

Exercise #03

- You don't need to turn in your homework, but you should practice all problems because they may probably appear in the later exam. 作業自己練習不用交，之後考試可能會出現類似題目

Problem 1.

- (Factorial) The factorial of a nonnegative integer n is written $n!$ (pronounced “n factorial”) and is defined as follows:

$$n! = n \cdot (n - 1) \cdot (n - 2) \cdot \dots \cdot 1 \text{ (for values of } n \text{ greater than or equal to } 1\text{)} \\ \text{and } n! = 1 \text{ (for } n = 0\text{).}$$

For example, $5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$, which is 120.

- Write a while-loop program that reads a nonnegative integer and computes and prints its factorial repeatedly. Input 0 to end the program. You should validate whether or not the input is a nonnegative integer.

Problem 2.

- Write a program that computes the value of e^x by using the formula:

$$e^x = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots$$

- Hint: $\text{pow}(x, y) = x^y$, `#include<math.h>`

Problem 3.

- **Fibonacci sequence:** Write a while-loop program that inputs a positive integer n , output the n -th value of the Fibonacci sequence. For example, if n is associated with the value 8 then result would be associated with 21. **Input 0 to end the program. You should validate whether or not the input is a nonnegative integer.**

Problem 4.

- Write a while-loop program that reads a nonnegative integer and computes and prints *the answers of* $1! + 2! + \dots + n!$ repeatedly. **Input 0 to end the program. You should validate whether or not the input is a nonnegative integer.**