PROGRAM: (Caesar Cipher)

```
#include <stdio.h>
#include <string.h>
#include<conio.h>
#include <ctype.h>
void main(){
char plain[10], cipher[10];
int key,i,length;
int result;
clrscr();
printf("\n Enter the plain text:");
scanf("%s", plain);
printf("\n Enter the key value:");
scanf("%d", &key);
printf("\n \n \t PLAIN TEXt: %s",plain);
printf("\n \n \t ENCRYPTED TEXT: ");
for(i = 0, length = strlen(plain); i < length; i++)
{
cipher[i]=plain[i] + key;
if (isupper(plain[i]) && (cipher[i] > 'Z'))
cipher[i] = cipher[i] - 26;
if (islower(plain[i]) && (cipher[i] > 'z'))
cipher[i] = cipher[i] - 26;
printf("%c", cipher[i]);
}
printf("\n \n \t AFTER DECRYPTION : ");
for(i=0;i<length;i++)
{
plain[i]=cipher[i]-key;
if(isupper(cipher[i])&&(plain[i]<'A'))
plain[i]=plain[i]+26;
if(islower(cipher[i])&&(plain[i]<'a'))
plain[i]=plain[i]+26;
printf("%c",plain[i]);
}
getch();
}
```

PROGRAM: (Playfair Cipher)

```
#include<stdio.h>
//#include<conio.h>
#include<string.h>
#include<ctype.h>
#define MX 5
void playfair(char ch1,char ch2, char key[MX][MX])
{
int i,j,w,x,y,z;
FILE *out;
if((out=fopen("cipher.txt","a+"))==NULL)
{
printf("File Currupted.");
}
for(i=0;i<MX;i++)
{
for(j=0;j<MX;j++)
{
if(ch1==key[i][j])
{
w=i;
x=j;
}
else if(ch2==key[i][j])
{
y=i;
z=j;
}}}
//printf("%d%d %d%d",w,x,y,z);
if(w==y)
{
```

```
x=(x+1)%5;z=(z+1)%5;
printf("%c%c",key[w][x],key[y][z]);
fprintf(out, "%c%c",key[w][x],key[y][z]);
}
else if(x==z)
{ w=(w+1)%5;y=(y+1)%5;
printf("%c%c",key[w][x],key[y][z]);
fprintf(out, "%c%c",key[w][x],key[y][z]);
}
else
{
printf("%c%c",key[w][z],key[y][x]);
fprintf(out, "%c%c",key[w][z],key[y][x]);
}
fclose(out);
}
void main()
{
int i,j,k=0,l,m=0,n;
char key[MX][MX],keyminus[25],keystr[10],str[25]={0};
char
alpa[26]={'A','B','C','D','E','F','G','H','I','J','K','L'
,'M','N','O','P','Q','R','S','T','U','V','W','X','Y','Z'}
;
//clrscr();
printf("\nEnter key:");
gets(keystr);
printf("\nEnter the plain text:");
gets(str);
n=strlen(keystr);
//convert the characters to uppertext
for (i=0; i<n; i++)
{
if(keystr[i]=='j')keystr[i]='i';
else if(keystr[i]=='J')keystr[i]='I';
keystr[i] = toupper(keystr[i]);
}
//convert all the characters of plaintext to uppertext
for (i=0; i<strlen(str); i++)
{
if(str[i]=='j')str[i]='i';
else if(str[i]=='J')str[i]='I';
str[i] = toupper(str[i]);
}
```

```
j=0;
for(i=0;i<26;i++)
{
for(k=0;k<n;k++)
{
if(keystr[k]==alpa[i])
break;
else if(alpa[i]=='J')
break;
}
if(k==n)
{
keyminus[j]=alpa[i];j++;
} }//construct key keymatrix
k=0;
for(i=0;i<MX;i++)
{
for(j=0;j<MX;j++)
{
if(k<n)
{
key[i][j]=keystr[k];
k++;}
else
{
key[i][j]=keyminus[m];m++;
}
printf("%c ",key[i][j]);
}
printf("\n");
}
printf("\n\nEntered text :%s\nCipher Text :",str);
for(i=0;i<strlen(str);i++)
{
if(str[i]=='J')str[i]='I';
if(str[i+1]=='\0')
playfair(str[i],'X',key);
else
{}
//getch();
}
if(str[i+1]=='J')str[i+1]='I';
if(str[i]==str[i+1])
playfair(str[i],'X',key);
```

```
else
{
playfair(str[i],str[i+1],key);i++;
}}
```

Output

```
/tmp/FuWbAZ5vZf.o
Enter key:one
Enter the plain text:two
O N E A B
C D F G H
I K L M P
Q R S T U
V W X Y Z
```

PROGRAM: (Hill Cipher)

```
#include<stdio.h>
//#include<conio.h>
#include<string.h>
int main(){
unsigned int a[3][3]={{6,24,1},{13,16,10},{20,17,15}};
unsigned int b[3][3]={{8,5,10},{21,8,21},{21,12,8}};
int i,j, t=0;
unsigned int c[20],d[20];
char msg[20];
//clrscr();
printf("Enter plain text\n ");
scanf("%s",msg);
for(i=0;i<strlen(msg);i++)
{ c[i]=msg[i]-65;printf("%d ",c[i]);
}
for(i=0;i<3;i++)
{ t=0;
for(j=0;j<3;j++)
{
t=t+(a[i][j]*c[j]);
}
d[i]=t%26;
}
printf("\nEncrypted Cipher Text :");
for(i=0;i<3;i++)
```

```
printf(" %c",d[i]+65);
for(i=0;i<3;i++)
{
t=0;
for(j=0;j<3;j++)
{
t=t+(b[i][j]*d[j]);
}
c[i]=t%26;
}
printf("\nDecrypted Cipher Text :");
for(i=0;i<3;i++)
printf(" %c",c[i]+65);
//getch();
return 0;
}
```

Output

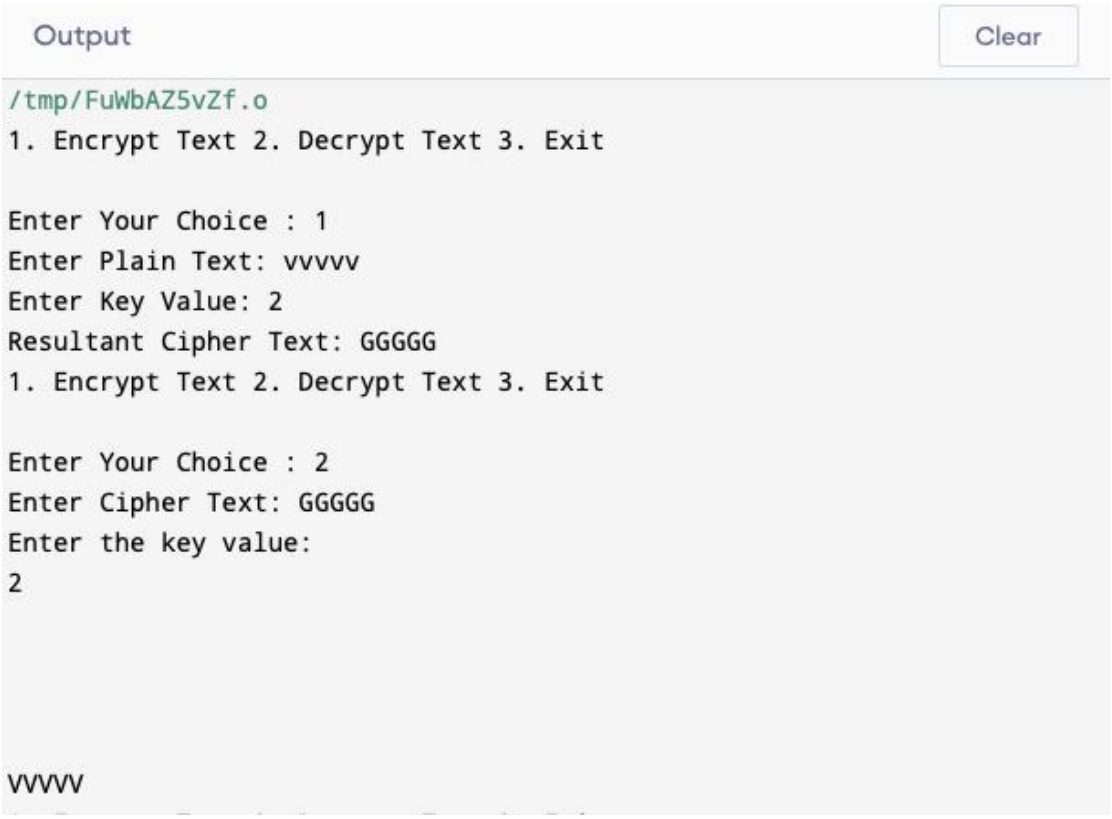
```
/tmp/FuWbAZ5vZf.o
Enter plain text
 varun
 53 32 49 52 45
Encrypted Cipher Text : R B Z
Decrypted Cipher Text : B G X
```

