Microprocessor and Computer Architecture

UE21CS251B

4th Semester, Academic Year 2021-22

Date:10-03-2023

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Include in your submission

ARM Assembly Code

Output Screen Shot

Week#____7_____ Program Number: ____1___

Title of the Program

1. **Write an ALP to display 0-9,A-F(up and down count) on an 8 segment display**

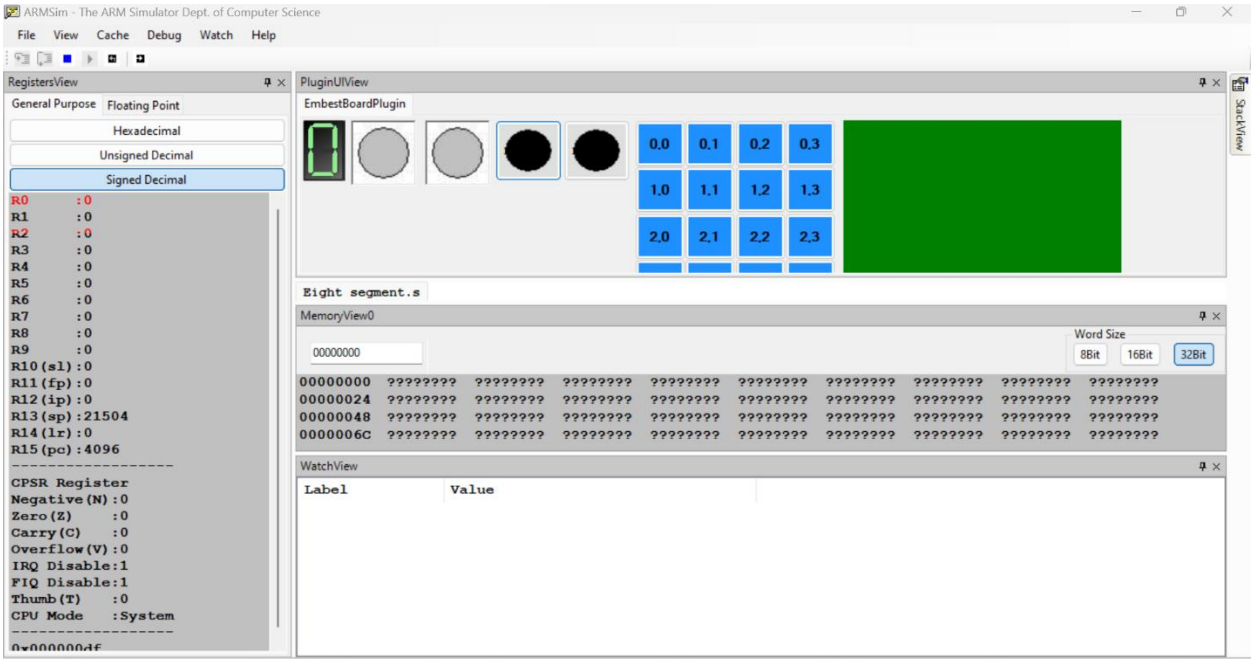
   Code:

```
; Program to display 0 to F  and F-0 on the 8 segment display depending on
the  which black button is pressed

.text
.global _start
```

```
begin: mov r0, #0
       mov r2,#0

 again: swi 0x202 ; check whether  black button pressed   or not
         cmp r0, #1
         beq loop1
         cmp r0, #2
         beq loop2
         b again


         loop1:  mov r5,#16
        ldr r1,=zero
        back1:ldrb r0, [r1]
        swi 0x200   ; Set 8 segment display to light up
        bl delay
        add r1,r1,#1
        sub r5, r5,#1
        cmp r5, #0
        bne back1
        b again

        loop2:
        mov r5,#16
        ldr r1,=F
       back2: ldrb r0, [r1]
        swi 0x200   ; Set 8 segment display to light up
        bl delay
        sub r1, r1, #1
        sub r5, r5,#1
        cmp r5, #0
        bne back2
        b again


        delay:  mov r4, #0X64000
        loop3:   sub r4, r4, #1
                  cmp r4, #0
                  bge loop3
                  mov pc, lr

         .data
          zero: .byte  0b11101101
          one:  .byte  0b01100000
          two:  .byte  0b01101110
```

```
three:  .byte  0b11111010
four:  .byte  0b00110011
five:  .byte  0b10101011
six:  .byte  0b10101111
seven:  .byte  0b01110000
eight:  .byte  0b11101111
nine:  .byte  0b11100011
A:  .byte  0b11100111
B:  .byte  0b00101111
C:  .byte  0b10001101
D:  .byte  0b01101110
E:  .byte  0b10001111
F:  .byte  0b10000111
```

