

# Class Exercise (1)

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- Write a program of the sum of all digits of a number
  - E.g., for 234 the sum is 9

# Class Exercise (2)

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- Write a program in C++ to asked user to input positive integers to process count, maximum, minimum, and average or terminate the process with -1

# Class Exercise (3)

- Write a program in C++ to make such a pattern like a pyramid with numbers increased by 1

Input number of rows: 4

```
1
2 3
4 5 6
7 8 9 10
```

# Class Exercise (4)

- Write a program in C++ to find the frequency of each digit in a given integer
- Sample Output:  
Input any number: 122345  
The frequency of 0 = 0  
The frequency of 1 = 1  
The frequency of 2 = 2  
The frequency of 3 = 1  
The frequency of 4 = 1  
The frequency of 5 = 1  
The frequency of 6 = 0  
The frequency of 7 = 0  
The frequency of 8 = 0  
The frequency of 9 = 0

# Solution

```
#include <iostream>
using namespace std;
int main()
{
    int n, i, j, ctr, r;
    cout << "\n\n Find frequency of each digit in a given integer:\n";
    cout << "-----\n";
    cout << " Input any number: ";
    cin >> n;
    for (i = 0; i < 10; i++)
    {
        cout << "The frequency of " << i << " = ";
        ctr = 0;
        for (j = n; j > 0; j = j / 10)
        {
            r = j % 10;
            if (r == i)
            {
                ctr++;
            }
        }
        cout << ctr << endl;
    }
}
```

# Class Exercise (5)

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- Write a C++ program to find the largest element of a given array of integers
- Write a C++ program to sort a given unsorted array of integers

# Class Exercise (6 - 7)

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- Given two arrays of integers, write a program that gives the unions of two arrays... the resulting array should contain all unique elements of both arrays.
- Write a C++ program to find the number of pairs of integers in a given array of integers whose sum is equal to a specified number

# Class Exercise (8)

- Implement a Cesar Cipher
  - Shift-key cipher

The encryption of Caesar cipher can be represented using modular arithmetic by first transforming the letters into numbers, according to the scheme, A = 0, B = 1,..., Z = 25. Encryption of a letter x by a shift n can be described mathematically as,

$$E_n(x) = (x + n) \mod 26.$$

Decryption is performed similarly,

$$D_n(x) = (x - n) \mod 26.$$

Plain Text	c	r	y	p	t	o	g	r	a	p	h	y
Alphabet Number + Key	2 + 3	17 + 3	24 + 3	15 + 3	19 + 3	14 + 3	6 + 3	17 + 3	0 + 3	15 + 3	7 + 3	24 + 3
Cipher Text	f	u	b	s	w	r	j	u	d	s	k	b