PROGRAM: (Vigenere Cipher)

```
#include <stdio.h>
//#include<conio.h>
#include <ctype.h>
#include <string.h>
void encipher();
void decipher();
void main()
{
int choice;
//clrscr();
while(1)
{
printf("\n1. Encrypt Text");
printf("\t2. Decrypt Text");
printf("\t3. Exit");
printf("\n\nEnter Your Choice : ");
```

```
scanf("%d",&choice);
if(choice == 3)
exit(0);
else if(choice == 1)
encipher();
else if(choice == 2)
decipher();
else
printf("Please Enter Valid Option.");
} }
void encipher()
{
unsigned int i,j;
char input[50],key[10];
printf("\n\nEnter Plain Text: ");
scanf("%s",input);
printf("\nEnter Key Value: ");
scanf("%s",key);
printf("\nResultant Cipher Text: ");
for(i=0,j=0;i<strlen(input);i++,j++)
{
if(j>=strlen(key))
{ j=0;
}
printf("%c",65+(((toupper(input[i])-65)+(toupper(key[j])-
65))%26));
}}
void decipher()
{
unsigned int i,j;
char input[50],key[10];
int value;
printf("\n\nEnter Cipher Text: ");
scanf("%s",input);
printf("\n\nEnter the key value: ");
scanf("%s",key);
for(i=0,j=0;i<strlen(input);i++,j++)
{
if(j>=strlen(key))
{ j=0; }
value = (toupper(input[i])-64)-(toupper(key[j])-64);
if( value < 0)
{ value = value * -1;
}
```

```
printf("%c",65 + (value % 26));
}}
```



PROGRAM: (Rail Fence)

```
#include<stdio.h>
//#include<conio.h>
#include<string.h>
void main()
{
int i,j,k,l;
char a[20],c[20],d[20];
//clrscr();
printf("\n\t\t RAIL FENCE TECHNIQUE");
printf("\n\nEnter the input string : ");
gets(a);
l=strlen(a);
/*Ciphering*/
for(i=0,j=0;i<l;i++)
{
if(i%2==0)
c[j++]=a[i];
}
for(i=0;i<l;i++)
{
```

```
if(i%2==1)
c[j++]=a[i];
}
c[j]='\0';
printf("\nCipher text after applying rail fence :");
printf("\n%s",c);
/*Deciphering*/
if(l%2==0)
k=l/2;
else
k=(l/2)+1;
for(i=0,j=0;i<k;i++)
{
d[j]=c[i];
j=j+2;
}
for(i=k,j=1;i<l;i++)
{
d[j]=c[i];
j=j+2;
}
d[l]='\0';
printf("\nText after decryption : ");
printf("%s",d);
//getch();
}
```

Output

```
/tmp/FuWbAZ5vZf.o
RAIL FENCE TECHNIQUE

Enter the input string : cns csa 5164
Cipher text after applying rail fence :
csca56n s 14
Text after decryption : cns csa 5164
```

