EXP NO:2 **DATE:**

PLAYFAIR CIPHER

Aim:
To implement an encryption algorithm using Playfair Cipher technique.

Algorithm:

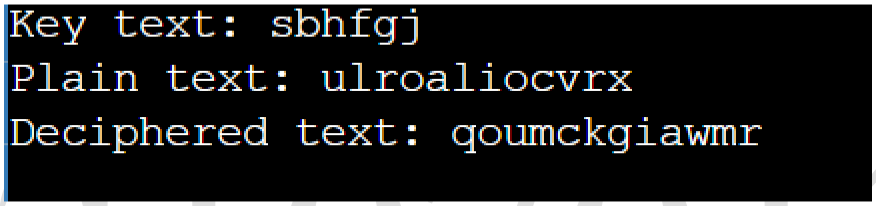
- Step 1: "Algorithm" (as the key) and "ulroaliocvrx" (as the encrypted text).
- Step 2: Remove spaces and convert to lowercase.
- Step 3: Create a 5x5 key table based on the modified key.
- Step 4: Apply Playfair Cipher decryption to the encrypted text using the generated key table.
- Step 5: Display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



```
Key text: sbhfgj
Plain text: ulroaliocvrx
Deciphered text: qoumckgiawmr
```

Result: