Microprocessor and Computer Architecture

UE23CS251B

4th Semester, Academic Year 2024-25

Date: 16-03-2025

Name: Keerthan P.V	SRN: PES2UG23CS272	Section :4E

Week#_____5_____   Assignment Program : _____1____

Title of the Program

Write an ALP using ARM7TDMI to find the substring present or not

ARM Assembly Code(1)

I. Found:

```
.data
mainstr:.asciz "CN Class"
substr:.asciz "Class"
sstr:.asciz "Match found."
fstr:.asciz "No Match found."

.text
LDR R1,=mainstr
LDR R2,=substr
Loop:MOV R3,R2
OLoop:LDRB R4,[R1]
    LDRB R5,[R3]
```

```
ILoop:CMP R4,R5
     BEQ Compare
     ADD R1,R1,#1
     CMP R4,#0
     BEQ Failure
     BNE OLoop

Compare:CMP R5,#0
     BEQ Success
     ADD R1,R1,#1
     ADD R3,R3,#1
     B OLoop

Success:LDR R0,=sstr
     SWI 0x02
     SWI 0X11

Failure:LDR R0,=fstr
     SWI 0x02
     SWI 0x11

.end
```

II. Not Found:

```
.data
mainstr:.asciz "CN Class"
substr:.asciz "Hello"
sstr:.asciz "Match found."
fstr:.asciz "No Match found."

.text
LDR R1,=mainstr
LDR R2,=substr
Loop:MOV R3,R2
OLoop:LDRB R4,[R1]
     LDRB R5,[R3]
ILoop:CMP R4,R5
     BEQ Compare
     ADD R1,R1,#1
     CMP R4,#0
     BEQ Failure
     BNE OLoop

Compare:CMP R5,#0
     BEQ Success
     ADD R1,R1,#1
     ADD R3,R3,#1
     B OLoop

Success:LDR R0,=sstr
     SWI 0x02
     SWI 0X11

Failure:LDR R0,=fstr
     SWI 0x02
     SWI 0x11

.end
```
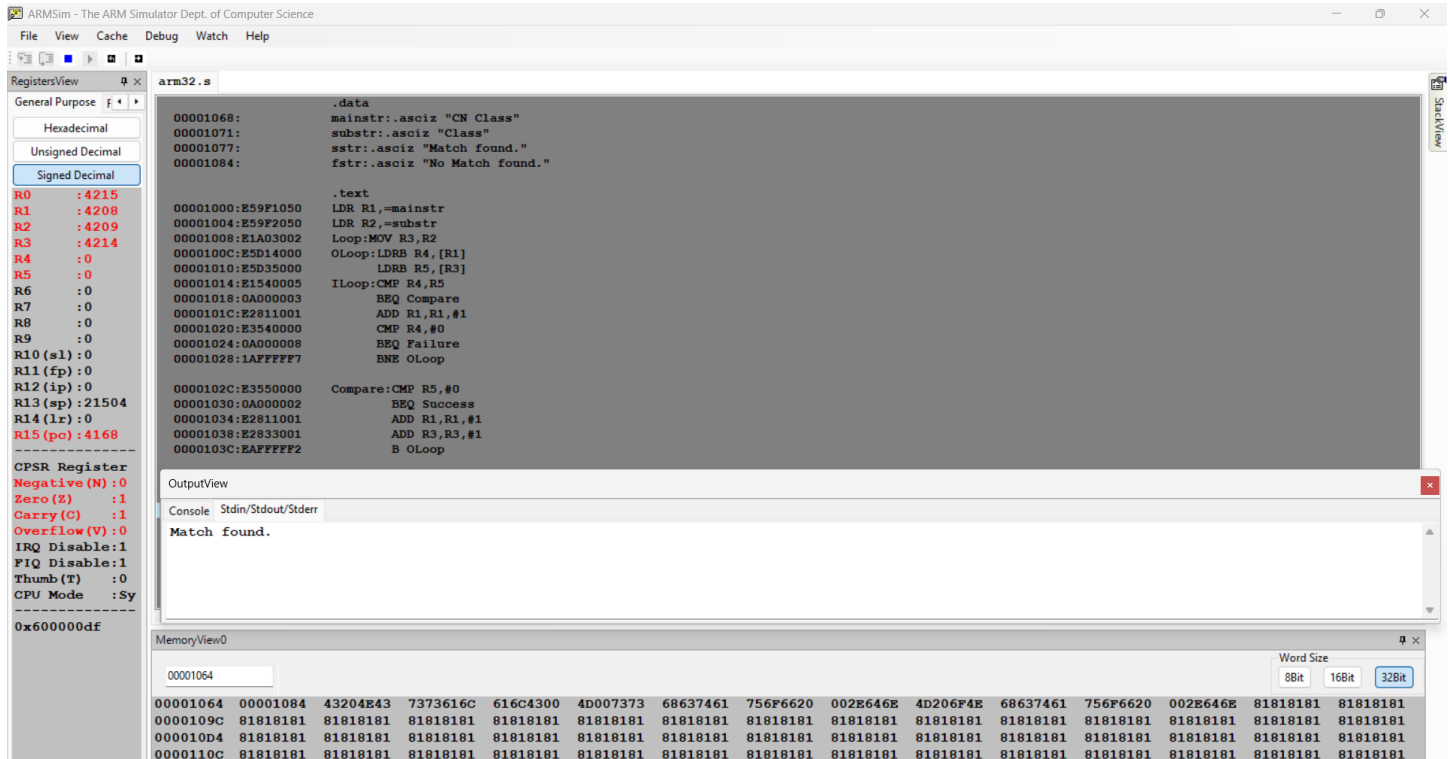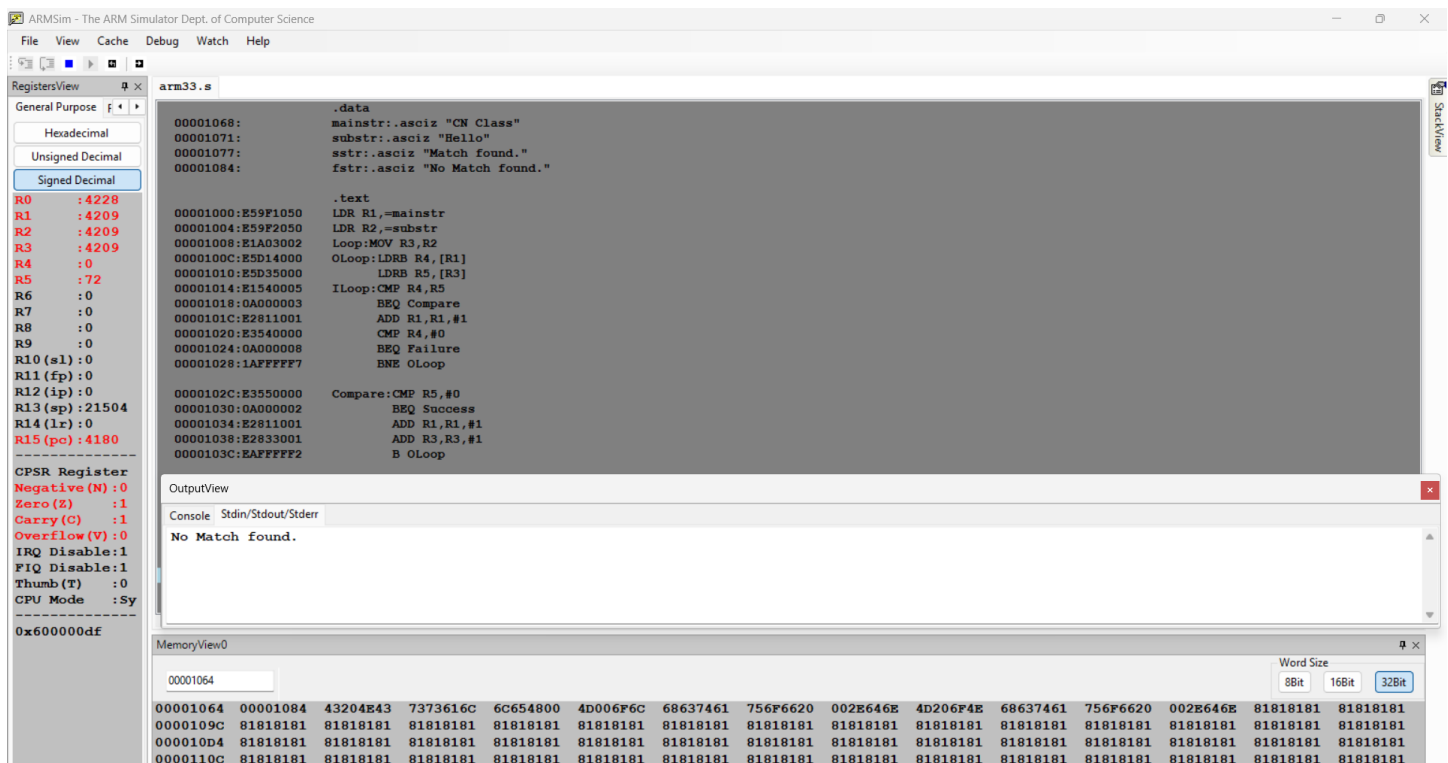
Output Screen Shot (2)

