PROJECT REPORT

CSN 252

ALPHABETS

TEAM Members:

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Project statement

To print all the alphabets repeatedly using assembly language (SIC INSTRUCTIONS) and simulate it using SIC tools.

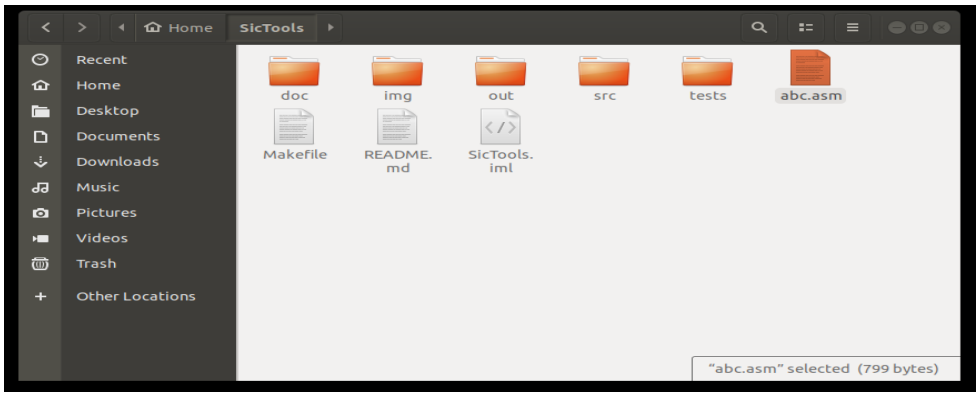
Pseudo Code

1. Clear accumulator then store accumulator into (offset) a variable
2. Initialize a loop (to print 'A' to 'Z' , 'a' to 'z' in a line) and store the required character to print in the accumulator.
3. Wait for the device until it is ready and then write the required character into the device.
4. Increase the offset that corresponds to the next character and verify the loop termination condition i.e. offset < 26.
5. When the offset is greater than or equal to 26 we need to start printing small case alphabets.
6. Then after printing each small letter we run the same loop and when we print all characters (small and upper case) we go to point 7.
7. If the loop is terminated (i.e. Set of all alphabets were printed) store a newline character inorder to print the next repeated line in a fresh line and write to the device
8. Then jump to instruction 1 to clear the accumulator and repeat the same process.

SIC Assembly Code :

```
abc          START      0
repeat       CLEAR        A             .Clear the accumulator value
             STA          offset       .Stores accumulator into the offset

loop         LDA          offset .Start of the loop
             ADD          asciiA .Update accumulator for next alphabet

td1          TD           device .Tests the device to update the equality flag
             JEQ          td1           .Wait until the device is ready
             WD           device .Writes accumulator to device

             LDA          offset
             ADD          one           .Increase the offset by 1
             STA          offset
             COMP         count
             JLT          loop          .Jumps to the loop if offset < count(26)
             JEQ          loop1
             COMP         count1
             JLT          loop
             LDA          newline       .Update accumulator to newline character

td2          TD           device
             JEQ          td2
             WD           device .Writes newline to device
             J            repeat .Jump to beginning
loop1        TD           device .Tests the device
             JEQ          loop1
             ADD          six
             STA          offset
             WD           device
             J            loop

. constants
device BYTE  X'01'
newline      WORD   10
asciiA WORD  65
count        WORD   26
count1       WORD   58
. variables
offset WORD  0
one        WORD     1
six    WORD  6
             END          loop
```

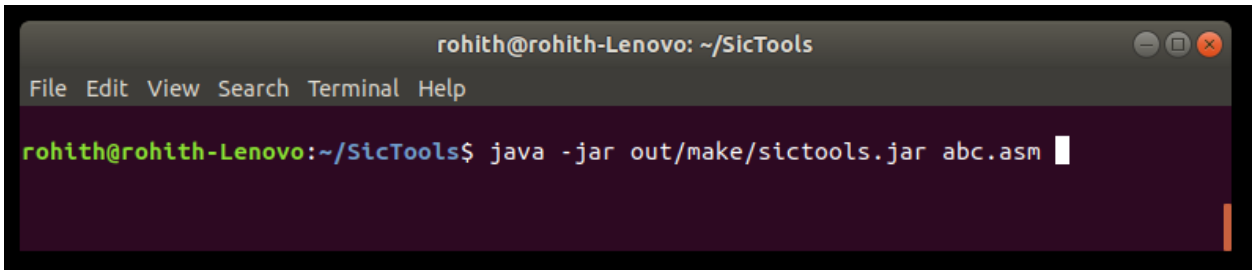
File Structure:



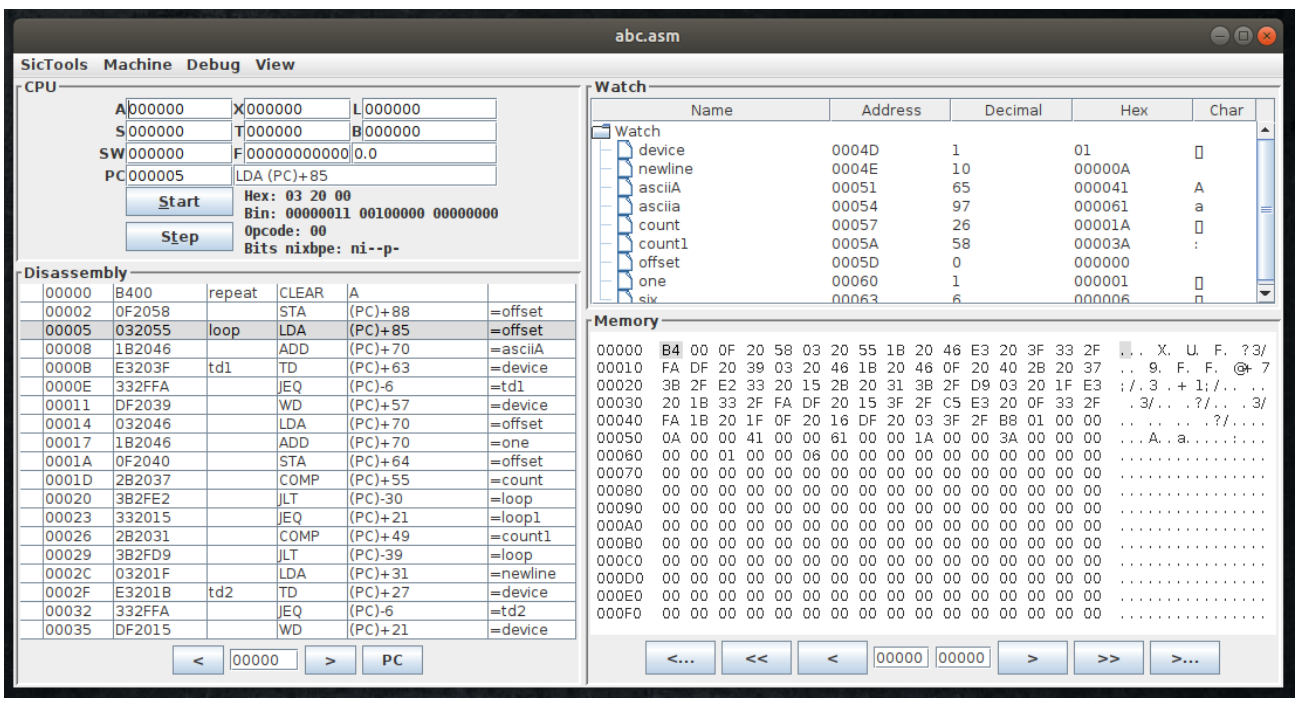
Source code (asm file):


```
abc         START       0

repeat  CLEAR           A               .Clear the accumulator value
                STA             offset  .Stores accumulator into the offset

loop            LDA             offset  .Start of the loop
                ADD             asciiA  .Update accumulator for next alphabet

td1             TD              device  .Tests the device to update the equality flag
                JEQ             td1             .Wait until the device is ready
                WD              device  .Writes accumulator to device

                LDA             offset
                ADD             one             .Increase the offset by 1
                STA             offset
                COMP            count
                JLT             loop            .Jumps to the loop if offset < count(26)
                JEQ             loop1           .Jumps to loop1 after printing all the upper case alphabets
                COMP            count1
                JLT             loop            .Temination occurs after printing all the alphabets in a line
                LDA             newline .Update accumulator to newline character

td2             TD              device
                JEQ             td2
                WD              device  .Writes newline to device

                J               repeat  .Jump to beginning
loop1           TD              device  .Tests the device
                JEQ             loop1   .Wait until the device is ready
                ADD             six     .To neglect characters between 'Z' & 'a'
                STA             offset  .Stores accumulator into the offset
                WD              device  .Writes accumulator to device
                J               loop    .Jumps to the loop

. constants
device  BYTE    X'01'
newline         WORD    10
asciiA  WORD    65
asciia  WORD    97
count           WORD    26
count1          WORD    58

. variables
offset  WORD    0
one         WORD 1
six     WORD    6
                END             loop
```

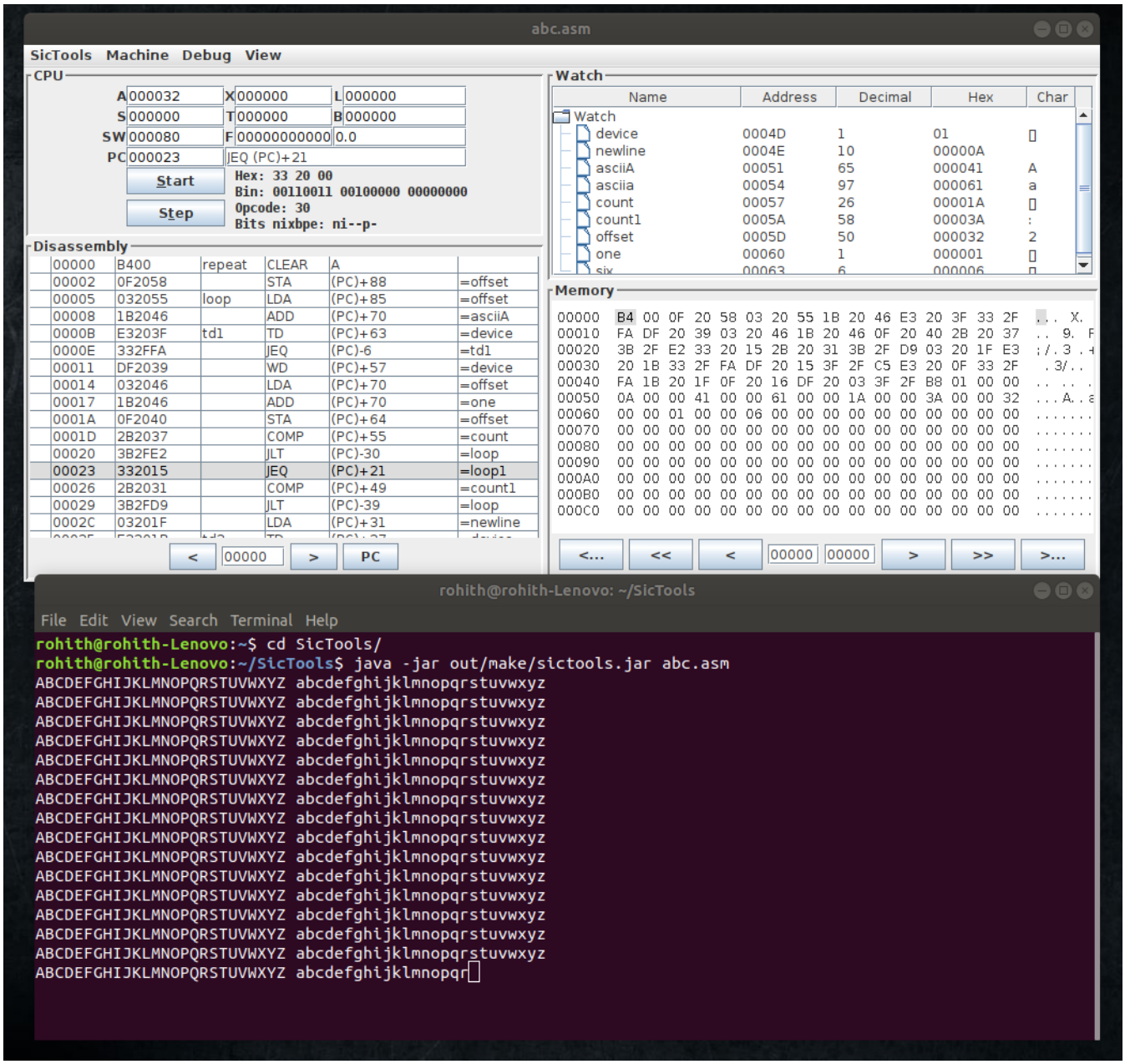
Starting the simulator via command line:

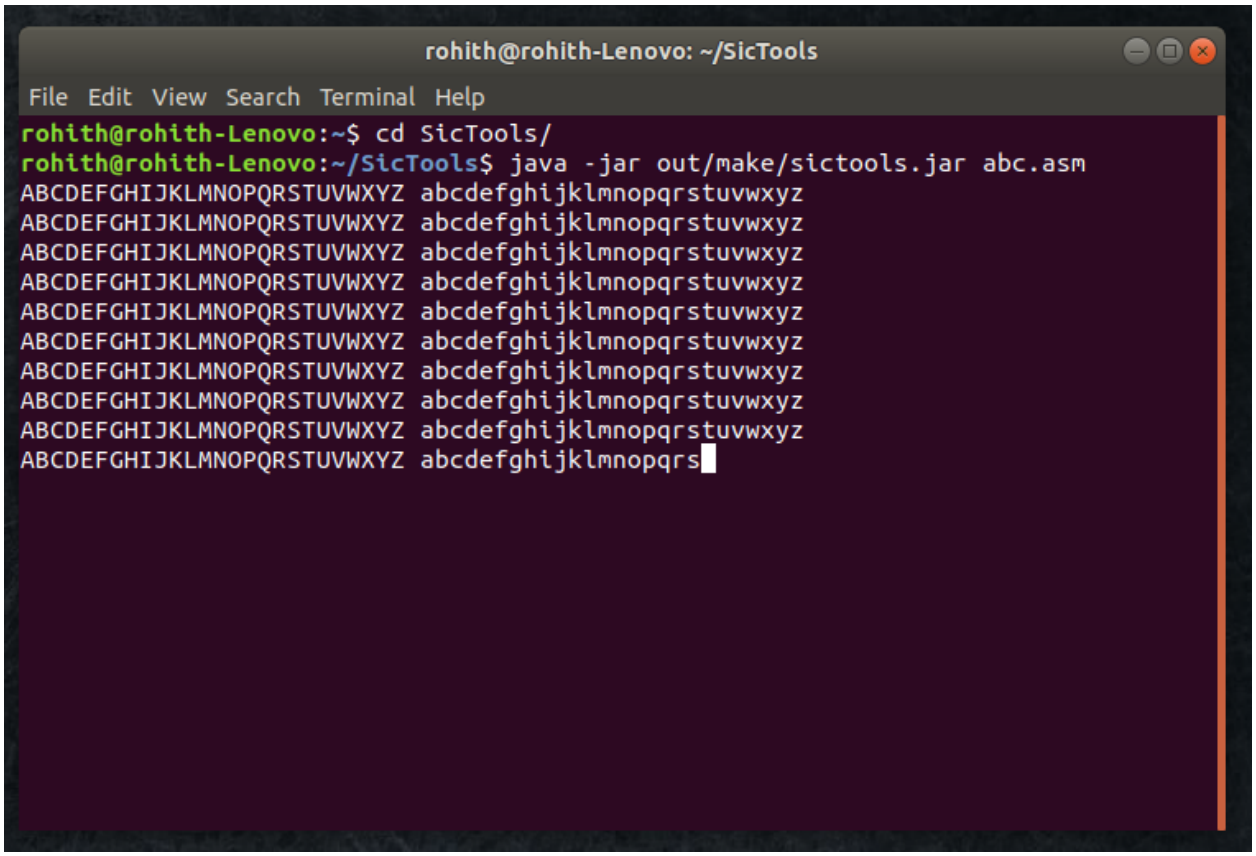


Simulating tool (initially):



Screenshots of running program:





```
rohith@rohith-Lenovo:~$ cd SicTools/
rohith@rohith-Lenovo:~/SicTools$ java -jar out/make/sictools.jar abc.asm
ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrs
```

Project Repository

Repository Name: alphabet

Github Link: https://github.com/AvvariSreedhar/alphabet/tree/main