IT8761 – Security Laboratory

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Aim: To implement the transposition techniques: RailFence Cipher and Row & Column Cipher

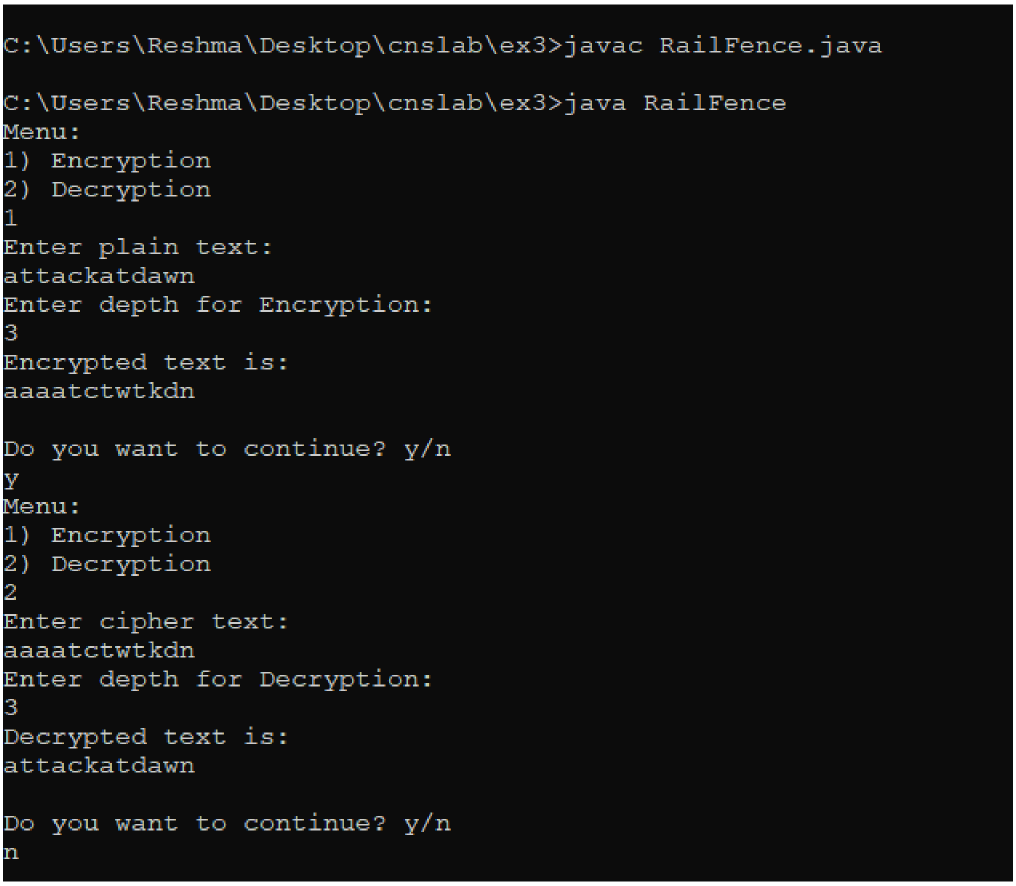
RailFence Cipher:

Code:

```
import java.util.*;
class RailFenceBasic{
   int depth;
   String Encryption(String plainText,int depth)
   {
      int r=depth,len=plainText.length();
      int c=len/depth;
      char mat[][]=new char[r][c];
      int k=0;

      String cipherText="";

      for(int i=0;i< c;i++)
      {
         for(int j=0;j< r;j++)
         {
            if(k!=len)
               mat[j][i]=plainText.charAt(k++);
            else
               mat[j][i]='X';
```

```
        }
    }
    for(int i=0;i< r;i++)
    {
        for(int j=0;j< c;j++)
        {
            cipherText+=mat[i][j];
        }
    }
    return cipherText;
}
String Decryption(String cipherText,int depth)
{
    int r=depth,len=cipherText.length();
    int c=len/depth;
    char mat[][]=new char[r][c];
    int k=0;

    String plainText="";


    for(int i=0;i< r;i++)
    {
        for(int j=0;j< c;j++)
        {
            mat[i][j]=cipherText.charAt(k++);
            }
        }
        for(int i=0;i< c;i++)
        {
            for(int j=0;j< r;j++)
            {
                plainText+=mat[j][i];
            }
        }

        return plainText;
    }
}

class RailFence{
 public static void main(String args[])
 {
    RailFenceBasic rf=new RailFenceBasic();
    Scanner scn=new Scanner(System.in);
    int depth;
    String plainText,cipherText,decryptedText;
    char ch;
    int choice;

    do{
        System.out.println("Menu:\n1) Encryption\n2) Decryption");
        choice=scn.nextInt();
        switch(choice)
        {
           case 1: System.out.println("Enter plain text:");
                    plainText=scn.next();
                    System.out.println("Enter depth for Encryption:");
                    depth=scn.nextInt();
                    cipherText=rf.Encryption(plainText,depth);
                    System.out.println("Encrypted text is:\n"+cipherText);
                    break;
           case 2: System.out.println("Enter cipher text:");
                    cipherText=scn.next();
                    System.out.println("Enter depth for Decryption:");
                    depth=scn.nextInt();
                    decryptedText=rf.Decryption(cipherText, depth);
                    System.out.println("Decrypted text is:\n"+decryptedText);
                    break;
        }
        System.out.println("\nDo you want to continue? y/n");
        ch = scn.next().charAt(0);
     }while(ch!='n');

  }
 }
```

Output:



```
C:\Users\Reshma\Desktop\cnslab\ex3>javac RailFence.java

C:\Users\Reshma\Desktop\cnslab\ex3>java RailFence
Menu:
1) Encryption
2) Decryption
1
Enter plain text:
attackatdawn
Enter depth for Encryption:
3
Encrypted text is:
aaaatctwtkdn

Do you want to continue? y/n
y
Menu:
1) Encryption
2) Decryption
2
Enter cipher text:
aaaatctwtkdn
Enter depth for Decryption:
3
Decrypted text is:
attackatdawn

Do you want to continue? y/n
n
```

Row & Column Transposition Cipher:

Code:

```
import java.util.*;

public class RowColumn{

  char arr[][],encrypt[][],decrypt[][],keya[],keytemp[];

  public void creatematrixE(String s,String key,int row,int column){

    arr=new char[row][column];

    int k=0;

    keya=key.toCharArray();

    for(int i=0;i<row;i++){

      for(int j=0;j<column;j++)
```

```
        {
            if(k<s.length())
            {
                arr[i][j]=s.charAt(k);
                k++;
            }
            else
            {
                arr[i][j]=' ';
            }
        }
    }
}
public void createkey(String key,int column){
    keytemp=key.toCharArray();
    for(int i=0;i<column-1;i++){
        for(int j=i+1;j<column;j++)
        {
            if(keytemp[i]>keytemp[j])
            {
                char temp=keytemp[i];
                keytemp[i]=keytemp[j];
                keytemp[j]=temp;
            }
        }
    }
```