PROGRAM: (RSA)

```
#include<stdio.h>
//#include<conio.h>
#include<stdlib.h>
#include<math.h>
#include<string.h>
long int
```

```
p,q,n,t,flag,e[100],d[100],temp[100],j,m[100],en[100],i;
char msg[100];
int prime(long int);
void ce();
long int cd(long int);
void encrypt();
void decrypt();
void main()
{
//clrscr();
printf("\nENTER FIRST PRIME NUMBER\n");
scanf("%d",&p);
flag=prime(p);
if(flag==0)
{
printf("\nWRONG INPUT\n");
//getch();
}
printf("\nENTER ANOTHER PRIME NUMBER\n");
scanf("%d",&q);
flag=prime(q);
if(flag==0||p==q)
{
printf("\nWRONG INPUT\n");
//getch();
}
printf("\nENTER MESSAGE\n");
fflush(stdin);
scanf("%s",msg);
for(i=0;msg[i]!=NULL;i++)
m[i]=msg[i];
n=p*q;
t=(p-1)*(q-1);
ce();
printf("\nPOSSIBLE VALUES OF e AND d ARE\n");
for(i=0;i<j-1;i++)
printf("\n%ld\t%ld",e[i],d[i]);
encrypt();
decrypt();
//getch();
}
int prime(long int pr)
{
int i;
```

```
j=sqrt(pr);
for(i=2;i<=j;i++)
{
if(pr%i==0)
return 0;
}
return 1;
}
void ce()
{
int k;
k=0;
for(i=2;i<t;i++)
{
if(t%i==0)
continue;
flag=prime(i);
if(flag==1&&i!=p&&i!=q)
{
e[k]=i;
flag=cd(e[k]);
if(flag>0)
{
d[k]=flag;
k++;
}
if(k==99)
break;
} } }
long int cd(long int x)
{
long int k=1;
while(1)
{
k=k+t;
if(k%x==0)
return(k/x);
} }
void encrypt() {
long int pt,ct,key=e[0],k,len;
i=0;
len=strlen(msg);
while(i!=len) {
pt=m[i];
```

```
pt=pt-96;
k=1;
for(j=0;j<key;j++)
{ k=k*pt;
k=k%n;
}
temp[i]=k;
ct=k+96;
en[i]=ct;
i++;
}
en[i]=-1;
printf("\nTHE ENCRYPTED MESSAGE IS\n");
for(i=0;en[i]!=-1;i++)
printf("%c",en[i]);
}
void decrypt()
{
long int pt,ct,key=d[0],k;
i=0;
while(en[i]!=-1)
{
ct=temp[i];
k=1;
for(j=0;j<key;j++)
{
k=k*ct;
k=k%n;
}
pt=k+96;
m[i]=pt;
i++;
}
m[i]=-1;
printf("\nTHE DECRYPTED MESSAGE IS\n");
for(i=0;m[i]!=-1;i++)
printf("%c",m[i]);
}
```

Output

```
/tmp/u0vDYz07px.o
ENTER FIRST PRIME NUMBER
7
ENTER ANOTHER PRIME NUMBER
5
ENTER MESSAGE
joe
POSSIBLE VALUES OF e AND d ARE

11  11
13  13
17  17
THE ENCRYPTED MESSAGE IS
eoj
THE DECRYPTED MESSAGE IS
joe
```

PROGRAM: (Diffie Hellman Key Exchange)

```
#include<stdio.h>
//#include<conio.h>
long long int power(int a, int b, int mod)
{
long long int t;
if(b==1)
return a;
t=power(a,b/2,mod);
if(b%2==0)
return (t*t)%mod;
else
return (((t*t)%mod)*a)%mod;
}
long int calculateKey(int a, int x, int n)
{
return power(a,x,n);
}
void main()
{
int n,g,x,a,y,b;
//clrscr();
printf("Enter the value of n and g : ");
scanf("%d%d",&n,&g);
printf("Enter the value of x for the first person : ");
```

```
scanf("%d",&x);
a=power(g,x,n);
printf("Enter the value of y for the second person : ");
scanf("%d",&y);
b=power(g,y,n);
printf("key for the first person is :%lld\n",power(b,x,n));
printf("key for the second person is :%lld\n",power(a,y,n));
//getch();
}
```

Output

```
/tmp/u0vDYz07px.o
Enter the value of n and g : 6
7
Enter the value of x for the first person : 2
Enter the value of y for the second person : 3
key for the first person is :1
key for the second person is :1
```