

Microprocessor and Computer Architecture Laboratory

UE19CS256

4th Semester, Academic Year 2020-21

Date:

Name: NAGAVENI L G	SRN: PES2UG21CS315	Section F
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Week# ____6____

Program Number: ____1__

Write an ALP to find the length of a given string

I. ARM Assembly Code (1).

```
.data
a: .asciz "INFRASTRUCTURE"
.text
ldr r0,=a
mov r1,#0
loop:
ldrb r2,[r0],#1
cmp r2,#0
beq close
add r1,r1,#1
b loop
```

```
close: swi 0x011
.end
```

II. Output Screen Shot (One Example of your choice)

The screenshot displays a debugger interface with three main panels: RegistersView, CodeView, and OutputView.

RegistersView: Shows the state of 16 registers (R0-R15) and the CPSR register. R0 is 4147, R1 is 14, and R15 (PC) is 4124. The CPSR register shows flags: Negative (N): 0, Zero (Z): 1, Carry (C): 1, Overflow (V): 0, IRQ Disable: 1, FIQ Disable: 1, Thumb (T): 0, and CPU Mode: System.

CodeView: Displays the assembly code for file 'w61.o'. The code includes a data section with a string 'INFRASTRUCTURE', a text section with a loop, and a 'close' label. The instruction 'close: swi 0x011' is highlighted.

OutputView: Shows the execution output in the console. It reports the loading of the assembly file, the start of execution, and the end of execution with an instruction count of 76 and an elapsed time of 00:00:00.0049979 seconds.

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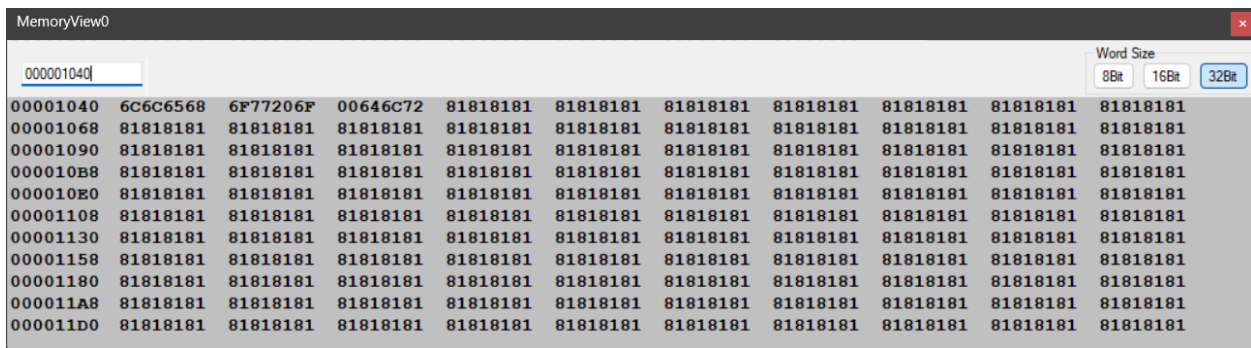
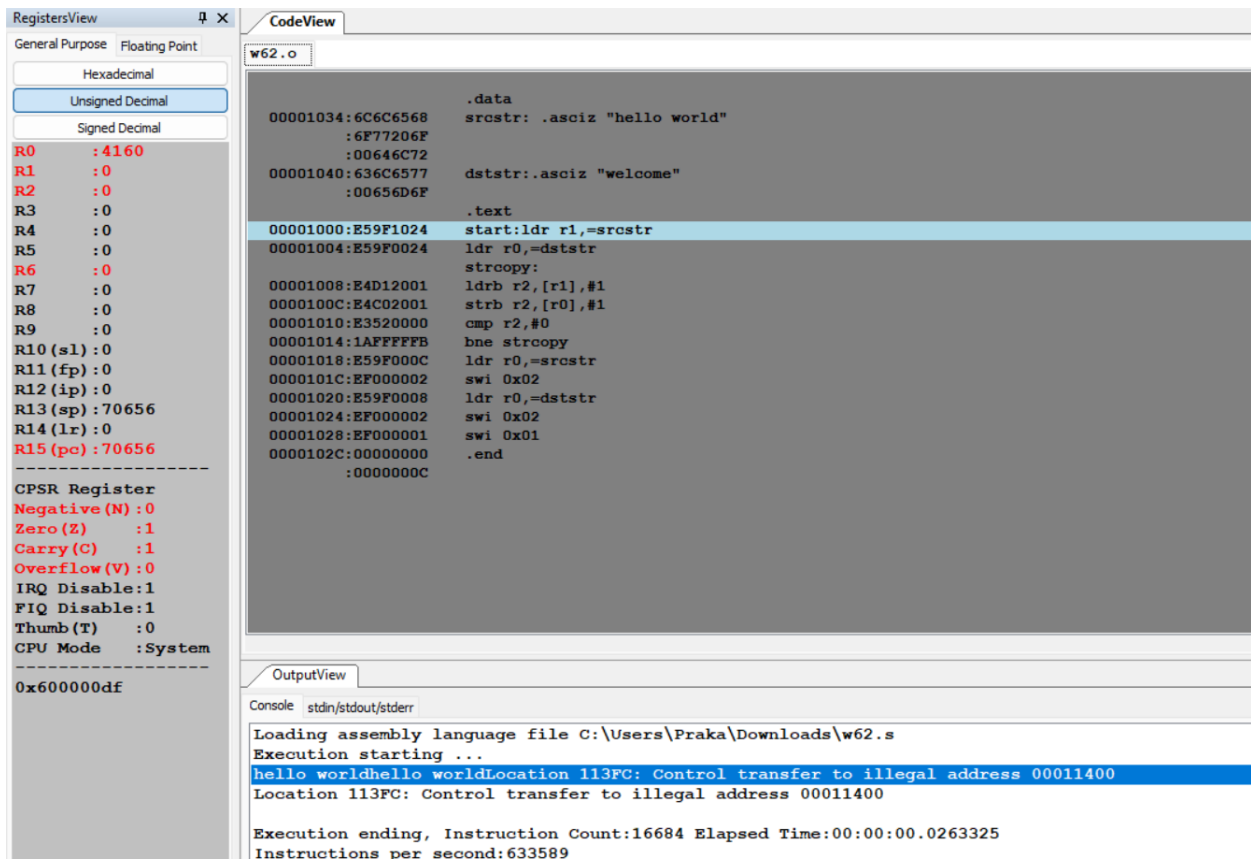
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Week# ____6____ Program Number: ____2__

Write an ALP to copy string from one location to another

I. ARM Assembly Code (1).

```
.data
srcstr: .asciz "hello world"
dststr: .asciz "welcome"
.text
start:ldr r1,=srcstr
ldr r0,=dststr
strcpy:
ldrb r2,[r1],#1
strb r2,[r0],#1
cmp r2,#0
bne strcpy
ldr r0,=srcstr
swi 0x02
ldr r0,=dststr
swi 0x02
swi 0x01
.end
```



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Week# ____6____ Program Number: ____3__

Write an ALP to find whether a given character is present in a string.

- I. ARM Assembly Code (1).
- II. Output Screen Shot -2 (One Example of your choice)

IF THE CHAR IS PRESENT

```
.DATA
STRING: .ASCIZ "INCREDIBLE"
CHAR: .ASCIZ "B"
FOUND: .ASCIZ "FOUND"
NFOUND: .ASCIZ "NOT FOUND"

.TEXT
LDR R0, =STRING
```

```

LDR R1, =CHAR
LDRB R3, [R1]
LOOP: LDRB R2, [R0], #1
      CMP R3, R2
      BEQ SUCCESS
      CMP R2, #0
      BNE LOOP
      B FAIL

SUCCESS: LDR R0, =FOUND
         SWI 0x02
         SWI 0x11

FAIL: LDR R0, =NFOUND
      SWI 0x02
      SWI 0x11

```

RegistersView
Hexadecimal
Unsigned Decimal
Signed Decimal
R0 : 4185
R1 : 4183
R2 : 66
R3 : 66
R4 : 0
R5 : 0
R6 : 0
R7 : 0
R8 : 0
R9 : 0
R10 (s1) : 0
R11 (fp) : 0
R12 (ip) : 0
R13 (sp) : 70656
R14 (lr) : 0
R15 (pc) : 4140
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 : System
0x600000df

CodeView
w63.o
.DATA
0000104C:52434E49 STRING: .ASCIZ "INCREDIBLE"
:42494445
:00454C
00001057:0042 CHAR: .ASCIZ "B"
00001059:4E554F46 FOUND: .ASCIZ "FOUND"
:0044
0000105F:20544F4E NFOUND: .ASCIZ "NOT FOUND"
:4E554F46
:0044
.TEXT
00001000:E59F0034 LDR R0, =STRING
00001004:E59F1034 LDR R1, =CHAR
00001008:E5D13000 LDRB R3, [R1]
0000100C:E4D02001 LOOP: LDRB R2, [R0], #1
00001010:E1530002 CMP R3, R2
00001014:0A000002 BEQ SUCCESS
00001018:E3520000 CMP R2, #0
0000101C:1AFFFFFA BNE LOOP
00001020:EA000002 B FAIL
00001024:E59F0018 SUCCESS: LDR R0, =FOUND
00001028:EF000002 SWI 0x02
0000102C:EF000011 SWI 0x11
00001030:E59F0010 FAIL: LDR R0, =NFOUND
00001034:EF000002 SWI 0x02
00001038:EF000011 SWI 0x11...
:00000000

OutputView
Console
Loading assembly language file C:\Users\Praka\Downloads\w63.s
Execution starting ...
FOUND
Execution ending, Instruction Count:44 Elapsed Time:00:00:00.0047436
Instructions per second:9275

IF THE CHAR IS NOT PRESENT

```
.DATA
STRING: .ASCIZ "INCREDIBLE"
CHAR: .ASCIZ "Z"
FOUND: .ASCIZ "FOUND"
NFOUND: .ASCIZ "NOT FOUND"
```

```
.TEXT
LDR R0, =STRING
LDR R1, =CHAR
LDRB R3, [R1]
LOOP: LDRB R2, [R0], #1
      CMP R3, R2
      BEQ SUCCESS
      CMP R2, #0
      BNE LOOP
      B FAIL
```

```
SUCCESS: LDR R0, =FOUND
          SWI 0x02
          SWI 0x11
```

```
FAIL: LDR R0, =NFOUND
      SWI 0x02
      SWI 0x11
```

RegistersView

General Purpose

Floating Point

Hexadecimal

Unsigned Decimal

Signed Decimal

R0 : 4191

R1 : 4183

R2 : 0

R3 : 90

R4 : 0

R5 : 0

R6 : 0

R7 : 0

R8 : 0

R9 : 0

R10 (s1) : 0

R11 (fp) : 0

R12 (ip) : 0

R13 (sp) : 70656

R14 (lr) : 0

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 : System

0x600000df

CodeView

w63.o

.DATA

0000104C:52434E49 STRING: .ASCIZ "INCREDIBLE"

:42494445

:00454C

00001057:005A CHAR: .ASCIZ "Z"

00001059:4E554F46 FOUND: .ASCIZ "FOUND"

:0044

0000105F:20544F4E NFOUND: .ASCIZ "NOT FOUND"

:4E554F46

:0044

.TEXT

00001000:E59F0034 LDR R0, =STRING

00001004:E59F1034 LDR R1, =CHAR

00001008:E5D13000 LDRB R3, [R1]

0000100C:E4D02001 LOOP: LDRB R2, [R0], #1

00001010:E1530002 CMP R3, R2

00001014:0A000002 BEQ SUCCESS

00001018:E3520000 CMP R2, #0

0000101C:1AFFFFFA BNE LOOP

00001020:EA000002 B FAIL

00001024:E59F0018 SUCCESS: LDR R0, =FOUND

00001028:EF000002 SWI 0x02

0000102C:EF000011 SWI 0x11

00001030:E59F0010 FAIL: LDR R0, =NFOUND

00001034:EF000002 SWI 0x02

00001038:EF000011 SWI 0x11...

:00000000

OutputView

Console

stdin/stdout/stderr

Loading assembly language file C:\Users\Praka\Downloads\w63.s

Execution starting ...

NOT FOUND

Execution ending, Instruction Count:62 Elapsed Time:00:00:00.0055936

Instructions per second:11084

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Week# ____6____

Program Number: ____4__

Write an ALP to find how many times a given character is present in a string

- I. ARM Assembly Code (1).
- II. Output Screen Shot (One Example of your choice)

If the char is present

```
.data
str: .asciz "BUTTERFLY"
char: .asciz "T"
.equ swi_writec,0x02
.equ swi_exit,0x11
.text
ldr r0,=str
ldr r1,=char
mov r5,#00
ldrb r3,[r1]
loop:
ldrb r2,[r0],#1
```

```

cmp r2,#0
beq exit
cmp r2,r3
bne loop
add r5,r5,#1
b loop
ldr r0,=str
swi swi_writec
exit: swi swi_exit
.end

