Objectives:

- Learn about security and cryptography using Caesar Cypher
- Learn about input and output file
- Use functions

Cryptography is a method of protecting data and communication by the use of codes in order to hide it from unauthorized users. The process of coding is called ***encryption***. The encryption process produces ***ciphertext***. The process of decoding is called ***decryption***. The decryption process produces the original ***plaintext***.

Plaintext	->	Encryption	->	Ciphertext	->	Decryption	->	Plaintext
Readable		Non-Readable						Readable

One of the oldest techniques used to code/encrypt messages is the Caesar Cipher. It works by shifting each character of a text by a known number of positions (*key*) down the character set. For example, if the key is 3 and the letter is 'A', it will be coded to ('A' + 3) = 'D'.

Step 1: Laboratory Preparation

Create a directory call `lab8` inside your `2400/Labs` directory. Do your work in this new directory.

Step 2: Program

Write a C++ program that encrypts/decrypt a file using Caesar Cypher. The program should be able to encrypt and decrypt all characters including white spaces. Start by displaying a menu of four choices:

1. Set the shift key value (default is 3)
2. Encrypt a file
3. Decrypt a file
4. Quit

The user should enter a shift key between 1 and 10.

Write the following functions:

- A function to display a menu.
- A function that obtains a key value between 1 and 10
- A function to encrypt. It should ask the user for the input file name and output file name, read text from the input file, and output the encrypted text to the output file.
- A function to decrypt. It should ask the user for the input file name and output file name, read text from the input file, and output the decrypted text to the output file.

Both encryption and decryption functions should take a *key* parameter. Print an error message if any of the files fail to open.

Encryption:

The shift key is used to modify each character by adding the key value to the character.

Decryption:

Reverses the process of encryption. The shift key is used to modify each character by subtracting the key value from the character.

Hints:

- Use inputStream.get() to read each character. This will allow you to read white spaces.

Use the following main program:

```
int main() {
    int choice, key;
    key = 3; //default
    do {
        displayMenu();
        cin >> choice;
        if (choice == 1) {
            // call the set key function and assign to key
        }
        else if (choice == 2) {
            //call the encryption function
        }
        else if (choice == 3) {
            //call the decryption function
        }
    } while(choice != 4);
    return 0;
}
```

Grading:

Programs that do not compile will earn zero points.
Programs that do not include the above functions will earn zero points.
Programs that use global variables other than constants will earn zero points.

Your grade will be determine using the following criteria:

- Correctness (90 points)
  - 10 points - print menu function
  - 20 points - obtain key function
  - 30 points - encrypt function
  - 30 points - decrypt function

- Style & Documentation (10 points)

Submit your program on Blackboard under *Lab 8* assignment.