

MPCA Lab

Week 6

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Section : L

Sem : 4

Roll : 42

a. Write an ALP to find the length of a given string

Code :

```
a - Notepad
File Edit View

.data
a:.asciz "HELLO WORLD"

.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
```

Output : Length is given by R1

The screenshot displays the ARMSim - The ARM Simulator interface. The main window shows the assembly code being executed, with the instruction `close:swi 0x011` highlighted. The left sidebar shows the RegisterView with the R1 register containing the value 4144, which represents the length of the string 'HELLO WORLD'. The bottom OutputView shows the execution log, including the loading of the assembly file and the final execution statistics.

RegistersView

Register	Value
R0	:4144
R1	:11
R2	:0
R3	:0
R4	:0
R5	:0
R6	:0
R7	:0
R8	:0
R9	:0
R10 (a1)	:0
R11 (fp)	:0
R12 (ip)	:0
R13 (sp)	:21504
R14 (lr)	:0
R15 (pc)	:4124

CPSR Register

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

OutputView

```
Console Stdin/Stdout/Stderr
Loading assembly language file C:\Users\yasha\OneDrive\Documents\PESU\Sem 4\MPCA\Lab\Week 6\a.s
Execution starting ...

Execution ending, Instruction Count:61 Elapsed Time:00:00:00.0711267
Instructions per second:857
```

b. Write an ALP to copy string from one location to another

Code :

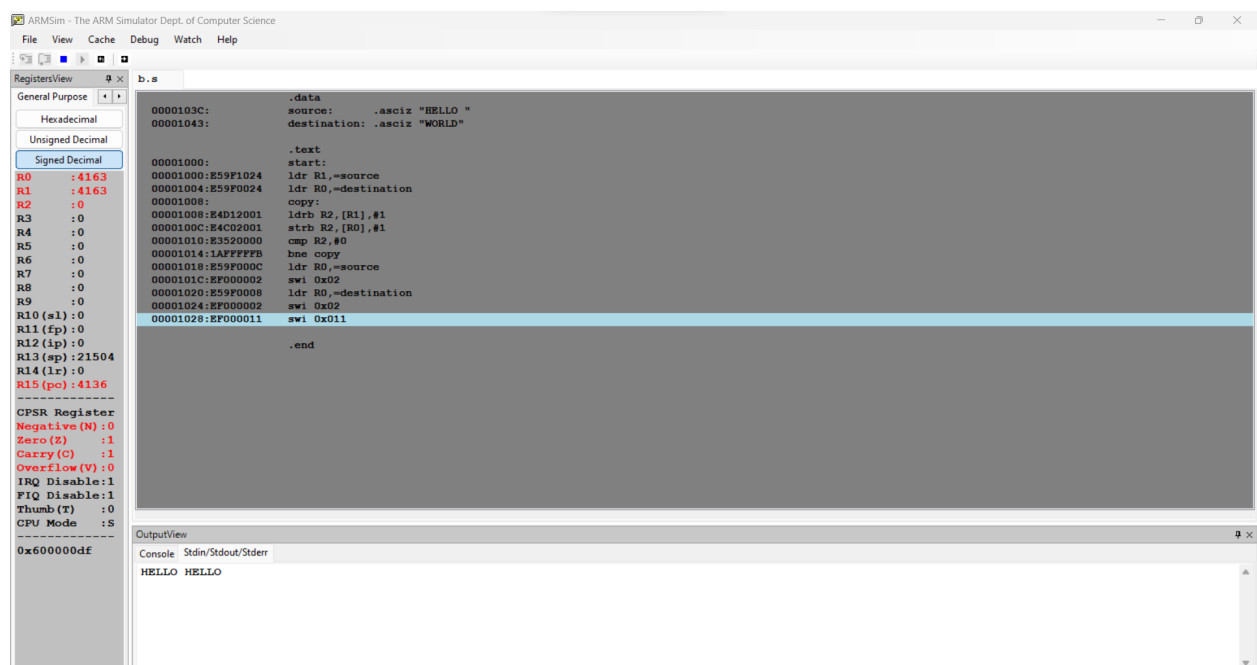
```
b - Notepad
File Edit View

.data
source:      .asciz "HELLO "
destination: .asciz "WORLD"

.text
start:
ldr R1,=source
ldr R0,=destination
copy:
ldrb R2,[R1],#1
strb R2,[R0],#1
cmp R2,#0
bne copy
ldr R0,=source
swi 0x02
ldr R0,=destination
swi 0x02
swi 0x011

.end
```

Output :



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

Code :

