CS 458 Fall 2024 - Coding assignment I

Due in Blackboard Assignment by Saturday, 9/14/2024 **at 11:59pm**

Objective

The objective of this assignment is to implement a simple encryption and decryption program in any programing language.

Program Features

(1) **Encryption:**
- Prompt the user to enter plaintext and a key.
- Use the entered key to perform encryption (e.g., Shift cipher).
- Display the resulting ciphertext.

(2) **Decryption:**
- Prompt the user to enter ciphertext and the corresponding key used for encryption.
- Use the entered key to perform decryption and retrieve the original plaintext.
- Display the decrypted plaintext.

(3) **Brute Force Attack:**
- Prompt the user to enter only the ciphertext (without the key).
- Implement a brute force attack to try all possible keys (shift values) for a Caesar cipher.
- Display all the possible plaintext results.

User Interaction

The program should display a menu with options for encryption, decryption, and brute force attack. The user can choose the desired operation by entering the corresponding option number.

Example Interaction

```
Choose an option:
1. Encryption
2. Decryption
3. Brute Force Attack

Enter your choice (1/2/3): 1

Enter plaintext: Hello World
Enter key: 3

Ciphertext: Khoor Zruog
```

Requirements

- The code should be well-documented, including comments explaining the logic of encryption, decryption, and the brute force attack.
- Ensure error handling for invalid inputs (e.g., non-numeric key, empty plaintext/ciphertext).

Submission

Students are required to submit a single PDF via Canvas, which should include:

1- The complete source code.
2- A detailed explanation of each function (Encryption, Decryption, Brute Force Attack).
3- Screenshots showing the code running in all modes and demonstrating the functionality of each part.