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
```

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cou
nt;
}
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, "SRIPRASATH");
printf("Key text: %s\n", key);
strcpy(str, "ulroaliocvrx");
   printf("Plain text: %s\n", str);

       decryptByPlayfairCipher(str, key);

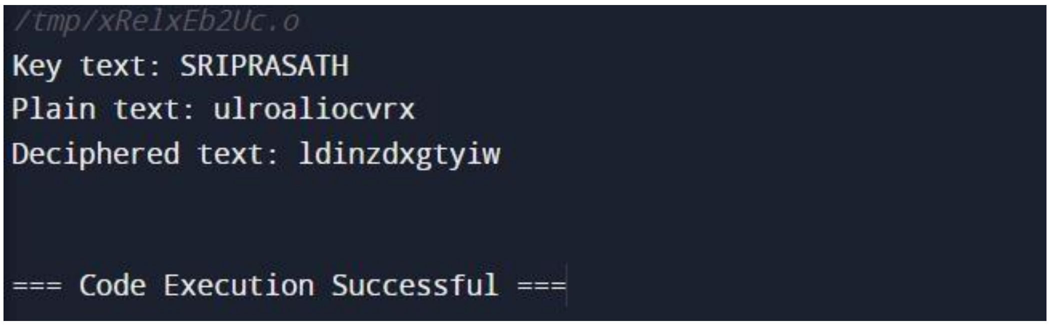
       printf("Deciphered text: %s\n", str);



   return 0;
}
```

Outp

ut:



```
/tmp/xRelxEb2Uc.o
Key text: SRIPRASATH
Plain text: ulroaliocvrx
Deciphered text: ldinzdxgtyiw


=== Code Execution Successful ===
```

Result: