

LAB ASSESSMENT 2

Name: Charan Lalchand Soneji

Registration number: 17BCE2196

Faculty: Prof Marimuthu K.

Course Title: Cryptography fundamentals

Slot: L51+ L52

3. To implement Affine Cipher technique

Code

```
#include<iostream>
#include<string>
#include<stdlib.h>
using namespace std;
int i,c=0;
int hcf[]={1,3,5,7,9,11,13,15,17,19,21,23,25};
int in(int a){

    for(i=0;i<13;i++){
        if(hcf[i]==a){
            c++;
        }
    }
    if(c>0){
        return 1;
    }
    else{
        return 0;
    }
}
int mmi(int a){
    int x=1;
    while((a*x)%26!=1){
        x++;
    }
    return x;
}
main(){
    cout << "-----Welcome
17BCE2196-----";
    int opt,i,cont=0;
    int a,b;
    string ip,op="\0";
```

```

while(1) {
    cout<<"-----"<<endl;
    cout<<"1.Encrypt"<<endl;
    cout<<"2.Decrypt"<<endl;
    cout<<"3.exit"<<endl;
    cin>>opt;
    switch(opt) {
case 1:
        cout<<"Enter value alpha:";
        cin>>a;
        while(in(a)==0) {
            cout<<"GCD(a,26) should be 1"<<endl;
            cout<<"Enter the alpha value:";
            cin>>a;
        }
        cout<<"Enter the value of b which should be less than
25:";
        cin>>b;
        cout<<"Enter the string to be encrypted:"<<endl;
        cin>>ip;
        for(i=0;i<ip.length();i++){
            op=op+char((a*(int(ip[i])-97)+b)%26+97);
        }
        cout<<endl<<"Encrypted word:"<<op<<endl;
        op="\0";
        break;
case 2:
        cout<<"Enter the alpha value:";
        cin>>a;
        while(in(a)==0) {
            cout<<"GCD(a,26) should be 1"<<endl;
            cout<<"Enter the alpha value:";
            cin>>a;
        }
        cout<<"Enter the value of b which should be less than
25:";
        cin>>b;
        cout<<"Enter the string to be encrypted:"<<endl;
        cin>>ip;
        for(i=0;i<ip.length();i++){
            cont=(mmi(a)*((ip[i]-97)-b));

            while(cont<0) {
                cont=cont+26;
            }
            op=op+char(cont%26+97);
        }
        cout<<endl<<"Decrypted word:"<<op<<endl;

```

```

        op="\0";
        break;
case 3:
    exit(0);
}
}
}

```

OUTPUT SNIPPETS

```

D:\College stuff\Semester 4\Cryptography Fundamentals\LAB\Assessment 2\test.exe
-----Welcome 17BCE2196-----
1.Encrypt
2.Decrypt
3.exit
1
Enter value alpha:
5
Enter the value of b which should be less than 25:10
Enter the string to be encrypted:
CHARAN

Encrypted word:WVMTMZ
-----
1.Encrypt
2.Decrypt
3.exit
2
Enter the alpha value:5
Enter the value of b which should be less than 25:10
Enter the string to be encrypted:
WVMTMZ

Decrypted word:wbuluh
-----
1.Encrypt
2.Decrypt
3.exit

```

```

1 #include<iostream>
2 #include<string>
3 #include<stdlib.h>
4 using namespace std;
5 int i,c=0;
6 int hcf[]={1,3,5,7,9,11,13,15,17,19,21,23,25};
7 int in(int a){
8
9     for(i=0;i<13;i++){
10         if(hcf[i]==a){
11             c++;
12         }
13     }
14     if(c>0){
15         return 1;
16     }
17     else{
18         return 0;
19     }
20 }
21 int mmi(int a){
22     int x=1;
23     while((a*x)%26!=1){
24         x++;
25     }
26 }

