# MICROPROCESSOR AND COMPUTER ARCHITECTURE LABORATORY

# UE19CS256

# 4TH SEMESTER, ACADEMIC YEAR 2020-21

| Name: Atul Anurag | SRN: PES2UG19CS075 | Section: B |
|---|---|---|

**Date: 04-03-2021**

**Week#6**

# Program Number: 1

**1. Write an ALP to blink LEDs. First, the right LED is switched on and the left LED is switched off. After 1 second, the right LED is switched off and the left LED is switched on and the program continue to blink both the LEDs.**

I. ARM Assembly Code



```
Week6_Program1_PES2UG19CS075.s
1    .text
2      mov r0, #0
3      led:
4        swi 0x201
5        add r0, r0, #1
6        ldr r1, =200000
7        delay:
8          sub r1, r1, #1
9          cmp r1, #0
10         bNE delay
11       cmp r0, #3
12       movGT r0, #0
13     b led
14     swi 0x011
```

II. Output Screen Shot **(screenshot was taken while the program was running)**
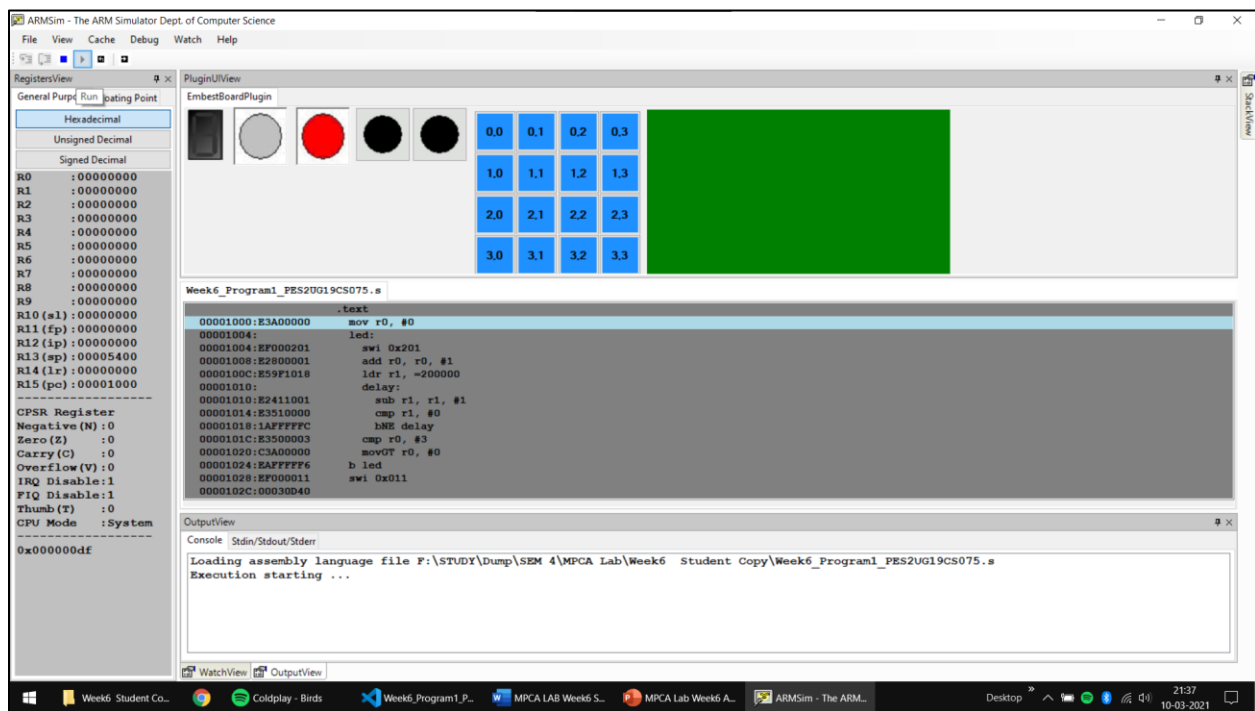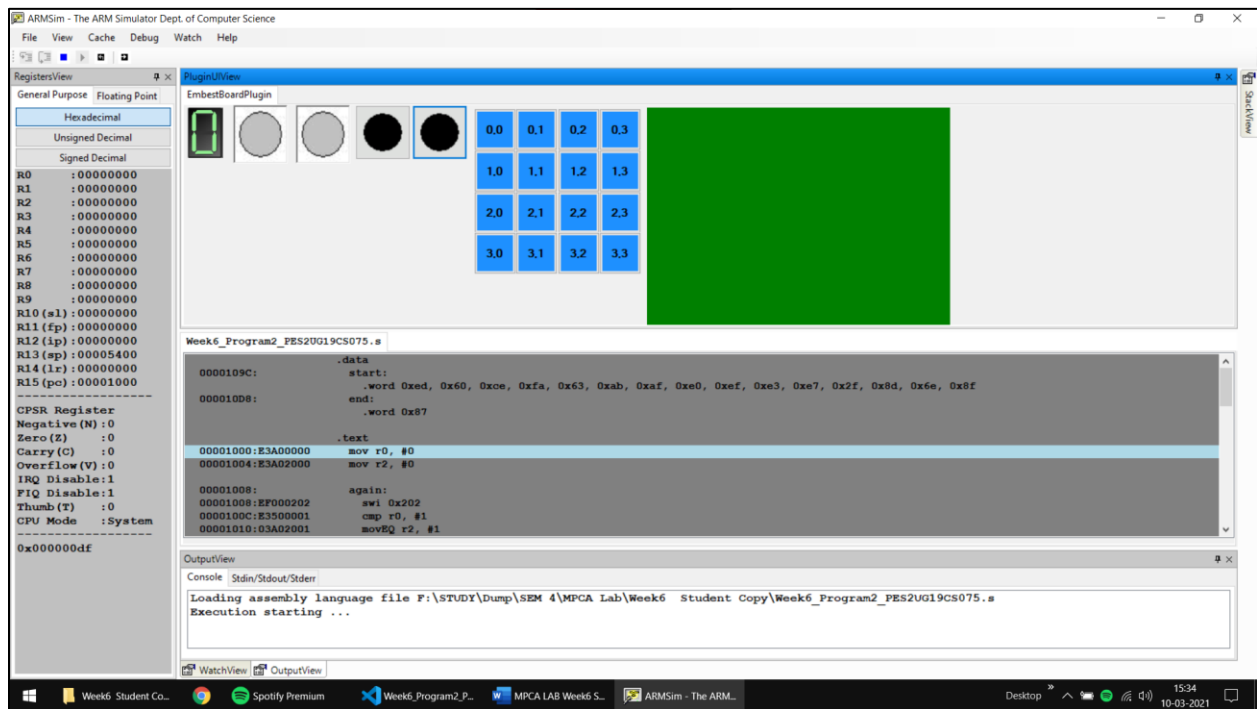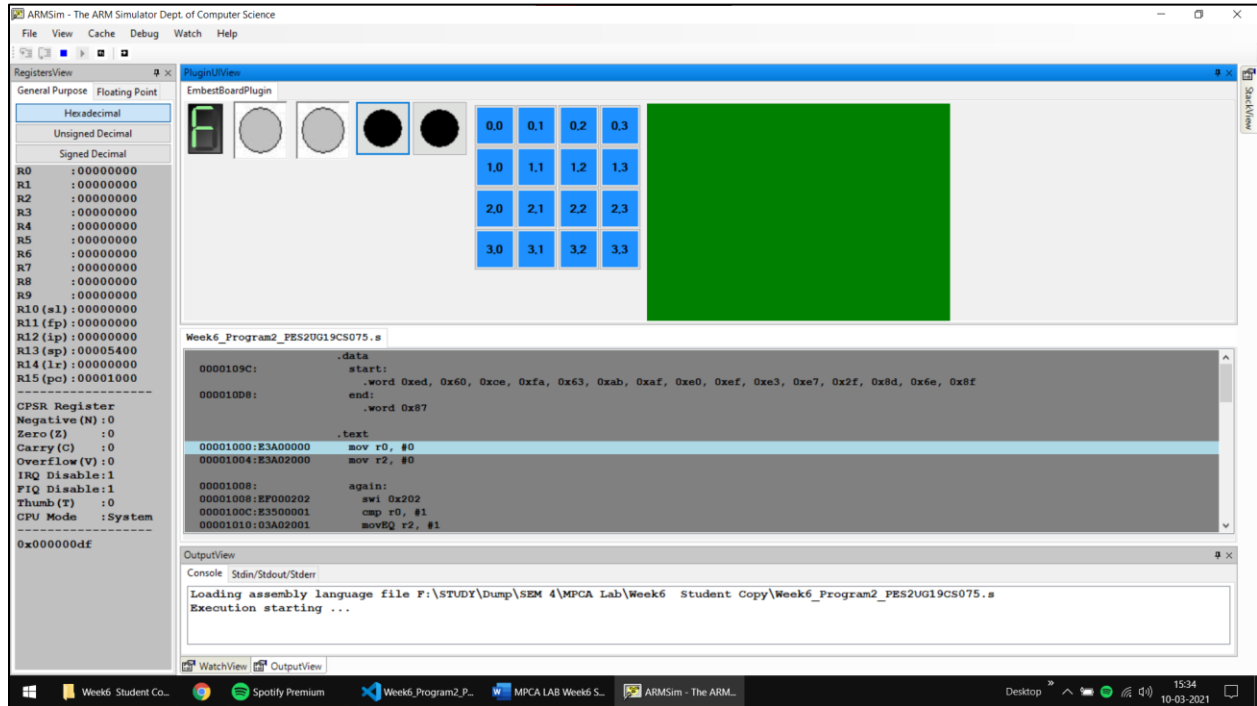
# Program Number: 2
# Write an ALP to display 0-9, A-F (up and down count) on an 8-segment display