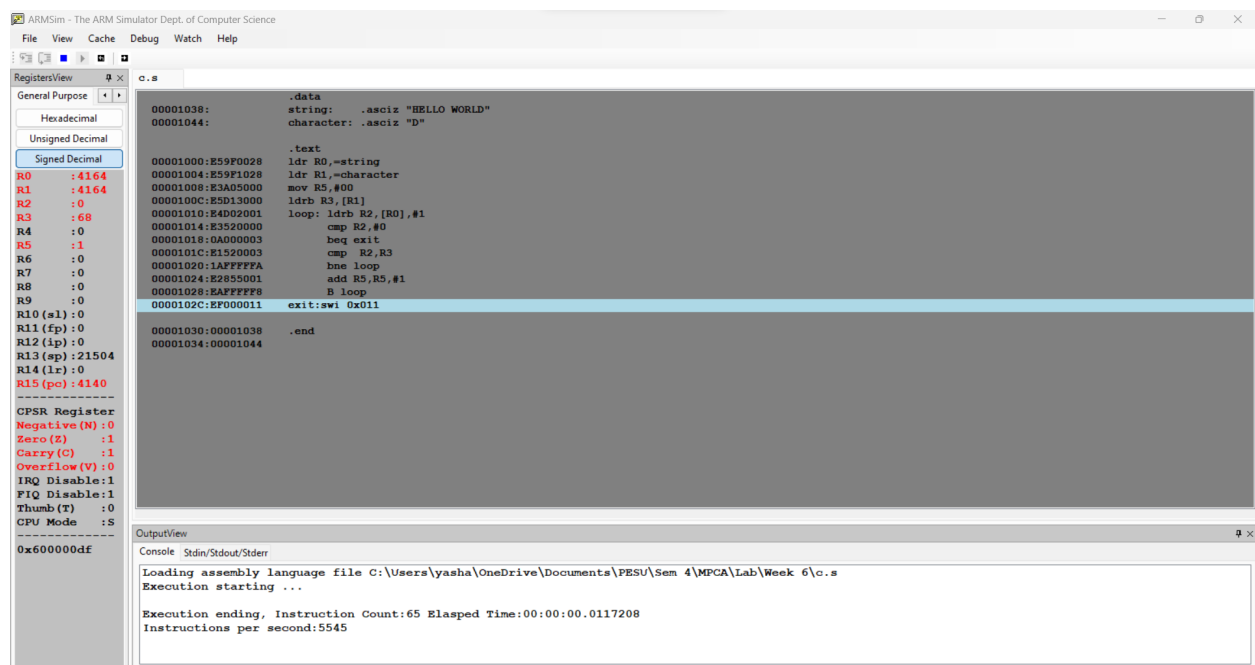
```
c - Notepad
File Edit View

.data
string: .asciz "HELLO WORLD"
character: .asciz "D"

.text
ldr R0,=string
ldr R1,=character
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
exit:swi 0x011

.end
```

Output : R5 tells us if the character is present or not



The screenshot displays the ARM Simulator interface. On the left, the 'RegistersView' shows the state of various registers. The 'General Purpose' registers are listed with their values in Signed Decimal format. R0 is 4164, R1 is 4164, R2 is 0, R3 is 68, R4 is 0, R5 is 1, R6 is 0, R7 is 0, R8 is 0, R9 is 0, R10 (s1) is 0, R11 (fp) is 0, R12 (ip) is 0, R13 (sp) is 21504, R14 (lr) is 0, and R15 (pc) is 4140. The CPSR Register shows Negative (N) as 0, Zero (Z) as 1, Carry (C) as 1, Overflow (V) as 0, IRQ Disable as 1, FIQ Disable as 1, Thumb (T) as 0, and CPU Mode as S. The main window shows the assembly code being executed, with the instruction 'exit:swi 0x011' highlighted. The 'OutputView' at the bottom shows the execution log, including the loading of the assembly language file, the start of execution, and the end of execution with a count of 65 instructions and an elapsed time of 0.0117208 seconds.

```
ARMsim - The ARM Simulator Dept. of Computer Science
File View Cache Debug Watch Help
RegistersView o.s
General Purpose
Hexadecimal
Unsigned Decimal
Signed Decimal
R0 : 4164
R1 : 4164
R2 : 0
R3 : 68
R4 : 0
R5 : 1
R6 : 0
R7 : 0
R8 : 0
R9 : 0
R10 (s1) : 0
R11 (fp) : 0
R12 (ip) : 0
R13 (sp) : 21504
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 : S
-----
0x600000df

.data
00001038: string: .asciz "HELLO WORLD"
00001044: character: .asciz "D"

.text
00001000:E59F0020 ldr R0,=string
00001004:E59F1028 ldr R1,=character
00001008:E3A05000 mov R5,#00
0000100C:E5D13000 ldrb R3,[R1]
00001010:E4D02001 loop: ldrb R2,[R0],#1
00001014:E3520000 cmp R2,#0
00001018:0A000003 beq exit
0000101C:E1520003 cmp R2,R3
00001020:1AFFFFFA bne loop
00001024:E2855001 add R5,R5,#1
00001028:EAF0FFFA B loop
0000102C:EF000011 exit:swi 0x011

00001030:00001038 .end
00001034:00001044

OutputView
Console Stdin/Stdout/Stderr
Loading assembly language file C:\Users\yasha\OneDrive\Documents\PESU\Sem 4\MPCA\Lab\Week 6\o.s
Execution starting ...

Execution ending, Instruction Count:65 Elapsed Time:00:00:00.0117208
Instructions per second:5545
```

