EXP NO:2
DATE:10/2/24 **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:

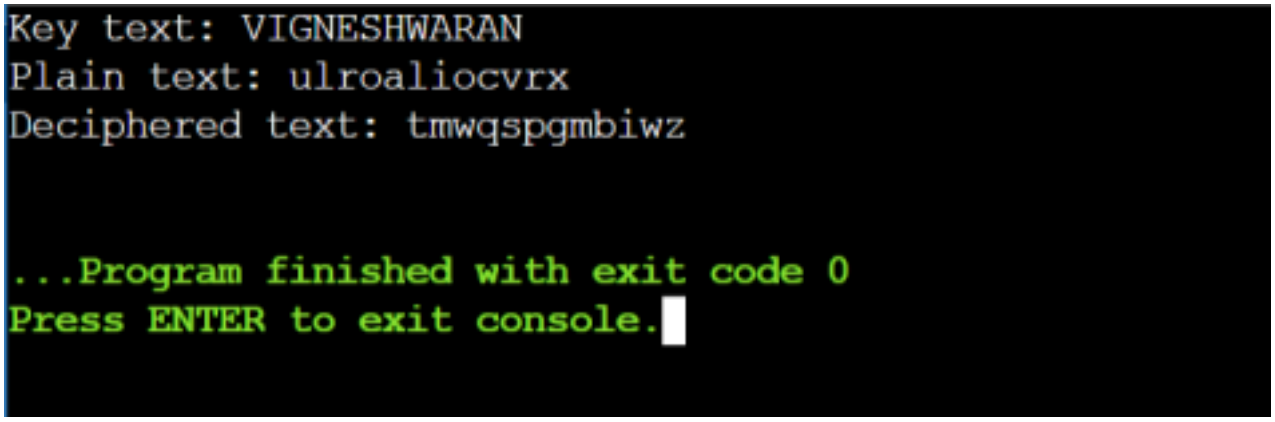
```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

#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, "Vaishnavi");
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: To implement an encryption algorithm using Playfair Cipher technique has been Executed successfully.