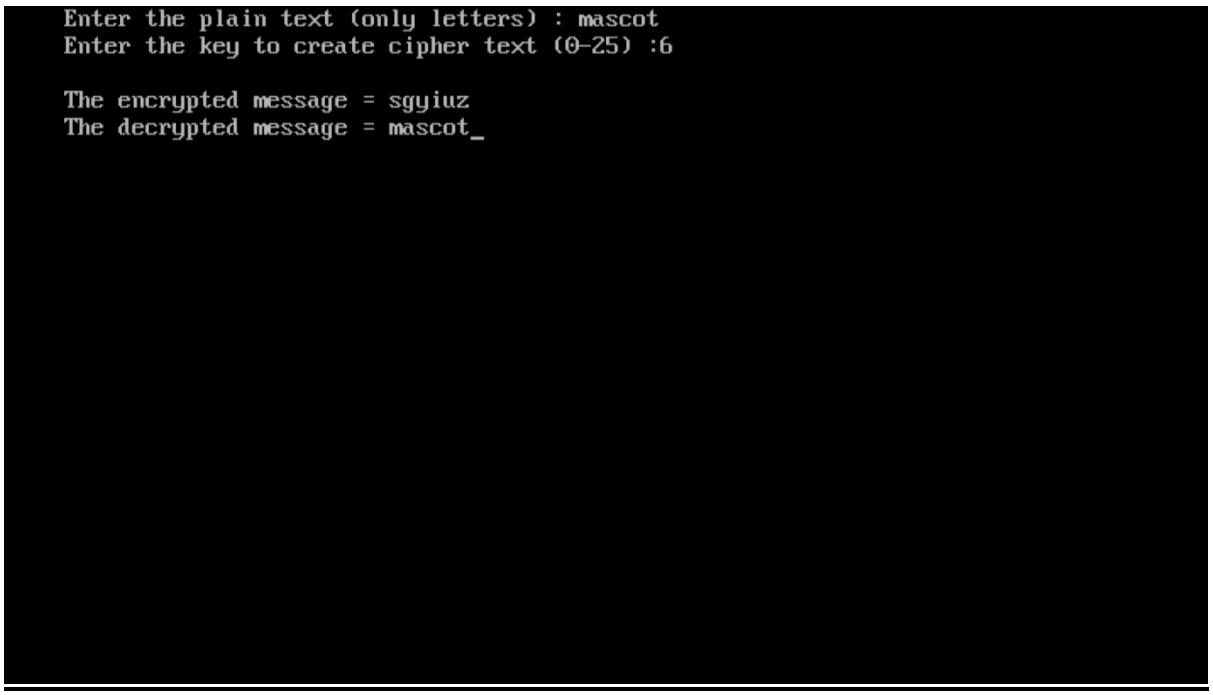
PROGRAM:

```
#include<stdio.h>
#include<conio.h>
char *encrypt(char *plain,int key)
{
	char cipher[100];
	int i=0,cip,num;
	while(plain[i]!='\0')
	{
		if((plain[i]>='A')&&(plain[i]<='Z'))
		{
			num=plain[i]-'A';
			cip=(num+key)%26;
			cip=cip+'A';
		}
		else if((plain[i]>='a')&&(plain[i]<='z'))
		{
			num=plain[i]-'a';
			cip=(num+key)%26;
			cip=cip+'a';
		}
		cipher[i]=cip;
		i++;

	}
	cipher[i]='\0';
	return cipher;}
```

```
char *decrypt(char *cipher,int key)
{
	char *plain;
	int i=0,cip,num;
	while(cipher[i]!='\0')
	{
		if((cipher[i]>='A')&&(cipher[i]<='Z'))
		{
			num=cipher[i]-'A';
			cip=(num-key)%26;
			if(cip<0)
				cip=cip+26;
			cip=cip+'A';
		}
		else if((cipher[i]>='a')&&(cipher[i]<='z'))
		{
			num=cipher[i]-'a';
			cip=(num-key)%26;
			if(cip<0)
				cip=cip+26;
			cip=cip+'a';
		}
		plain[i]=cip;
		i++;
	}
	plain[i]='\0';
	return plain;
```

```
}
int main()
{
        char message[100];
        int key;
        clrscr();
        printf("Enter the plain text (only letters) : ");
        scanf("%s",message);
        printf("Enter the key to create cipher text (0-25) :");
        scanf("%d",&key);
        printf("\nThe encrypted message = %s",encrypt(message,key));
        printf("\nThe decrypted message = %s",decrypt(encrypt(message,key),key));
        getch();
        return 0;
}
```

OUTPUT:


Enter the plain text (only letters) : mascot
Enter the key to create cipher text (0-25) :6
The encrypted message = sgyiuz
The decrypted message = mascot

PROGRAM:

```
#include<stdio.h>
#include<conio.h>
#include<stdlib.h>
#include<string.h>

char mat[5][6],message[100],key[10],two[20][3],cipher[100];
int size;

void keygen()
{
  int i=0,j=-1,l,dup=0,k;
  char alp='a';

  for(k=0;key[k]!='\0';k++)
  {
    dup=0;
    for(l=k-1;l>=0;l--)
    {
        if(key[k]==key[l])
        {
            dup=1;
            break;
        }
    }
    if(dup==0)
    {
```

```
        if(j>=4)
        {
                i++;
                j=0;
        }
        else
                j++;
        mat[i][j]=key[k];
    }
}
while(alp!=123)
{
        dup=0;
        for(l=0;key[l]!='\0';l++)
        {
                if((alp==key[l])||(alp=='j'))
                {
                        dup=1;
                        alp++;
                        break;
                }
        }
        if(dup==0)
        {
                if(j>=4)
                {
                i++;
```

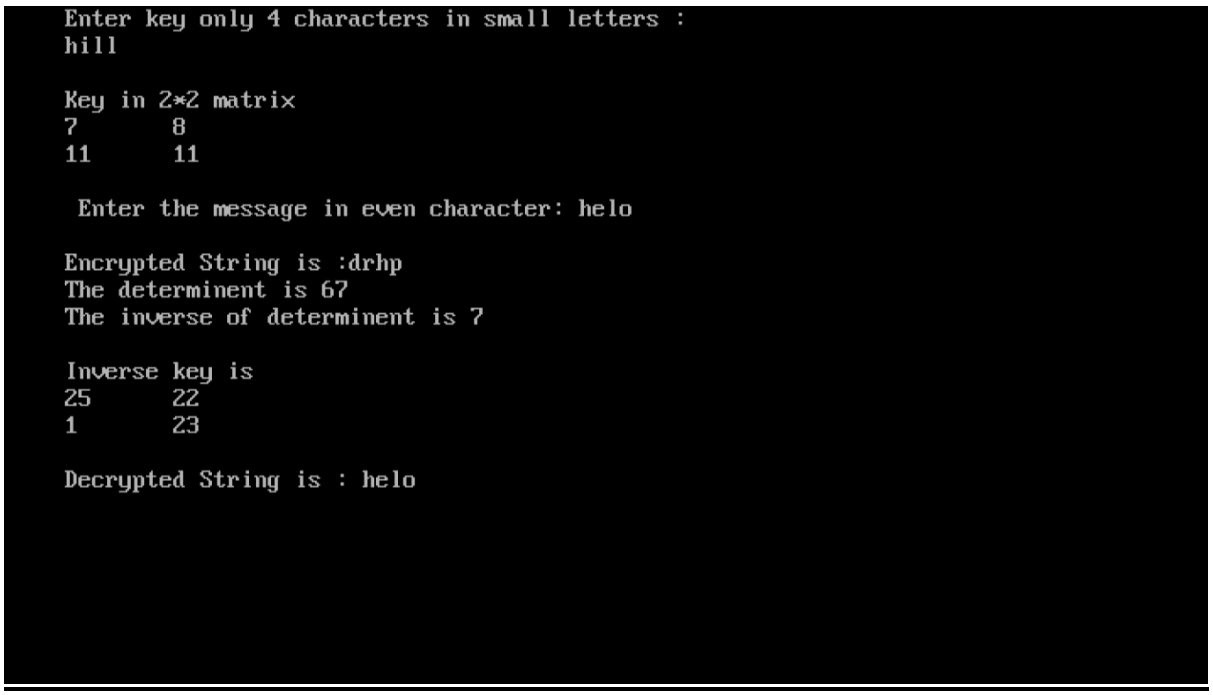
```
                j=0;
                }
                else
                j++;
                mat[i][j]=alp++;
        }
  }
  for(i=0;i<5;i++)
  {
        for(j=0;j<5;j++)
        printf("%c\t",mat[i][j]);
        printf("\n");
  }

}
void split()
{
        int i,len,k=0;
        len=strlen(message);
        for(i=0;i<len;i=i+2)
        {
                if(message[i]!=message[i+1])
                {
                        two[k][0]=message[i];
                        if(message[i+1]=='\0')
                        two[k][1]='x';
                        else
```

```
                two[k][1]=message[i+1];


            }
            else
            {
                two[k][0]=message[i];
                two[k][1]='x';
                i--;


            }
            two[k][2]='\0';
            k++;
        }
        size=k;
        for(i=0;i<size;i++)
        printf("\nsplit=%s",two[i]);
}
void encrypt()
{
        int i,j,k,m,n,temp1,temp2,x=0,o,p;
        for(k=0;k<size;k++)
        {
            for(i=0;i<5;i++)
            for(j=0;j<5;j++)
            {
                if(two[k][0]==mat[i][j])
                {
```

```
for(m=0;m<5;m++)
{
        if(two[k][1]==mat[i][m])
        {
                n=(j+1)%5;
                cipher[x++]=mat[i][n];
                n=(m+1)%5;
                cipher[x++]=mat[i][n];
                break;
        }
        else if(two[k][1]==mat[m][j])
        {
                n=(i+1)%5;
                cipher[x++]=mat[n][j];
                n=(m+1)%5;
                cipher[x++]=mat[n][j];
                break;
        }
        else
        {
                for(temp2=0;temp2<5;temp2++)
                if(two[k][1]==mat[m][temp2])
                {
                        cipher[x++]=mat[i][temp2];
                        cipher[x++]=mat[m][j];
                        break;
                }
```

```
                                        }
                                    }
                                }
                            }
                    }
                    cipher[x]='\0';
                    printf("\nCipher= %s",cipher);
}

int main()
{
                    clrscr();
                    printf("\nEnter the message in small case letter ");
                    scanf("%s",message);
                    printf("\nEnter the key in small case letter");
                    scanf("%s",key);
                    keygen(key);
                    split();
                    encrypt();
                    getch();
                    return 0;

}
```

