CS212: Project 1A

This project is about cryptographic encryption and decryption.

Part 1: Interfaces:

(1) Create two interfaces MessageEncoder and MessageDecoder.
(2) The MessageEncoder interface has a single abstract method `encode(plaintext)`, where `plaintext` is the message to be encoded. The method returns the encoded message.

Part 2: SubstitutionCipher class:

(3) Create a class SubstitutionCipher that implements the interface MessageEncoder.
(4) The constructor should have one parameter called `shift`.
(5) Define the method `encode` so that each letter is shifted by the value in `shift`.
   (For example, if `shift` is 3, a will be replaced by d, b will be replaced by e, c will be replaced by f, and so on.)
(6) Hint: You may wish to define a private method that shifts a single character.

Part 3: ShuffleCipher class:

(7) Create class ShuffleCipher that implements the interface MessageEncoder.
(8) The constructor should have one parameter called `n`.
(9) Define the method `encode` so that the message is shuffled `n` times.
(10) To perform one shuffle, split the message in half and then take characters from each half alternately. (For example, if the message is abcdefghi, the halves are abcde and fghi. The shuffled message is afbgchfghie.
(11) Hint: You may wish to define a private method that performs one shuffle.

Part 4:

(12) Finally write a program that uses these classes to encode a message.

Part 5:
This is optional for those of you who like the challenge of decoding.

1) Use the interface MessageDecoder that has a single method `decode(cipherText)`, where `cipherText` is the message to be decoded. This method returns decoded message.

2) Modify the classes SubstitutionCipher and ShuffleCipher so that they implement both MessageEncoder and MessageDecoder.
3) Write decode(cipherText) method and other required methods to decode the cipherText in both SubstitutionCipher class and ShuffleCipher class.

PART 6:

4) Finally write a method to both encode and decode messages using your classes.