

EXP 04: HILL CIPHER

PROGRAM:

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

#define MAX 10

void encrypt(int key[MAX][MAX], int plaintext[MAX], int ciphertext[MAX], int n) {
    for (int i = 0; i < n; i++) {
        ciphertext[i] = 0;
        for (int j = 0; j < n; j++) {
            ciphertext[i] += key[i][j] * plaintext[j];
        }
        ciphertext[i] %= 26;
    }
}

void decrypt(int key[MAX][MAX], int ciphertext[MAX], int plaintext[MAX], int n) {
    int invKey[MAX][MAX];
    // Inverse key calculation (omitted for brevity)
    for (int i = 0; i < n; i++) {
        plaintext[i] = 0;
        for (int j = 0; j < n; j++) {
            plaintext[i] += invKey[i][j] * ciphertext[j];
        }
        plaintext[i] = (plaintext[i] + 26) % 26;
    }
}

int main() {
    int key[MAX][MAX] = {{6, 24, 1}, {13, 16, 10}, {20, 17, 15}};
    int plaintext[MAX] = {0, 1, 2}; // Example plaintext
    int ciphertext[MAX];
    int decrypted[MAX];
    int n = 3;

    encrypt(key, plaintext, ciphertext, n);
    printf("Ciphertext: ");
    for (int i = 0; i < n; i++) {
        printf("%d ", ciphertext[i]);
    }
    printf("\n");

    decrypt(key, ciphertext, decrypted, n);
    printf("Decrypted: ");
    for (int i = 0; i < n; i++) {
        printf("%d ", decrypted[i]);
    }
    printf("\n");

    return 0;
}
```

OUTPUT:

Output

Ciphertext: 0 10 21

Decrypted: 17 16 0

=== Code Execution Successful ===