

## Homework #3.

### 010.133 Digital Computer Concept and Practice

**Due : 8:00PM, April 24, 2013**

1. Write the RTL code to solve a problem with these conditions.

- X is stored in memory address 0x1000, Y is stored in memory address 0x1004
- X, Y is stored with 2's complement representation.
- Compute  $5X - Y$  and store in memory address 0x1008

2. Explain how this microoperation operates according to the following control word. (Give description for each control bit)

| AA                     |   |   | BA |   |   | DA |   |   | AS                    | BS | FS |   |   |   |   | DS | RW | MW |
|------------------------|---|---|----|---|---|----|---|---|-----------------------|----|----|---|---|---|---|----|----|----|
| 0                      | 1 | 0 | 1  | 0 | 1 | 0  | 1 | 1 | 0                     | 1  | 0  | 1 | 1 | 0 | 1 | 0  | 1  | 0  |
| Constant <sub>in</sub> |   |   |    |   |   |    |   |   | Address <sub>in</sub> |    |    |   |   |   |   |    |    |    |
| 0xF00A003C             |   |   |    |   |   |    |   |   | 0x000010FF            |    |    |   |   |   |   |    |    |    |

3. Answer the questions according to the following assembly code.

|     |     |            |
|-----|-----|------------|
|     | MOV | R0, #0     |
|     | MOV | R1, #100   |
| L : | ADD | R1, R1, #3 |
|     | LDR | R2, [R1]   |
|     | ADD | R0, R0, R2 |
|     | CMP | R1, #109   |
|     | BNE | L          |

- ① How many cycles does it take?
- ② How many ALU results are selected by DS?
- ③ Write the values of Memory Address bus for each cycle.