MPCA WEEK5 LAB

Name:Vrushank G

Section:”I”

SRN:PES1UG20CS516

1. Write a program in ARM7TDMI-ISA to multiply 2 matrices of order3.

i.e., implement c[i][j]=c[i][j] + a[i][j] x b[i][j].

a. Use MLA instruction

b. Use MUL instruction

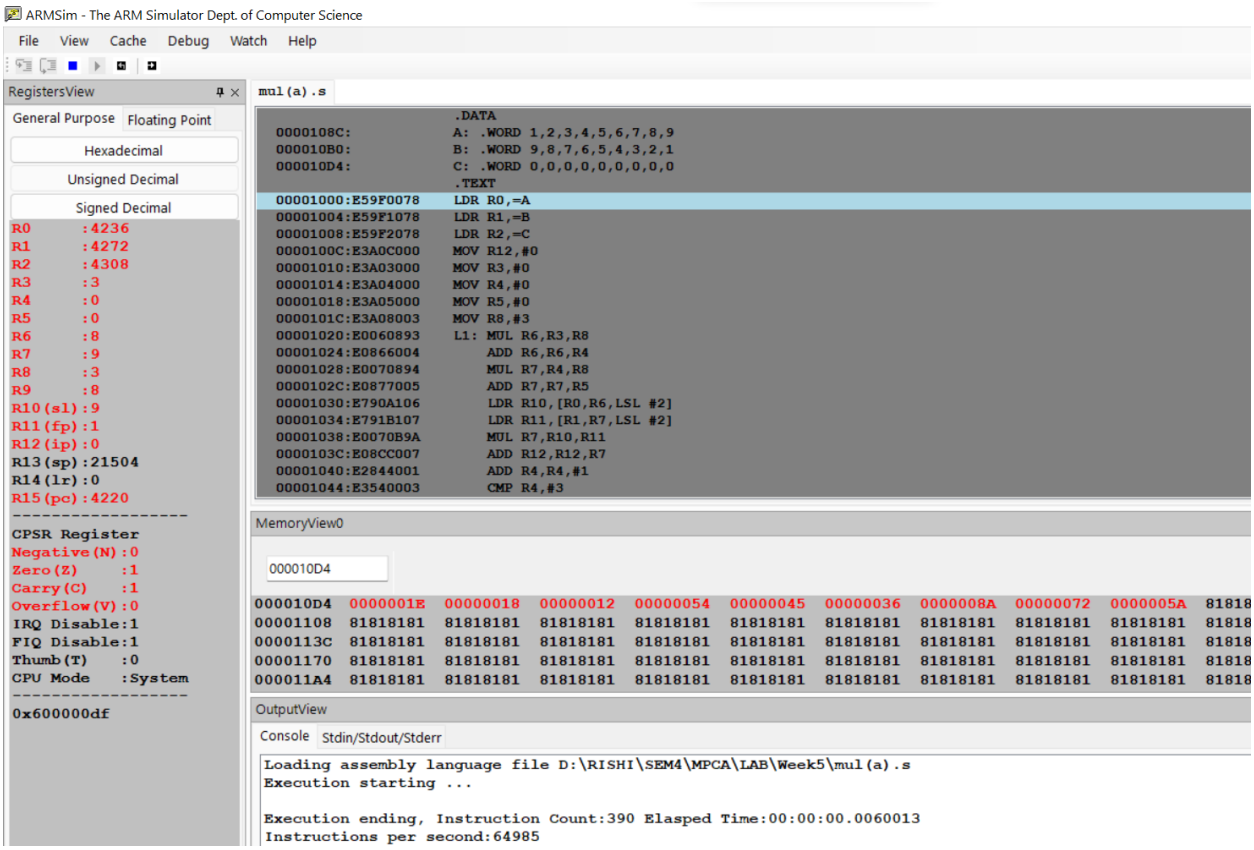
a.

=>CODE:

```
.DATA
A: .WORD 1,2,3,4,5,6,7,8,9
B: .WORD 9,8,7,6,5,4,3,2,1
C: .WORD 0,0,0,0,0,0,0,0,0
.TEXT
LDR R0,=A
LDR R1,=B
LDR R2,=C
MOV R12,#0
MOV R3,#0
MOV R4,#0
MOV R5,#0
MOV R8,#3
L1: MUL R6,R3,R8
    ADD R6,R6,R4
    MUL R7,R4,R8
```

```
    ADD R7,R7,R5
    LDR R10,[R0,R6,LSL #2]
    LDR R11,[R1,R7,LSL #2]
    MUL R7,R10,R11
    ADD R12,R12,R7
    ADD R4,R4,#1
    CMP R4,#3
    BNE L1
    MUL R9,R3,R8
    ADD R9,R9,R5
    STR R12,[R2,R9,LSL #2]
    MOV R4,#0
    MOV R12,#0
    ADD R5,R5,#1
    CMP R5,#3
    BNE L1
MOV R5,#0
ADD R3,R3,#1
CMP R3,#3
BNE L1

SWI 0X011
```

=>Output:



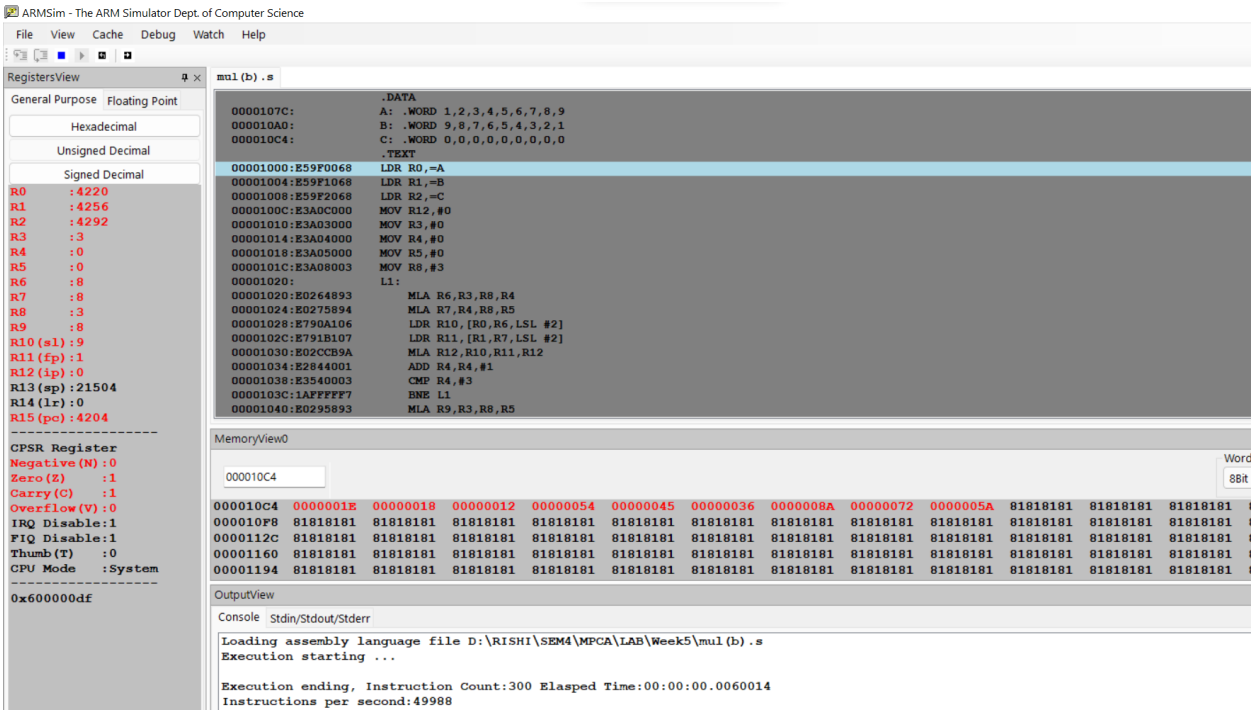
b.

=>CODE:

```
.DATA
A: .WORD 1,2,3,4,5,6,7,8,9
B: .WORD 9,8,7,6,5,4,3,2,1
C: .WORD 0,0,0,0,0,0,0,0,0
.TEXT
LDR R0,=A
LDR R1,=B
LDR R2,=C
MOV R12,#0
MOV R3,#0
MOV R4,#0
MOV R5,#0
MOV R8,#3
L1:
    MLA R6,R3,R8,R4
    MLA R7,R4,R8,R5
    LDR R10,[R0,R6,LSL #2]
    LDR R11,[R1,R7,LSL #2]
```

```
    MLA R12,R10,R11,R12
    ADD R4,R4,#1
    CMP R4,#3
    BNE L1
    MLA R9,R3,R8,R5
    STR R12,[R2,R9,LSL #2]
    MOV R4,#0
    MOV R12,#0
    ADD R5,R5,#1
    CMP R5,#3
    BNE L1
    MOV R5,#0
    ADD R3,R3,#1
    CMP R3,#3
    BNE L1

SWI 0X11
```

=>Output:

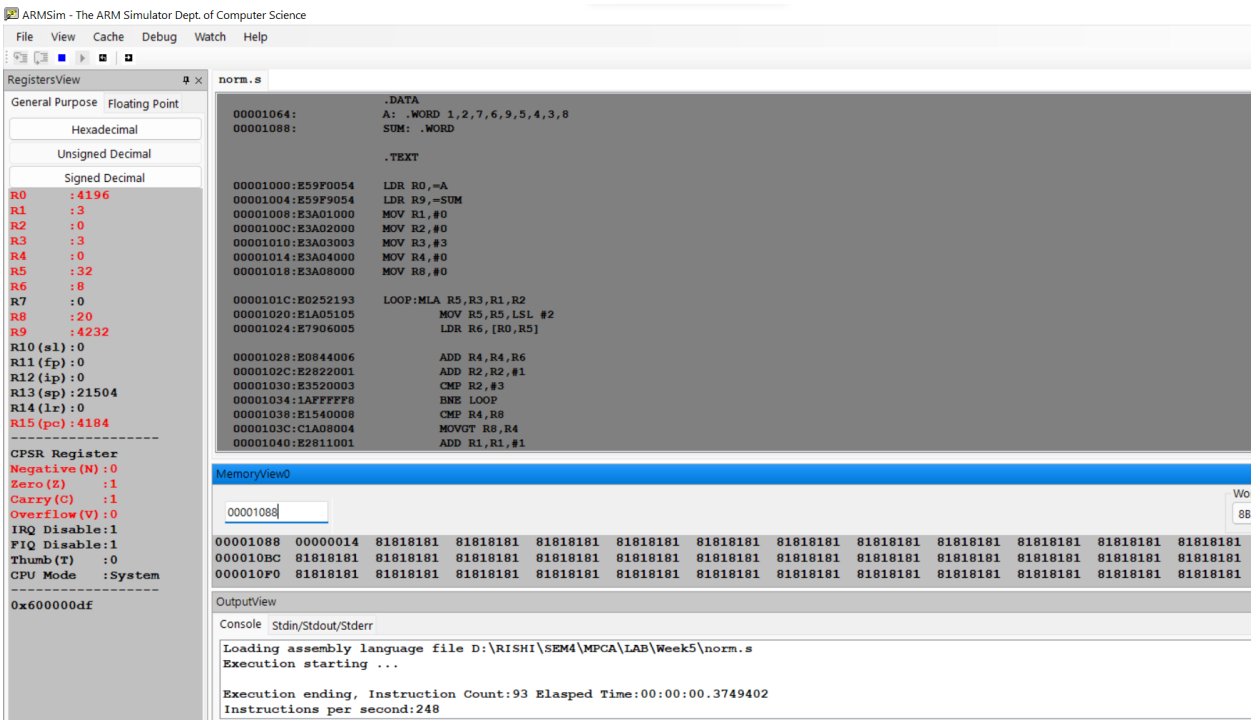


2. Write a program in ARM7TDMI-ISA to find the NORM of a square matrix of order n

=>CODE:

```
.DATA
A: .WORD 1,2,7,6,9,5,4,3,8
SUM: .WORD

.TEXT

LDR R0,=A
LDR R9,=SUM
MOV R1,#0
MOV R2,#0
MOV R3,#3
MOV R4,#0
MOV R8,#0

LOOP:MLA R5,R3,R1,R2
    MOV R5,R5,LSL #2
    LDR R6,[R0,R5]

    ADD R4,R4,R6
    ADD R2,R2,#1
    CMP R2,#3
    BNE LOOP
    CMP R4,R8
    MOVGT R8,R4
    ADD R1,R1,#1
    MOV R2,#0
    MOV R4,#0
    CMP R1,#3
    BNE LOOP

    STR R8,[R9]
SWI 0X011
```

=>Output:



3. Write a program in ARM7TDMI-ISA to find the ROWSUM of a matrix.

=>CODE:

```
.DATA
A: .WORD 1,2,3,4,5,6,7,8,9
SUM: .WORD 0,0,0

.TEXT

LDR R0,=A
LDR R9,=SUM

MOV R1,#0

MOV R2,#0

MOV R3,#3

MOV R4,#0
```

```
LOOP:MLA R5,R3,R1,R2
    MOV R5,R5,LSL #2
    LDR R6,[R0,R5]

    ADD R4,R4,R6
    ADD R2,R2,#1
    CMP R2,#3
    BNE LOOP
    STR R4,[R9],#4
    ADD R1,R1,#1
    MOV R2,#0
    MOV R4,#0
    CMP R1,#3
    BNE LOOP


SWI 0X011
```

=>Output: