1: Specification for Caesar Cipher Encryption and Decryption with a Key

The program starts with a main menu and prompts the user to choose from a set of options represented by characters. It accepts an uppercase or lowercase character from A to D. However, if the user enters any other alphabetic and non-alphabetic character not in the selection, it will return an error, and the program returns to main menu for reselection. The user can choose to exit the program any time by entering uppercase or lowercase ‘D’.

For processes that use a key, the program will prompt the user to enter a one-digit or two-digit integer from 0 to 25. If the key is beyond the (0-25, it wraps around and converts it to a (0-25) range. The key can also be entered as a one-digit uppercase or lowercase alphabetic character (A-Z). If the key entered is an integer with more than the maximum number of digits allowed (two), the program only reads in the first two digits as the chosen key. If the key is any other character, the key becomes 0, which means that the message shows as is.

For the first part of the program, the user can enter uppercase or lowercase ‘A’ for encryption with a key and uppercase or lowercase ‘B’ for decryption with a key. If encryption with a key is chosen, the program reads in the user’s desired key and the plaintext file. It checks if this input file exists and if it does not exist, it notifies the user that the file cannot be opened. Otherwise, it shows the plaintext message to the console. Next, the program prompts the user for an output file name, and the encryption process begins. This shows the encrypted message to the screen while saving it to the output file.

The process is the same for a cipher text decryption, except that the program reads in the cipher text to be converted and the right key to successfully convert the cipher text to a plain text. The plain text output filename is dependent on the user as well, and when the decryption process is done, it shows the message to the screen and saves it to the desired output file.

During the encryption or decryption process, text formatting for any resulting encrypted or decrypted message remains the same as the original (input file). Uppercase characters, when converted, stays uppercase, and lowercase characters stays lowercase. Only alphabetic characters are converted while non-alphabetic characters such as punctuation marks stays the same.