Lab 3
Assembly Lab II
Exercise & Report Format

Exercise 1 : Factorial

1. Write assembly code of factorial according to the C code (ex1.c)
   (You can get hint from example of Variable Multiplication & Termial in Lab3 ppt)
2. The assembly code need to include function call and recursion.
3. Write comment line-by-line like Lab3 ppt.

```c
int factorial(int n) {
    if (n == 1) return 1;
    return n * factorial(n-1);
}

int main() {
    int n = 10;
    int result = factorial(n);
    return 0;
}
```

Termial example in Lab3 ppt doesn't consider $n \leq 0$
you need to do that :
factorial ($n < 0$) => -1
factorial ($n == 0$) => 0! = **1**
factorial ($n > 0$) => n!

test data ➡

```
.data
test1: .word -10
test2: .word 0
test3: .word 1
test4: .word 5
test5: .word 10

.text
    li    ra, -1
main:
```

Exercise 2 : Power

1. Write assembly code of power according to the C code (ex2.c)
2. Write comment line-by-line like Lab3 ppt.

```c
int power(int base, int exponent) {
    // ...
}

int main() {
    int base = 2;
    int exponent = 3;
    int result = power(base, exponent);
    return 0;
}
```

- $2 \times 3 = 2 + 2 + 2$ => loop of addition
- $2^3 = 2 \times 2 \times 2$ => loop of multiplication

test data 

```
.data
test1: .word 0, 5
test2: .word 5, 0
test3: .word 1, 9
test4: .word 9, 1
test5: .word 3, 8
test6: .word 10, 2
test7: .word -1, 2
test8: .word -1, 3
test9: .word -3, 0
test10: .word -5, 5

.text
    li    ra, -1
main:
```

0^5
5^0
1^9
$(-5)^5$