C&NS Lab Assignment 3

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Batch B2

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Vigenere cipher

Vigener Cipher is another simple polyalphabetic substitution cipher. It is the same as the caesar cipher instead of an integer key it has a string key.

Plain text	z	a	e	a	d	d
key(abc)	a	b	c	a	b	c
Cipher text	z	b	g	a	e	f

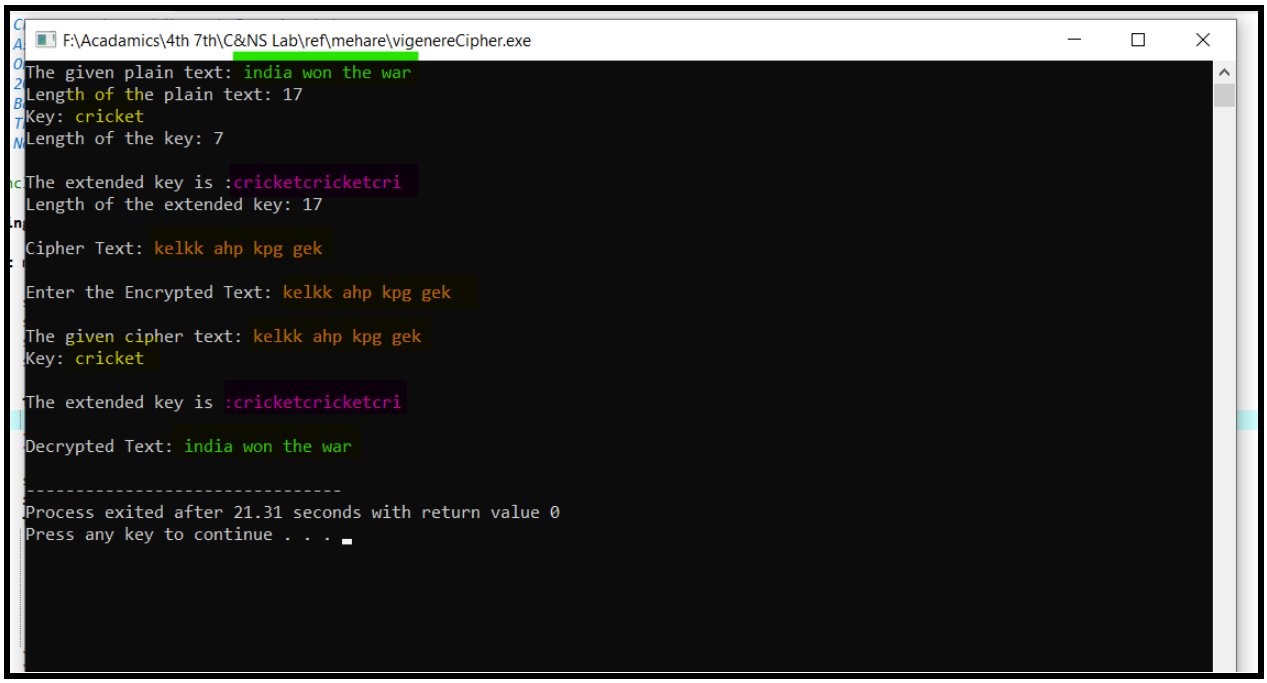
Code

vigenereCipher.cpp

```cpp
// Cryptography and Network Security Lab
// Assignment 3
// Onkar Gavali
// 2019BTECS00037
// Batch B2
// This programs demonstrates the vigenere cipher
// Note: length of key in vigenere cipher should be lesser than or equal to plain text

#include <iostream>

using namespace std;

int main() {

    string plainText = "india won the war";
    string key = "cricket";
    size_t keyLength = key.size();
    string extendedKey {};

    for(size_t i = 0; i < plainText.size(); i++){
        extendedKey += key[i%keyLength];
    }

    string cipherText{};
    int j = 0;
```

```
    for(size_t i = 0; i < plainText.size(); i++){
        if(plainText[i] == ' '){
            cipherText += ' ';
        }else{
            cipherText += (((plainText[i]-'a')+(extendedKey[j]-'a'))%26)+'a';
            j++;
        }
    }

    cout << "The given plain text: " << plainText << endl;
    cout << "Length of the plain text: " << plainText.length() << endl;
    cout << "Key: " << key << endl;
    cout << "Length of the key: " << key.length() << endl;
    cout << "\nThe extended key is :" << extendedKey << endl;
    cout << "Length of the extended key: " << extendedKey.length() << endl;
    cout << "\nCipher Text: " << cipherText << endl;

    string encryptedText{};
    string decryptedText{};
    cout << "\nEnter the Encrypted Text: ";
    getline(cin, encryptedText);

    j = 0;
    for(size_t i = 0; i < encryptedText.size(); i++){
        if(encryptedText[i] == ' '){
            decryptedText += ' ';
        }else{
            decryptedText += (((encryptedText[i] - 'a')-(extendedKey[j]-'a')+26)%26)+'a';
            j++;
        }
    }

    cout << "\nThe given cipher text: " << encryptedText << endl;
    cout << "Key: " << key << endl;
    cout << "\nThe extended key is :" << extendedKey << endl;
    cout << "\nDecrypted Text: " << decryptedText << endl;

    return 0;
}
```

Output



Conclusion

- Vigenere cipher is better than other early substitution ciphers. Brute force attacks were difficult to decode Vigenere cipher.
- Because the same characters in plaintext ciphered with the same character for each instance that character are quite rare makes it difficult to decrypt its code without the key.