微處理機 LAB 1

110611052 郭宗諺
110611063 林穎沛

PART 1. (50%)

1. 查閱 programming manual，寫出 MOV，STR，LDR 用法與差異。(30%)

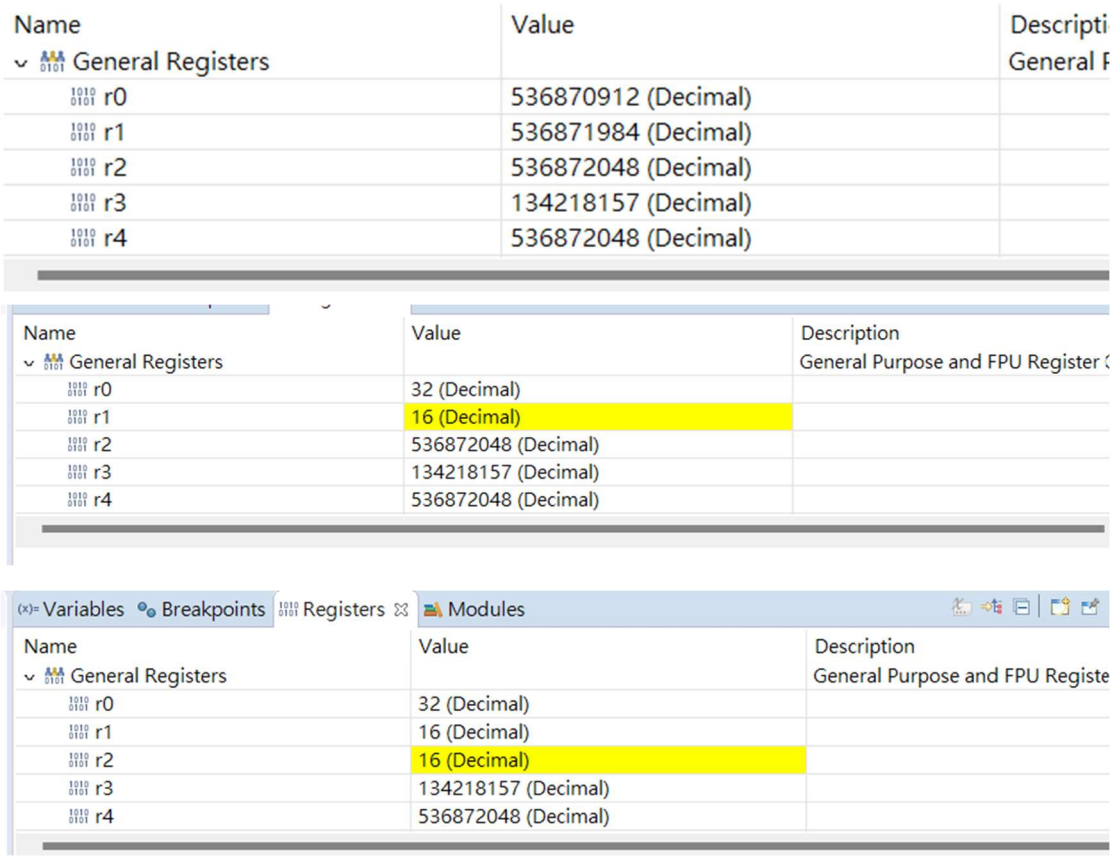
MOV: copies the value of operand2 into operand1 MOV r0, r1 //copies the value of r1 into r0
STR: Store register to memory. STR r0, [r1] //store the value in r0 to the register which has address r1
LDR: load register with a value from memory. LDR r0, [r1] //loads r0 from the address in r1.

2. 舉一個暫存器間接定址法的程式碼並說明其運作過程。(20%)

```
MOV r1, #6   //將數值 6 存入 r1 暫存器
LDR r0, [r1]  //將 r1 暫存器的 address 存入 r0
```

PART 2. (50%) 實作題 請完成實驗 截圖紀錄實驗結果並附上程式碼

1. 組內組員，一人一題 (50%)
   a. 用組合語言寫出 20H - 10H 並在 register 中追蹤其數值相加變化



Name	Value	Descripti
General Registers		General F
r0	536870912 (Decimal)	
r1	536871984 (Decimal)	
r2	536872048 (Decimal)	
r3	134218157 (Decimal)	
r4	536872048 (Decimal)	

Name	Value	Description
General Registers		General Purpose and FPU Register
r0	32 (Decimal)	
r1	16 (Decimal)	
r2	536872048 (Decimal)	
r3	134218157 (Decimal)	
r4	536872048 (Decimal)	

Variables | Breakpoints | Registers | Modules

Name	Value	Description
General Registers		General Purpose and FPU Registe
r0	32 (Decimal)	
r1	16 (Decimal)	
r2	16 (Decimal)	
r3	134218157 (Decimal)	
r4	536872048 (Decimal)	

```
    .syntax unified
    .cpu cortex-m4
    .thumb

.text
    .global main
    .equ AA, 0x55

main:
    movs r0, #0x20
    movs r1, #0x10
    sub r2, r0, r1
      B main
```

b. 用組合語言寫出 5H x 9H　並在 register 中追蹤其數值相加變化
(請分別擷取計算前 register 中的值及計算後之值的變化)

r0	536870912 (Decimal)	
r1	536871984 (Decimal)	
r2	536872048 (Decimal)	
r3	134218157 (Decimal)	
r4	536872048 (Decimal)	

Name	Value	Description
General Registers		General Purpose and FPU Register Group
r0	5 (Decimal)	
r1	9 (Decimal)	
r2	536872048 (Decimal)	

General Registers		General Purpose and FPU Register Group
r0	5 (Decimal)	
r1	9 (Decimal)	
r2	45 (Decimal)	

```
    .syntax unified
    .cpu cortex-m4
    .thumb

.text
    .global main
    .equ AA, 0x55

main:
    movs r0, #0x05
    movs r1, #0x09
    mul r2, r0, r1
    B main
```

PART 3. 加分練習，不計入平常成績

Fibonacci serial:　宣告一數值 N (1≤N≤100)，計算 Fib(N)並將回傳值存放至 R4 暫存器

Tips: Fib(0) = 0 ; Fib(1) = 1 ; Fib(N) = Fib(N-1) + Fib(N-2) for N>1

```
    .syntax unified
    .cpu cortex-m4
    .thumb

.text
    .global main

FIB:
    cmp r3, r4
    bge OUTFIB

    add r2, r1, r0
    movs r0, r1
    movs r1, r2
    add r3, r3, #1
    B FIB
OUTFIB:
main:
    movs r0, #0  //a0
    movs r1, #1  //a1
    movs r2, #0
    movs r3, #0  //i
    movs r4, #8 //N
    B FIB

    B main
```