# CIS7 Project Documentation Guide

In the documentation, provide at least 2 pages (single-space) that contains the following components of your course project:

1. Team name, members.

NoobMaster69, Juan José Magaña-Paredes

1. Project Information and details: (30 points)

* What problems are you solving in this project?

In this project I am tasked with creating a Vigenère cipher encryption and decryption machine. The main problem I had in creating this project was figuring out how to set my validation limits and the formula to calculate the encryption and decryption process.

* What solutions are you implementing in the project?

My solution to the validation limits is to compress it as small as possible so I would avoid having to write an exponential amount of code. I set my menu limits to only accept either a digit from 1, 2, 3, or 4. For my validation with the input of a text, I set it to use isalpha to only take in alphabetical inputs and nothing else. As for my solution to the mathematical process of encrypting and decrypting a text, I used the formula that was given to me in the project description.

* Provide explanation of calculations and algorithm implementation.

The basic formula of Encryption is, the plain text (P) and key (K) are added modulo 26,

Ei = (Pi + Ki) mod 26. What this means is that the value of the letter in the text is going to be added to the value of the corresponding letter in the key, and then they will be mod to 26. What this means is, using the Vigenère cipher square, the letter of the text will cross with the letter of the key and form a new letter and the process will continue until the plain text is completely encrypted. The decryption formula is Di = (Ei - Ki + 26) mod 26. Very similar to the encryption only with this formula subtracting, rather than adding but the process of using the square is the same.

* What is the program objectives? Explain how your program is interacting with the user and its purpose.

The objective is to decrypt a message, encrypt a message, and learn how the Vigenère cipher square works. The program interacts with the user through a menu and gives the user the option to encrypt a text, decrypt a text, or to gain information on the Vigenère cipher square. The purpose of the menu is to create an organized environment for the user and to make the program easy to use.

* How is discrete structures implemented in the C++ program?

Discrete structures are implemented in this C++ program through the use of the mathematical process to encrypt and decrypt a text.

* What are the limitations of the program?

One of the limitations to this program is that during either the encryption or decryption process, if the user does not enter a single lined, alpha text, the user will be prompted of only doing such that, but if they continue to input the wrong text, the program will just continue rather than validate the input once again. As of now, with my knowledge, this is the only limitation that I am aware of. The menu validation works fine and will continue to validate for as long as the user inputs the wrong option.

* Provide recommendation on improving the limitations of the program.

I recommend on figuring out a way to fix the validation input for when the user inputs an improper form of text during the initial encryption and decryption process.

1. Flowchart AND Pseudocode. (30 points)

* Write the pseudocode for the program, from start to finish. Be sure to include decision-making branching.

**Prompt: - MENU**

User is prompted the tittle of the program: “vigenere cipher”, and is prompted the menu with 4 options.

**Option 1:**

This option is to encrypt a text where it will prompt the user to enter a text to encrypt and then they will need to input a key to encrypt and last, the program will give the user the new text.

**Option 2:**

This option is very similar, almost identical to the encryption processs in option 1, the only difference is that it will ask for a text to decrypt.

**Option 3:**

This option will demonstrate the vigenere cipher square and explain the process of encryption and decryption. Source cited from: <https://www.geeksforgeeks.org/vigenere-cipher/>

**Option 4:**

This option is to exit

* Use standard shapes for flowchart, be sure to include decision-making branching.

START:

Vigenere Title & Menu

If 1 input

If not 1, 2, 3, 4

Input Validation

END

Loop to menu

Input Option 3

Loop to menu

Input Option 4

Input Option 2

Input Option 1

Loop to menu

Input Option

If 4 input

If 2 input

If 3 input