EXP NO:2 **DATE: 03/01/24**

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:

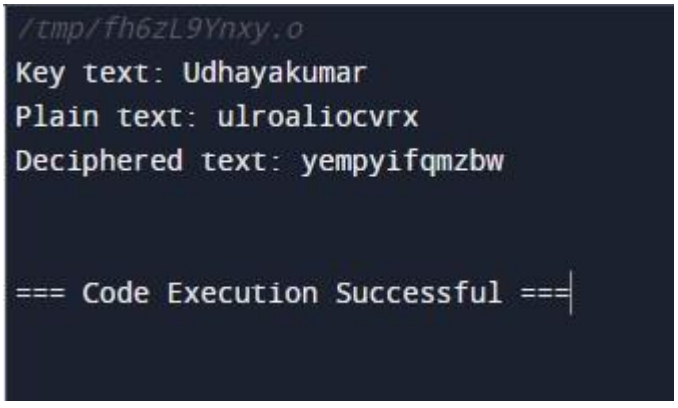
```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>  #define SIZE 30
void toLowerCase(char plain[], int
ps) {   int i;
 for (i = 0; i < ps; i++) {   if
(plain[i] > 64 && plain[i] < 91)
plain[i] += 32;
 }  }  int removeSpaces(char* plain,
int ps) {
 int i, count = 0;
for (i = 0; i < ps;
i++)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

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:

Thus the encryption algorithm using Playfair Cipher technique is implemented successfully.