

St. Francis Institute of Technology

Class: SE-ITA/ITB Semester: IV; A.Y. 2023-2024

Subject: Microprocessor Lab

Experiment – 9: Check if given string is a palindrome or not

1. Aim:

Write an ALP to check if the given string is palindrome or not.

2. Requirements

DOSBox (an x86 emulator with DOS), Turbo Assembler, Turbo Debugger

3. Pre-Experiment Exercise

Algorithm:

- a. Initialize the data segment with messages to take string input, display if the string is palindrome or not.
- b. Write the macro for displaying message on the output screen.
- c. Initialize the code segment. Use macro to display the message “Enter the string:\$”
- d. Wait for input from the user and scan the string using INT 21H. While scanning, the assembler first stores the length of the buffer, next the length of the actual string followed by message.
- e. Use block transfer concepts to duplicate the string using SI and DI registers.
- f. Begin comparison between first and last of the string and check if they match or no.
- g. If they match, repeat for remaining part of the string. If all match, display message “String is palindrome\$”.
- h. If they don’t match, display message “String is not palindrome\$”

4. Laboratory Exercise:

Procedure:

- a. Open DOSbox and go to TASM.
- b. Open a new document using the command - edit <filename>.asm
- c. Write the Program and save the changes to the same file.
- d. Assemble the program using the command - tasm <filename.asm>
- e. If any errors are displayed, then change the code in <filename>
- f. If no errors are displayed, execute the command - tlink <filename>.obj
- g. Next execute the command - <filename>

5. Post Experiment Exercise:

a. Results/Calculations/Observations:

Along with ALP, attach at least one screenshot of display showing whether the entered string is palindrome or not.

b. Questions:

- i. What is a procedure? Explain types of procedures in 8086.
- ii. Differentiate between macro and procedure.

c. Conclusion:

Write the conclusion/comments based on the experiment performed and the output obtained.

d. References:

Mention two book references and two web references.

MPL EXPERIMENT 9

Write an ALP to check if the given string is palindrome or not.

CODE:

```
model small
stack 10h
data segment
    len dB 00h
    msg0 dB 10,13,"Enter the String:$"
    msg1 dB 0fh dup("?")
    msg2 dB 0fh dup("?")
    msg3 dB 10,13,"String is palindrome$"
    msg4 dB 10,13,"String is not palindrome$"
data ends
disp macro msg
    mov ah,09h
    lea dx,msg
    int 21h
endm
code segment
    assume cs:code , ds:data
start:
    mov ax,data
    mov ds,ax
    disp msg0
    lea dx,msg1
    mov ah,0ah
    int 21h
    mov cl,[msg1+1]
    mov len,cl
    lea si,[msg1+2]
    lea di,[msg2+2]
reverse:
```

Name: Vishal Rajesh Mahajan

Class: SE IT A

Exp: 9

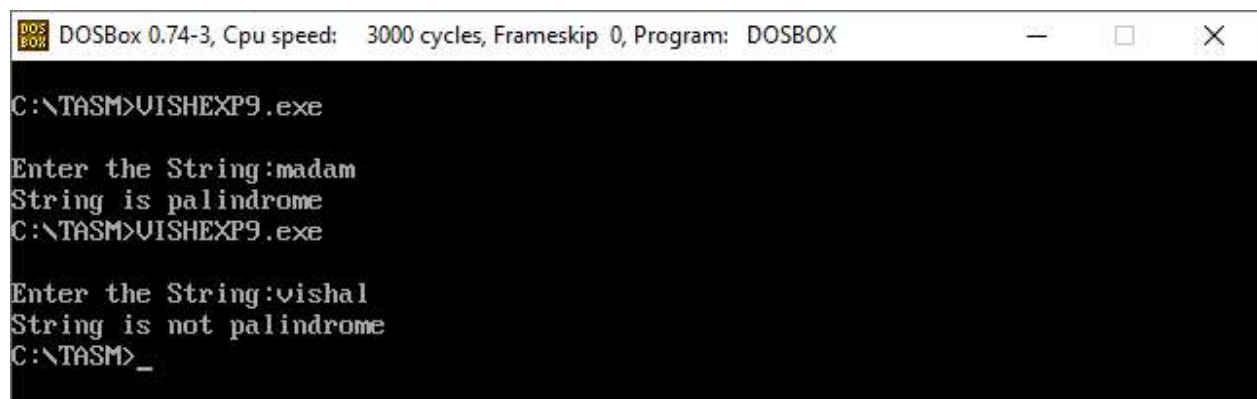
Roll No: 63

```
    mov al,[si]
    mov [di],al
    inc si
    inc di
    dec cl
    jnz reverse
    lea si,[msg1+2]
    dec di
    mov cl,len
    mov ch,00h
up:
    mov al,[si]
    cmp al,[di]
    jne notpalin
    inc si
    dec di
    loop up
    disp msg3
    jmp exit
notpalin: disp msg4
exit: mov ah,4ch
      int 21h
```

code ends

end start

OUTPUT:

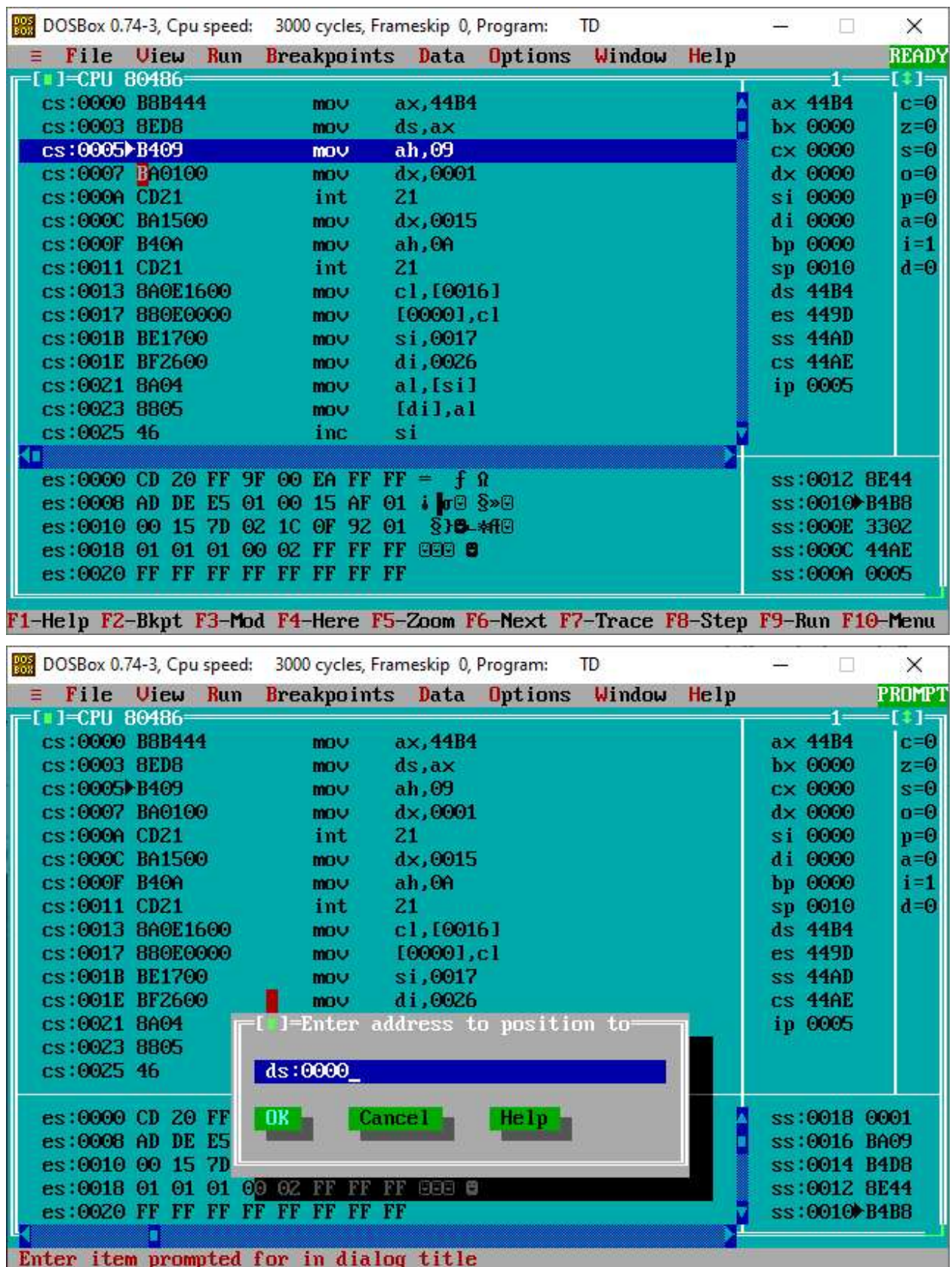


```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX

C:\TASM>VISHEXP9.exe

Enter the String:madam
String is palindrome
C:\TASM>VISHEXP9.exe

Enter the String:vishal
String is not palindrome
C:\TASM>_
```



Name: Vishal Rajesh Mahajan

Exp: 9

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```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: TD
C:\TASM>td VISHEXP9.exe
Turbo Debugger Version 2.51 Copyright (c) 1988,91 Borland International
Enter the String:mam_
```

