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Experiment 6:

String Reversal and Finding the Length of the String

Programme	:	**BTech. CSE Core**	Semester	:	**Win 2021-22**
Course	:	**Microprocessor and Interfacing**	Code	:	**CSE2006**
Faculty	:	**Dr. Florence Gnana Poovathy J**	Slot	:	**L15+L16**
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Date: 09-03-2022	Exp. 06	String Reversal and String length	VIT Vellore Institute of Technology (Deemed to be University under section 3 of UGC Act, 1956)

String Reversal and Length of the String

Aim: To perform logical operations, shifts, BCD-ASCII conversion, and decimal to hexadecimal conversion.

Tool Used: Assembler – MASM611

Algorithm:

Step 1: First of all, mount the c drive using the command: **mount c c:\masm611\bin**

Step 2: After pressing **enter,** type **c:** and press enter.

Step 3: Now give a command, **<filename>.asm** for writing/editing the code and the write the code.

Step 4: A pop window appears; there we have to write out code(instructions) following the logic given below.

i. Initializing the data segment which includes the string, its length and the variable where its going to store the result
ii. Moving the data to AX and AX to DX and EX
iii. Moving the length to CX and CX to BX
iv. Add -2 to CX.
v. Load the string to SI and the variable to store result to di
vi. Add the length to SI and add -2 to SI
vii. In l1 Moving the first element from SI to AL and AL to DI
viii. Decrease SI
ix. Increase DI
x. Looping the l1
xi. Moving first element of SI to AL and then AL to DI
xii. Increase DI
xiii. Move $ to DL and DL to DI
xiv. Moving 9h to ah i.e. printing the string
xv. Loading the string to DX
xvi. And calling an interrupt.
xvii. Moving 13 to DX
xviii. Moving 02h to AH and calling an interrupt
xix. Moving 10 to DX
xx. Moving 02h to AH and calling an interrupt
xxi. Moving 09h to AH and loading the REV1 to DX and printing it by calling an interrupt.
xxii. file is successfully terminated

Step 5: Now give a command, **masm <filename>.asm** for running the code. The object file is created.

Step 6: Now give a command, **link <filename>.obj** to link the object file to library file present in the bin folder.

Step 7: Press **ENTER** four times.

Step 8: Write **debug <filename>.exe**

-u
-g (followed by the **address of HLT or INT** to view the values in registers).

PROGRAM:

STRREV.ASM

```
DATA SEGMENT
        NAME1 DB "HARIKET$"
        LEN1 DW $-NAME1
        REV1 DB 10 DUP (?)
DATA ENDS
CODE SEGMENT
        ASSUME CS:CODE, DS:DATA
START:
        MOV AX,DATA
        MOV DS, AX
        MOV ES, AX
        MOV CX, LEN1
        MOV BX, CX
        ADD CX, -2
        LEA SI, NAME1
        LEA DI, REV1
        ADD SI, LEN1
        ADD SI, -2
L1:  MOV AL, [SI]
        MOV [DI], AL
        DEC SI
```

STRREV.ASM

```
        INC DI
        LOOP L1
        MOV AL, [SI]
        MOV [DI], AL
        INC DI
        MOV DL, "$"
        MOV [DI], DL

PRINT: MOV AH, 09H
         LEA DX, NAME1
        INT 21H
        MOV DX, 13
        MOV AH, 2
        INT 21H
        MOV DX, 10
        MOV AH, 2
        INT 21H
        MOV AH, 09H
        LEA DX, REV1
        INT 21H
EXIT:   MOV AH, 4CH
        INT 21H

CODE ENDS
END START
```

```
C:\>debug strrev.exe
-u
0766:0000 B86407        MOV     AX,0764
0766:0003 8ED8          MOV     DS,AX
0766:0005 8EC0          MOV     ES,AX
0766:0007 8B0E0800      MOV     CX,[0008]
0766:000B 8BD9          MOV     BX,CX
0766:000D 83C1FE        ADD     CX,-02
0766:0010 8D360000      LEA     SI,[0000]
0766:0014 8D3E0A00      LEA     DI,[000A]
0766:0018 03360800      ADD     SI,[0008]
0766:001C 83C6FE        ADD     SI,-02
0766:001F 8A04          MOV     AL,[SI]
-u
0766:0021 8805          MOV     [DI],AL
0766:0023 4E            DEC     SI
0766:0024 47            INC     DI
0766:0025 E2F8          LOOP    001F
0766:0027 8A04          MOV     AL,[SI]
0766:0029 8805          MOV     [DI],AL
0766:002B 47            INC     DI
0766:002C B224          MOV     DL,24
0766:002E 8815          MOV     [DI],DL
0766:0030 B409          MOV     AH,09
0766:0032 8D160000      LEA     DX,[0000]
0766:0036 CD21          INT     21
0766:0038 BA0D00        MOV     DX,000D
0766:003B B402          MOV     AH,02
0766:003D CD21          INT     21
0766:003F BA0A00        MOV     DX,000A
```

```
-u
0766:0042 B402          MOV     AH,02
0766:0044 CD21          INT     21
0766:0046 B409          MOV     AH,09
0766:0048 8D160A00      LEA     DX,[000A]
0766:004C CD21          INT     21
0766:004E B44C          MOV     AH,4C
0766:0050 CD21          INT     21
0766:0052 C8            DB      C8
0766:0053 1404          ADC     AL,04
0766:0055 7915          JNS     006C
0766:0057 0481          ADD     AL,81
0766:0059 0E            PUSH    CS
0766:005A 44            INC     SP
0766:005B 3204          XOR     AL,[SI]
0766:005D 06            PUSH    ES
0766:005E 43            INC     BX
0766:005F 98            CBW
0766:0060 92            XCHG    DX,AX
0766:0061 92            XCHG    DX,AX
```

```
C:\>strrev.exe
HARIKET
TEKIRAH
C:\>

C:\>debug strrev.exe
-g 0766:0042
HARIKET
AX=020D  BX=0008  CX=0000  DX=000A  SP=0000  BP=0000  SI=0000  DI=0011
DS=0764  ES=0764  SS=0763  CS=0766  IP=0042   NV UP EI PL NZ NA PE CY
0766:0042 B402          MOV     AH,02
```

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Sample Input:

HARIKET

Sample Output:

TEKIRAH
Length:0008

Result: The string has been reversed, and length has been found.