```

RegistersView

General Purpose

Floating Point

Hexadecimal

Unsigned Decimal

Signed Decimal

R0 : 4170
R1 : 4170
R2 : 0
R3 : 84
R4 : 0
R5 : 2
R6 : 0
R7 : 0
R8 : 0
R9 : 0
R10 (s1) : 0
R11 (fp) : 0
R12 (ip) : 0
R13 (sp) : 70656
R14 (lr) : 0
R15 (pc) : 4148

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 : System

0x600000df

CodeView

w64.o

```

.data
00001040:54545542 str: .asciz "BUTTERFLY"
:4C465245
:0059
0000104A:0054 char: .asciz "T"
.equ swi_writec,0x02
.equ swi_exit,0x11
.text
00001000:E59F0030 ldr r0,=str
00001004:E59F1030 ldr r1,=char
00001008:E3A05000 mov r5,#00
0000100C:E5D13000 ldrb r3,[r1]
loop:
00001010:E4D02001 ldrb r2,[r0],#1
00001014:E3520000 cmp r2,#0
00001018:0A000005 beq exit
0000101C:E1520003 cmp r2,r3
00001020:1AFFFFFA bne loop
00001024:E2855001 add r5,r5,#1
00001028:EAF000F8 b loop
0000102C:E59F0004 ldr r0,=str
00001030:EF000002 swi swi_writec
00001034:EF000011 exit: swi swi_exit
00001038:00000000 .end
:0000000A

```

OutputView

Console

stdin/stdout/stderr

Loading assembly language file C:\Users\Praka\Downloads\w64.s
Execution starting ...

Execution ending, Instruction Count:57 Elapsed Time:00:00:00.0040049
Instructions per second:14232

If the char is not present

```
.data
str: .asciz "BUTTERFLY"
char: .asciz "G"
.equ swi_writec,0x02
.equ swi_exit,0x11
.text
ldr r0,=str
ldr r1,=char
mov r5,#00
ldrb r3,[r1]
loop:
ldrb r2,[r0],#1
cmp r2,#0
beq exit
cmp r2,r3
bne loop
add r5,r5,#1
b loop
ldr r0,=str
swi swi_writec
exit: swi swi_exit
.end
```

RegistersView

General Purpose

Floating Point

Hexadecimal

Unsigned Decimal

Signed Decimal

R0 : 4170

R1 : 4170

R2 : 0

R3 : 71

R4 : 0

R5 : 0

R6 : 0

R7 : 0

R8 : 0

R9 : 0

R10 (s1) : 0

R11 (fp) : 0

R12 (ip) : 0

R13 (sp) : 70656

R14 (lr) : 0

R15 (pc) : 4148

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 : System

0x600000df

CodeView

w64.o

```

.data
00001040:54545542    str: .asciz "BUTTERFLY"
               :4C465245
               :0059
0000104A:0047    char: .asciz "G"
               .equ swi_writec,0x02
               .equ swi_exit,0x11
               .text
00001000:E59F0030    ldr r0,=str
00001004:E59F1030    ldr r1,=char
00001008:E3A05000    mov r5,#00
0000100C:E5D13000    ldrb r3,[r1]
               loop:
00001010:E4D02001    ldrb r2,[r0],#1
00001014:E3520000    cmp r2,#0
00001018:0A000005    beq exit
0000101C:E1520003    cmp r2,r3
00001020:1AFFFFFFFA    bne loop
00001024:E2855001    add r5,r5,#1
00001028:EAF000F8    b loop
0000102C:E59F0004    ldr r0,=str
00001030:EF000002    swi swi_writec
00001034:EF000011    exit: swi swi_exit
00001038:00000000    .end
               :0000000A

```

OutputView

Console

stdin/stdout/stderr

Loading assembly language file C:\Users\Praka\Downloads\w64.s

Execution starting ...

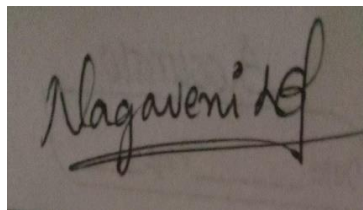
Execution ending, Instruction Count:53 Elapsed Time:00:00:00.0040005

Instructions per second:13248

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

A handwritten signature in black ink on a light-colored background. The signature appears to read 'Nagaveni L G' with a stylized flourish at the end.

Name: NAGAVENI L G

SRN: PES2UG21CS315

Section: F

Date: 24-02-2023