

H M Mythreya

PES2UG20CS130

MPCA-Lab Week-6

Task 1: Write a program in ARM7TDMI-ISA to find the sum of all the digits in a 32bit number.

Code:

```
.DATA
    A: .WORD 15
.TEXT
    MOV R0,#1
    MOV R9,#0
    MOV R2,#15
loop:
    AND R3,R2,#1
    AND R9,R9,r3
    AND R0,R0,#1
    MOV R2,R2,LSR #1
    CMP R0,#5
    BNE loop
    BEQ exit
exit:
    SWI 0x11
.end
```

The screenshot displays two windows from an ARM7TDMI-ISA development environment. The left window, titled 'RegistersView', shows the state of the processor's registers. The right window, titled 'CodeView', shows the assembly code for a file named '32bitsum.o'.

RegistersView:

- General Purpose registers: R0:1, R1:0, R2:1, R3:1, 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):4116.
- 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.
- Address: 0x800000df.

CodeView:

32bitsum.o

```
.DATA
    A: .WORD 15
.TEXT
    MOV R0,#1
    MOV R9,#0
    MOV R2,#15
loop:
    AND R3,R2,#1
    AND R9,R9,r3
    AND R0,R0,#1
    MOV R2,R2,LSR #1
    CMP R0,#5
    BNE loop
    BEQ exit
exit:
    SWI 0x11
.end...
```

Task 2: Write a program in ARM7TDMI-ISA to find the number of occurrences of a given character in a string. Example: Given string : My name is Bond. Character : 'n'. Expected Output : Display 2 in a register.

Code:

```
.DATA
    a: .asciz "My name is Mythreya"
    b: .asciz "i"
.TEXT
    LDR r0,=a
    LDR r1,=b
    MOV r2,#0
    MOV r3,#0
    LDRB r4,[r1]
```

```
loop:
    ADD r2,r2,#1
    LDRB r1,[r0],#1
    CMP r4,r1
    BEQ count
    CMP r2,#11
    BEQ final
    B loop
```

```
count:
    ADD r3,r3,#1
    B loop
```

```
final:
    SWI 0X011
```

The screenshot displays the ARM7TDMI-ISA simulator interface. The left pane shows the **RegistersView** with the **General Purpose** tab selected. The register list shows R0 through R15, with R15 (PC) highlighted in red at address 4116. Below the register list, the **CPSR Register** is shown with various flags like Negative (N), Zero (Z), Carry (C), Overflow (V), IRQ Disable, FIQ Disable, Thumb (T), and CPU Mode (System). The right pane shows the **CodeView** for the file **stringoccurrence.o**. It displays the assembly code for the program, including the **.DATA** section for strings 'a' and 'b', the **.TEXT** section with instructions for loading registers, moving values, and looping, and the **count:** and **final:** labels. The code is color-coded and includes memory addresses for each instruction.