1.found:

File   View   Cache   Debug   Watch   Help

arm32.s

```
                        .data
00001068:               mainstr:.asciz "CN Class"
00001071:               substr:.asciz "Class"
00001077:               sstr:.asciz "Match found."
00001084:               fstr:.asciz "No Match found."

                        .text
00001000:E59F1050       LDR R1,=mainstr
00001004:E59F2050       LDR R2,=substr
00001008:E1A03002       Loop:MOV R3,R2
0000100C:E5D14000       OLoop:LDRB R4,[R1]
00001010:E5D35000             LDRB R5,[R3]
00001014:E1540005       ILoop:CMP R4,R5
00001018:0A000003             BEQ Compare
0000101C:E2811001             ADD R1,R1,#1
00001020:E3540000             CMP R4,#0
00001024:0A000008             BEQ Failure
00001028:1AFFFFF7             BNE OLoop

0000102C:E3550000       Compare:CMP R5,#0
00001030:0A000002             BEQ Success
00001034:E2811001             ADD R1,R1,#1
00001038:E2833001             ADD R3,R3,#1
0000103C:EAFFFFF2             B OLoop
```

RegistersView — General Purpose — Hexadecimal — Unsigned Decimal — Signed Decimal

R0 :4215
R1 :4208
R2 :4209
R3 :4214
R4 :0
R5 :0
R6 :0
R7 :0
R8 :0
R9 :0
R10(sl):0
R11(fp):0
R12(ip):0
R13(sp):21504
R14(lr):0
R15(pc):4168

CPSR Register
Negative(N):0
Zero(Z)   :1
Carry(C)   :1
Overflow(V):0
IRQ Disable:1
FIQ Disable:1
Thumb(T)   :0
CPU Mode   :Sy

0x600000df

OutputView — Console — Stdin/Stdout/Stderr

Match found.

MemoryView0 — Word Size — 8Bit 16Bit 32Bit

```
00001064
00001064  00001084  43204E43  7373616C  616C4300  4D007373  68637461  756F6620  002E646E  4D206F4E  68637461  756F6620  002E646E  81818181  81818181
0000109C  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181
000010D4  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181
0000110C  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181
```

2.Not found:

File   View   Cache   Debug   Watch   Help

arm33.s

```
                        .data
00001068:               mainstr:.asciz "CN Class"
00001071:               substr:.asciz "Hello"
00001077:               sstr:.asciz "Match found."
00001084:               fstr:.asciz "No Match found."

                        .text
00001000:E59F1050       LDR R1,=mainstr
00001004:E59F2050       LDR R2,=substr
00001008:E1A03002       Loop:MOV R3,R2
0000100C:E5D14000       OLoop:LDRB R4,[R1]
00001010:E5D35000             LDRB R5,[R3]
00001014:E1540005       ILoop:CMP R4,R5
00001018:0A000003             BEQ Compare
0000101C:E2811001             ADD R1,R1,#1
00001020:E3540000             CMP R4,#0
00001024:0A000008             BEQ Failure
00001028:1AFFFFF7             BNE OLoop

0000102C:E3550000       Compare:CMP R5,#0
00001030:0A000002             BEQ Success
00001034:E2811001             ADD R1,R1,#1
00001038:E2833001             ADD R3,R3,#1
0000103C:EAFFFFF2             B OLoop
```

RegistersView — General Purpose — Hexadecimal — Unsigned Decimal — Signed Decimal

R0 :4228
R1 :4209
R2 :4209
R3 :4209
R4 :0
R5 :72
R6 :0
R7 :0
R8 :0
R9 :0
R10(sl):0
R11(fp):0
R12(ip):0
R13(sp):21504
R14(lr):0
R15(pc):4180

CPSR Register
Negative(N):0
Zero(Z)   :1
Carry(C)   :1
Overflow(V):0
IRQ Disable:1
FIQ Disable:1
Thumb(T)   :0
CPU Mode   :Sy

0x600000df

OutputView — Console — Stdin/Stdout/Stderr

No Match found.

