**Pseudocode**

Output message welcoming the user to a Vigenere Cipher tool program

Dynamic Memory Allocation

Initialize and Declare Variables

While running variable is true

Output sentence asking user whether to encrypt or decrypt

Input ‘e’ for encrypt or ‘d’ for decrypt

If input is not ‘d’, ‘D’, ‘e’, or ‘E’

Output sentence telling user they did not enter ‘e’ or ‘d’

Continue to execute next iteration of loop

Output sentences asking user to input message

Declare Variables

Do

Input temporary string for message

Append newline then append temporary string to get result

While temporary string is not empty

If Result is a newline

Return empty string

Return characters of result except the first

Output sentences asking user to input key

Declare Variables

Do

Input temporary string for key

Append newline then append temporary string to get result

While temporary string is not empty

If Result is a newline

Return empty string

Return characters of result except the first

Open output file and write results at its end only.

Case based on input for choosing to encrypt or decrypt

If input is ‘e’ or ‘E’

Output locked ASCII art and sentences stating encrypted message is displayed

Declare Variables

For index that is less than size of key

If each character in key is from alphabet

Add all its alphabet characters to keyAlpha

Else if not at the end of non-alphabet indexes when finding the characters within the key

Add all its non-alphabet characters to keyNonAlpha

Increment index

If no alphabetic characters are in key

Do not encrypt alphabetic characters in plain text

If no non-alphabetic characters are in key

Do not encrypt non-alphabetic characters in plain text

Create iterator for unordered map

For index that is less than plain text

If each character in plain text is from alphabet

Use iterator to find index of current alphabetic character from plain text

Assign character to column index

Use iterator to find index of current alphabetic character from the key

Assign character to row index

If character in plain text is lowercase

Use row and column indexes to search alpha matrix for cipher character, lowercase it, and add to encrypted message

Else

Use row and column indexes to search alpha matrix for cipher character and add to encrypted message

Increment total of alphabetic characters

Else if not at the end of non-alphabet indexes when finding the characters within plain text

Use iterator to find index of current non-alphabetic character from plain text

Assign character to column index

Use iterator to find index of current non-alphabetic character from the key

Assign character to row index

Use row and column indexes to search non-alpha matrix for cipher character and add to encrypted message

Increment total of non-alphabetic characters

Else

Do not change non-letter symbol and add it to encrypted message

Increment index

Return encrypted message

Output encrypted message

If output file is open

Output encryption separator, plain text, key, and encrypted message

Break statement

Else if input is ‘d’ or ‘D’

Output unlocked ASCII art and sentences stating decrypted message is displayed

Declare Variables

For index that is less than size of key

If each character in key is from alphabet

Add all its alphabet characters to keyAlpha

Else if not at the end of non-alphabet indexes when finding the characters within the key

Add all its non-alphabet characters to keyNonAlpha

Increment index

If no alphabetic characters are in key

Do not decrypt alphabetic characters in plain text

If no non-alphabetic characters are in key

Do not decrypt non-alphabetic characters in plain text

Create iterator for unordered map

For index that is less than plain text

If each character in plain text is from alphabet

Use iterator and key to get the row

Assign character to row index

For index that is less than size of matrix

If position in matrix using index and row is equal to the key

Return the index value

Return negative one

Uppercase character and assign it to column index

If character in cipher text is lowercase

Use initial and column indexes to search alpha matrix for plain character, lowercase it, and add to decrypted message

Else

Use initial and column indexes to search alpha matrix for plain character and add to decrypted message

Increment total of alphabetic characters

Else if not at the end of non-alphabet indexes when finding the characters within cipher text

Use iterator to find index of current non-alphabetic character from cipher text

Assign character to row index

For index that is less than size of matrix

If position in matrix using index and row is equal to the key

Return the index value

Return negative one

Assign character to column index

Use initial and column indexes to search non-alpha matrix for plain character and add to decrypted message

Increment total of non-alphabetic characters

Else

Do not change non-letter symbol and add it to decrypted message

Increment index

Return decrypted message

Output decrypted message

If output file is open

Output decryption separator, cipher text, key, and decrypted message

Break statement

Else

Break statement

If output file is open

Close the output file

Else

Output sentence stating the output file could not be written to

While input is not y, Y, n, or N

Output sentence asking user if they want to process another message

Input ‘y’ for yes or ‘n’ for no

If input is not y, Y, n, or N

Output sentence telling user they need to enter ‘y’ or ‘n’

Case based on input for choosing to yes or no

If input is ‘n’ or ‘N’

Output sentence saying goodbye to use

Running is now false

Break statement

Else

Output line of sharp symbols

Break statement

Delete Dynamic Memory