Lab 5

Goals-

Refine requirements for a program using inheritance

Implement the requirements using polymorphism and OOP

A file filter reads an input file, transforms it in some way, and writes the results to an output file. Write an abstract file filter class that defines a pure virtual function for transforming a character. Then create a subclass for each of these transformations:

1. creates an unchanged copy of the original file
2. transforms each character in the file to uppercase
3. performs encryption

The class will have this member function:

```
void doFilter(ifstream &in, ofstream &out)
```

It is called to perform the actual filtering. It will read a character, transform it as required (#1, #2, or #3) using the `transform` function, and then write the character to the output file.

The member function for transforming a single character should have the prototype

```
char transform(char ch)
```

This will be the virtual function in the base class. You must also use it for #1 so think about what it will do in that case. It may not be changing the character but you must use the function.

The encryption class should have a constructor that takes an integer as an argument and uses it as the encryption key. The class must prompt the user to enter this integer key value. To encrypt a character, add the key to each character, take the result modulus 26 and write it to the output file.

You will read, transform, and write each character individually. You will not save them in your program or read all of them into an array or vector.

NOTE: Part one includes creating the base class. Please do it first! Save a copy. Then work on the others in order. As you get the new subclass working save a copy with a different name. This way you will not lose partial credit.

What to submit?

Your source code
Your makefile
One or more sample text files you used in testing
Submit all files in a zip file

Modular Grading

We are using modular grading. Each lab will be divided into specific modules. Each module will be graded pass/fail. It either works properly or it does not. 10% of every lab or assignment grade is style/comments or other elements of self-documenting code and clarity. Remember the labs are worth 10 points total.

Programming style- 1 point

Create the class hierarchy and demonstrate using the copy filter (#1)- 3 points

Create the uppercase subclass (#2)- 2 points

Create the encryption subclass (#3)- 2 points

Correctly open and close all files- 2 points