Lab Report 3 [ARM Assembly- Computations in ARM

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AIM :

Write assembly language programs for

1) Computing factorial of a given number.

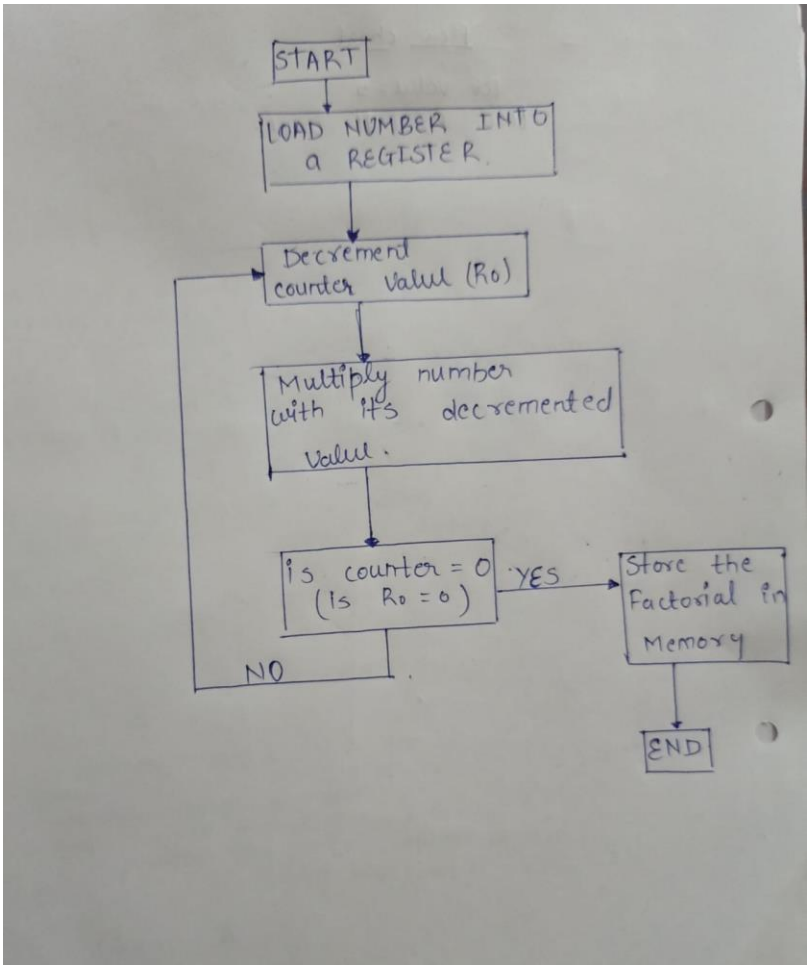
2)To combine the low four bits of each of the four consecutive bytes beginning at LIST into one 16 bit half word and storing the result in the 32 bit variable result.

3)Given a 32 bit number , identify whether

it is even or odd.

Q1: Factorial of a number

Flowchart:



