

## 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 ; k*y^2
        MUL R7,R5,R2 ; a*x^2
        ADDS R8,R7,R6 ; a*x^2 + k*y^2
        ADDCS R9,R9,#1
        SWI &11

        AREA PROGRAM, DATA, READONLY
X DCD &8
Y DCD &4
A DCD &2
K DCD &3
END
```

### Output:

```
Running with Code Size Limit: 32K
Load "C:\\Users\\User\\Documents\\Code-sync\\Keil\\ARM\\E:

*** Restricted Version with 32768 Byte Code Size Limit
*** Currently used: 60 Bytes (0%)
```

The expected result B0 is displayed in R8.

Current	
R0	0x00000008
R1	0x00000004
R2	0x00000002
R3	0x00000003
R4	0x00000010
R5	0x00000040
R6	0x00000030
R7	0x00000080
R8	0x000000B0
R9	0x00000000
R10	0x00000000
R11	0x00000000
R12	0x00000000
R13 (SP)	0x00000000
R14 (LR)	0x0000002C
R15 (PC)	0x00000018
CPSR	0x000000D3
SPSR	0x000000D3

## 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
```

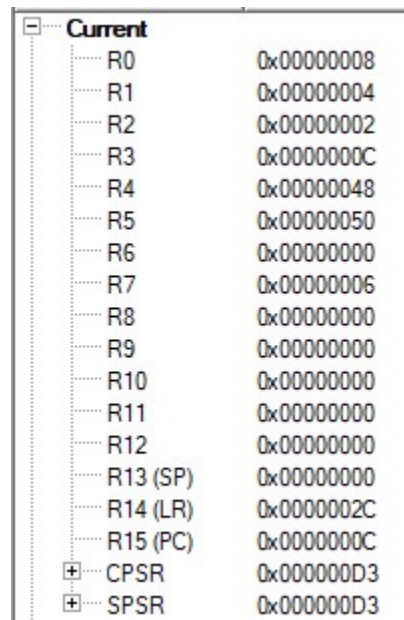
```
AREA PROGRAM, DATA, READONLY
X DCD &8
Y DCD &4
Z DCD &2
END
```

## Output:

```
Running with Code Size Limit: 32K
Load "C:\\Users\\User\\Documents\\Code-sync\\Keil\\ARM\\Experiment 13\\eqn.axf"

*** Restricted Version with 32768 Byte Code Size Limit
*** Currently used: 56 Bytes (0%)
```

The expected result 50 is displayed in R5.



Current	
R0	0x00000008
R1	0x00000004
R2	0x00000002
R3	0x0000000C
R4	0x00000048
R5	0x00000050
R6	0x00000000
R7	0x00000006
R8	0x00000000
R9	0x00000000
R10	0x00000000
R11	0x00000000
R12	0x00000000
R13 (SP)	0x00000000
R14 (LR)	0x0000002C
R15 (PC)	0x0000000C
+ CPSR	0x000000D3
+ SPSR	0x000000D3

## Result:

The experiments to implement the equations is found valid and correct.