

# Microprocessor and Computer Architecture

**UE20CS252**

**4th Semester, Academic Year 2021-22**

Date: 11/03/2023

Name: NAGAVENI L G	SRN: PES2UG21CS315	Section: F
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Week# 7

Program Number: 1

## **Title of the Program**

Display hexadecimal digits [0-9,A-F] on the 8-segment display. Also display PES on the 8-segment display

**Include in your submission**

### **ARM Assembly Code(1)**

```
.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,#64000
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 0b11100011
nine: .byte 0b11100011
A:    .byte 0b11100111
B:    .byte 0b00101111
```

C: .byte 0b10001101  
D: .byte 0b01101110  
E: .byte 0b10001111  
F: .byte 0b10000111

## **ARM ASSEMBLY CODE FOR PESU:**

```
.text
.global _start
begin:
mov r0,#0
mov r2,#0
again:swi 0x202 ;check whether black button
pressed or no
cmp r0,#1
beq loop1
cmp r0,#2
beq loop2
b again
loop1: mov r5,#4 ; number of characters in
"PESU"
ldr r1,=P
back1: ldrb r0,[r1]
swi 0x200
bl delay
add r1,r1,#1
```

```
sub r5,r5,#1
cmp r5,#0
bne back1
b again
loop2:
mov r5,#4
ldr r1,=U
back2:
ldrb r0,[r1]
swi 0x200
bl delay
add r1,r1,#1
sub r5,r5,#1
cmp r5,#0
bne back2
b again delay:
mov
r4,#64000
loop3: sub
r4,r4,#1
cmp r4,#0
bge loop3
mov pc,lr

.data
```