## I.    ARM Assembly Code

```
1   .data
2     start:
3       .word 0xed, 0x60, 0xce, 0xfa, 0x63, 0xab, 0xaf, 0xe0, 0xef, 0xe3, 0xe7, 0x2f, 0x8d, 0x6e, 0x8f
4     end:
5       .word 0x87
6
7   .text
8     mov r0, #0
9     mov r2, #0
10
11    again:
12      swi 0x202
13      cmp r0, #1
14      movEQ r2, #1
15      bEQ forward
16      cmp r0, #2
17      movEQ r2, #2
18      bEQ backward
19      b again
20
21    forward:
22      mov r5, #16
23      ldr r1, =start
24      next:
25        ldrb r0, [r1]
26        swi 0x200
27        b delay
28        first:
29          add r1, r1, #4
30          sub r5, r5, #1
31          cmp r5, #0
32          bNE next
33      b again
34
35    backward:
36      mov r5, #16
37      ldr r1, =end
38      prev:
39        ldrb r0, [r1]
40        swi 0x200
41        b delay
42        second:
43          sub r1, r1, #4
44          sub r5, r5, #1
45          cmp r5, #0
46          bNE prev
47      b again
48
49  delay:
50      mov r4, #64000
51      count:
52        sub r4, r4, #1
53        cmp r4, #0
54        bNE count
55      cmp r2, #1
56      bEQ first
57      b second
```

## II. Output Screen Shot (1st screenshot is up count when button 1 is pressed, 2nd screenshot is down count when the button 2 is pressed, both screenshots are taken when the sequence ends)

# Program Number: 3

## Write an ALP to move a string from Right to Left on LCD (40 columns by 15 rows).

### I. ARM Assembly Code

```
[10]
[01] Week6_Program3_PES2UG19CS075.s
1      .data
2        str: .asciz "ATUL ANURAG\n"
3
4      .text
5        swi 0x206
6        mov r0, #10
7        mov r1, #5
8        ldr r2, =str
9        loop:
10          swi 0x206
11          swi 0x204
12          cmp r0, #0
13          subNE r0, r0, #1
14          bNE loop
15          movEQ pc, lr
16       swi 0x011
```

### II. Output Screen Shot (screenshot taken after the program ends after the string moves from (10,5) to (0,5))
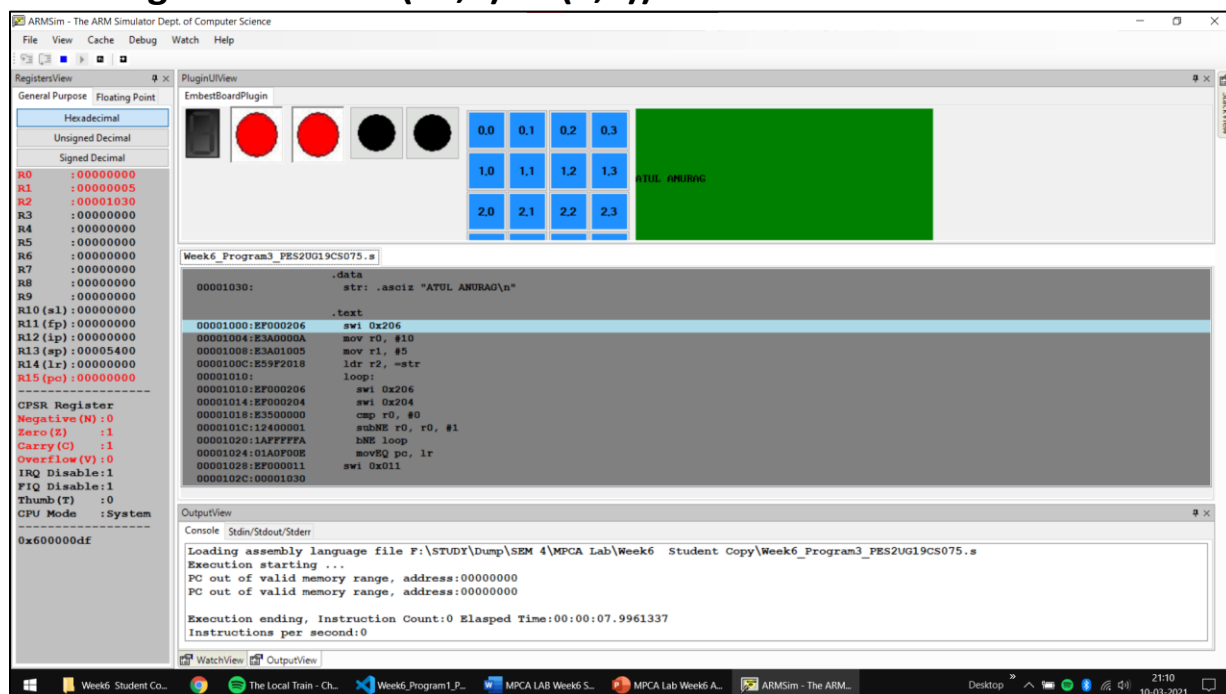
# Disclaimer:

- 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: *Atul Anurag*

Name: Atul Anurag

SRN: PES2UG19CS075

Section: B

Date: 04-03-2021