

CS 105 – Homework #1 – Due Wednesday, March 23, 2022

In the following encryption problems, you may ignore all spaces and punctuation, and you may also treat all letters as case insensitive. In other words, you may use all capital letters. Please show all your work.

1. Write down a sentence from *The Code Book* that has at least four words. This will be a plaintext message. Use a transposition cipher to encrypt this message. Let the key value be five.
2. Let's consider the Vigenère cipher, and use the same plaintext message as the previous question. Encrypt this message, using your name as the key.
3. Now we will see why the Vigenère cipher is so confusing for the cryptanalyst to break. In this problem, you will again be using your name as the key. Find an example of a plaintext word or phrase in which the following situation takes place: two different plaintext letters become represented by the same ciphertext letter. You may use any words in the English language. Show the plaintext, ciphertext, and indicate the two letters that have matching ciphertext representations.
4. We'll repeat the previous question but this time look for something a little different. Use the Vigenère cipher using your name as the key again. Find an example of a plaintext word or phrase in which this situation takes place: the same letter occurs in two different places in the plaintext, but each time is represented by different letters in the ciphertext. Show the plaintext, ciphertext, and indicate the letters that are the same in plaintext but differ in the ciphertext.
5. Use a book cipher to encrypt the message "Furman won the game". As the key, use the first paragraph on page 120 in *The Code Book*. This is the paragraph that begins with "So, a key that is as long as the message ..."