MICROPROCESSOR AND INTERFACING TECHNIQUES

CODE: CSI2006   **SLOT: L53 + L54**

LAB ASSIGNMENT – 4

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AIM: To write an assembly language program for

- Reversing a string
- Block Transfer

ALGORITHM:

- Reversing a string

Input:

-> "das" as input

Process:

- Using a stack to store the string via using push()
- Then poping out the string and as the stack stores the in LIFO manner hence our string is reversed

Conclusion for reversing the string: String in the reverse manner as output

CODE:


```asm
.model small

.stack 100h

.data

string db 'das'

.code

main proc

 mov ax, @data

 mov ds,ax

 mov si, offset string

 mov cx, 03h

l1:mov bx,[si]

 push bx

 inc si
```
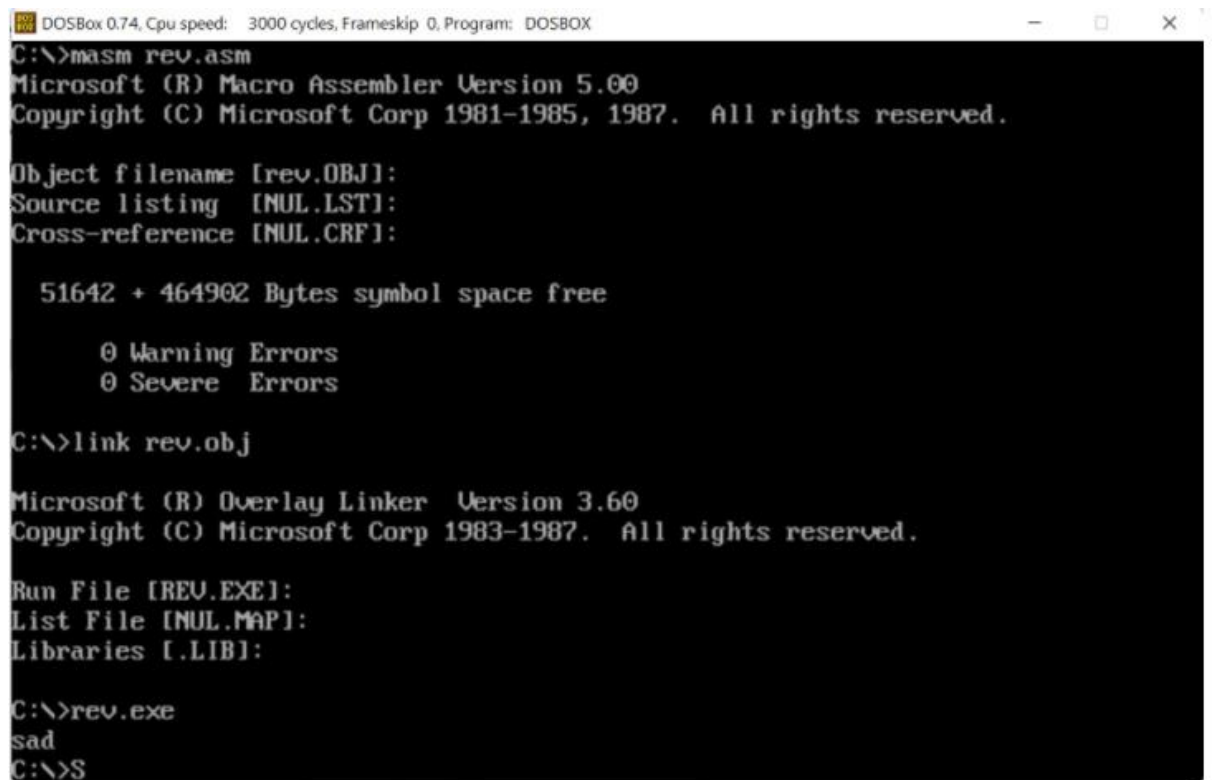
```
loop l1

mov cx,03h

l2:pop dx

mov ah,02

int 21h

loop l2

mov ah,4ch

int 21h

main endp

end main
```

OUTPUT:

ALGORITHM:

Block Transfer

Input:
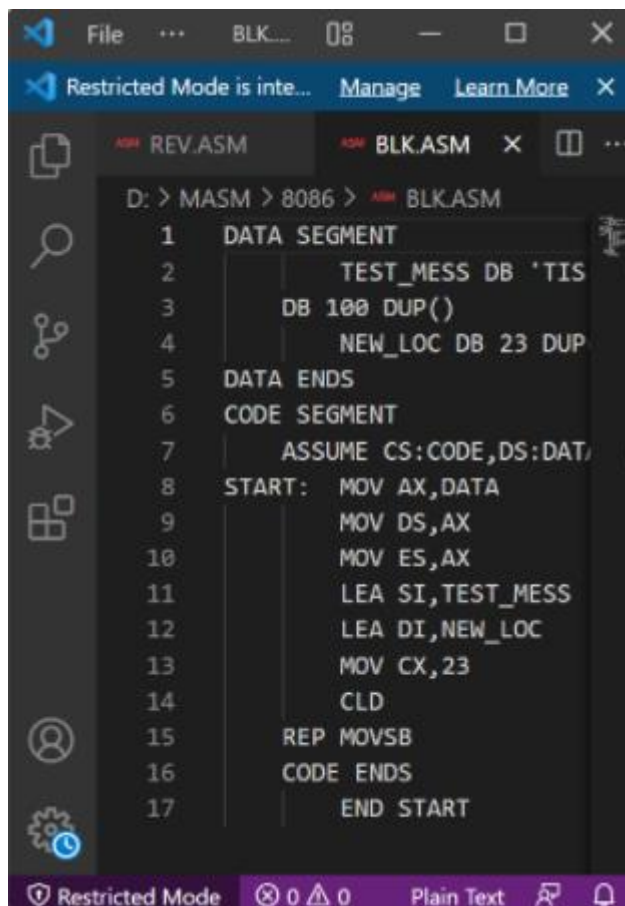
-> "TIS TIME FOR A NEW HOME" as input

Process:

- SI and DI points a character of source and Destination
- CLD and REP MOVSB commands takes care of automatic incrementation of SI, DI and CX registers after copying bytes from source Index address to Destination Index address.

Conclusion for reversing the string: String in the reverse manner as output

CODE:


```
DATA SEGMENT

    TEST_MESS DB 'TIS TIME FOR A NEW HOME'

  DB 100 DUP()
```

```asm
        NEW_LOC DB 23 DUP(0)

DATA ENDS

CODE SEGMENT

    ASSUME CS:CODE,DS:DATA,ES:DATA

START:  MOV AX,DATA

        MOV DS,AX

        MOV ES,AX

        LEA SI,TEST_MESS

        LEA DI,NEW_LOC

        MOV CX,23

        CLD

    REP MOVSB

    CODE ENDS

        END START
```
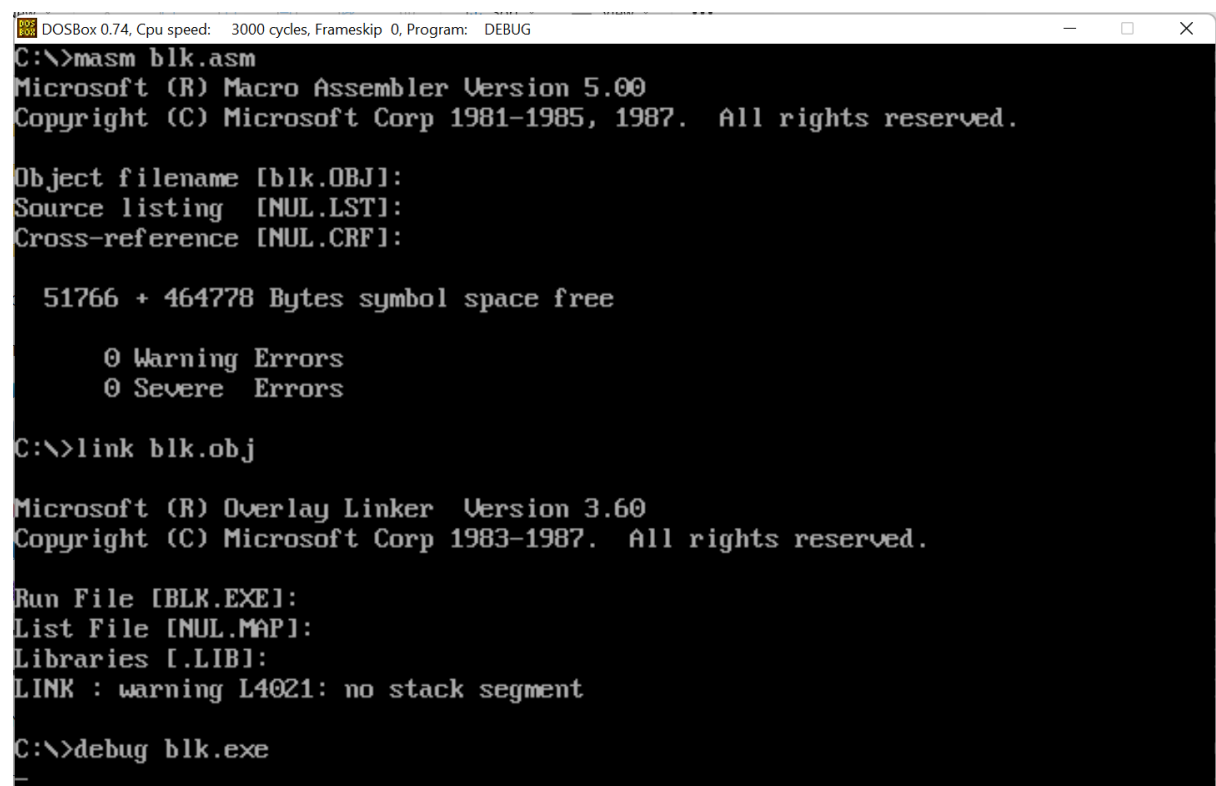
OUTPUT:

```
-t

AX=076A  BX=0000  CX=00B5  DX=0000  SP=0000  BP=0000  SI=0000  DI=0000
DS=075A  ES=075A  SS=0769  CS=0774  IP=0003   NU UP EI PL NZ NA PO NC
0774:0003 8ED8          MOV     DS,AX
-t

AX=076A  BX=0000  CX=00B5  DX=0000  SP=0000  BP=0000  SI=0000  DI=0000
DS=076A  ES=075A  SS=0769  CS=0774  IP=0005   NU UP EI PL NZ NA PO NC
0774:0005 8EC0          MOV     ES,AX
-t

AX=076A  BX=0000  CX=00B5  DX=0000  SP=0000  BP=0000  SI=0000  DI=0000
DS=076A  ES=076A  SS=0769  CS=0774  IP=0007   NU UP EI PL NZ NA PO NC
0774:0007 8D360000      LEA     SI,[0000]                      DS:0000=4954
-d ds:0000
076A:0000  54 49 53 20 54 49 4D 45-20 46 4F 52 20 41 20 4E   TIS TIME FOR A N
076A:0010  45 57 20 48 4F 4D 45 00-00 00 00 00 00 00 00 00   EW HOME.........
076A:0020  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
076A:0030  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
076A:0040  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
076A:0050  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
076A:0060  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
076A:0070  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
```

```
0774:000F B91700        MOV     CX,0017
-t

AX=076A  BX=0000  CX=0017  DX=0000  SP=0000  BP=0000  SI=0000  DI=007B
DS=076A  ES=076A  SS=0769  CS=0774  IP=0012   NU UP EI PL NZ NA PO NC
0774:0012 FC            CLD
-t

AX=076A  BX=0000  CX=0017  DX=0000  SP=0000  BP=0000  SI=0000  DI=007B
DS=076A  ES=076A  SS=0769  CS=0774  IP=0013   NU UP EI PL NZ NA PO NC
0774:0013 F3            REPZ
0774:0014 A4            MOVSB
-t

AX=076A  BX=0000  CX=0016  DX=0000  SP=0000  BP=0000  SI=0001  DI=007C
DS=076A  ES=076A  SS=0769  CS=0774  IP=0013   NU UP EI PL NZ NA PO NC
0774:0013 F3            REPZ
0774:0014 A4            MOVSB
-t

AX=076A  BX=0000  CX=0015  DX=0000  SP=0000  BP=0000  SI=0002  DI=007D
DS=076A  ES=076A  SS=0769  CS=0774  IP=0013   NU UP EI PL NZ NA PO NC
0774:0013 F3            REPZ
0774:0014 A4            MOVSB
-
```

```
-t

AX=076A  BX=0000  CX=0014  DX=0000  SP=0000  BP=0000  SI=0003  DI=007E
DS=076A  ES=076A  SS=0769  CS=0774  IP=0013   NV UP EI PL NZ NA PO NC
0774:0013 F3            REPZ
0774:0014 A4            MOVSB
-t

AX=076A  BX=0000  CX=0013  DX=0000  SP=0000  BP=0000  SI=0004  DI=007F
DS=076A  ES=076A  SS=0769  CS=0774  IP=0013   NV UP EI PL NZ NA PO NC
0774:0013 F3            REPZ
0774:0014 A4            MOVSB
-t

AX=076A  BX=0000  CX=0012  DX=0000  SP=0000  BP=0000  SI=0005  DI=0080
DS=076A  ES=076A  SS=0769  CS=0774  IP=0013   NV UP EI PL NZ NA PO NC
0774:0013 F3            REPZ
0774:0014 A4            MOVSB
-t

AX=076A  BX=0000  CX=0011  DX=0000  SP=0000  BP=0000  SI=0006  DI=0081
DS=076A  ES=076A  SS=0769  CS=0774  IP=0013   NV UP EI PL NZ NA PO NC
0774:0013 F3            REPZ
0774:0014 A4            MOVSB
-
```

```
-t

AX=076A  BX=0000  CX=000E  DX=0000  SP=0000  BP=0000  SI=0009  DI=0084
DS=076A  ES=076A  SS=0769  CS=0774  IP=0013   NV UP EI PL NZ NA PO NC
0774:0013 F3            REPZ
0774:0014 A4            MOVSB
-t

AX=076A  BX=0000  CX=000D  DX=0000  SP=0000  BP=0000  SI=000A  DI=0085
DS=076A  ES=076A  SS=0769  CS=0774  IP=0013   NV UP EI PL NZ NA PO NC
0774:0013 F3            REPZ
0774:0014 A4            MOVSB
-t

AX=076A  BX=0000  CX=000C  DX=0000  SP=0000  BP=0000  SI=000B  DI=0086
DS=076A  ES=076A  SS=0769  CS=0774  IP=0013   NV UP EI PL NZ NA PO NC
0774:0013 F3            REPZ
0774:0014 A4            MOVSB
-t

AX=076A  BX=0000  CX=000B  DX=0000  SP=0000  BP=0000  SI=000C  DI=0087
DS=076A  ES=076A  SS=0769  CS=0774  IP=0013   NV UP EI PL NZ NA PO NC
0774:0013 F3            REPZ
0774:0014 A4            MOVSB
-
```

```
-t

AX=076A  BX=0000  CX=0008  DX=0000  SP=0000  BP=0000  SI=000F  DI=008A
DS=076A  ES=076A  SS=0769  CS=0774  IP=0013   NV UP EI PL NZ NA PO NC
0774:0013 F3            REPZ
0774:0014 A4            MOVSB
-t

AX=076A  BX=0000  CX=0007  DX=0000  SP=0000  BP=0000  SI=0010  DI=008B
DS=076A  ES=076A  SS=0769  CS=0774  IP=0013   NV UP EI PL NZ NA PO NC
0774:0013 F3            REPZ
0774:0014 A4            MOVSB
-t

AX=076A  BX=0000  CX=0006  DX=0000  SP=0000  BP=0000  SI=0011  DI=008C
DS=076A  ES=076A  SS=0769  CS=0774  IP=0013   NV UP EI PL NZ NA PO NC
0774:0013 F3            REPZ
0774:0014 A4            MOVSB
-t

AX=076A  BX=0000  CX=0005  DX=0000  SP=0000  BP=0000  SI=0012  DI=008D
DS=076A  ES=076A  SS=0769  CS=0774  IP=0013   NV UP EI PL NZ NA PO NC
0774:0013 F3            REPZ
0774:0014 A4            MOVSB
-
```

```
DS=076A  ES=076A  SS=0769  CS=0774  IP=0013   NV UP EI PL NZ NA PO NC
0774:0013 F3            REPZ
0774:0014 A4            MOVSB
-t

AX=076A  BX=0000  CX=0001  DX=0000  SP=0000  BP=0000  SI=0016  DI=0091
DS=076A  ES=076A  SS=0769  CS=0774  IP=0013   NV UP EI PL NZ NA PO NC
0774:0013 F3            REPZ
0774:0014 A4            MOVSB
-t

AX=076A  BX=0000  CX=0000  DX=0000  SP=0000  BP=0000  SI=0017  DI=0092
DS=076A  ES=076A  SS=0769  CS=0774  IP=0015   NV UP EI PL NZ NA PO NC
0774:0015 E98D00        JMP     00A5
-t

AX=076A  BX=0000  CX=0000  DX=0000  SP=0000  BP=0000  SI=0017  DI=0092
DS=076A  ES=076A  SS=0769  CS=0774  IP=00A5   NV UP EI PL NZ NA PO NC
0774:00A5 5E            POP     SI
-t

AX=076A  BX=0000  CX=0000  DX=0000  SP=0002  BP=0000  SI=0000  DI=0092
DS=076A  ES=076A  SS=0769  CS=0774  IP=00A6   NV UP EI PL NZ NA PO NC
0774:00A6 8BE5          MOV     SP,BP
-
```

```
AX=076A  BX=0000  CX=0000  DX=0000  SP=0000  BP=0000  SI=0000  DI=0092
DS=076A  ES=076A  SS=0769  CS=0774  IP=00A8  NV UP EI PL NZ NA PO NC
0774:00A8 5D            POP     BP
-t

AX=076A  BX=0000  CX=0000  DX=0000  SP=0002  BP=7302  SI=0000  DI=0092
DS=076A  ES=076A  SS=0769  CS=0774  IP=00A9  NV UP EI PL NZ NA PO NC
0774:00A9 C3            RET
-t

AX=076A  BX=0000  CX=0000  DX=0000  SP=0004  BP=7302  SI=0000  DI=0092
DS=076A  ES=076A  SS=0769  CS=0774  IP=0000  NV UP EI PL NZ NA PO NC
0774:0000 B86A07        MOV     AX,076A
-d ds:007b
076A:0070                                     54 49 53 20 54          TIS T
076A:0080  49 4D 45 20 46 4F 52 20-41 20 4E 45 57 20 48 4F   IME FOR A NEW HO
076A:0090  4D 45 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ME..............
076A:00A0  B8 6A 07 8E D8 8E C0 8D-36 00 00 8D 3E 7B 00 B9   .j......6...>{..
076A:00B0  17 00 FC F3 A4 E9 8D 00-8A 86 FA FE 2A E4 40 50   ............*.@P
076A:00C0  8D 86 FA FE 50 8D 86 7C-FF 50 E8 C5 72 83 C4 06   ....P..¦.P..r...
076A:00D0  8B 9E 7A FF D1 E3 D1 E3-8B 87 CC 17 8B 97 CE 17   ..z.............
076A:00E0  89 46 FC 89 56 FE 05 0C-00 52 50 E8 42 48 83 C4   .F..V....RP.BH..
076A:00F0  04 50 8D 86 7C FF 50 E8-02 0F 83                  .P..¦.P....
-_
```

```
DS=076A  ES=076A  SS=0769  CS=0774  IP=0015  NV UP EI PL NZ NA PO NC
0774:0015 E98D00        JMP     00A5
-t

AX=076A  BX=0000  CX=0000  DX=0000  SP=0004  BP=7302  SI=0017  DI=0092
DS=076A  ES=076A  SS=0769  CS=0774  IP=00A5  NV UP EI PL NZ NA PO NC
0774:00A5 5E            POP     SI
-t

AX=076A  BX=0000  CX=0000  DX=0000  SP=0006  BP=7302  SI=0000  DI=0092
DS=076A  ES=076A  SS=0769  CS=0774  IP=00A6  NV UP EI PL NZ NA PO NC
0774:00A6 8BE5          MOV     SP,BP
- d ds:007b
 ^ Error
-d ds:007b
076A:0070                                     54 49 53 20 54          TIS T
076A:0080  49 4D 45 20 46 4F 52 20-41 20 4E 45 57 20 48 4F   IME FOR A NEW HO
076A:0090  4D 45 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ME..............
076A:00A0  B8 6A 07 8E D8 8E C0 8D-36 00 00 8D 3E 7B 00 B9   .j......6...>{..
076A:00B0  17 00 FC F3 A4 E9 8D 00-8A 86 FA FE 2A E4 40 50   ............*.@P
076A:00C0  8D 86 FA FE 50 8D 86 7C-FF 50 E8 C5 72 83 C4 06   ....P..¦.P..r...
076A:00D0  8B 9E 7A FF D1 E3 D1 E3-8B 87 CC 17 8B 97 CE 17   ..z.............
076A:00E0  89 46 FC 89 56 FE 05 0C-00 52 50 E8 42 48 83 C4   .F..V....RP.BH..
076A:00F0  04 50 8D 86 7C FF 50 E8-02 0F 83                  .P..¦.P....
-
```