OUTPUT:


Enter key only 4 characters in small letters :
hill
Key in 2*2 matrix
7 8
11 11
Enter the message in even character: helo
Encrypted String is :drhp
The determinent is 67
The inverse of determinent is 7
Inverse key is
25 22
1 23
Decrypted String is : helo

PROGRAM:

```
#include<stdio.h>
#include<math.h>
#include<string.h>

char message[20],key[10],encrypt[20],decrypt[20];
int ke[2][2],sp[10][2],e[10][2],length;
int in[2][2],adj[2][2],d[10][2],esp[10][2];

void encryption();
void decryption();
void getKeyMessage();
void inverse();
void splitmessage();
void splitcipher();
void main()
{
        clrscr();
        getKeyMessage();
        encryption();
        inverse();
        getch();

}

void encryption()
{
```

```
        int i=0,j,k;
        splitmessage();
        for(i=0;i<length;i++)
        for(j=0;j<2;j++)
                e[i][j]=0;
        for(i=0;i<length;i++)
                for(j=0;j<2;j++)
                {
                        for(k=0;k<2;k++)
                                e[i][j]=e[i][j]+ke[j][k]*sp[i][k];
                        e[i][j]=e[i][j]%26;

                }
        printf("\nEncrypted String is :");
        k=0;
        for(i=0;i<length;i++)
        for(j=0;j<2;j++)
                encrypt[k++]=e[i][j]+97;
        encrypt[k]='\0';
        printf("%s",encrypt);
}
void decryption()
{
        int i=0,j,k;
        splitcipher();
        for(i=0;i<length;i++)
        for(j=0;j<2;j++)
```

```
                d[i][j]=0;
        for(i=0;i<length;i++)
        for(j=0;j<2;j++)
        {
                for(k=0;k<2;k++)
                        d[i][j]=d[i][j]+in[j][k]*esp[i][k];
                d[i][j]=d[i][j]%26;

        }
        printf("\nDecrypted String is : ");
        k=0;
        for(i=0;i<length;i++)
        for(j=0;j<2;j++)
                decrypt[k++]=d[i][j]+97;
        encrypt[k]='\0';
        printf("%s",decrypt);
}

void getKeyMessage()
{
        int i,j=0,k=0;
        printf("Enter key only 4 characters in small letters :  \n");
        scanf("%s",key);

        for(i=0;i<2;i++)
        for(j=0;j<2;j++)
                ke[i][j]=key[k++]-97;
```

