Almas Ansari

19BCS042

Computer Networks Lab

Problem -4

Q4: Write a program to encrypt and decrypt Plain text using Playfair Cipher

Code:

```
#include<iostream>
#include<string>
#include<set>

using namespace std;

string plaintoenc(string s, char matrix[5][5]);

string enctoplain(string s,char matrix[5][5]);

int main(){
   char matrix[5][5];
   string s, k,keyun="";
   cout<<"Enter text\n";
   cin>>s;
   cout<<"Enter key\n";
   cin>>k;
   for(int i=0;i<k.length();i++){
      bool foo = true;
      for(int j=0; j<keyun.size();j++){
         if(k[i]==keyun[j]){
            foo=false;
```

```
            break;
        }
    }
    if(foo) keyun+=k[i];
}
set<char> repeat;
char f='a';
for(int i=0;i<5;i++){
    for(int j=0;j<5;j++){
        if((i*5+j)<keyun.size()){
            matrix[i][j]=keyun[i*5+j];
            repeat.insert(keyun[i*5+j]);
        }else{
            if(repeat.find(f)==repeat.end() && f!='j'){
                matrix[i][j]=f;
                repeat.insert(f++);
            }else{
                f++;
                j--;
            }
        }
    }
}
string st = plaintoenc(s,matrix);
cout<<"encryption of plain text: "<<st<<endl;
cout<<"Do you want to decrypt?"<<endl;
cout<<"enter y if yes else n";
string c;
cin>>c;
if(c=="y"){
    cout<<"original text: "<<enctoplain(st,matrix)<<endl;
}
```

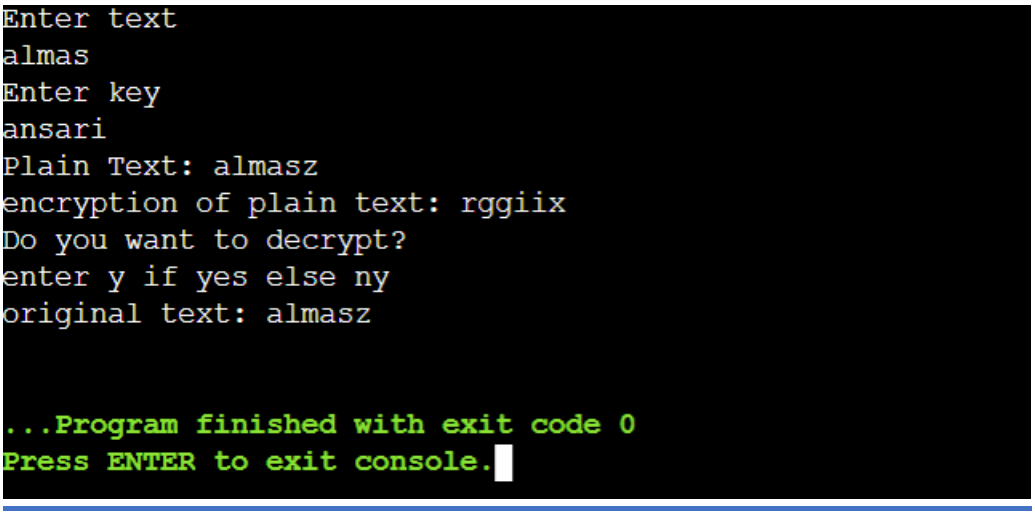
```
    return 0;
}

string enctoplain(string s,char matrix[5][5]){
    int x,y,g,h,t=0;
    string s1,temp;
    for(int i=0,j=1;i<s.size()-1 && j<s.size();i+=2,j+=2){
        if(s[i]==s[j]) s[j]='x';
        for(int k=0;k<5;k++){
            for(int l=0;l<5;l++){
                if(matrix[k][l]==s[i]){
                    x=k;
                    y=l;
                }else if(matrix[k][l]==s[j]){
                    g=k;
                    h=l;
                }
            }
        }if(y==h){
            x=(x-1) + (x>1) ? 0 : 5;
            g=(g-1) + (g>1) ? 0 : 5;
            s1+=matrix[y][y];
            s1+=matrix[g][h];
        }
        else if(x==g){
            y=(y+4)%5;
            h=(h+4)%5;
            s1+=matrix[x][y];
            s1+=matrix[g][h];
        }
        else{
            s1+=matrix[x][h];
```

```
            s1+=matrix[g][y];
        }
    }
    return s1;
}
string plaintoenc(string s, char matrix[5][5]){
    int x,y,g,h,t=0;
    string s1,temp;
    while(t<s.length()-1){
        if(s[t]==s[t+1]){
            for(int i=0;i<=t;i++){
                temp+=s[i];
            }
            temp+='x';
            for(int i=t+1;i<s.length();i++){
                temp+=s[i];
            }
            s=temp;
        }t+=2;
    }
    if(s.size()%2) s+='z';
    cout<<"Plain Text: "<<s<<endl;
    for(int i=0,j=1;i<s.size()-1 && j<s.size();i+=2,j+=2){
        if(s[i]==s[j]) s[j]='x';
        for(int k=0;k<5;k++){
            for(int l=0;l<5;l++){
                if(matrix[k][l]==s[i]){
                    x=k;
                    y=l;
                }else if(matrix[k][l]==s[j]){
                    g=k;
                    h=l;
```

```
            }
        }
    }
    if(y==h){
        x=(x+1)%5;
        g=(g+1)%5;
        s1+=matrix[y][y];
        s1+=matrix[g][h];
    }
    else if(x==g){
        y=(y+1)%5;
        h=(h+1)%5;
        s1+=matrix[x][y];
        s1+=matrix[g][h];
    }
    else{
        s1+=matrix[x][h];
        s1+=matrix[g][y];
    }
  }
  return s1;
}
```

Output:


Enter text
almas
Enter key
ansari
Plain Text: almasz
encryption of plain text: rggiix
Do you want to decrypt?
enter y if yes else ny
original text: almasz
...Program finished with exit code 0
Press ENTER to exit console.