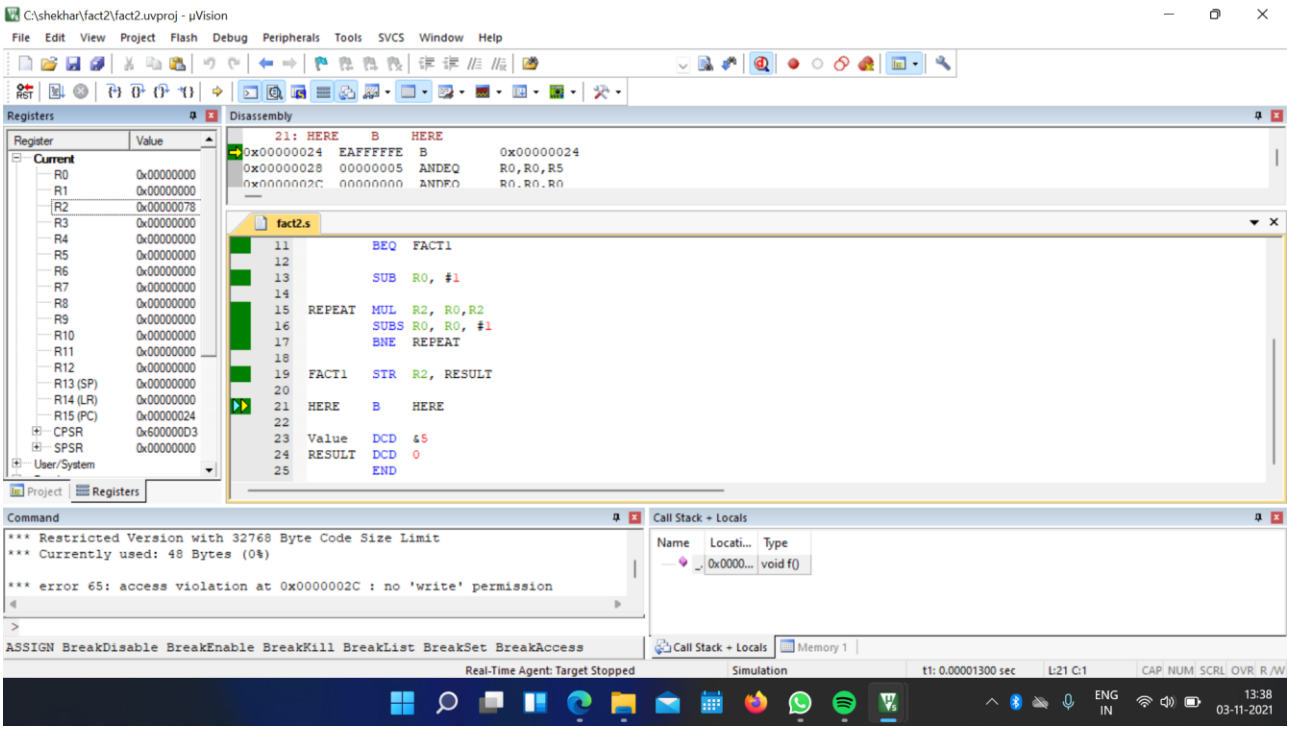
Code:

* FACTORIAL OF A NUMBER

TTL factorial

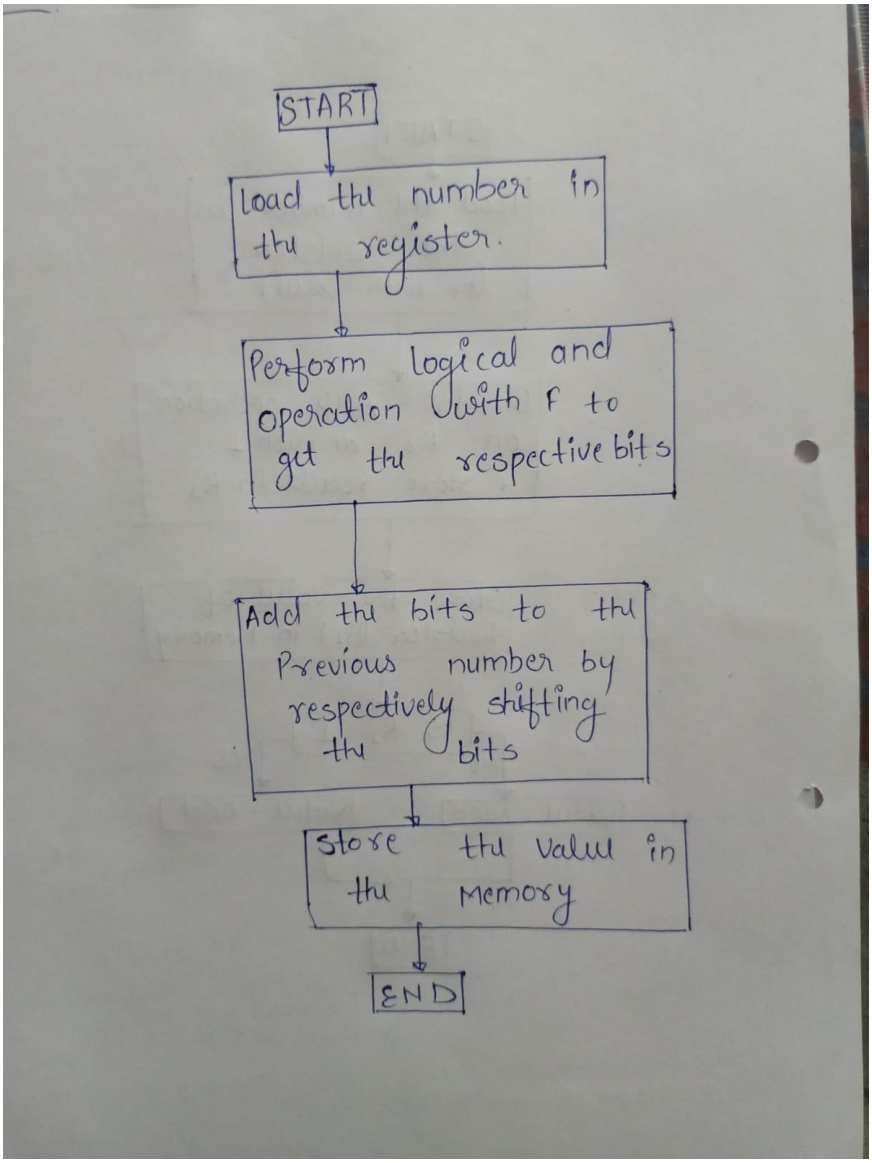
```
AREA Program, Code, Readonly
ENTRY

Main
LDR  R0, Value
MOV  R2, R0

CMP  R0, #1        ;Check value = 1 or not if 1 then jump to
FACT1
BEQ  FACT1   ;branch if equal to

SUB  R0, #1 ; decrement in counter

REPEAT  MUL  R2, R0,R2   ;loop for factorial
SUBS R0, R0, #1
BNE  REPEAT

FACT1    STR  R2, RESULT
```

```
HERE     B    HERE

Value    DCD &5
RESULT   DCD  0   ; storing result
END
```



2) To combine the low four bits of each of the four consecutive bytes beginning at LIST into one 16 bit half word and storing the result in the 32 bit variable result.

Flowchart:



Code:

* Combine the low four bits of each of the four consecutive bytes beginning at LIST into one 16-bit halfword. The

