21IT077

IMPLEMENTATION OF CRYPTOGRAPHIC SOLUTIONS USING SYMMETRIC ENCRYPTION

AIM: To implement Caesar Cipher, Shift Cipher and the Brute Force attack on Shift Cipher.

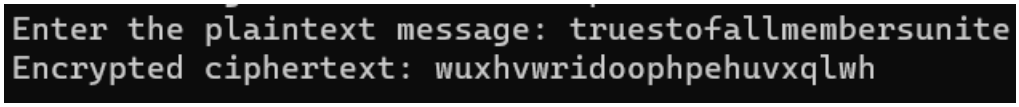
CODE:

CAESAR CIPHER

```
#include <iostream>
#include <string>
using namespace std;

string Encrypt(string message, int key) {
   string encryptedMessage = "";

   for (char ch : message) {
      if (isupper(ch)) {
         encryptedMessage += char(int(ch + key - 65) % 26 + 65);
      }
      else if (islower(ch)) {
         encryptedMessage += char(int(ch + key - 97) % 26 + 97);
      }
      else {
         encryptedMessage += ch;
      }
   }
   return encryptedMessage;
}

int main() {
   string plaintext;
   int key;
```

```
    cout << "Enter the plaintext message: ";
    getline(cin, plaintext);
    //Setting key to be 3 (for Ceasar Cipher)
    key=3;
    string ciphertext = Encrypt(plaintext, key);
    cout << "Encrypted ciphertext: " << ciphertext << endl;
    return 0;
}
```

OUTPUT:



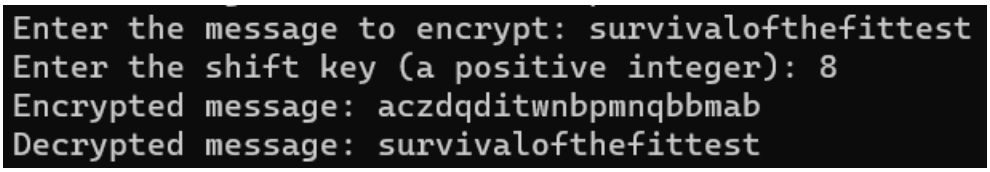
SHIFT CIPHER

```
#include <iostream>
#include <string>
using namespace std;

string encrypt(string plaintext, int shift) {
    string encryptedText = "";
    for (size_t i = 0; i < plaintext.length(); i++) {
        if (isupper(plaintext[i]))
            encryptedText += char(int(plaintext[i] + shift - 65) % 26 + 65);
        else if (islower(plaintext[i]))
            encryptedText += char(int(plaintext[i] + shift - 97) % 26 + 97);
        else
            encryptedText += plaintext[i];
    }
    return encryptedText;
```

```
}

string decrypt(string ciphertext, int shift) {
    string decryptedText = "";
    for (size_t i = 0; i < ciphertext.length(); i++) {
        if (isupper(ciphertext[i]))
            decryptedText += char(int(ciphertext[i] - shift - 65 + 26) % 26 + 65);
        else if (islower(ciphertext[i]))
            decryptedText += char(int(ciphertext[i] - shift - 97 + 26) % 26 + 97);
        else
            decryptedText += ciphertext[i];
    }
    return decryptedText;
}

int main() {
    int shiftKey;
    string message;

    cout << "Enter the message to encrypt: ";
    getline(cin, message);

    cout << "Enter the shift key: ";
    cin >> shiftKey;

    // Encryption part
    string encryptedMessage = encrypt(message, shiftKey);
    cout << "Encrypted message: " << encryptedMessage << endl;
```

```
    // Decryption part
    string decryptedMessage = decrypt(encryptedMessage, shiftKey);
    cout << "Decrypted message: " << decryptedMessage << endl;


    return 0;
}
```

OUTPUT:



BRUTE FORCE ATTACK (ON SHIFT CIPHER)

```
#include <iostream>
#include <string>
using namespace std;


string decrypt(string ciphertext, int shift) {
    string decryptedText = "";
    for (size_t i = 0; i < ciphertext.length(); i++) {
        if (isupper(ciphertext[i]))
            decryptedText += char(int(ciphertext[i] - shift - 65 + 26) % 26 + 65);
        else if (islower(ciphertext[i]))
            decryptedText += char(int(ciphertext[i] - shift - 97 + 26) % 26 + 97);
        else
            decryptedText += ciphertext[i];
    }
    return decryptedText;
}
```

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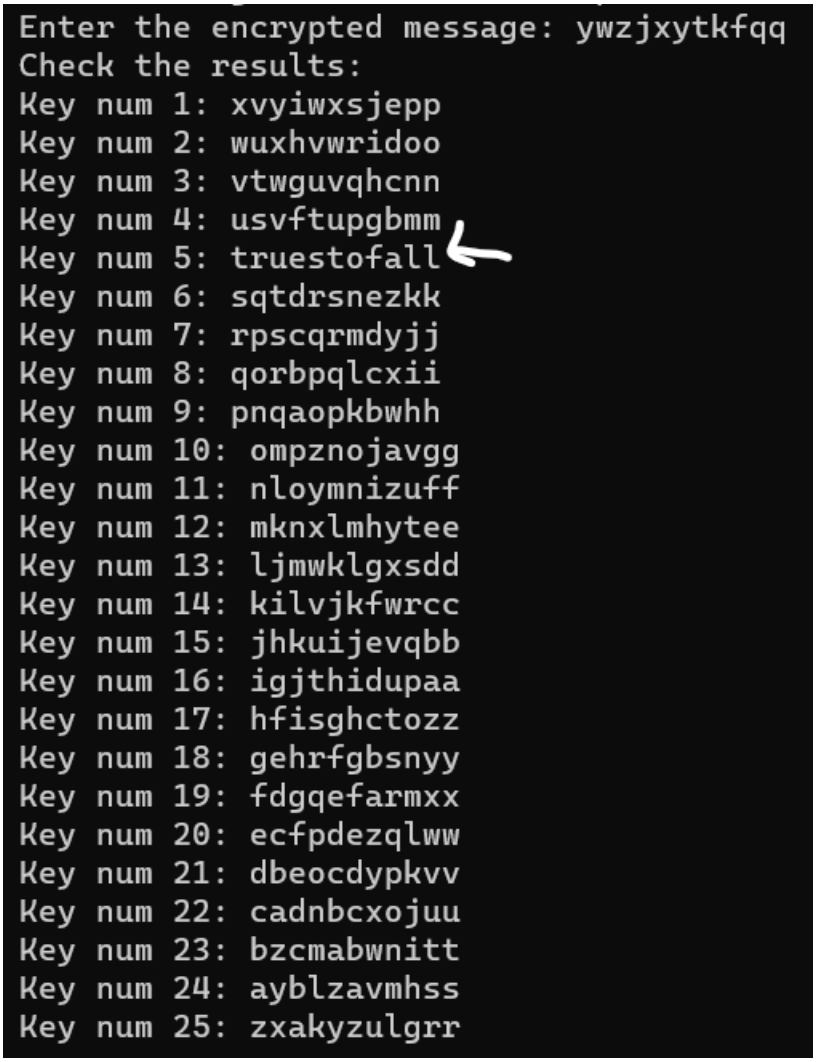
```
int main() {
   string encryptedMessage;

   cout << "Enter the encrypted message: ";
   getline(cin, encryptedMessage);

   // Perform brute-force attack
   cout << "Check the results:" << endl;
   for (int shiftKey = 1; shiftKey <= 25; shiftKey++) {
      string decryptedMessage = decrypt(encryptedMessage, shiftKey);
      cout << "Key num " << shiftKey << ": " << decryptedMessage << endl;
   }
   return 0;
}
```

OUTPUT:



RESULT:

Thus, Caesar Cipher, Shift Cipher and Brute Force attack have been implemented accordingly.