



PARSHVANATH CHARITABLE TRUST'S
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Department of Computer Science and Engineering
Data Science

Department of Computer Science Engineering Data Science

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Class / Branch: S.E.D.S.

Semester: IV
Subject: Microprocessor Lab

Experiment No. 7

1. **Aim:** Write an Assembly Language Program to find factorial of a number using procedure.

2. **Software used:** tasm, tlink, td, dosemu

3. **Theory :-**

A procedure is a set of code that can be branched to and returned from in such a way that the code is as if it were inserted at the point from which it is branched to. The branch to procedure is referred to as the *call*, and the corresponding branch back is known as the *return*. The return is always made to the instruction immediately following the call regardless of where the call is located.

The CALL instruction not only branches to the indicated address, but also pushes the return address onto the stack. The RET instruction simply pops the return address from the stack. The registers used by the procedure need to be stored before their contents are changed, and then restored just before their contents are changed, and then restored just before the procedure is exited.

Procedures are used in the source code by placing a statement of the form at the beginning of the procedure

Procedure name PROC Attribute and by terminating the procedure with a statement

Procedure name ENDP

The attribute that can be used will be either NEAR or FAR. If the attribute is NEAR, the RET instruction will only pop a word into the IP register, but if it is FAR, it will also pop a word into the CS register.

4. **Program:**

.model small

.data

```
num db ?
fact db 1h
res db 10 dup ('$')
msg1 db "enter number : $"
msg2 db 10,13,"result : $"
.code
start:
mov ax,@data
mov ds,ax
lea dx,msg1
mov ah,9
int 21h
mov ah,1
int 21h
call factorial
lea si,res
call hex2dec
lea dx,msg2
mov ah,9
int 21h
lea dx,res
mov ah,9
int 21h
mov ah,4ch
int 21h
hex2dec proc near
mov cx,0
mov bx,10
loop1: mov dx,0
div bx
```

```
add dl,30h
push dx
inc cx
cmp ax,9
jg loop1
add al,30h
mov [si],al
loop2: pop ax
inc si
mov [si],al
loop loop2
ret
hex2dec endp
factorial proc near
sub al,30h
mov num,al
mov ah,0
mov al,fact
mov ch,0
mov cl,num
label1: mul cx
loop label1
ret
factorial endp
end start
```

Output:

```
COMMAND - DOS in a BOX

FreeCom version 0.84-pre2 XMS_Swap [Aug 28 2006 00:29:00]
Sound on: SB at 0x220-0x22f, IRQ=5, DMA8=1, DMA16=5. MPU-401 at 0x330-0x331.
D: = LINUX\FS\HOME\APSIT attrib = READ/WRITE
Error 35 (network name not found)
while redirecting drive E: to LINUX\FS\MEDIA\CDROM
"Welcome to dosemu 1.4.0.8!"
C:\>d:
D:\>cd tasm
D:\TASM>tasm fa.asm
Turbo Assembler Version 2.51 Copyright (c) 1988, 1991 Borland International

Assembling file:   fa.asm
Error messages:    None
Warning messages:  None
Passes:            1
Remaining memory:  486k

D:\TASM>tlink fa.obj
Turbo Link Version 4.0 Copyright (c) 1991 Borland International
Warning: No stack
D:\TASM>fa.exe
ENTER NUMBER : 5
RESULT : 120
D:\TASM>
```

5. Conclusion :-