P: .byte 0b11000111

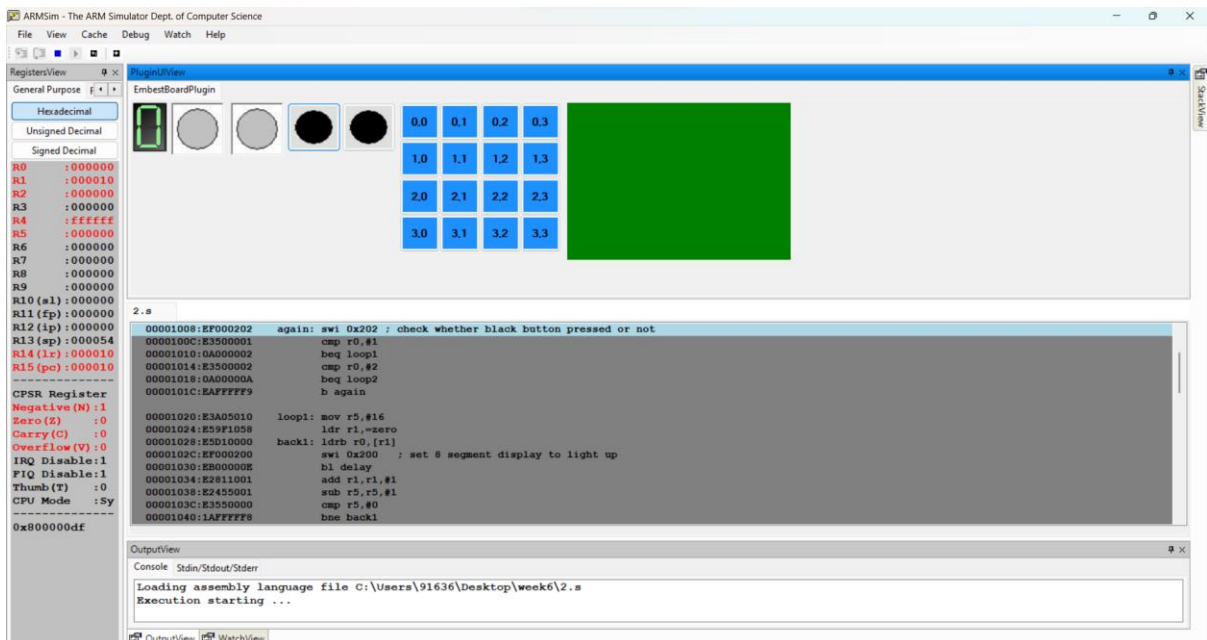
E: .byte 0b10001111

S: .byte 0b10101011

U: .byte 0b11111100

## Output Screen Shots (4)

(upcounter/down counter screenshot)-1



# letters P,E,S-3

File View Cache Debug Watch Help

RegistersView

General Purpose Floating Point

Hexadecimal

Unsigned Decimal

Signed Decimal

R0 : 00000000  
R1 : 00000000  
R2 : 00000000  
R3 : 00000000  
R4 : 00000000  
R5 : 00000000  
R6 : 00000000  
R7 : 00000000  
R8 : 00000000  
R9 : 00000000  
R10 (s1) : 00000000  
R11 (fp) : 00000000  
R12 (ip) : 00000000  
R13 (sp) : 00005400  
R14 (lr) : 00000000  
R15 (pc) : 00001018

CPSR Register

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

0x800000df

PluginView

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

p4.s

```
.text
.global _start

00001000:E3A00000 begin: mov r0,#0
00001004:E3A02000 mov r2,#0

00001008:EF000202 again: swi 0x202 ; check whether black button pressed or not
0000100C:E3500001 cmp r0,#1
00001010:0A000002 beq loop1
00001014:E3500002 cmp r0,#2
00001018:0A00000A beq loop2
0000101C:EAF00000 b again

00001020:E3A05004 loop1: mov r5,#4 ; number of characters in "PESU"
00001024:E59F1058 ldr r1,=P
```

OutputView

Console Stdin/Stdout/Stderr

Loading assembly language file C:\Users\91984\Documents\SEM 4\Microprocessor and Computer Architecture\Lab\Week 7\p4.s

Execution ending, Instruction Count:621048 Elapsed Time:00:03:04.8127410

Instructions per second:3360

Execution starting ...

StackView

000053BC:81818181  
000053C0:81818181  
000053C4:81818181  
000053C8:81818181  
000053CC:81818181  
000053D0:81818181  
000053D4:81818181  
000053D8:81818181  
000053DC:81818181  
000053E0:81818181  
000053E4:81818181  
000053E8:81818181  
000053EC:81818181  
000053F0:81818181  
000053F4:81818181  
000053F8:81818181  
000053FC:81818181  
00005400:81818181  
00005404:81818181  
00005408:81818181  
0000540C:81818181  
00005410:81818181  
00005414:81818181  
00005418:81818181  
0000541C:81818181  
00005420:81818181  
00005424:81818181  
00005428:81818181  
0000542C:81818181  
00005430:81818181  
00005434:81818181  
00005438:81818181  
0000543C:81818181  
00005440:81818181

File View Cache Debug Watch Help

RegistersView

General Purpose Floating Point

Hexadecimal

Unsigned Decimal

Signed Decimal

R0 : 00000000  
R1 : 00000000  
R2 : 00000000  
R3 : 00000000  
R4 : 00000000  
R5 : 00000000  
R6 : 00000000  
R7 : 00000000  
R8 : 00000000  
R9 : 00000000  
R10 (s1) : 00000000  
R11 (fp) : 00000000  
R12 (ip) : 00000000  
R13 (sp) : 00005400  
R14 (lr) : 00000000  
R15 (pc) : 00001018

CPSR Register

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

0x800000df

PluginView

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

p4.s

```
.text
.global _start

00001000:E3A00000 begin: mov r0,#0
00001004:E3A02000 mov r2,#0

00001008:EF000202 again: swi 0x202 ; check whether black button pressed or not
0000100C:E3500001 cmp r0,#1
00001010:0A000002 beq loop1
00001014:E3500002 cmp r0,#2
00001018:0A00000A beq loop2
0000101C:EAF00000 b again

00001020:E3A05004 loop1: mov r5,#4 ; number of characters in "PESU"
00001024:E59F1058 ldr r1,=P
```

OutputView

Console Stdin/Stdout/Stderr

Loading assembly language file C:\Users\91984\Documents\SEM 4\Microprocessor and Computer Architecture\Lab\Week 7\p4.s

Execution ending, Instruction Count:799448 Elapsed Time:00:01:00.8143367

Instructions per second:13145

Execution starting ...

