

Roll No: 11
Name: Soham Desai
Xavier ID : 202003021
Date: 6/4/22

EXPERIMENT 11

Aim: Compute the factorial of a positive integer 'n' using recursive procedure

LO: 5

LO STATEMENT: Write programs based on string and procedure for 8086 microprocessor

Software and Hardware Requirements: TASM Software

Theory:

1. MOV Instruction

The MOV instruction is the most important command in the 8086 because it moves data from one location to another. It also has the widest variety of parameters; so the assembler programmer can use MOV effectively, the rest of the commands are easier to understand. MOV copies the data in the source to the destination. The data can be either a byte or a word. Sometimes this has to be explicitly stated when the assembler cannot determine from the operands whether a byte or word is being referenced.

Syntax:

Move Destination, Source

Example:

MOV Ax, Bx

2. INT instruction:

Interrupt is the method of creating a temporary halt during program execution and allows peripheral devices to access the microprocessor. The microprocessor responds to that interrupt with an ISR (Interrupt Service Routine), which is a short program to instruct the microprocessor on how to handle the interrupt.

Example:

INT 21H

3. LOOP instruction:

Loop instructions are Used to simplify the decrementing. testing and branching portion of the loop .A loop instruction is used to loop a group of instructions until the condition satisfies, i.e., CX = 0. To get the loop instruction to work first you have to define a label, set the value in cx which would be the number of times the loop should execute.

Example:

LOOP back

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4. Proc near Instruction:

A near procedure refers to a procedure which is in the same code segment from that of the call instruction. It is also called intra-segment procedure. A near procedure call replaces the old IP with new IP.

Example:

CALL fact

5. RET Instruction:

The ret instruction transfers control to the return address located on the stack. This address is usually placed on the stack by a call instruction. Issue the ret instruction within the called procedure to resume execution flow at the instruction following the call.

Syntax:

RET

Code:

assume cs:code,ds:data

data segment

num db 04H

ans dw ?

data ends

code segment

start:

 mov Ax,data

 mov Ds,Ax

 mov Cl,num

 mov Ch,00H

 mov Ax,0001H

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back:

call fact

LOOP back

```
mov ans,Ax
```

```
mov AH,4CH
```

INT 21H

fact proc near

MUL CI

RET

fact ENDP

code ends

end start

Output:

[]-CPU 80486-								-1=[↑][↓]
4BAE:0000	B8AD4B	mov	ax,4BAD	ax 0192	c=1			
4BAE:0003	8ED8	mov	ds,ax	bx 0018	z=0			
4BAE:0005	8A0E0000	mov	cl,[0000]	cx 0012	s=1			
4BAE:0009	B500	mov	ch,00	dx 09E3	o=0			
4BAE:000B	B80100	mov	ax,0001	si 10AB	p=0			
4BAE:000E	E80900	call	001A	di 3256	a=0			
4BAE:0011	E2FB	loop	000E	bp 0100	i=1			
4BAE:0013	A30100	mov	[0001],ax	sp 0106	d=1			
4BAE:0016	B44C	mov	ah,4C	ds 2110				
4BAE:0018	CD21	int	21	es 114E				
4BAE:001A	F6E1	mul	cl	ss 0192				
4BAE:001C	C3	ret		cs 0000				
4BAE:001D	0000	add	[bx+sil],al	ip 0000				
4BAD:0000	04 18 00 00 00 00 00 00	♦↑						
4BAD:0008	00 00 00 00 00 00 00 00							
4BAD:0010	B8 AD 4B 8E D8 BA 0E 00	7 H A ↑ E J		4BAC:0002 6474				
4BAD:0018	00 B5 00 B8 01 00 E8 09	7 7 0 0		4BAC:0000 0000				

Conclusion: From this experiment we have learned about how to use procedure and call then in 8086 assembly language