Assignment no 8

Input-

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#include <bits/stdc++.h>
using namespace std;

int main(){

    string name;
    int key,len;
    cout<<"Enter the input message:"<<endl;
    cin>>name;
    cout<<"Enter the key:"<<endl;
    cin>>key;
    char matrix[30][30];
    len = name.length();
    for(int i=0;i<key;i++){
        for(int j=0;j<len;j++){
            matrix[i][j] = '*';
        }
    }
    int k=0,l=0,temp=0,flag=0;
     for(int i=0;i<len;i++){
        flag=0;
        temp=0;

         if(k==0 || k==key-1){
            k=k*(-1);
        }
        //since matrix index cannot be negative whenever k value is -ve convert to positive and after computation convert it back to original value
        if(k<0){
```

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                  temp=k;
                  k=k*(-1);
                  flag=1;
            }
            matrix[k][i]=name[l];
            if(flag==1){
                  k=temp;
            }
            l++;
            k++;
      }
      cout<<endl;

      //printing the railfence matrix obtained.Railfence matrix even stores white spaces if the
input message is a sentence.
      printf("Railfence matrix is: \n");
      for(int i=0;i<key;i++){
            for(int j=0;j<len;j++){
                  cout<<" "<<matrix[i][j];
            }
            cout<<endl;
      }

//code for encryption

      char str[100];
      int glo=0;
      //string the encrypted message from railfence matrix if the entry of the matrix is not '*'
      for(int i=0;i<key;i++){
            for(int j=0;j<len;j++){
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                        if(matrix[i][j] != '*'){
                                str[glo++]=matrix[i][j];
                        }
                }
        }
        //printing original message
        cout<<"original message is: "<<endl;
        cout<<""<<name<<endl;
        //printing encrypted message
        cout<<"encrypted message is: "<<endl;
        cout<<str<<endl;
        char dstr[100];
        int glob=0;

        printf("Railfence matrix is: \n");
        for(int i=0;i<key;i++)
        {
                for(int j=0;j<len;j++)
                {
                        cout<<" "<<matrix[i][j];
                }
                cout<<endl;
        }

//code for decryption
        cout<<"Decrypted message is: "<<endl;
        int kk=0,temp1=0;
        for(int i=0;i<len;i++){
                temp1=0;
                flag=0;
                if(kk==0 || kk==key-1){
```

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            kk=kk*(-1);
        }
         if(kk<0){
            temp1=kk;
            kk=kk*(-1);
            flag=1;
        }
        //obtaining decrypted message from railfence matrix
        char ct=matrix[kk][i];
         dstr[glob++]=ct;

         if(flag==1){
            kk=temp1;
         }
         kk++;
    }
    //printing decrypted message
    for(int i=0;dstr[i] !='\0';i++){
        cout<<""<<dstr[i];
    }
    cout<<endl;
}
```

Output-

```
Enter the input message:

hello

Enter the rail:

3

Railfence matrix is:

 h * * * o
 * e * l *
 * * l * *
original message is:
hello
encrypted message is:
hoell
Railfence matrix is:
 h * * * o
 * e * l *
 * * l * *
Decrypted message is:
hello
```