```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: TD
File View Run Breakpoints Data Options Window Help
[CPU 80486]
cs:0000 B8B444 mov ax,44B4 ax:0AB4 c=0
cs:0003 BED8 mov ds,ax bx:0000 z=0
cs:0005 B409 mov ah,09 cx:0000 s=0
cs:0007 BA0100 mov dx,0001 dx:0015 o=0
cs:000A CD21 int 21 si:0000 p=0
cs:000C BA1500 mov dx,0015 di:0000 a=0
cs:000F B40A mov ah,0A bp:0000 i=1
cs:0011 CD21 int 21 sp:0010 d=0
cs:0013 8A0E1600 mov cl,[0016] ds:44B4
cs:0017 880E0000 mov [0000],cl es:449D
cs:001B BE1700 mov si,0017 ss:44AD
cs:001E BF2600 mov di,0026 cs:44AE
cs:0021 8A04 mov al,[si] ip:0013
cs:0023 8805 mov [di],al
cs:0025 46 inc si
ds:0000 00 0A 0D 45 6E 74 65 72 Enter
ds:0008 20 74 68 65 20 53 74 72 the Str
ds:0010 69 6E 67 3A 24 3F 03 6D ing:$?m
ds:0018 61 6D 0D 3F 3F 3F 3F 3F amf?????
ds:0020 3F 3F 3F 3F 3F 3F 3F 3F ?????????
ss:0018 0001
ss:0016 BA09
ss:0014 B4DB
ss:0012 8E44
ss:0010 B4B8
F1-Help F2-Bkpt F3-Mod F4-Here F5-Zoom F6-Next F7-Trace F8-Step F9-Run F10-Menu
```


DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: TD

File View Run Breakpoints Data Options Window Help

READY

[CPU 80486]

Address	Instruction	Register	Value
cs:0021 8A04	mov	al,[si]	ax 0A6D c=0
cs:0023 8805	mov	[di],al	bx 0000 z=0
cs:0025 46	inc	si	cx 0002 s=0
cs:0026 47	inc	di	dx 0015 o=0
cs:0027 FEC9	dec	cl	si 0018 p=0
cs:0029 75F6	jne	0021	di 0027 a=0
cs:002B BE1700	mov	si,0017	bp 0000 i=1
cs:002E 4F	dec	di	sp 0010 d=0
cs:002F 8A0E0000	mov	cl,[0000]	ds 44B4
cs:0033 B500	mov	ch,00	es 449D
cs:0035 8A04	mov	al,[si]	ss 44AD
cs:0037 3A05	cmp	al,[di]	cs 44AE
cs:0039 750E	jne	0049	ip 0021
cs:003B 46	inc	si	
cs:003C 4F	dec	di	

ds:0000 03 0A 0D 45 6E 74 65 72 Enter
 ds:0008 20 74 68 65 20 53 74 72 the Str
 ds:0010 69 6E 67 3A 24 3F 03 6D ing:\$?m
 ds:0018 61 6D 0D 3F 3F 3F 3F 3F amJ?????
 ds:0020 3F 3F 3F 3F 3F 3F 6D 3F ??????m?

ss:0018 0001
 ss:0016 BA09
 ss:0014 B4DB
 ss:0012 8E44
 ss:0010 B4B8

F1-Help F2-Bkpt F3-Mod F4-Here F5-Zoom F6-Next F7-Trace F8-Step F9-Run F10-Menu

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: TD

File View Run Breakpoints Data Options Window Help

STATUS

[CPU 80486]

Address	Instruction	Register	Value
44AE:0050 B44C	mov	ah,4C	ax 0192 c=1
44AE:0052 CD21	int	21	bx 02F4 z=0
44AE:0054 0000	add	[bx+si],al	cx 00D8 s=1
44AE:0056 0000	add	[bx+si],al	dx 0990 o=0
44AE:0058 0000	add	[bx+si],al	si 0019 p=0
44AE:005A 0000	add	[bx+si],al	di 0FA6 a=0
44AE:005C 0000	add	[bx+si],al	bp 0100 i=1
44AE:005E 0000	add	[bx+si],al	sp 0106 d=1
44AE:0060 030A	add	cx,[bp+si]	ds 1D09
44AE:0062 0D456E	or	ax,6E45	es 02F4
44AE:0065 7465	je	00CC	ss 0192
44AE:0067 7220	jb	0089	cs 0000
44AE:0069 7468	je	00D3	ip 0000
44AE:006B 65205374	and	gs:[bp+di+74],di	
44AE:006F 7			

44B4:0000 0
 44B4:0008 2
 44B4:0010 6
 44B4:0018 6
 44B4:0020 3

44AD:0018 0001
 44AD:0016 BA09
 44AD:0014 B4DB
 44AD:0012 8E44
 44AD:0010 B4B8

Terminated, exit code 109

OK Help