

Experiment 13

Aim:

To write an ARM Assembly Language to implement the equations

- $ax^2 + by^2$
- $6(x+y)+2z+4$

Tool Used: Keil uVision4

Equation 1 Code

```
        AREA PROGRAM, CODE, READONLY

        ENTRY
MAIN
        LDR R0, X
        LDR R1, Y
        LDR R2, A
        LDR R3, K
        MUL R4,R1,R1 ; y^2
        MUL R5,R0,R0 ; x^2
        MUL R6,R3,R4 ; ky^2
        MUL R7,R5,R2 ; ax^2
        ADDS R8,R7,R6 ; ax^2 + ky^2
        ADDCS R9,R9,#1
        SWI &11

        AREA PROGRAM, DATA, READONLY
X DCD &3
Y DCD &1
A DCD &2
K DCD &2
END
```

Output:

The expected result 14 is displayed in R8.

Registers	
Register	Value
Current	
R0	0x00000003
R1	0x00000001
R2	0x00000002
R3	0x00000002
R4	0x00000001
R5	0x00000009
R6	0x00000002
R7	0x00000012
R8	0x00000014
R9	0x00000000
R10	0x00000000
R11	0x00000000
R12	0x00000000
R13 (SP)	0x00000000
R14 (LR)	0x0000002C
R15 (PC)	0x00000024
CPSR	0x000000D3
SPSR	0x000000D3
User/System	

Equation 2 Code

```

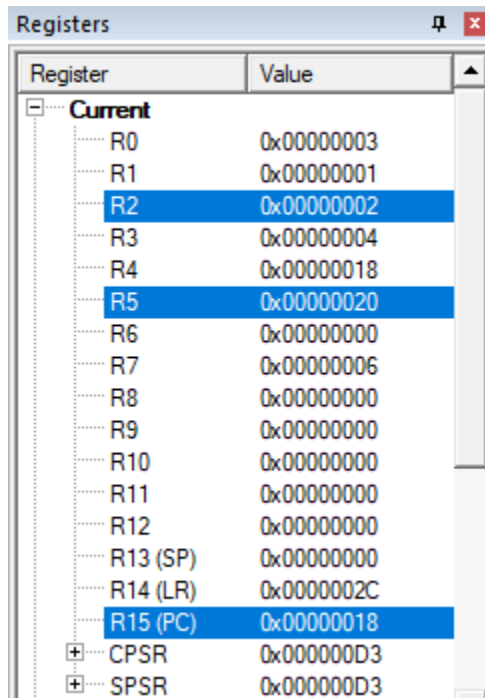
        AREA PROGRAM, CODE, READONLY
ENTRY
MAIN
        LDR R0, X
        LDR R1, Y
        LDR R2, Z
        MOV R7, #6;
        ADD R3,R0,R1 ; X+Y
        MUL R4,R3,R7 ; 6(X+Y)
        MOV R2,R2,LSL #1 ; 2Z
        ADDS R5,R2,R4 ; 6(X+Y) + 2Z
        ADDCS R5,R5,#5;
        ADDCC R5,R5,#4;
        SWI &11

        AREA PROGRAM, DATA, READONLY
X DCD &3
Y DCD &1
Z DCD &2
END

```

Output:

The expected result 20 is displayed in R5.



Register	Value
Current	
R0	0x00000003
R1	0x00000001
R2	0x00000002
R3	0x00000004
R4	0x00000018
R5	0x00000020
R6	0x00000000
R7	0x00000006
R8	0x00000000
R9	0x00000000
R10	0x00000000
R11	0x00000000
R12	0x00000000
R13 (SP)	0x00000000
R14 (LR)	0x0000002C
R15 (PC)	0x00000018
CPSR	0x000000D3
SPSR	0x000000D3

Result:

The experiment to implement both the equations is found valid and correct.