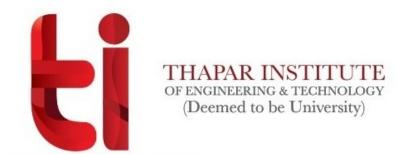
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING



EMBEDDED SYSTEMS Experiment 10-12

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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
        MUL R7, R2, R1; multiply both operands
LOOP2
        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
        MOV R8,#1; store 1 is r8
LOOP1
        STRB R8, [R0]; store result in memory
        B L00P3
LOOP3
        END
```

Output:

```
Running with Code Size Limit: 32K
Load "C:\\Users\\User\\Documents\\Code-sync\\Keil\\ARM\\Experiment 10\\exp10.axf"

*** Restricted Version with 32768 Byte Code Size Limit

*** Currently used: 60 Bytes (0%)
```

For non Zero value:

```
0x00001000: 05 78 00 00 00 00 00 00 00 00 00 00 00 00
```

For Zero:

Result:

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