Screenshot:



Week#____7_____ Program Number: ____2___

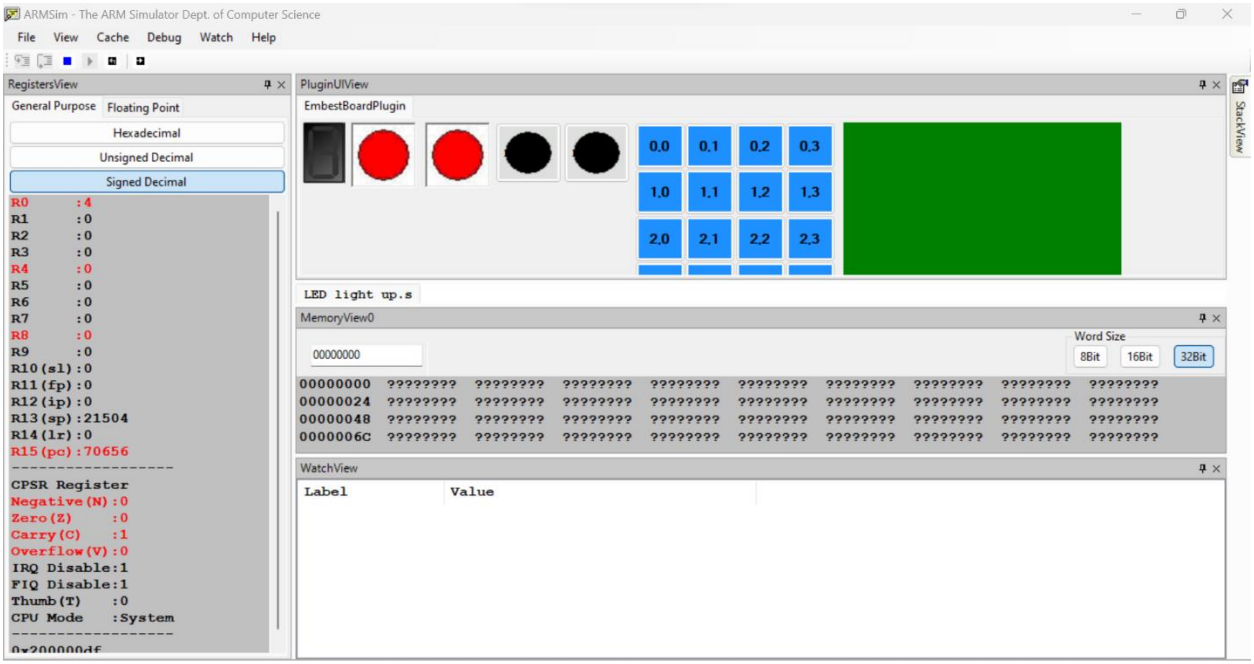
Title of the Program

2. 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.

Code:

```
;  Set LED to light up
    .text
  mov r0, #0

  loop: swi 0x201
  ;to light up LED ,r0= 1 means right led light up,
  ;r0=2 means left LED and r0=3 means both LED light up


  add r0, r0, #1
           mov r4,#0x84000
        delay: sub r4, r4,#1
         cmp r4, #0
         bne delay
  cmp r0, #3
  ble loop
  .end
```

Screenshot:


ARMSim - The ARM Simulator Dept. of Computer Science
File View Cache Debug Watch Help
RegistersView
General Purpose Floating Point
Hexadecimal
Unsigned Decimal
Signed Decimal
R0 :4
R1 :0
R2 :0
R3 :0
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):70656
CPSR Register
Negative(N):0
Zero(Z) :0
Carry(C) :1
Overflow(V):0
IRQ Disable:1
FIQ Disable:1
Thumb(T) :0
CPU Mode :System
0x2000004f
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
LED light up.s
MemoryView0
00000000
Word Size
8Bit 16Bit 32Bit
00000000 ???????? ???????? ???????? ???????? ???????? ???????? ???????? ???????? ????????
00000024 ???????? ???????? ???????? ???????? ???????? ???????? ???????? ???????? ????????
00000048 ???????? ???????? ???????? ???????? ???????? ???????? ???????? ???????? ????????
0000006C ???????? ???????? ???????? ???????? ???????? ???????? ???????? ???????? ????????
WatchView
Label Value
StackView

Week#____7_____ Program Number: ____3___

Title of the Program

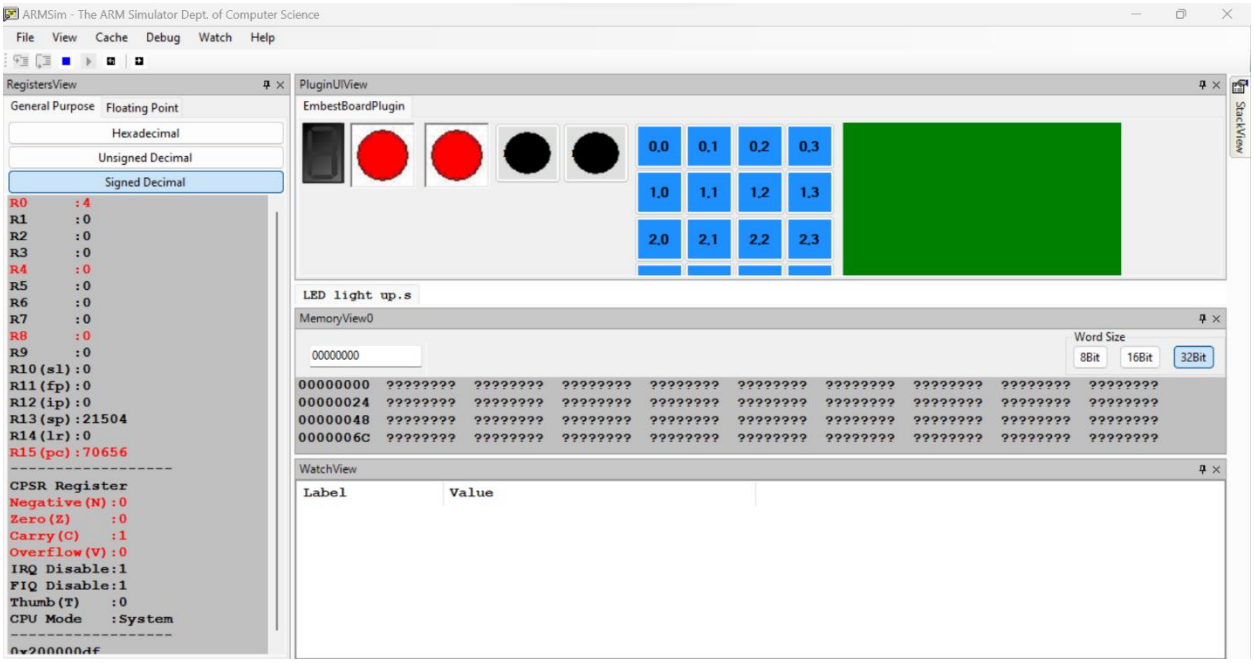
3. Write an ALP to move a string from Right to Left on LCD (40 columns by 15 rows).

Code:

```
; Streaming right to left
.text
mov r0 , #30  ; r0 = x
mov r1 , #7    ; r1 = y


mov r7 , #0
ldr r8 , =num
ldr r8 , [r8]
ldr r2 , =str
loop:
      swi 0x204   ; display a string on screen address should be in r2 reg
      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   ;Clear one line in the display on the LCD screen.r0-line no(y)
      mov r7 , #0
      mov pc , lr

.data
str:   .asciz  "HELLO WORLD"
num:  .word  15000
```

Screenshot:



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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