University of Dhaka

Department of Computer Science and Engineering

CSE-3113 : Microprocessor and Assembly Lab

Lab Report 3: Register Based Assembly Programming for Arithmetic Operation

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Submitted On :

01 February, 2023

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1 Objectives

The objectives of this lab is to understand and have familiarize with register based assembly programming for Cortex M4 processor for arithmetic(Addition,Subtraction, Multiplication) operation.

2 What to do?

The lab has the following tasks:

(1) Write a simple program to calculate: P = Q + R + S. Let Q = 2, R = 4, S = 5. Assume that r1 = Q, r2 = R, r3 = S. The result P will go in r0.

(2) Write a simple program to calculate: P = Q - R. Assume that r1 = Q, r2 = R, and Q¿R. The result P will go in r0.

(3) Write a simple program to calculate: P = Q - R- S. Let Q = 12, R = 4, S = 5. Assume that r1 = Q, r2 = R, r3 = S. The result P will go in r0.

(4) Write a simple program to calculate: P = Q x R. The result P will go in r0.

(5) This problem is same as the problem 1. W = X + Y + Z . Once again, let X = 9, Y = 8, Z = 5 and we assume that r4 = X, r3 = Y, r2 = Z. In this case, you will put the data in memory in the form of constants before the program runs.

3 Problem 1

```
        AREA problem1, CODE, READONLY
        ENTRY
        EXPORT main
main
    MOV r1, #8
    MOV r2, #-2
    MOV r3, #1
    ADD r4, r1, r2
    ADD r0,r4,r3
Stop B Stop
    END
```

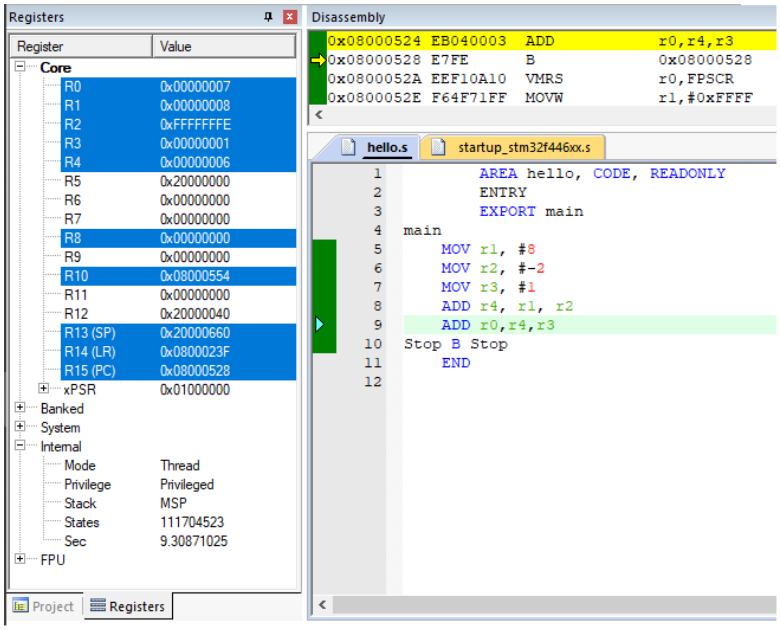

Figure 1: Problem 1 screenshot of solution and debugging

4 Problem 2

```
      AREA test, CODE, READONLY
     ENTRY
     EXPORT main
main
  MOV r1, #6
  MOV r2, #-1
  SUB r0, r1, r2
Stop  B Stop
  END
```

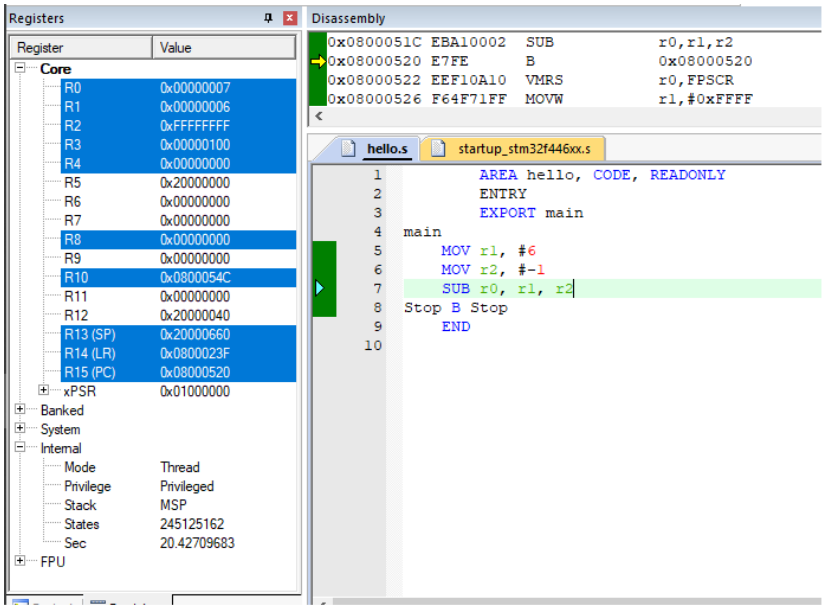

Figure 2: Problem 2 screenshot of solution and debugging

5 Problem 3

```
        AREA problem3, CODE, READONLY
        ENTRY
        EXPORT main
main
    MOV r1, #4
    MOV r2, #10
    MOV r3, #-2
    SUB r4,r1,r2
    SUB r0,r4,r3
Stop B Stop
    END
```

