

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);

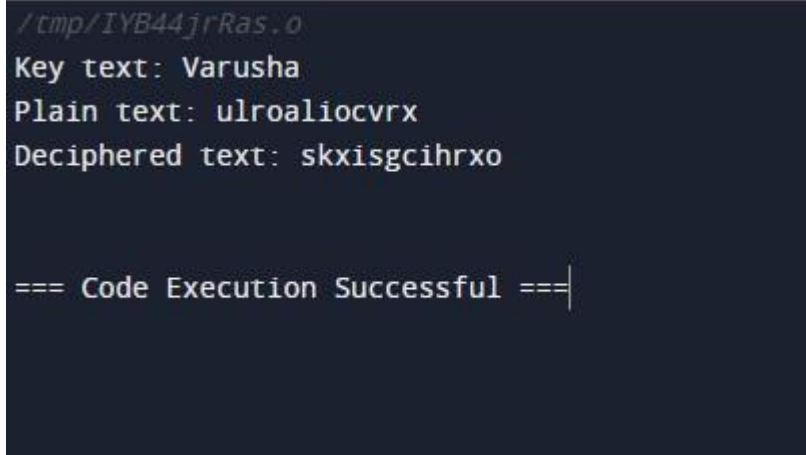
decrypt(str, keyT, ps);
}

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:

A terminal window with a dark background and light-colored text. The text shows the execution of a program, displaying the key, plain text, and deciphered text. At the bottom, a success message is shown with a cursor at the end.

```
/tmp/IYB44jrRas.o
Key text: Varusha
Plain text: ulroaliocvrx
Deciphered text: skxisgcihrxo

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

Result:

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