Lab B-03: Programming Exercise 1
The following questions are to be completed in the Lab, and included in the report.

1. Specify the register contents and the status bits as the following instructions are executed.

```
EOR R0, R0, R0
MOV R1, #0xFFFFFFFF
MOV R2, #0x00000066
ADDS R1, R1, #0x01
SUBS R0, R0, #0x01
ADD R0, R0, R1
SUBS R0, R0, #0x86
ORRS R0, R0, R2
END
```

Verify your results by executing the above instruction in the simulator in step forward mode and examining various registers after each step.

2. Write ARM instructions to do the following:

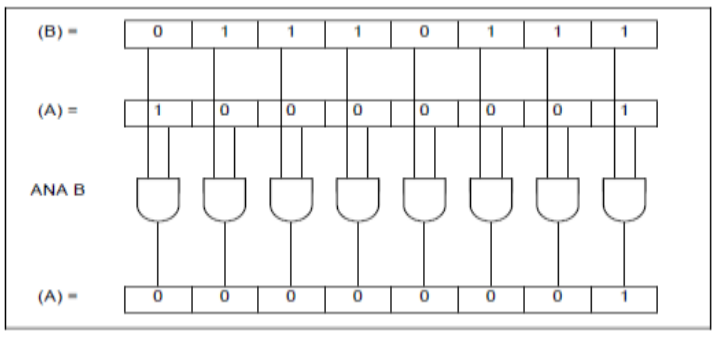
i) Load the number 30H in R1 and 39H in R2
ii) Subtract 39H from 30H using R1 and R2 (30H – 39H)
iii) Store the result in memory address 7500H

3. Write instructions to

i) Clear R0,
ii) Load the data bytes 8EH in R10 and F7H in R12.
iii) Obtain only the low order 4 bits from both data bytes (Hint: logical mask)
iv) Exclusive OR the masked bytes
v) Store the result in a memory location

Verify your theoretical result by executing the program in step forward mode.

The following questions are to be included in the report only.
4. To conserves energy and to avoid an electrical overload on a hot afternoon, implement the following procedures to control the appliances through the house. Assume that the control switches are located in the kitchen and they are available to anyone in the house.



Write ARM instructions to do the following:

i) Turn on the air conditioner if switch S_7 of the input port 00H is on.
ii) Ignore all other switches of the input port even if someone attempt to turn on other appliances.
iii) Simulate the output at memory location 7500H

5. Given the following register and memory values, what values do the following ARM instructions load into R0? Assume instructions are not related.

Address 1040 contains 0x40
Address 2040 contains 0x50
R0 contains 0x0020
R1 contains 0x0040
R2 contains 0x1000
R3 contains 0x0020
R4 contains 0x2000

i) MOV R0, #0x20
ii) ADD R0, R1, R3
iii) MOV R0, R2
iv) LDR R0, [R2, #0x40]
v) STR R0, [R2]
vi) LDR R0, [R4, R1]

6. Specify the flag status if the following ARM instructions are executed:

```
EORS R0, R0, R0
SUB R0, R0, #0x01
MOV R1,#0xFFH
ADDS R1, R1, #0x01
```