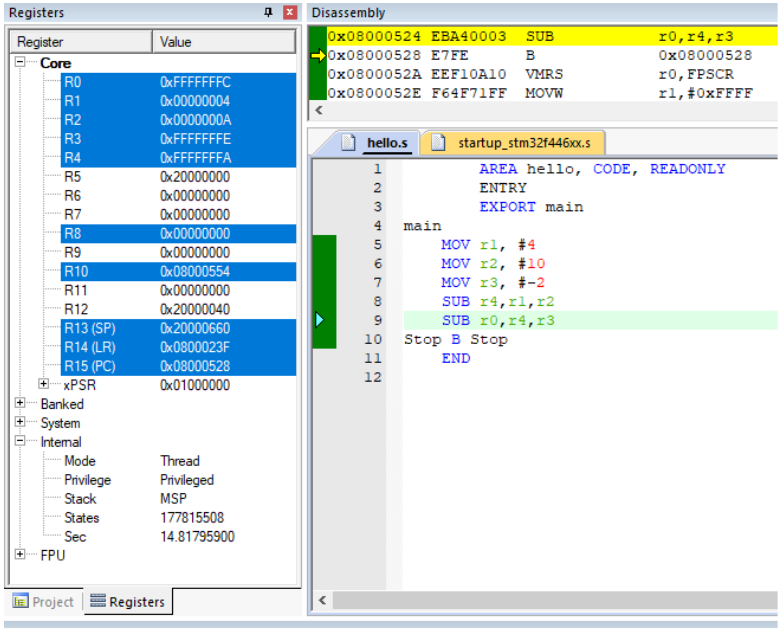

Figure 3: Problem 3 screenshot of solution and debugging

6 Problem 4

```
        AREA problem4, CODE, READONLY
        ENTRY
        EXPORT main
main
    MOV r1, #-3
    MOV r2, #6
    MUL r0, r1, r2
Stop B Stop
    END
```

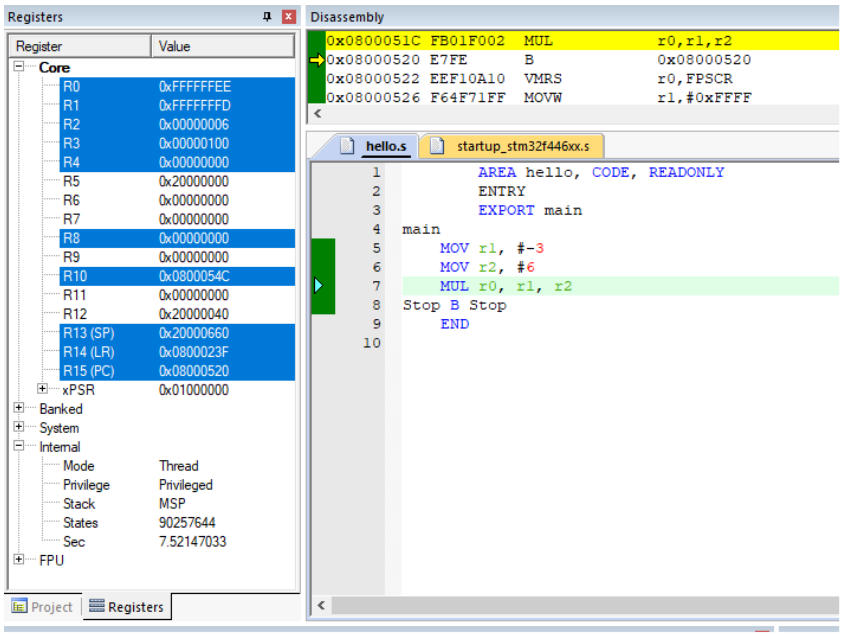

Figure 4: Problem 4 screenshot of solution and debugging

7 Problem 5

```
        AREA hello, CODE, READONLY
        ENTRY
        EXPORT main
main
      MOV r4, #-3
      MOV r3, #-2
      MOV r2, #10
      ADD r5,r4,r3
      ADD r0,r5,r2
Stop B Stop
    END
```

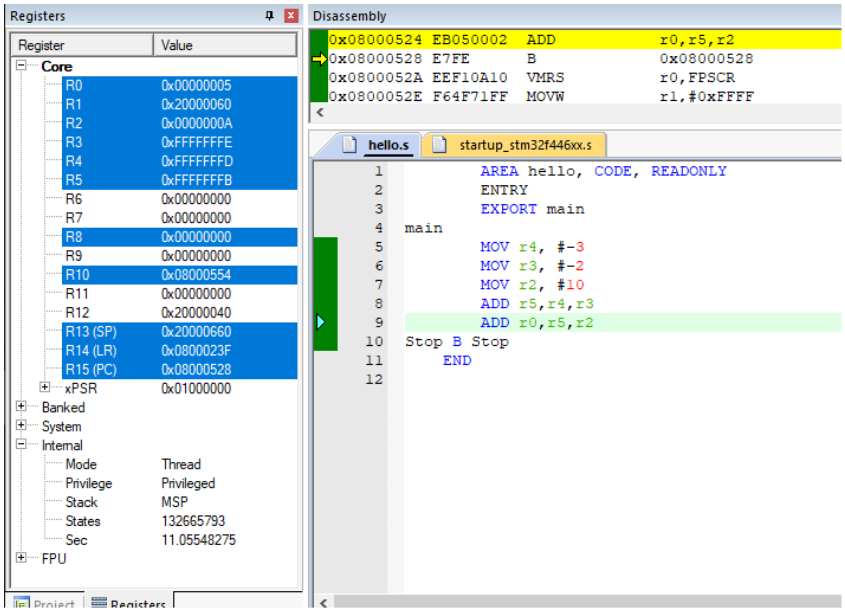

Figure 5: Problem 5 screenshot of solution and debugging