StackView

000053BC:81818181  
000053C0:81818181  
000053C4:81818181  
000053C8:81818181  
000053CC:81818181  
000053D0:81818181  
000053D4:81818181  
000053D8:81818181  
000053DC:81818181  
000053E0:81818181  
000053E4:81818181  
000053E8:81818181  
000053EC:81818181  
000053F0:81818181  
000053F4:81818181  
000053F8:81818181  
000053FC:81818181  
00005400:81818181  
00005404:81818181  
00005408:81818181  
0000540C:81818181  
00005410:81818181  
00005414:81818181  
00005418:81818181  
0000541C:81818181  
00005420:81818181  
00005424:81818181  
00005428:81818181  
0000542C:81818181  
00005430:81818181  
00005434:81818181  
00005438:81818181  
0000543C:81818181  
00005440:81818181

File View Cache Debug Watch Help

RegistersView

General Purpose Floating Point

Hexadecimal

Unsigned Decimal

Signed Decimal

R0 : 00000000

R1 : 00000000

R2 : 00000000

R3 : 00000000

R4 : 00000000

R5 : 00000000

R6 : 00000000

R7 : 00000000

R8 : 00000000

R9 : 00000000

R10 (s1) : 00000000

R11 (fp) : 00000000

R12 (ip) : 00000000

R13 (sp) : 00005400

R14 (lr) : 00000000

R15 (pc) : 00001008

-----

CPSR Register

Negative (N) : 1

Zero (Z) : 0

Carry (C) : 0

Overflow (V) : 0

IRQ Disable : 1

FIQ Disable : 1

Thumb (T) : 0

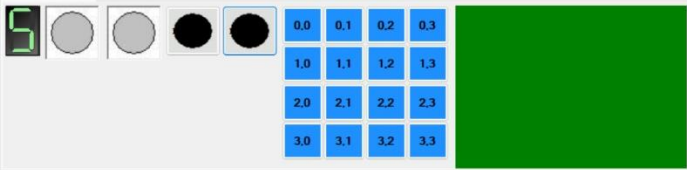
CPU Mode : System

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0x800000df

PluginView

EmbestBoardPlugin



p4.s

```
.text
.global _start

00001000:E3A00000    begin: mov r0,#0
00001004:E3A02000    mov r2,#0

00001008:EF000202    again: swi 0x202 ; check whether black button pressed or not
0000100C:E3500001    cmp r0,#1
00001010:0A000002    beq loop1
00001014:E3500002    cmp r0,#2
00001018:0A00000A    beq loop2
0000101C:EAF000F9    b again

00001020:E3A05004    loop1: mov r5,#4 ; number of characters in "PESU"
00001024:E59F1058    ldr r1,=P
```

OutputView

Console Stdin/Stdout/Stderr

Loading assembly language file C:\Users\91984\Documents\SEM 4\Microprocessor and Computer Architecture\Lab\Week 7\p4.s

Execution ending, Instruction Count:799448 Elapsed Time:00:01:00.8143367

Instructions per second:13145

Execution starting ...

StackView

000053BC:01010101

000053C0:01010101

000053C4:01010101

000053C8:01010101

000053CC:01010101

000053D0:01010101

000053D4:01010101

000053D8:01010101

000053DC:01010101

000053E0:01010101

000053E4:01010101

000053E8:01010101

000053EC:01010101

000053F0:01010101

000053F4:01010101

000053F8:01010101

000053FC:01010101

00005400:01010101

00005404:01010101

00005408:01010101

0000540C:01010101

00005410:01010101

00005414:01010101

00005418:01010101

0000541C:01010101

00005420:01010101

00005424:01010101

00005428:01010101

0000542C:01010101

00005430:01010101

00005434:01010101

00005438:01010101

0000543C:01010101

00005440:01010101



# Microprocessor and Computer Architecture

**UE20CS252**

**4th Semester, Academic Year 2021-22**

Date: 11/03/2023

Name: NAGAVENI L G	SRN: PES2UG21CS315	Section: F
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Week# 7 Program Number: 2

## **Title of the Program**

Move a string from RIGHT to LEFT on the LCD display panel. Display your name on the LCD Panel

Include in your submission

### **ARM Assembly Code(1)**

```
.text
mov r0,#30
mov r1,#7
mov r7,#0
ldr r8,=num
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

.data

str: .asciz "PES2UG21CS315 NAGAVENI L G"

num: .word 55000

# 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: Nagaveni L G

Name: NAGAVENI L G

SRN: PES2UG21CS315

Section: F

Date: 11/03/2023