

ARM Processor – Programming

Lecture on ARM7 Assembly program

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Program Structure

AREA RESET, DATA, READONLY

; COMMENTS

AREA PROGRAM1, CODE, READONLY

; CODE SECTION

[Variable declaration _ Section]

ENTRY

[Initialization _ Section]

[Instruction _ Section]

END

Program to perform addition

AREA RESET, DATA, READONLY

AREA PROGRAM1, CODE, READONLY

num1 equ 5

num2 equ 5

ENTRY

MOV R2, #num1

MOV R3, #num2

ADD R1, R2, R3

ST1 B ST1

END

Program to move a block of data

AREA RESET, DATA, READONLY ; Program code should be stored from 0x00 location of ROM

AREA PROGRAM1, CODE, READONLY

num equ 0x0A

ENTRY

MOV R2, #num

LDR R0, =SOURCE

LDR R1, =DEST

UP LDRB R3, [R0], #01
STRB R3, [R1], #01

SUBS R2, R2, #01

BNE UP

STOP B STOP

AREA SOURCE, DATA, READWRITE

DCB 0X10, 0X20, 0X30, 0X40, 0X50, 0X60, 0X70, 0X80, 0X90, 0X0A

AREA DEST, DATA, READWRITE

SPACE 0X20

END

Program to Search an element in an array

AREA RESEAREA SEARCH1 , CODE, READONLY

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ENTRY                                     ;Mark first instruction to execute
START

    MOV R1,#1                           ; INITIALISE COUNTER TO 1(N=6)
    LDR R2,=TABLE                        ; LOADS THE ADDRESS OF FIRST VALUE
    MOV R5,#0                           ; MAKE THE POSITION TO 0
LOOP   LDR R4,[R2],#4                    ; WORD ALIGN TO ARRAY ELEMENT
    LDR R3,VALUE                         ; VALUE TO BE FIND
    CMP R4,R3                           ; COMPARE VALUE & STORED ARRAY
    BEQ FOUND                           ; VALUE MATCHED WITH STORED ARRAY STOP
    ADD R1,R1,#1                        ; INCREMENT COUNTER
    CMP R1,#7                           ; IF GIVEN VALUE NOT FOUND IN ARRAY IT ENDS HERE (NUM OF ELEMENTS)
    BEQ     NOTFOUND                    ; NOT FOUND
    BNE LOOP                            ; LOOK BACK TILL ARRAY ENDS
FOUND  MOV R5,R1                        ; POSITION OF SEARCHED ELEMENT IN ARRAY
    B stop

NOTFOUND  MOV R5,#0x00000000

stop     B stop

VALUE    DCD 0X1234BBBB                 ; GIVEN NUMBER          TO BE SEARCHED

TABLE    DCI 0X11110202,0X22220101,0XAAAA1234,0XABCD1234,0X1234BBBB,0XABCDCCCC; ARRAY OF 32 BIT NUMBERS(N=6)

END

T, DATA, READONLY                    ; Program code should be stored from 0x00 location of ROM
```