Microprocessor and Computer Architecture

UE23CS251B

4th Semester, Academic Year 2024-25

Date:09/02/2025

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Week#____4_____ Program Number: ____1___

Title of the Program

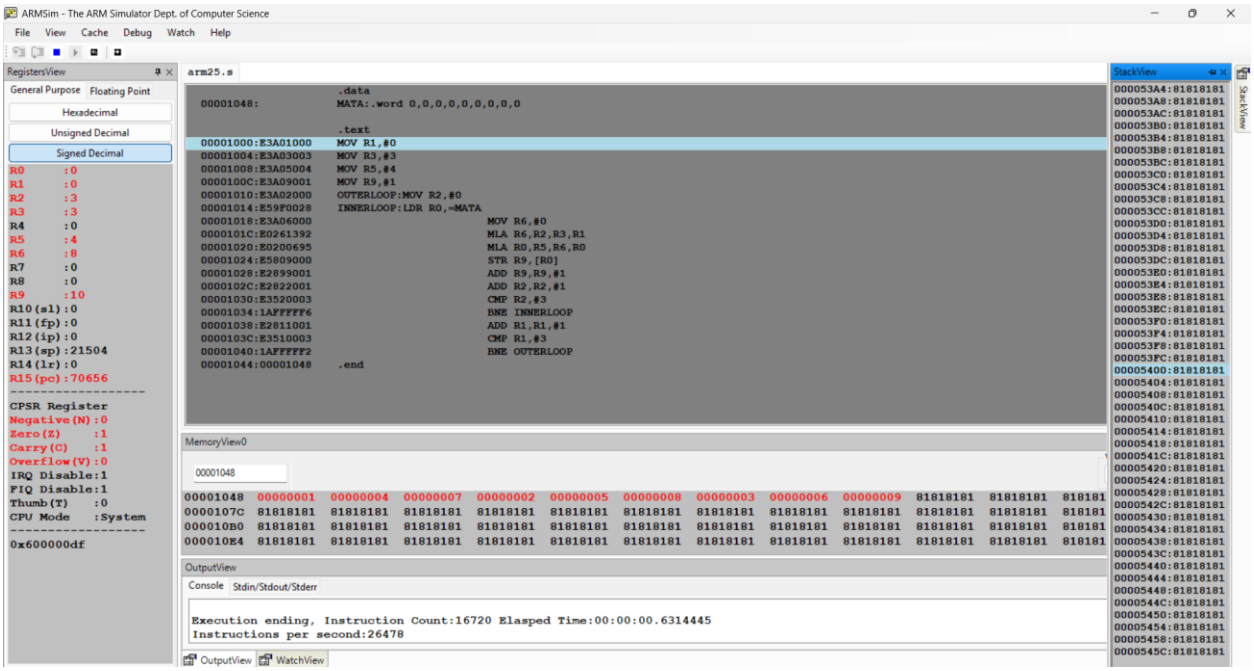
1. Write an ALP using ARM7TDMI to generate a matrix of order 3 to store natural numbers. USE column MAJOR ORDER

I. ARM Assembly Code(1)

```
.data
MATA:.word 0,0,0,0,0,0,0,0,0


.text
MOV R1,#0
MOV R3,#3
MOV R5,#4
MOV R9,#1
```

```
OUTERLOOP:MOV R2,#0
INNERLOOP:LDR R0,=MATA
          MOV R6,#0
          MLA R6,R2,R3,R1
          MLA R0,R5,R6,R0
          STR R9,[R0]
          ADD R9,R9,#1
          ADD R2,R2,#1
          CMP R2,#3
          BNE INNERLOOP
          ADD R1,R1,#1
          CMP R1,#3
          BNE OUTERLOOP
.end
```

II. Output Screen Shots (1)



Week#____4_____ Program Number: ____2___

Title of the Program

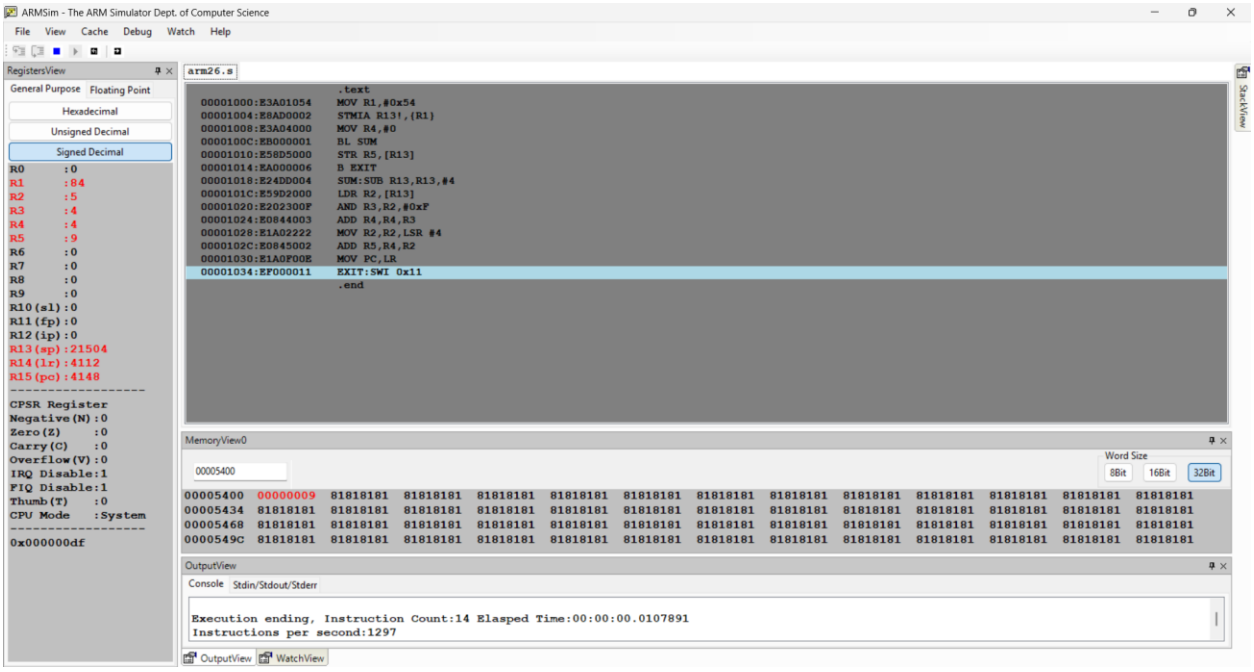
2. Write an ALP using ARM7TDMI to find the sum of 2 BCD numbers in a function using stack parameter passing technique.

