University of Dhaka

Department of Computer Science and Engineering

CSE-3113 : Microprocessor and Assembly Language Lab

Lab 3

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1 Objectives

The objective this lab is to teach The basics of low-level programming and computer architecture and the use of assembly language to write simple programs that interact with computer hardware.

2 Lab Questions

2.1 Problem 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.

```
    AREA lABprob, CODE, READONLY
    ENTRY
    EXPORT main
main
        MOV r1, #2
        MOV r2, #4
        MOV r3, #5
        ADD r0,r1,r2
        ADD r0,r0,r3
STOP B STOP
    END
```

Listing 1: Adding 3 Numbers

2.2 Problem 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

```
    AREA lABprob, CODE, READONLY
    ENTRY
    EXPORT PROB2
PROB2
        MOV r1, #8
        MOV r2, #4
        SUB r0,r1,r2
STOP B STOP
    END
```

Listing 2: Subtracting 2 Numbers

2.3 Problem 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.

```
    AREA lABprob, CODE, READONLY
    ENTRY
    EXPORT PROB3
PROB3
        MOV r1, #12
        MOV r2, #4
        MOV r3, #5
        SUB r0,r1,r2
        SUB r0,r0,r3
STOP B STOP
    END
```

Listing 3: Subtracting 3 Numbers

2.4 Problem 4

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

```
    AREA lABprob, CODE, READONLY
    ENTRY
    EXPORT PROB4
PROB4
        MOV r1, #8
        MOV r2, #4
        MUL r0,r1,r2
STOP B STOP
    END
```

Listing 4: multiplying 2 Numbers

2.5 Problem 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.

```
1     AREA lABprob, CODE, READONLY
2     ENTRY
3     EXPORT PROB5
4  X EQU 9
5  Y EQU 8
6  Z EQU 5
7  PROB5
8           MOV r4, #X
9           MOV r3, #Y
10          MOV r2, #Z
11          ADD r0,r3,r4
12          ADD r0,r0,r2
13 STOP B STOP
14    END
```

Listing 5: adding 3 Numbers