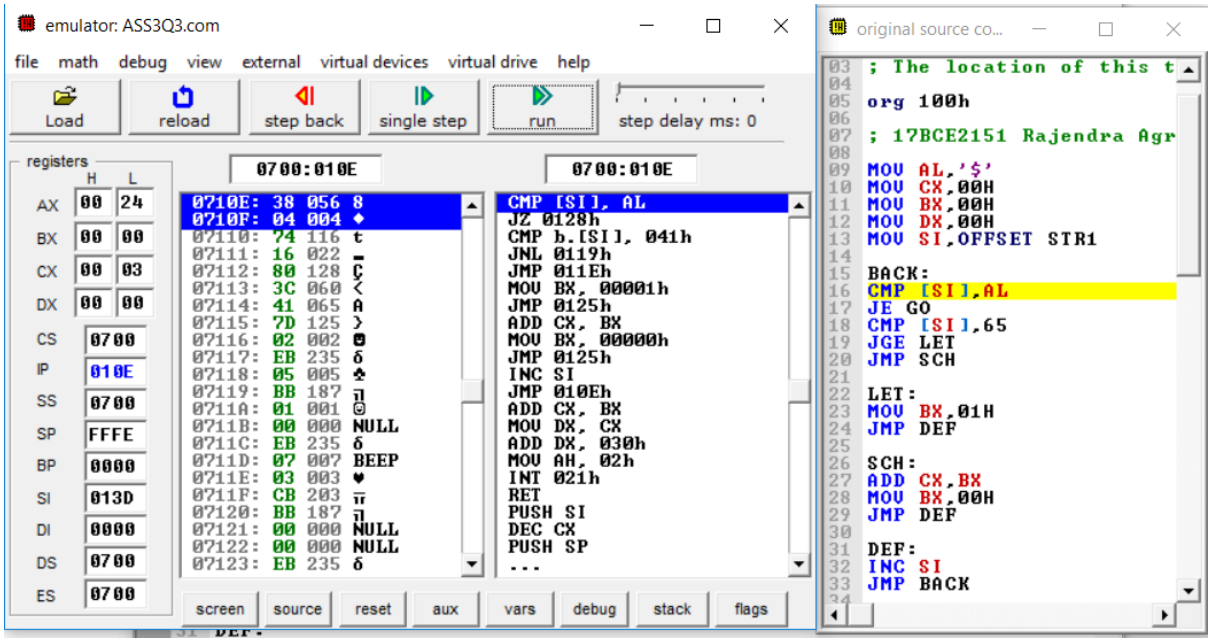
5. “VIT IS A,GOOD; PLACE” as we encounter a space, BX will be added to CX and so CX is 2 and BX will be made to 0.



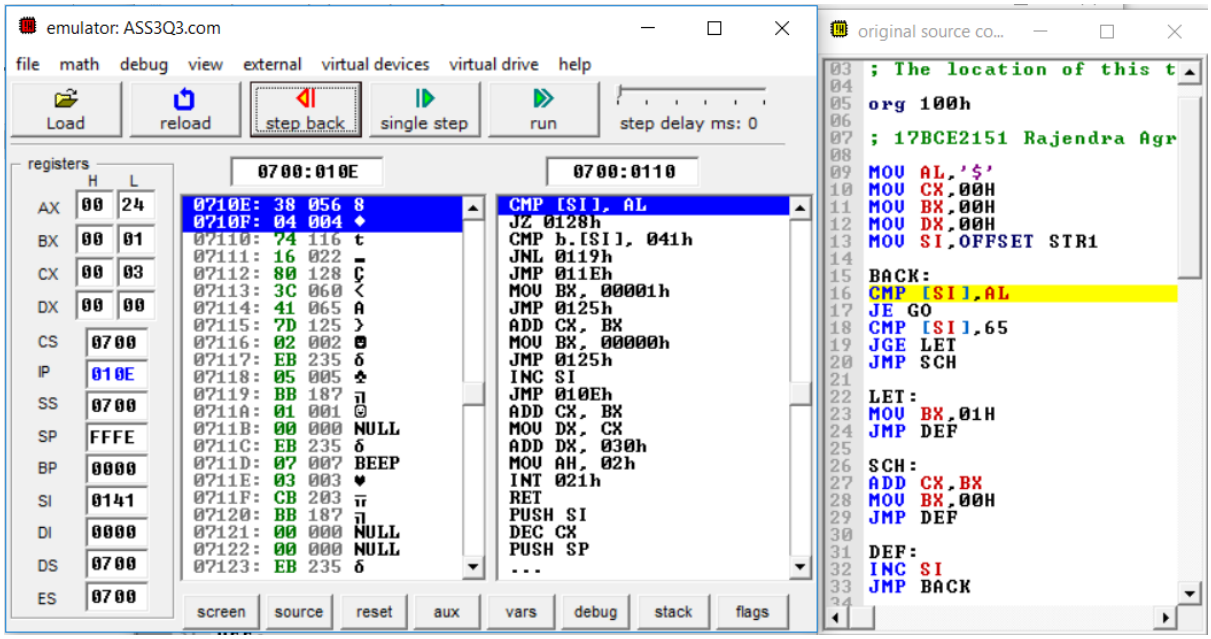
6. “VIT IS **A**,GOOD; PLACE” during scan of “A” value of BX will be 1 and CX is 2.



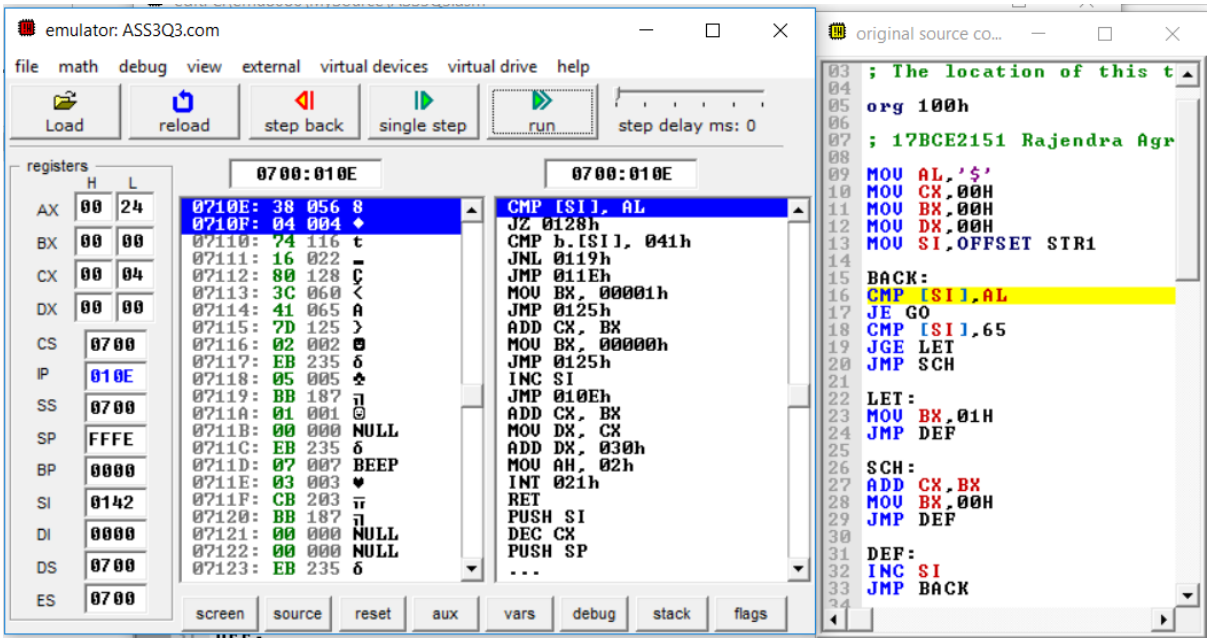
7. “VIT IS A,GOOD; PLACE” as we encounter a comma, BX will be added to CX and so CX is 3 and BX will be made to 0.



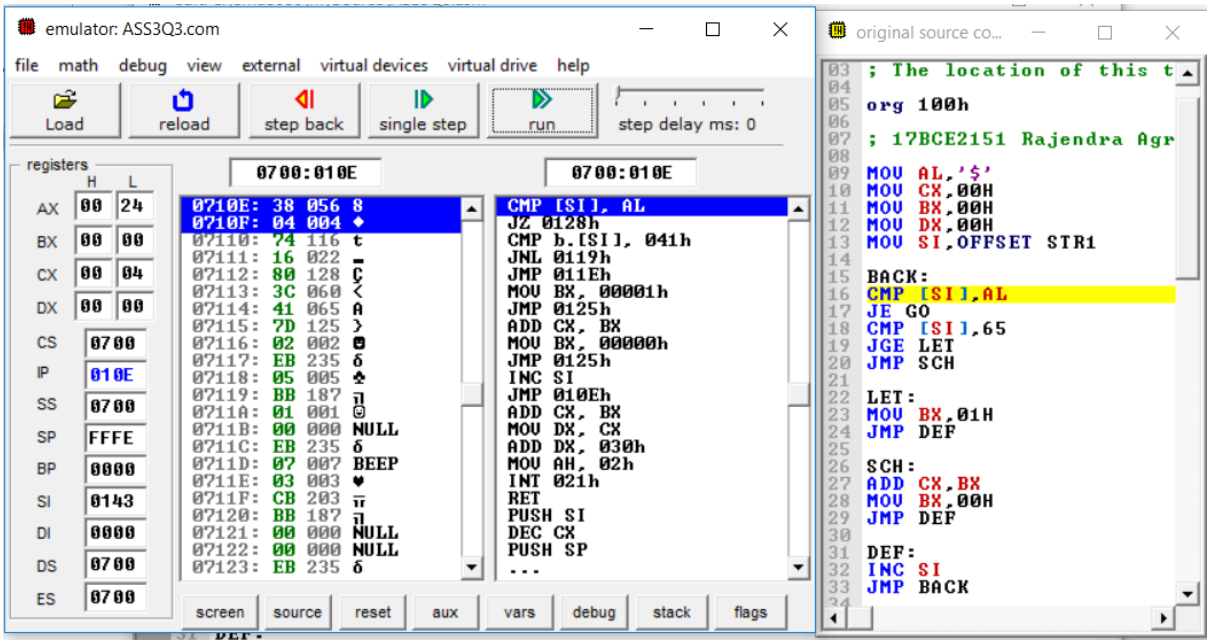
8. “VIT IS A,**GOOD**; PLACE” during scan of “GOOD” value of BX will be 1 and CX is 3.



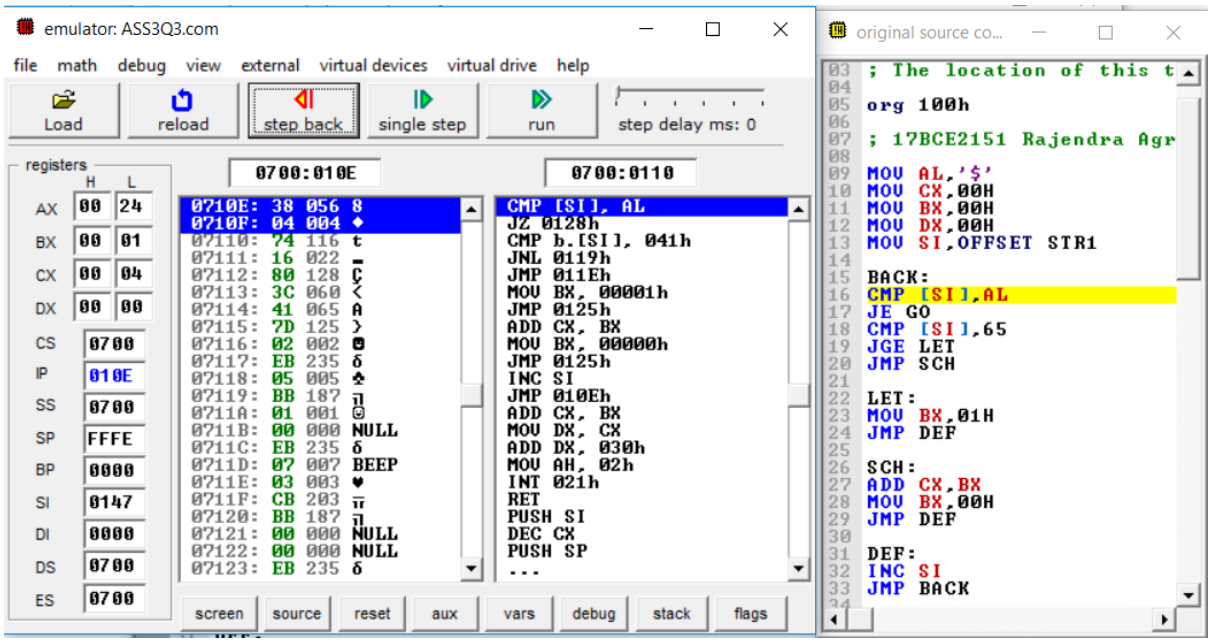
9. “VIT IS A,GOOD; PLACE” as we encounter a semicolon, BX will be added to CX and so CX is 4 and BX will be made to 0.



10. “VIT IS A,GOOD; PLACE” as we encounter a space, BX will be added to CX and so CX is 4(since BX was set to 0) and BX will be made to 0



11.“VIT IS A,GOOD; **PLACE**” during scan of “PLACE” value of BX will be 1 and CX is 4.



12.“VIT IS A,GOOD; PLACE” as the string is completed, value of BX is added to CX and CX is totalled to 5 which is printed on screen.