ARM Assembly Code(1)

```
.text

MOV R1,#0x54

STMIA R13!,{R1}

MOV R4,#0

BL SUM
```

```
STR R5,[R13]
B EXIT
SUM:SUB R13,R13,#4
LDR R2,[R13]
AND R3,R2,#0xF
ADD R4,R4,R3
MOV R2,R2,LSR #4
ADD R5,R4,R2
MOV PC,LR
EXIT:SWI 0x11
.end
```

Output Screen Shots (1)



Week#____4_____ Program Number: ____3___

Title of the Program

Write an ALP using ARM7TDMI to find the transpose of a matrix.

I. ARM Assembly Code(1)

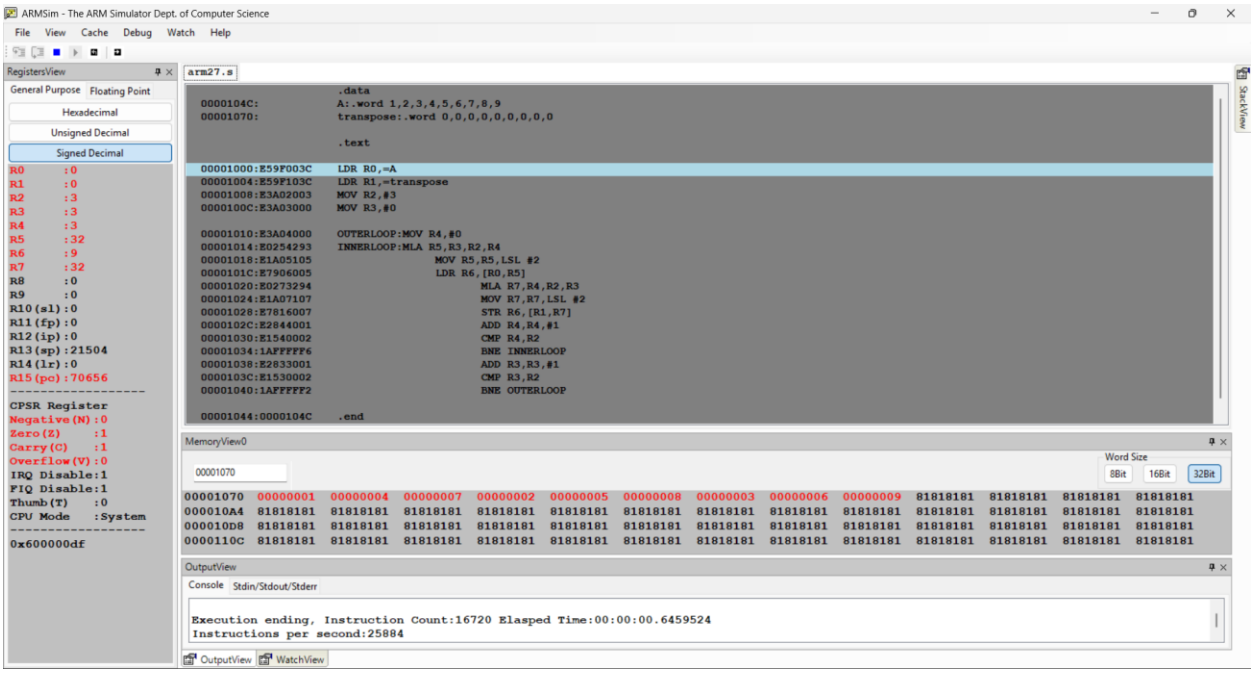
```
.data
A:.word 1,2,3,4,5,6,7,8,9
transpose:.word 0,0,0,0,0,0,0,0,0

.text

LDR R0,=A
LDR R1,=transpose
MOV R2,#3
MOV R3,#0

OUTERLOOP:MOV R4,#0
INNERLOOP:MLA R5,R3,R2,R4
        MOV R5,R5,LSL #2
        LDR R6,[R0,R5]
            MLA R7,R4,R2,R3
            MOV R7,R7,LSL #2
```

```
STR R6,[R1,R7]

ADD R4,R4,#1

CMP R4,R2

BNE INNERLOOP

ADD R3,R3,#1

CMP R3,R2

BNE OUTERLOOP


.end
```

II. Typed Code to be Included. Screenshot of Code not permitted

III. Output Screen Shots (1)

IV. The results should be clearly visible in the screenshots. The screenshot should include the code window, register window, memory window and console window



Disclaimer:

- The programs and output submitted is duly written, verified and executed by me.
- I have not copied from any of my peers nor from the external resource such as internet.
- If found plagiarized, I will abide with the disciplinary action of the University.

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