

**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, "THARUN");
    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:

```
/tmp/ofUHwnf1Kr.o
Enter a message to encrypt: THARUN
Enter the key: rcvgfy
Encrypted message: UIBSV0

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

### Result: