# Assembly Language Programming Homework 2

Total number of problems: 3 Fall 2025

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1. Fill in the blanks with RV32I RISC-V assembly instructions to assemble the C code for integer operation below. Assume that the variables a, b, and c are stored in the registers `t0`, `t1`, and `t2`. 아래의 C정수 연산 코드를 RV32I RISC-V 어셈블리 코드로 변환하시오 변수 a, b, c는 레지스터 `t0`, `t1`, `t2`에 저장되어 있다고 가정한다.

(a) a = b + 2*c;

```
1) li t3, ( 2 )
2) mul t4, ( t3 ), t2
3) add ( t0 ), ( t1 ), t4
```

(b) a = 4*b-c%7

```
1) li t3, ( 4 )
2) mul t4, ( t3 ), t1
3) li  t3, ( 7 )
4) ( rem ) t5, ( t2 ), t3
5) ( sub ) t0, ( t4 ), ( t5 )
```

2. Convert the following RISC-V assembly instructions into binary machines codes by filling in the blanks. 빈 칸을 채워 아래의 RISC-V 어셈블리 명령어를 2진 기계어로 변환하시오.

(a) `andi t2, s0, 132`

( 0000 10000 100 ) ( 01000 ) 111 ( 00111 ) 0010011

20-31th bits 15-19th bits 7-11th bits

132 = 128 + 4

(b) `mul t1, s5, s6`

( 0000001 ) ( 10110 ) ( 10101 ) 000 ( 00110 ) 0110011

25-31th bits 20-24th bits 15-19th bit 7-11th bits

mul.

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3. Assume that the RISC-V assembly code in the right table is executed with the register values given as in the left table. 오른쪽 RISC-V 어셈블리 코드가 왼쪽의 레지스터 초기 값으로 실행된다고 가정하자.

| Register | value |
|---|---|
| t0 | 55 |
| t1 | 47 |

t2 -55 40.

blt -55 < 47 ok.

li t2 40

```
Instructions
        sub t2, zero, t0
        blt t2, t1, label1
        addi  t2, t1, 30
        j default
label1: li  t2, 40
default: ~.
```

Write the result of executing the assembly code above by filling in the blanks of the table below. 위의 어셈블리 코드를 실행했을 때의 결과를 아래 테이블에 적으시오.

| Register values at 'default' | |
|---|---|
| t0 | 55 |
| t1 | 47 |
| t2 | 40 |