Microprocessor and Computer Architecture

UE23CS251B

4th Semester, Academic Year 2024-25

Date: 23/03/2025

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

Week#____7_____   Program Number: ____1___

Title of the Program

Write an ALP to set the LED to light up

Include in your submission

ARM Assembly Code(1)

```
.text
MOV R0,#0
LOOP:SWI 0x201
ADD R0,R0,#1
SWI 0x201
MOV R1,#64000
DELAY:SUB R1,R1,#1
CMP R1,#0
```
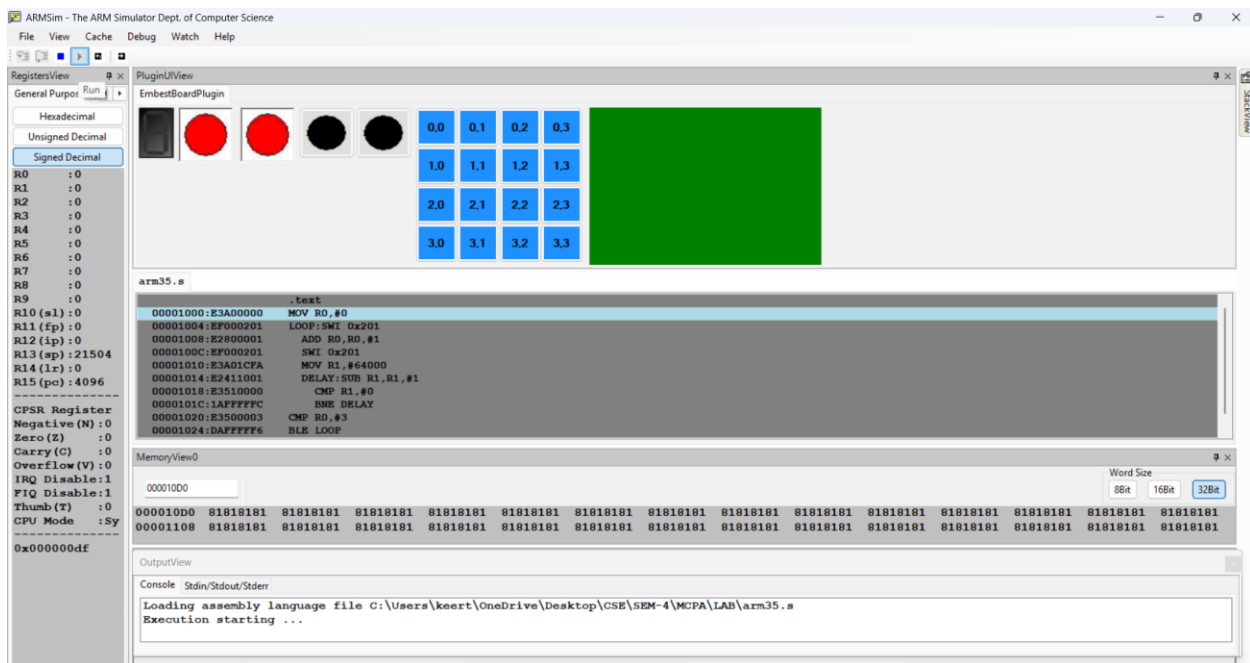
BNE DELAY

CMP R0,#3

BLE LOOP

.end

Output Screen Shots (1)

Week#____7_____   Program Number: ____2___

Title of the Program

Display hexadecimal digits [0-9] on the 8-segment display. Also display PESU on the 8-segment display

Include in your submission

```
ARM Assembly Code(1)
.data
zero:.byte 0b11101101
one:.byte 0b01100000
two:.byte 0b11001110
three:.byte 0b11101010
four:.byte 0b01100011
five:.byte 0b10101011
six:.byte 0b10101111
seven:.byte 0b11100000
eight:.byte 0b11101111
nine:.byte 0b11101011
P:.byte 0b11000111
E:.byte 0b10001111
S:.byte 0b10101011
U:.byte 0b01101101
```

```
.text
MOV R0,#0
MOV R2,#0
Loop:SWI 0x202
    ADD R0,R0,#1
    CMP R0,#1
    BEQ Loop1
    CMP R0,#2
    BEQ Loop2
    SWI 0x11

Loop1:MOV R5,#14
    LDR R1,=zero
Back1:LDRB R0,[R1]
    SWI 0x200
    BL Delay
    ADD R1,R1,#1
    SUB R5,R5,#1
    CMP R5,#0
    BNE Back1
    B Loop

Loop2:MOV R5,#14
    LDR R1,=U
```

```
Back2:LDRB R0,[R1]
    SWI 0x200
    BL Delay
    SUB R1,R1,#1
    SUB R5,R5,#1
    CMP R5,#0
    BNE Back2
    B Loop

Delay:MOV R4,#64000
Back3:SUB R4,R4,#1
    CMP R4,#0
    BGT Back3
    MOV PC,LR

.end
```
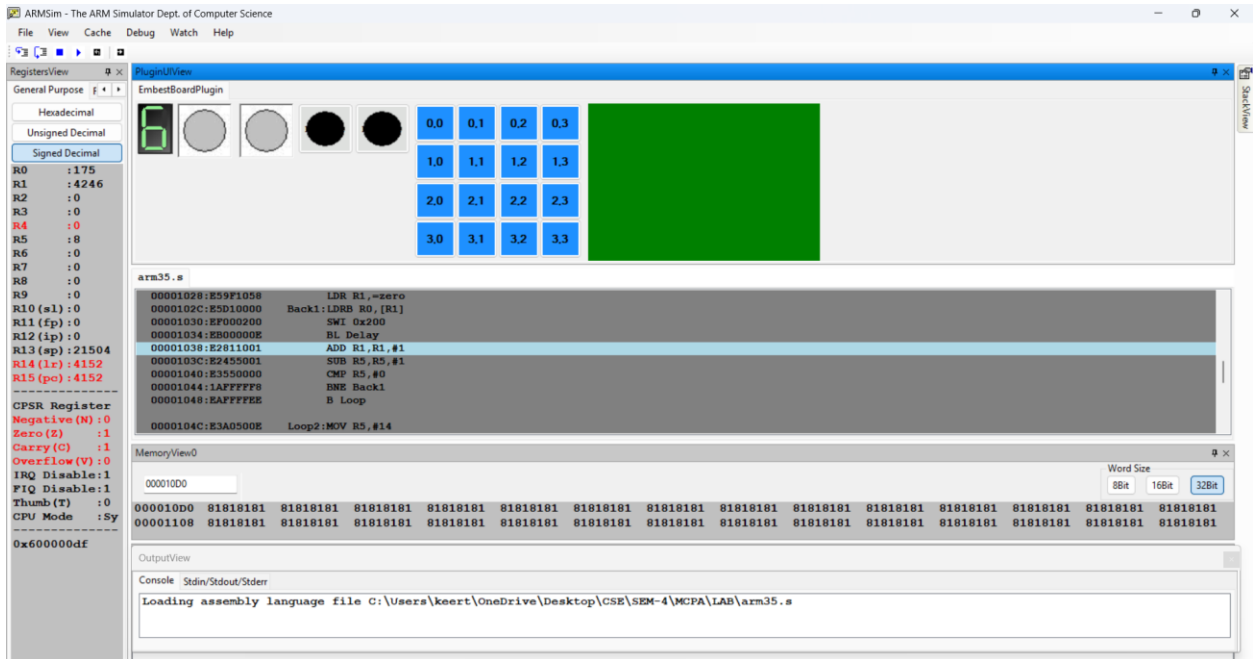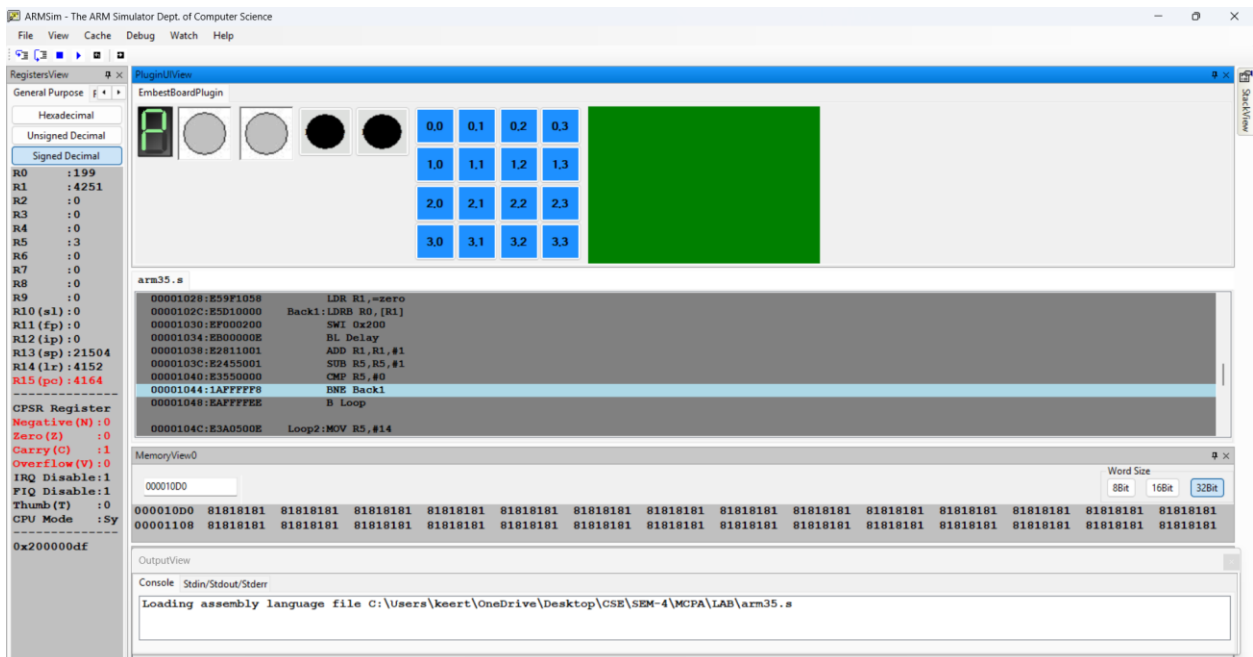
Output Screen Shots (4)

