**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

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**EMBEDDED SYSTEMS**

**Experiment 10-12**

**Submitted to, Submitted by,**

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**M.Tech (VLSI Design)**

**Experiment 10**

**Aim:**

To write an ARM Assembly Language to find the factorial of a given 8-bit number.

**Tool Used:**

Keil uVision4

**Theory:**

The numbers in the memory location are repeatedly multiplied and subtracted in iterative manner.

**Code:**

 AREA PROGRAM, CODE, READONLY

 ENTRY

MAIN

        LDR R0, =0x00001000 ; memory location of input value

        LDRB R1,[R0], #1 ; loading into r1

        ADDS R1,R1,#0 ; checking if r1 is 0

        BEQ LOOP1 ; if 0 call subroutine

        MOV R2,R1 ; copy r1 to r2

        SUB R2,R2,#1 ; r2 = r2 - 1 for operand 2

LOOP2   MUL R7,R2,R1 ; multiply both operands

        MOV R1,R7 ; store back in r1

        SUBS R2,R2,#1 ; decrement r2

        BNE LOOP2 ; loop if not zero

        STRB R1,[R0] ; store result in memory

        B LOOP3 ; unconditional loop

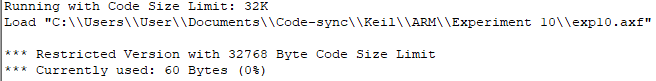
LOOP1   MOV R8,#1 ; store 1 is r8

        STRB R8,[R0] ; store result in memory

LOOP3   B LOOP3

        END

**Output:**

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For non Zero value:

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For Zero:

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**Result:**

The experiment on to find the factorial of a given 8 bit number has been performed and verified to be correct.