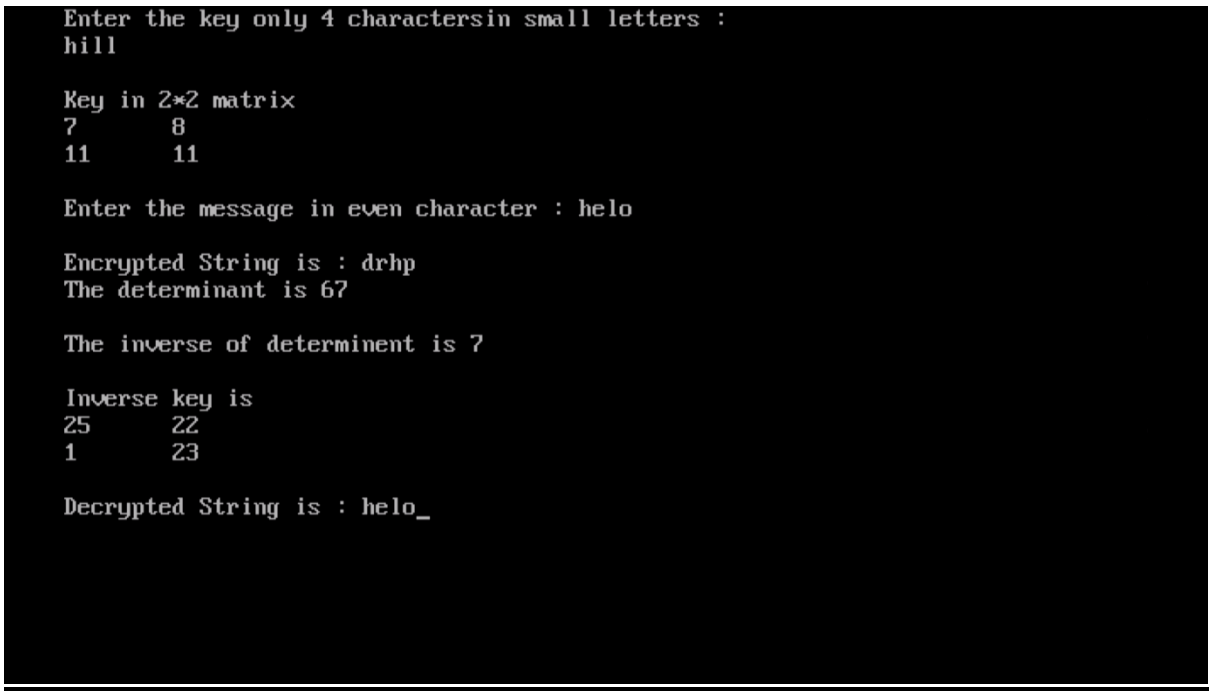
```
	printf("\nKey in 2*2 matrix \n");
	for(i=0;i<2;i++)
	{
		for(j=0;j<2;j++)
			printf("%d\t",ke[i][j]);
		printf("\n");

	}
	printf("\n Enter the message in even character: ");
	scanf("%s",message);
}

void splitmessage()
{
	int i=0,k=0,j=0;
	while(message[i]!='\0')
	{
		sp[j][k]=message[i++]-97;
		k=(k+1)%2;
		if(k==0)
			j++;

	}
	length=j;
}

void splitcipher()
```

```
{
	int i=0,j=0,k=0;
	while(encrypt[i]!='\0')
	{
		esp[j][k]=encrypt[i++]-97;
		k=(k+1)%2;
		if(k==0)
			j++;

	}
}

void inverse()
{
	int i,j,k,det,idet=0;
	det=((ke[0][0]*ke[1][1])-(ke[0][1]*ke[1][0])%26);
	if(det==0)
	{
		printf("Determinent cannot be ZERO");

	}
	else
	{
		if(det<0)
			det=det+26;
		printf("\nThe determinent is %d\t",det);
```

```
adj[0][0]=ke[1][1];
adj[1][1]=ke[0][0];
adj[0][1]=-ke[0][1]+26;
adj[1][0]=-ke[1][0]+26;

for(i=1;i<26;i++)
if(((det*i)%26)==1)
{
        idet=i;
        printf("\nThe inverse of determinent is %d\n",idet);
        break;
}
if(idet==0)
        printf("SORRY, Inverse is not possible");
else
{
        printf("\nInverse key is \n");
        for(i=0;i<2;i++)
        {
                for(j=0;j<2;j++)
                {
                        in[i][j]=(adj[i][j]*idet)%26;
                        printf("%d\t",in[i][j]);
                }
                printf("\n");
        }
        decryption();
```

```
                }
            }
        }
```

