EXP NO:2

DATE:

PLAYFAIR CIPHER

Aim:

To implement an encryption algorithm using Playfair Cipher technique.

Algorithm:

- Step 1: "Algorithm" (as the key) and "ulroaliocvrx" (as the encrypted text).
- Step 2: Remove spaces and convert to lowercase.
- Step 3: Create a 5x5 key table based on the modified key.
- Step 4: Apply Playfair Cipher decryption to the encrypted text using the generated key table.
- Step 5: Display the deciphered text.

Program:

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#define SIZE 30
void toLowerCase(char plain[], int ps)
{
 int i;
 for (i = 0; i < ps; i++) {
 if (plain[i] > 64 && plain[i] < 91)
 plain[i] += 32;
 }
}
int removeSpaces(char* plain, int ps)
{
 int i, count = 0;
 for (i = 0; i < ps; i++)
 if (plain[i] != ' ')
```

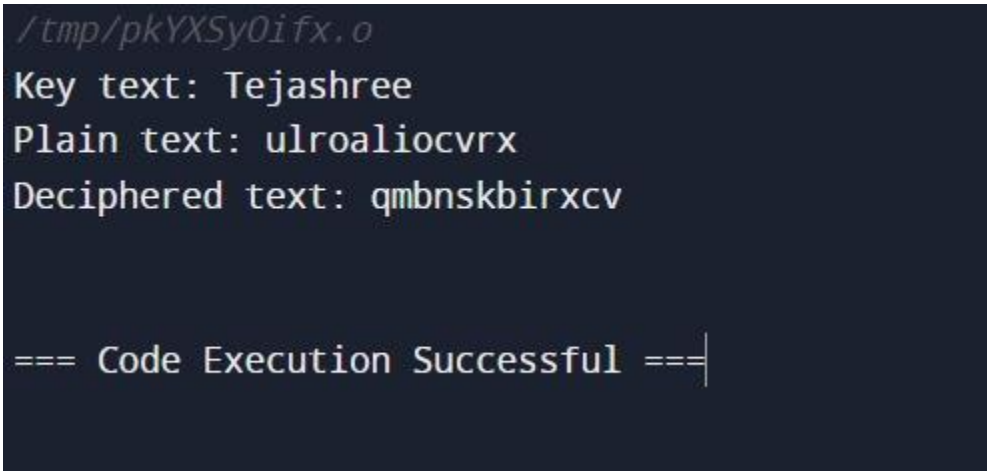
```
plain[count++] = plain[i];
 plain[count] = '\0';
 return count;
 }
void generateKeyTable(char key[], int ks, char
keyT[5][5]) {
 int i, j, k, flag = 0, *dicty;
 dicty = (int*)calloc(26, sizeof(int));

 for (i = 0; i < ks; i++) {
 if (key[i] != 'j')
 dicty[key[i] - 97] = 2;
 }
 dicty['j' - 97] = 1;
 i = 0;
 j = 0;
 for (k = 0; k < ks; k++) {
 if (dicty[key[k] - 97] == 2) {
 dicty[key[k] - 97] -= 1;
 keyT[i][j] = key[k];
 j++;
 if (j == 5) {
 i++;
 j = 0;
 }
 }
 }
 for (k = 0; k < 26; k++) {
 if (dicty[k] == 0) {
 keyT[i][j] = (char)(k + 97);
 j++;
 if (j == 5) {
 i++;
 j = 0;
 }
 }
 }
 }
}
```

```
void search(char keyT[5][5], char a, char b, int
 arr[]) {
 int i, j;

 if (a == 'j')
 a = 'i';
 else if (b == 'j')
 b = 'i';

 for (i = 0; i < 5; i++) {
 for (j = 0; j < 5; j++) {
 if (keyT[i][j] == a) {
 arr[0] = i;
 arr[1] = j;
 }
 else if (keyT[i][j] == b) {
 arr[2] = i;
 arr[3] = j;
 }
 }
 }
 }
int mod5(int a)
 {
 if (a < 0)
 a += 5;
 return (a % 5);
 }
void decrypt(char str[], char keyT[5][5], int
 ps) {
 int i, a[4];
 for (i = 0; i < ps; i += 2) {
 search(keyT, str[i], str[i + 1], a);
 if (a[0] == a[2]) {
 str[i] = keyT[a[0]][mod5(a[1] - 1)];  str[i + 1]
= keyT[a[0]][mod5(a[3] - 1)];  }
 else if (a[1] == a[3]) {
```

```
str[i] = keyT[mod5(a[0] - 1)][a[1]];  str[i + 1]
= keyT[mod5(a[2] - 1)][a[1]];  }
 else {
 str[i] = keyT[a[0]][a[3]];
 str[i + 1] = keyT[a[2]][a[1]];
 }
 }
 }

void decryptByPlayfairCipher(char str[], char
key[]) {
 char ps, ks, keyT[5][5];
 ks = strlen(key);
 ks = removeSpaces(key, ks);
 toLowerCase(key, ks);
 ps = strlen(str);
 toLowerCase(str, ps);
 ps = removeSpaces(str, ps);

 generateKeyTable(key, ks, keyT);

 decrypt(str, keyT, ps);
 }

int main()
{
 char str[SIZE], key[SIZE];

 strcpy(key, "Thrisha");
 printf("Key text: %s\n", key);
 strcpy(str, "ulroaliocvrx");
 printf("Plain text: %s\n", str);

 decryptByPlayfairCipher(str, key);

 printf("Deciphered text: %s\n", str);
```

```
return 0;
}
```

Output:



Result: