Course Project Part 2: Programming and Documentation

Project Information and details:

• What problems are you solving in this project?

1. Encrypting and decrypting user input with a Vigenere cipher.
2. Demonstrating the implementation of a basic cryptographic technique in C++

• What solutions are you implementing in the project?

1. User input, key generation, encryption, and decryption.

• Provide explanation of calculations and algorithm implementation.

1. Encryption formula: The plaintext(P) and key(K) are added modulo 26.

*(Ei = (Pi + Ki) mod 26)*

1. Decryption formula: Di = (Ei - Ki + 26) mod 26

• What is the program objectives? Explain how your program is interacting with the user

and its purpose.

1. The program’s objectives is to create a Vigenere cipher for encrypting and decrypting user input

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

1. By using cryptograph and modular arithmetic

• What are the limitations of the program?

1. Lower case must be converted with only alphabetic characters

• Provide recommendation on improving the limitations of the program.

1. Support for mixed characters

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

making branching

key generation:

FUNCTION keyGen(plaintext, input)

SET key TO input

WHILE length of key < length of plaintext

key = key + keyword

ENDWHILE

RETURN substring of key to match length of plaintext

END FUNCTION

Encryption:

FUNCTION encrypt(plaintext, key)

SET ciphertext TO ""

FOR i FROM 0 TO length of plaintext - 1

Calculate encryptChar = ((plaintext[i] - 'A') + (key[i] - 'A')) % 26 + 'A'

Append encryptChar to ciphertext

END FOR

RETURN ciphertext

END FUNCTION

Decryption:

FUNCTION decrypt(ciphertext, key)

SET plaintext TO ""

FOR i FROM 0 TO length of ciphertext - 1

Calculate decryptChar = ((ciphertext[i] - 'A') - (key[i] - 'A') + 26) % 26 + 'A'

Append decryptChar to plaintext

END FOR

Return plaintext

END FUNCTION

Main:

PROMPT

INPUT plaintext

INPUT keyword

CONVERT plaintext and keyword to uppercase

SET key to keyGen(plaintext, keyword)

SET ciphertext to encrypt(plaintext, key)

OUTPUT "Ciphertext: ", ciphertext

SET decryptedText TO decrypt(ciphertext, key)

OUTPUT "Decrypted text: ", decryptedText

END