OUTPUT:


Enter the key only 4 charactersin small letters :
hill
Key in 2*2 matrix
7 8
11 11
Enter the message in even character : helo
Encrypted String is : drhp
The determinant is 67
The inverse of determinent is 7
Inverse key is
25 22
1 23
Decrypted String is : helo_

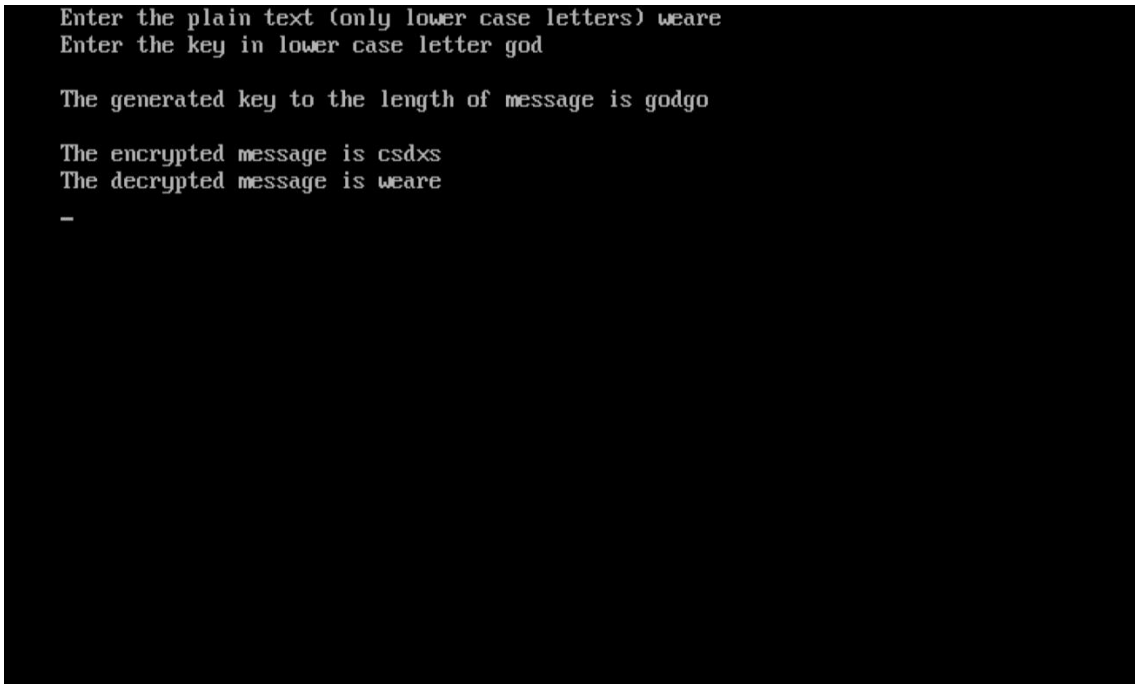
PROGRAM:

```
#include<stdio.h>
#include<conio.h>
#include<string.h>

char message[100],k[20],key[100],plain[100],cipher[20];

void genkey()
{
	int i,j=0;
	for(i=0;message[i]!='\0';i++)
	{
		if(k[j]!='\0')
			key[i]=k[j++];
		else
		{
			j=0;i--;
		}
	}
	key[i]='\0';
	printf("\nThe generated key to the length of message is %s\n",key);
}
void encryption()
{
	int i=0,cip,num,k;
	while(message[i]!='\0')
	{
```

```
            num=message[i]-'a';
            k=key[i]-'a';
            cip=(num+k)%26;
            cip=cip+'a';
            cipher[i]=cip;
            i++;
        }
        cipher[i]='\0';
        printf("\nThe encrypted message is %s",cipher);

}
void decryption()
{
        int i=0,cip,num,k;
        while(cipher[i]!='\0')
        {
            num=cipher[i]-'a';
            k=key[i]-'a';
            cip=(num-k)%26;
            if(cip<0)
                cip=cip+26;
            cip=cip+'a';
            plain[i]=cip;
            i++;
        }
        plain[i]='\0';
        printf("\nThe decrypted message is %s\n",plain);
```

```
}
int main()
{
        clrscr();
        printf("Enter the plain text (only lower case letters) ");
        scanf("%s",message);
        printf("Enter the key in lower case letter ");
        scanf("%s",k);
        genkey();
        encryption(message,key);
        decryption(cipher,key);
        getch();
        return 0;
}
```

OUTPUT:


Enter the plain text (only lower case letters) weare
Enter the key in lower case letter god
The generated key to the length of message is godgo
The encrypted message is csdxs
The decrypted message is weare

PROGRAM:

```
#include<stdio.h>
#include<conio.h>
#include<string.h>

char message[100],mes[10][100],plain[100],cipher[100];
int key;

void transpose()
{
	int i=0,j=-1,k=0;
	while(message[i]!='\0')
	{
		j++;
		while(j<key)
		{
			if(message[i]!='\0')
				mes[j++][k++]=message[i++];
			else
				break;

		}
		j--;
		while(j>0)
		{
			if(message[i]!='\0')
				mes[--j][k++]=message[i++];
```

```
                else
                        break;
                }
        }
        printf("\nThe transpose matrix is \n");
        for(i=0;i<key;i++)
        {
                for(j=0;message[j]!='\0';j++)
                        printf("%c",mes[i][j]);
                printf("\n");
        }
}
void encryption()
{
        int i,j,k=0;
        transpose();
        for(i=0;i<key;i++)
        {
                for(j=0;message[j]!='\0';j++)
                        if(mes[i][j]>='a'&&mes[i][j]<='z')
                                cipher[k++]=mes[i][j];

        }
        cipher[k]='\0';
        printf("\nThe encrypted message is %s\n",cipher);

}
```

```
int main()
{
	int i,j;
	clrscr();
	printf("Enter the plain text (onlt lower case letter): ");
	scanf("%s",message);
	printf("Enter the key in number ");
	scanf("%d",&key);
	encryption();
	getch();
	return 0;
}
```

OUTPUT:


Enter the plain text (onlt lower case letter): goodmorning
Enter the key in number 4
The transpose matrix is
g r
o o n
o m i g
d n
The encrypted message is groonomigdn

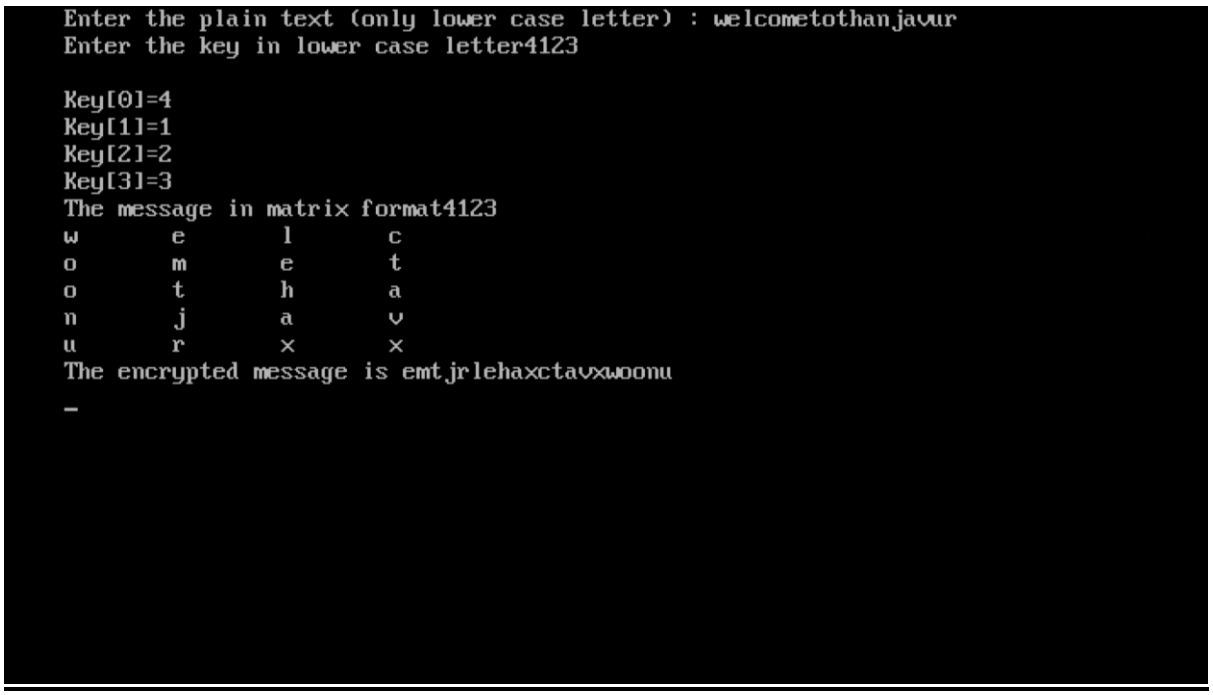
PROGRAM:

```
#include<stdio.h>
#include<conio.h>
#include<string.h>

char message[100],ke[20],mes[10][10],plain[100],cipher[20];
int key[20],length,len;

void transpose()
{
        int i=0,j=0,k=0,len1;
        len1=strlen(ke);
        while(message[i]!='\0')
        {
                for(k=0;ke[k]!='\0';k++)
                        if(message[i]!='\0')
                                mes[j][k]=message[i++];
                        else
                                break;
                        j++;
        }
        j--;
        while(ke[k]!='\0')
                mes[j][k++]='x';
        len=j+1;
        printf("\nThe message in matrix format");
        printf("%s",ke);
```

```
	for(i=0;i<len;i++)
	{
		printf("\n");
		for(j=0;j<len1;j++)
			printf("%c\t",mes[i][j]);

	}
}
void encryption()
{
	int i,j,k,l;
	transpose();
	i=1,k=0;
	for(i=1;i<=length;i++)
	{
		for(j=0;j<length;j++)
			if(i==key[j])
				break;
		for(l=0;l<len;l++)
			cipher[k++]=mes[l][j];
	}
	cipher[k]='\0';
	printf("\nThe encrypted message is %s \n",cipher);

}
int main()
{
```

```
    int i,j;
    clrscr();
    printf("Enter the plain text (only lower case letter) : ");
    scanf("%s",message);
    printf("Enter the key in lower case letter");
    scanf("%s",ke);
    for(i=0;ke[i]!='\0';i++)
    {
        key[i]=ke[i]-'0';
        printf("\nKey[%d]=%d",i,key[i]);
    }
    length=i;
    encryption(message,key);
    getch();
    return 0;
}
```

OUTPUT:


Enter the plain text (only lower case letter) : welcometothanjavur
Enter the key in lower case letter4123
Key[0]=4
Key[1]=1
Key[2]=2
Key[3]=3
The message in matrix format4123
w e l c
o m e t
o t h a
n j a v
u r x x
The encrypted message is emtjrlehaxctavxwoonu