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

Code :

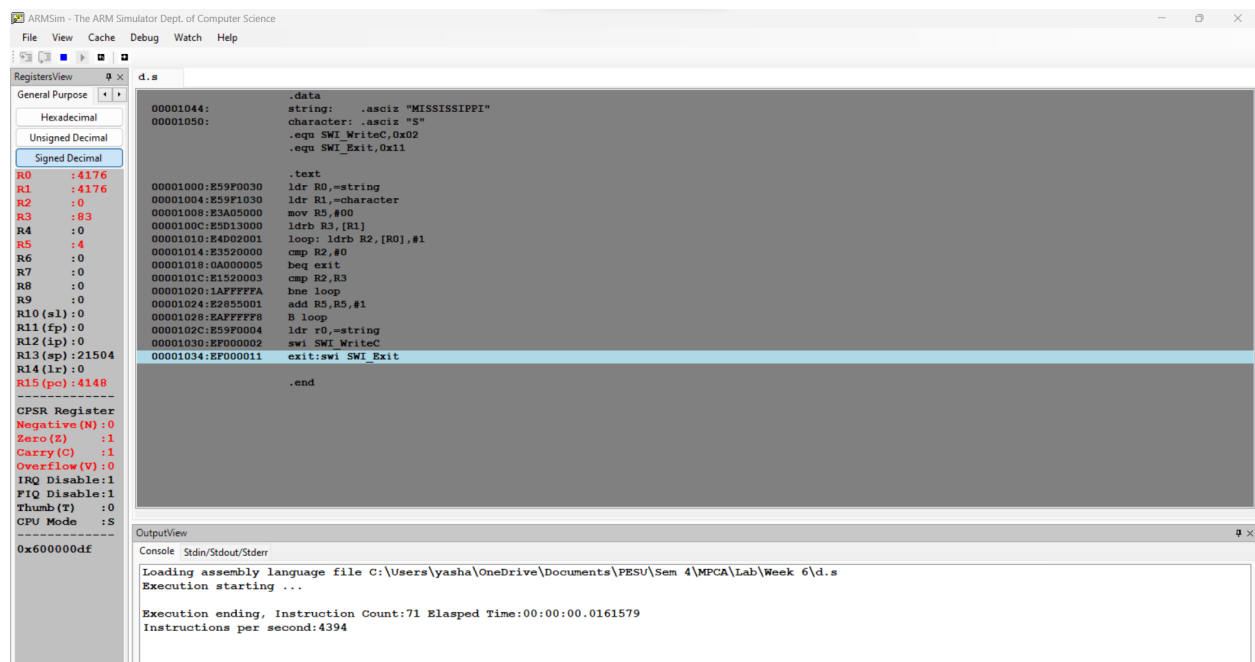
```
d - Notepad
File Edit View

.data
string: .asciz "MISSISSIPPI"
character: .asciz "S"
.equ SWI_WriteC,0x02
.equ SWI_Exit,0x11

.text
ldr R0,string
ldr R1,character
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,string
swi SWI_WriteC
exit:swi SWI_Exit

.end
```

Output: R5 gives us the count of the repeated character



ARMSim - The ARM Simulator Dept. of Computer Science

File View Cache Debug Watch Help

RegistersView

General Purpose

Hexadecimal

Unsigned Decimal

Signed Decimal

Register	Value
R0	:4176
R1	:4176
R2	:0
R3	:83
R4	:0
R5	:4
R6	:0
R7	:0
R8	:0
R9	:0
R10 (s1)	:0
R11 (fp)	:0
R12 (ip)	:0
R13 (sp)	:21504
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 : S

0x600000df

OutputView

Console Stdin/Stdout/Stderr

Loading assembly language file C:\Users\yasha\OneDrive\Documents\PESU\Sem 4\MPCA\Lab\Week 6\d.s

Execution starting ...

Execution ending, Instruction Count:71 Elapsed Time:00:00:00.0161579

Instructions per second:4394