(upcounter/down counter screenshot)-1

letters P,E,S,U-4

Screenshot 1:

ARMSim - The ARM Simulator Dept. of Computer Science

File   View   Cache   Debug   Watch   Help

RegistersView

General Purpose

Hexadecimal
Unsigned Decimal
Signed Decimal

R0   :143
R1   :4251
R2   :0
R3   :0
R4   :0
R5   :3
R6   :0
R7   :0
R8   :0
R9   :0
R10(sl):0
R11(fp):0
R12(ip):0
R13(sp):21504
R14(lr):4152
R15(pc):4152

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

PluginUIView / EmbestBoardPlugin

arm35.s

```
00001028:E59F1058      LDR R1,=zero
0000102C:E5D10000  Back1:LDRB R0,[R1]
00001030:EF000200      SWI 0x200
00001034:EB00000E      BL Delay
00001038:E2811001      ADD R1,R1,#1
0000103C:E2455001      SUB R5,R5,#1
00001040:E3550000      CMP R5,#0
00001044:1AFFFFF8      BNE Back1
00001048:EAFFFFEE      B Loop
0000104C:E3A0500E  Loop2:MOV R5,#14
```

MemoryView0   Word Size 8Bit 16Bit 32Bit

000010D0

```
000010D0 81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181
00001108 81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181
```

OutputView

Console   Stdin/Stdout/Stderr

Loading assembly language file C:\Users\keert\OneDrive\Desktop\CSE\SEM-4\MCPA\LAB\arm35.s

---

Screenshot 2:

ARMSim - The ARM Simulator Dept. of Computer Science

File   View   Cache   Debug   Watch   Help

RegistersView

General Purpose

Hexadecimal
Unsigned Decimal
Signed Decimal

R0   :171
R1   :4252
R2   :0
R3   :0
R4   :0
R5   :2
R6   :0
R7   :0
R8   :0
R9   :0
R10(sl):0
R11(fp):0
R12(ip):0
R13(sp):21504
R14(lr):4152
R15(pc):4152

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

PluginUIView / EmbestBoardPlugin

arm35.s

```
00001028:E59F1058      LDR R1,=zero
0000102C:E5D10000  Back1:LDRB R0,[R1]
00001030:EF000200      SWI 0x200
00001034:EB00000E      BL Delay
00001038:E2811001      ADD R1,R1,#1
0000103C:E2455001      SUB R5,R5,#1
00001040:E3550000      CMP R5,#0
00001044:1AFFFFF8      BNE Back1
00001048:EAFFFFEE      B Loop
0000104C:E3A0500E  Loop2:MOV R5,#14
```

MemoryView0   Word Size 8Bit 16Bit 32Bit

000010D0

```
000010D0 81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181
00001108 81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181
```

OutputView

Console   Stdin/Stdout/Stderr

Loading assembly language file C:\Users\keert\OneDrive\Desktop\CSE\SEM-4\MCPA\LAB\arm35.s

File   View   Cache   Debug   Watch   Help

RegistersView

General Purpose

Hexadecimal
Unsigned Decimal
Signed Decimal

R0   :109
R1   :4253
R2   :0
R3   :0
R4   :0
R5   :1
R6   :0
R7   :0
R8   :0
R9   :0
R10(sl):0
R11(fp):0
R12(ip):0
R13(sp):21504
R14(lr):4152
R15(pc):4152