MemoryView0 — Word Size — 8Bit 16Bit 32Bit

```
00001064
00001064  00001084  43204E43  7373616C  6C654800  4D006F6C  68637461  756F6620  002E646E  4D206F4E  68637461  756F6620  002E646E  81818181  81818181
0000109C  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181
000010D4  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181
0000110C  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181
```

Week#_____3_____   Assignment Program : _____2__

Title of the Program

Write an ALP using ARM7TDMI to find swap first and last character of a given string

ARM Assembly Code(1)

I. Typed Code to be Included.

```
.data
str1:.asciz "Keerthan"
n1:.asciz "\n"
str2:.asciz "The swapped string is:"
.text
LDR R0,=str1
SWI 0x02
MOV R1,#8
LDRB R2,[R0]
SUB R1,R1,#1
LDRB R3,[R0,R1]
STRB R3,[R0]
STRB R2,[R0,R1]
LDR R0,=n1
SWI 0x02
LDR R0,=str2
SWI 0x02
LDR R0,=str1
SWI 0x02
```
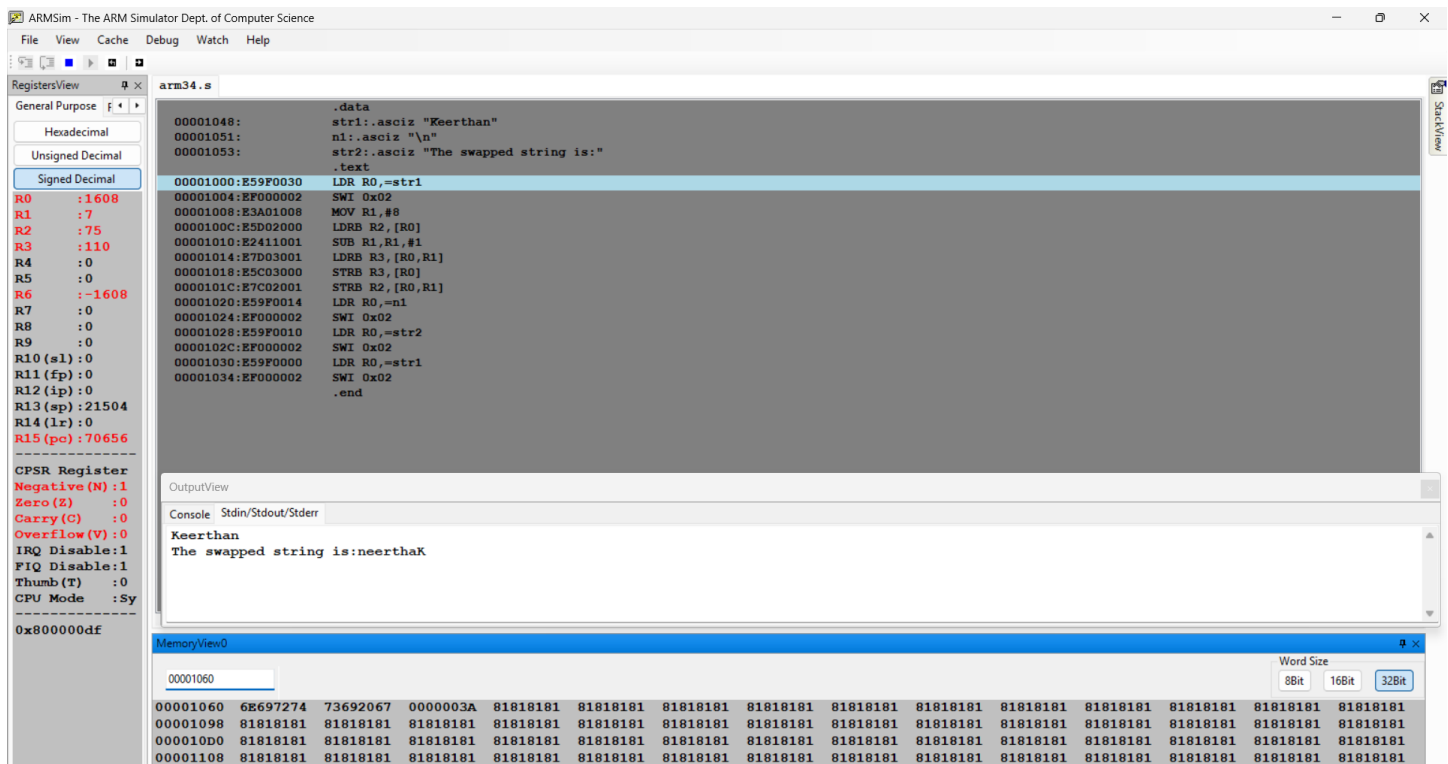
.end

II. Output Screen Shots (1)

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.

Signature:	Keerthan P.V
Name:	Keerthan P.V
SRN:	PES2UG23CS272
Section:	4E
Date:	16/03/2025