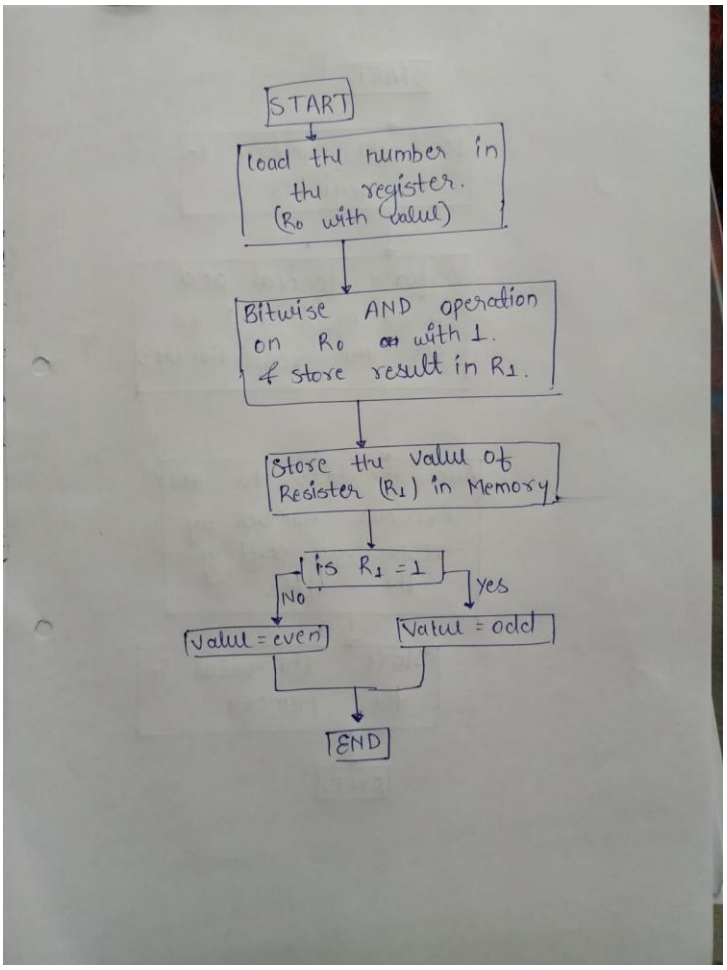
* value at LIST goes into the most significant nibble of the result. Store the result in the 32-bit variable RESULT.

```
TTL

   AREA PROGRAM, CODE, READONLY

   ENTRY


MAIN
```

```
LDR R5, Mask
   LDR R0, =Value
LDRB R1, [R0]
LDRB R2, [R0, #4]!
LDRB R3, [R0, #4]!
LDRB R4, [R0, #4]!
AND R1, R1, R5
AND R2, R2, R5
AND R3, R3, R5
AND R4, R4, R5
MOV R1, R1, LSL #12
MOV R2, R2, LSL #8
MOV R3, R3, LSL #4
ADD R6, R1, R2
ADD R6, R6, R3
ADD R6, R6, R4
STR R6, Result
HERE B HERE

Mask    DCW &000F
ALIGN
Value   DCD &1C, &22, &36, &4F
      ALIGN
Result  DCD 0
END
```

3)Even Or Odd

Flowchart:

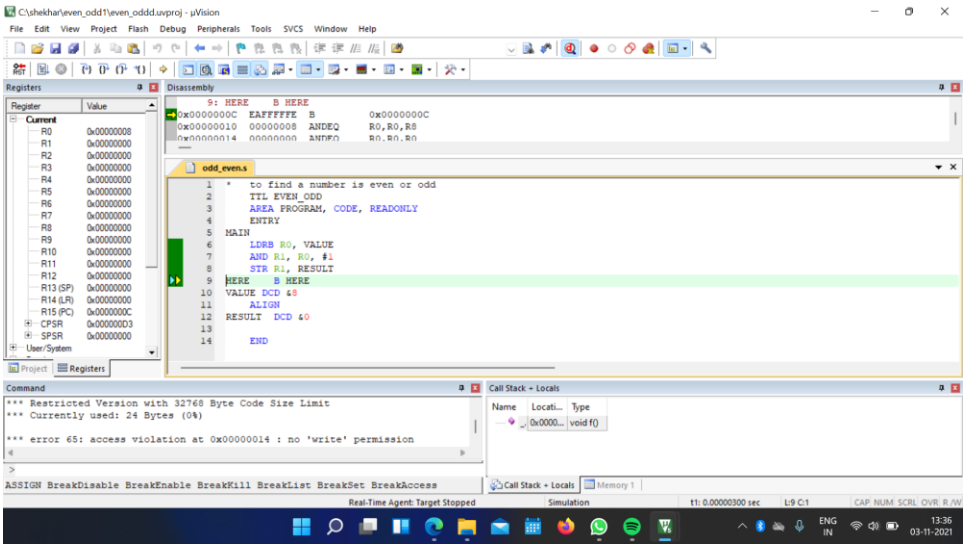


Code:

* to find a number is even or odd

```
TTL EVEN_ODD
AREA PROGRAM, CODE, READONLY
ENTRY
MAIN
LDRB R0, VALUE
```

```
AND R1, R0, #1
STR R1,      RESULT
HERE    B HERE
VALUE DCD &8
ALIGN
RESULT      DCD &0

END
```



Interfaces:

Getting familiar with ARM codes and programming.

Learnt about ARM architecture and its Assembly language programming.