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

PluginUIView

EmbestBoardPlugin

0,0	0,1	0,2	0,3
1,0	1,1	1,2	1,3
2,0	2,1	2,2	2,3
3,0	3,1	3,2	3,3

arm35.s

```
00001028:E59F1058          LDR R1,=zero
0000102C:E5D10000    Back1:LDRB R0,[R1]
00001030:EF000200          SWI 0x200
00001034:EB00000E          BL Delay
00001038:E2811001          ADD R1,R1,#1
0000103C:E2455001          SUB R5,R5,#1
00001040:E3550000          CMP R5,#0
00001044:1AFFFFF0          BNE Back1
00001048:EAFFFFEE          B Loop

0000104C:E3A0500E    Loop2:MOV R5,#14
```

MemoryView0

Word Size
8Bit 16Bit 32Bit

000010D0

```
000010D0  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181
00001108  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181  81818181
```

OutputView

Console   Stdin/Stdout/Stderr

Loading assembly language file C:\Users\keert\OneDrive\Desktop\CSE\SEM-4\MCPA\LAB\arm35.s

Title of the Program

Move a string(Your Name, Your SRN) from RIGHT to LEFT on the LCD display panel. Display your name on the LCD Panel

Include in your submission

```
ARM Assembly Code(1)
.data
str:.asciz "Keerthan PES2UG23CS272"
num:.word 15000

.text
MOV R0,#30
MOV R1,#8
MOV R7,#0
LDR R8,=num
BL Sum
LDR R8,[R8]
LDR R2,=str
LOOP:SWI 0x204
    BL Sum
    CMP R0,#0
```

```
    SUBNE R0,R0,#1
    SWIEQ 0x11
    B LOOP


Sum:CMP R7,R8
    ADDNE R7,R7,#1
    BNE Sum
    SWI 0x206
    MOV R7,#0
    MOV PC,LR


.end
```
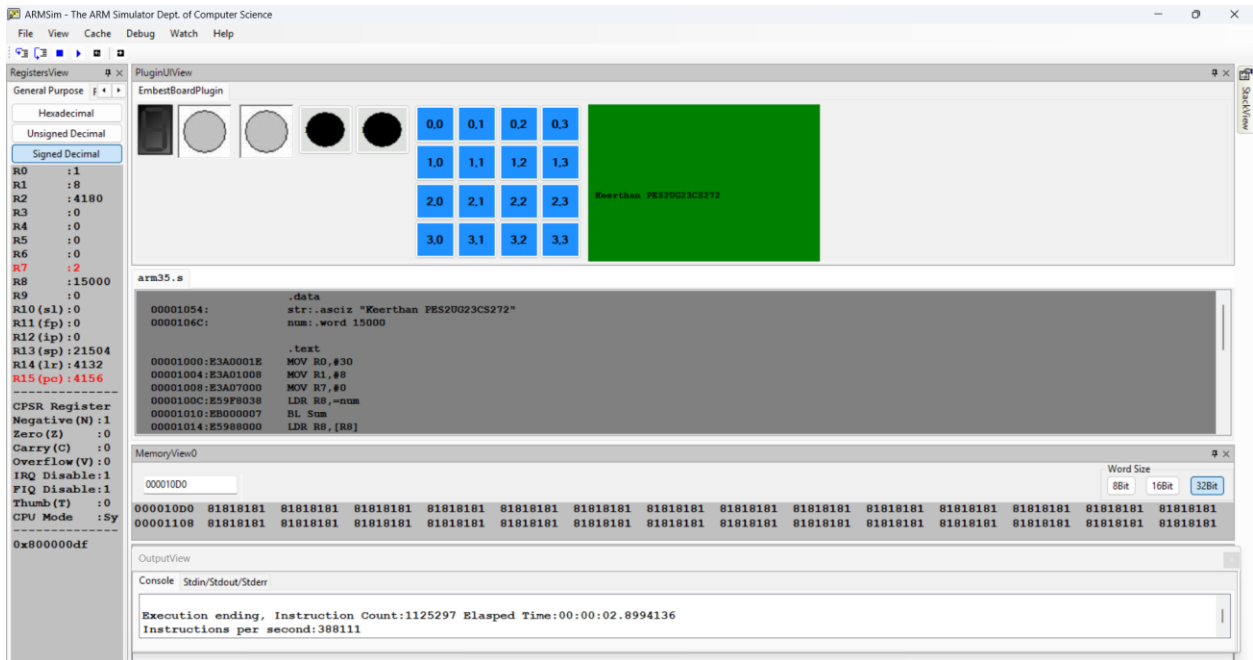
Output Screen Shot (1)

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
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Section: 4E
Date: 23/03/2025