Name: **Tushar Nankani** Roll No: **1902112** Batch: **C23**

**Microprocessor: Experiment 7**

**Aim**: Assembly program to find factorial of number using procedure.

**Theory:**

Factorial

Factorial of a non-negative integer, is multiplication of all integers smaller than or equal to n. For example, factorial of 6 is 6\*5\*4\*3\*2\*1 which is 720.

AAM - ASCII Adjust after Multiplication. Corrects the result of multiplication of two

BCD values.

Algorithm:

AH = AL / 10

AL = remainder

AAM - No operands

Example:

MOV AL, 15

AL = 0Fh

AAM

AH = 01

AL = 05

RET

IMUL - Signed multiply.

Algorithm: when operand is a byte:

AX = AL \* operand. when operand is a word: (DX AX) = AX \* operand.

Example:

MOV AL, -2

MOV BL, -4

IMUL BL

AX = 8 RET

**ALGORITHM:**

Input the Number whose factorial is to be find and Store that Number in CX Register (Condition for LOOP Instruction)

Insert 0001 in AX(Condition for MUL Instruction) and 0000 in DX

Multiply CX with AX until CX become Zero(0) using LOOP Instruction

Copy the content of AX to memory location 0600

Copy the content of DX to memory location 0601

Stop Execution

**Code:**

DATA SEGMENT

NUM DB ?

FACT DB 1H

RES DB 10 DUP ('$')

MSG1 DB "ENTER NUMBER : $"

MSG2 DB 10,13,"RESULT : $"

DATA ENDS

CODE SEGMENT

ASSUME DS:DATA,CS:CODE

START:

MOV AX,DATA

MOV DS,AX

LEA DX,MSG1

MOV AH,9

INT 21H

MOV AH,1

INT 21H

SUB AL,30H

MOV NUM,AL

MOV AH,0

MOV AL,FACT

MOV CH,0

MOV CL,NUM

CALL FACTO

FACTO PROC ;define FACTORIAL Procedure

LABEL1: MUL CL

LOOP LABEL1

LEA SI,RES

FACTO ENDP ;here factorial procedure ends

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

CODE ENDS

END START

OUTPUT:

