

SRN-PES2UG20CS298

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CLASS-4E

MPCA LAB

Week 6

1. Q1. Write a program in ARM7TDMI–ISA to find the sum of all the digits in a 32– bit number.

Code:

.DATA

A: .WORD 32

.TEXT

LDR R0,=A

MOV R1,#15

LDR R2,[R0]

MOV R3,#8

LOOP:

ANDS R4,R1,R2

ADDS R5,R5,R4

LSR R2, #4

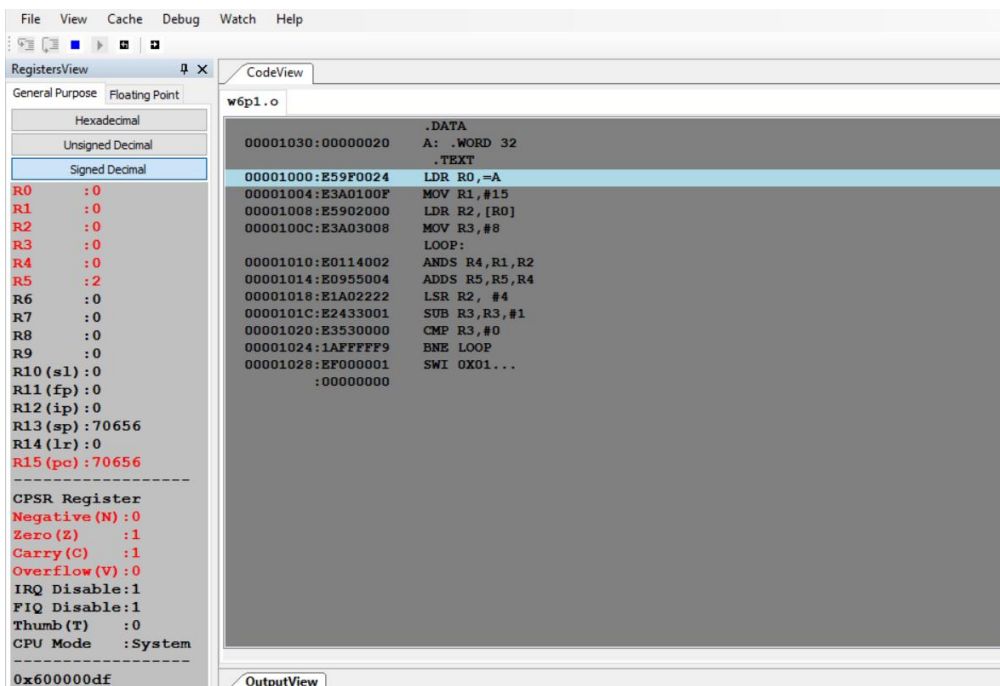
SUB R3,R3,#1

CMP R3,#0

BNE LOOP

SWI 0X01

Output:



- Write a program in ARM7TDMI-ISA to find the number of occurrences of a given character in a string.

Code:

.DATA

A: .ASCII "HELLO WORLD"

B: .ASCII "L"

.TEXT

LDR R0,=A

LDR R1,=B

MOV R4,#0

MOV R9,#0

LOOP:

LDRB R2,[R0],#1

LDRB R3,[R1]

CMP R2,R3

BEQ LOOP1

ADD R9,R9,#1

CMP R9,#100

BNE LOOP

LOOP1:

ADD R4,R4,#1

BAL LOOP

Output:

The screenshot shows the ARMSim# - The ARM Simulator interface. The title bar reads "ARMSim# - The ARM Simulator Dept. of Computer Science". The menu bar includes "File", "View", "Cache", "Debug", "Watch", and "Help". Below the menu bar is a toolbar with icons for file operations and simulation control. The main window is divided into three panes: "RegistersView", "CodeView", and "OutputView/WatchView".

The "RegistersView" pane on the left shows the state of the ARM registers. It has tabs for "General Purpose" and "Floating Point". The "General Purpose" tab is selected, and the "Signed Decimal" format is chosen. The registers are listed as follows:

Register	Value
R0	: 4160
R1	: 4167
R2	: 76
R3	: 72
R4	: 1
R5	: 0
R6	: 0
R7	: 0
R8	: 0
R9	: 3
R10 (s1)	: 0
R11 (fp)	: 0
R12 (ip)	: 0
R13 (sp)	: 70656
R14 (lr)	: 0
R15 (pc)	: 4132

Below the registers is the "CPSR Register" section, which shows the status of various flags and the CPU mode:

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

The "CodeView" pane on the right shows the assembly code for the file "week6b.o". The code is organized into sections: ".DATA", ".TEXT", and ".BSS". The ".TEXT" section contains the main logic of the program, including the "LOOP" and "LOOP1" labels. The code is as follows:

```
.DATA
0000103C:4C4C4548 A: .ASCII "HELLO WORLD"
:4F57204F
:444C52
00001047:48 B: .ASCII "H"
.TEXT
00001000:E59F002C LDR R0,=A
00001004:E59F102C LDR R1,=B
00001008:E3A04000 MOV R4,#0
0000100C:E3A09000 MOV R9,#0
LOOP:
00001010:E4D02001 LDRB R2,[R0],#1
00001014:E5D13000 LDRB R3,[R1]
00001018:E1520003 CMP R2,R3
0000101C:0A000002 BEQ LOOP1
00001020:E2899001 ADD R9,R9,#1
00001024:E3590014 CMP R9,#20
00001028:1AFFFFFFF8 BNE LOOP
LOOP1:
0000102C:E2844001 ADD R4,R4,#1
00001030:EAF00006 BAL LOOP...
:00000000
:0000000B
```

The "OutputView/WatchView" pane at the bottom is currently empty, showing the "Console" tab with "stdin/stdout/stderr" selected.