```

4. To implement Hill cipher technique

Code

```
#include<iostream>
#include<stdlib.h>
#include<string>
using namespace std;
string ip,op="\0";
int n,x=0,v,w[100];
float matr[100][200],t;
main(){

    int size,i,j,option;
    int m=0,ip,q,h;
    int k[100][100]={'\0'},p[100][1]={'\0'},c[100][1]={'\0'};

    while(1){
        cout<<endl<<"-----WELCOME
17BCE2196-----"<<endl;
        cout<<"Please enter your choice\n";
        cout<<"1.Encryption\n";
        cout<<"2.Decryption\n";
        cout<<"3.Exit\n";
        cin>>option;
        switch(option){
        case(1):
            cout<<"Enter the message:";
            cin>>ip;
            cout<<"Enter the size of key matrix:";
            cin>>size;
            while((ip.length())%size !=0){

                cout<<"Please Enter the size such that (length of
message)%(size of key matrix)==0";
                cin>>size;
            }
            for(i=0;i<size;i++){
                for(j=0;j<size;j++){
                    cout<<"Enter the element of the matrix:";
                    cin>>k[i][j];
                }
            }
            for(m=0;m<ip.length();m=m+size){
                ip=0;
                for(t=m;t<m+size;t++){
                    p[ip][0]=int(ip[t])-97;
                    ip++;
                }
                for (i = 0; i < size; i++)
```

```

    {
        for (j = 0; j <1; j++)
        {
            c[i][j] = 0;
            for (q = 0; q < size; q++)
            {
                c[i][j] += k[i][q]*p[q][j];
            }
            c[i][j]=c[i][j]%26;
            op=op+char(c[i][j]+97);
        }
    }
    cout<<"Encrypted message:"<<op;
    op="\0";
    cout<<endl;
    break;

case(2):
    x=0;
    cout<<"Enter the message which has to be decrypted:";
    cin>>ip;
    cout<<"Enter size of key matrix:";
    cin>>size;
    while((ip.length())%size !=0){
        cout<<"Please Enter the size such that (length of
message)%(size of key matrix)==0 !";
        cin>>size;
    }
    n=size;
    cout<<"Enter the elements of matrix"<<endl;
    for(i=0;i<n;i++)
        for(j=0;j<n;j++)
            cin>>matr[i][j];
    for(i=0;i<n;i++)
    {
        for(j=n;j<2*n;j++)
        {
            if(i==j-n)
                matr[i][j]=1;
            else
                matr[i][j]=0;
        }
    }
    for(i=0;i<n;i++)
    {
        t=matr[i][i];
        for(j=i;j<2*n;j++)

```

```

        matr[i][j]=matr[i][j]/t;
for(j=0;j<n;j++)
{
    if(i!=j)
    {
        t=matr[j][i];
        for(v=0;v<2*n;v++)
            matr[j][v]=matr[j][v]-t*matr[i][v];
    }
}
}
//cout<<"\n\nInverse matrix\n\n";
for(i=0;i<n;i++)
{
    for(j=n;j<2*n;j++){
        // cout<<"\t"<<matr[i][j];
        w[x]=(int)matr[i][j];
        if(w[x]<0){w[x]=26+w[x];}
        x++;
    }
    //cout<<"\n";
}
x=0;
for(i=0;i<size;i++){
    for(j=0;j<size;j++){
        k[i][j]=(w[x]);
        x++;
    }
}
for(m=0;m<ip.length();m=m+size){
    ip=0;
    for(h=m;h<m+size;h++){
        p[ip][0]=int(ip[h])-97;
        ip++;
    }
    for (i = 0; i < size; i++)
    {
        for (j = 0; j <1; j++)
        {
            c[i][j] = 0;
            for (q = 0; q < size; q++)
            {
                c[i][j] += k[i][q]*p[q][j];
            }
            c[i][j]=c[i][j]%26;
            op=op+char(c[i][j]+97);
        }
    }
}

```

```

    }
    cout<<"Decrypted message:"<<op;
    op="\0";
    cout<<endl;
    break;
case (3):
    exit(0);
}}}

```

OUTPUT SNIPPETS

```

D:\College stuff\Semester 4\Cryptography Fundamentals\LAB\Assessment 2\test2.exe
Enter element of the matrix:1
Enter element of the matrix:2
Encrypted message:ybhuvu

-----WELCOME 17BCE2196-----
Please enter your choice
1.Encryption
2.Decryption
3.Exit
2
Enter the message which needs to be decrypted:ybhuvu
Enter the size of key matrix:3
Enter the elements of matrix
5
2
5
2
6
7
9
0
1
2
Decrypted message:athaaa

-----WELCOME 17BCE2196-----
Please enter your choice
1.Encryption
2.Decryption
3.Exit

```

```

1 #include<iostream>
2 #include<stdlib.h>
3 #include<string>
4 using namespace std;
5 string inp,op="\0";
6 int n,x=0,v,w[100];
7 float matr[100][200],t;
8
9 main(){
10     int sk,i,j,option,m=0,ip,q,h;
11     int k[100][100]={{'\0'},p[100][1]={{'\0'}};
12     while(1){
13         cout<<endl<<"-----WELCOME 17BCE2196-----"<<endl;
14         cout<<"Please enter your choice\n";
15         cout<<"1.Encryption\n";
16         cout<<"2.Decryption\n";
17         cout<<"3.Exit\n";
18         cin>>option;
19         switch(option){
20             case(2):
21                 x=0;
22                 cout<<"Enter the message which needs to be decrypted:";
23                 cin>>inp;
24                 cout<<"Enter the size of key matrix:";
25                 cin>>sk;

```

Compiler Warnings: 0
Output Filename: D:\College stuff\Semester 4\Cryptography Fundamentals\LAB\Assessment 2\test2.exe
Output Size: 1.04099292755127 MiB
Compilation Time: 0.84s