



Vidyavardhini's College of Engineering & Technology
Department of Artificial Intelligence and Data Science (AI&DS)

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Class/Sem:	SE/IV
Experiment No.:	2B
Title:	Program for calculating factorial using assembly language
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Marks:	
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Aim: Program to calculate the Factorial of a number.

Theory:

To calculate the factorial of any number, we use MUL instruction. Here, initially, we initialize the first register by value 1. The second register is initialized by the value of the second register. After multiplication, decrement the value of the second register and repeat the multiplying step till the second register value becomes zero. The result is stored in the first register.

Algorithm:

1. Start.
2. Set AX=01H, and BX with the value whose factorial we want to find.
3. Multiply AX and BX.
4. Decrement BX=BX-1.
5. Repeat steps 3 and 4 till BX=0.
6. Stop.

Code:

```
ORG 100H  
  
MOV AX, 00H  
  
MOV BX, 04H  
  
MOV CX, 02H  
  
L1: ADD AX, BX  
  
    DEC CX  
  
    JNZ L1  
  
RET
```



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Output:-

The screenshot shows an 8086 emulator window titled "emulator: noname.com". The interface includes a menu bar (file, math, debug, view, external, virtual devices, virtual drive, help) and a toolbar with buttons for Load, reload, step back, single step, run, and a step delay slider set to 0 ms.

Registers:

	H	L
AX	00	18
BX	00	00
CX	00	0C
DX	00	00
CS	F400	
IP	0154	
SS	0700	
SP	FFFA	
BP	0000	
SI	0000	
DI	0000	
DS	0700	
ES	0700	

Memory (F400:0154):

Address	Hex	Dec	Comment
F4150:	FF	255	RES
F4151:	FF	255	RES
F4152:	CD	205	=
F4153:	20	032	\$PA
F4154:	CF	207	±
F4155:	00	000	NULL
F4156:	00	000	NULL
F4157:	00	000	NULL
F4158:	00	000	NULL
F4159:	00	000	NULL
F415A:	00	000	NULL
F415B:	00	000	NULL
F415C:	00	000	NULL
F415D:	00	000	NULL
F415E:	00	000	NULL
F415F:	00	000	NULL
F4160:	FF	255	RES
F4161:	FF	255	RES
F4162:	CD	205	=
F4163:	1A	026	+
F4164:	CF	207	±
F4165:	00	000	NULL

BIOS (DI: INT 020h):

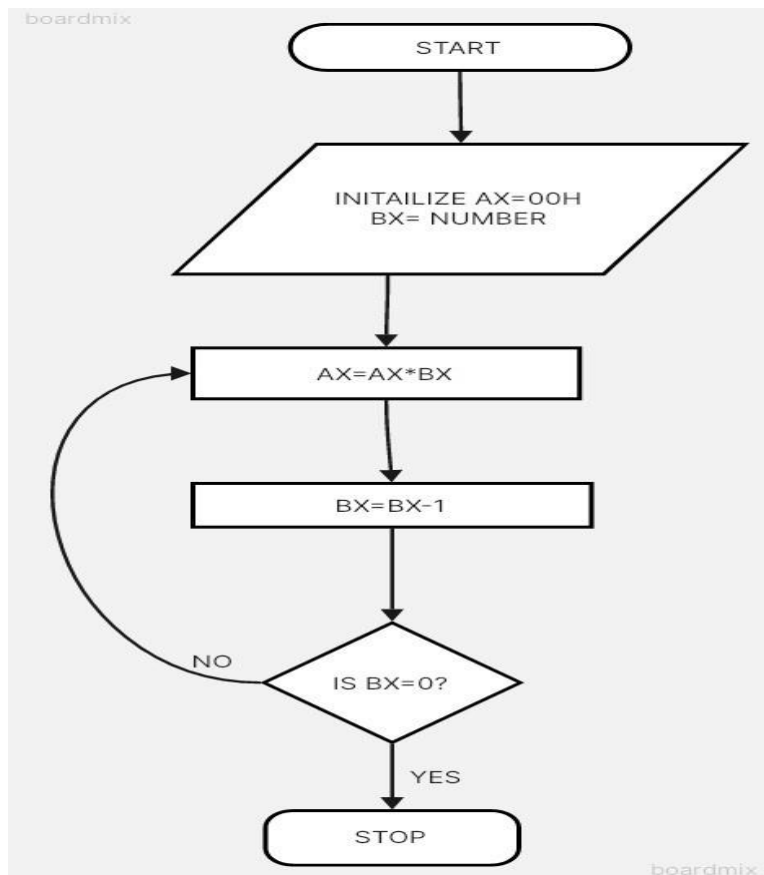
Address	Hex	Dec	Comment
INT 020h			IRET
			ADD [BX + SI], AL
			ADD [BX + SI], AL
			ADD [BX + SI], AL
			ADD [BX + SI], AL
			ADD [BX + SI], AL
			ADD BH, BH
			DEC BP
			SBB CL, BH
			ADD [BX + SI], AL
			ADD [BX + SI], AL
			ADD [BX + SI], AL
			ADD [BX + SI], AL
			ADD [BX + SI], AL
			ADD BH, BH
			DEC BP
			ADD BH, CL
			ADD [BX + SI], AL
			ADD [BX + SI], AL
			...

At the bottom, there are tabs for screen, source, reset, aux, vars, debug, stack, and flags.



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Flowchart:





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Conclusion:

1. Explain shift instructions.
2. Explain rotate instructions.

1)The 8086 can perform two types of Shift operations; the logical shift and the arithmetic shift. There are four shift operations (SHL, SAL, SHR, and SAR).

2)The 8086 can perform two types of rotate operations; the rotate without carry and the rotate through carry. There are four rotate operations (ROL, ROR, RCL, and RCR). ROL shifts each bit of a register to the left. The highest bit is copied into both the Carry flag and into the lowest bit of the register