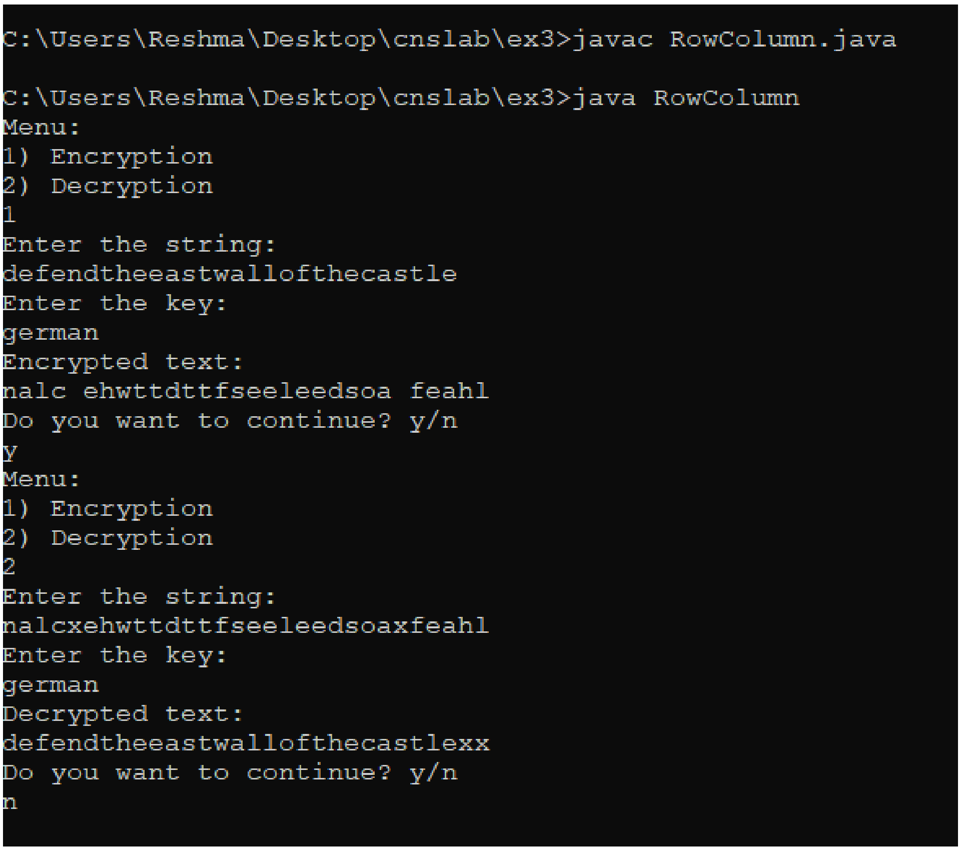
```
}
public void creatematrixD(String s,String key,int row,int column){
   arr=new char[row][column];
   int k=0;
   keya=key.toCharArray();
   for(int i=0;i<column;i++)
   {
      for(int j=0;j<row;j++)
      {
         if(k<s.length())
         {
            arr[j][i]=s.charAt(k);
            k++;
         }
         else
         {
            arr[j][i]=' ';
         }
      }
   }
}
public void encrypt(int row,int column){
   encrypt=new char[row][column];
   for(int i=0;i<column;i++)
   {
      for(int j=0;j<column;j++)
```

```
        {
            if(keya[i]==keytemp[j])
            {
                for(int k=0;k<row;k++)
                {
                    encrypt[k][j]=arr[k][i];
                }
                keytemp[j]='?';
                break;
            }
        }
    }
}
public void decrypt(int row,int column){
    decrypt=new char[row][column];
    for(int i=0;i<column;i++)
    {
        for(int j=0;j<column;j++)
        {
            if(keya[j]==keytemp[i])
            {
            for(int k=0;k<row;k++)
            {
                decrypt[k][j]=arr[k][i];
            }
            keya[j]='?';
            break;
            }
        }
    }
}
public void resultE(int row,int column,char arr[][]){
    System.out.println("Encrypted text:");
    for(int i=0;i<column;i++)
    {
        for(int j=0;j<row;j++)
        {
            System.out.print(arr[j][i]);
        }
    }
}
public void resultD(int row,int column,char arr[][]) {
    System.out.println("Decrypted text:");
    for(int i=0;i<row;i++)
    {
        for(int j=0;j<column;j++)
        {
            System.out.print(arr[i][j]);
        }
    }
}
public static void main(String args[]){
```

```
int row,column,choice;
char ch;
RowColumn obj=new RowColumn();
Scanner in = new Scanner(System.in);
do{
   System.out.println("Menu:\n1) Encryption\n2) Decryption");
   choice=in.nextInt();
   System.out.println("Enter the string:");
   String s=in.next();
   System.out.println("Enter the key:");
   String key=in.next();
   row=s.length()/key.length();
   if(s.length()%key.length()!=0)
      row++;
   column=key.length();
   switch(choice)
   {
      case 1: obj.creatematrixE(s,key,row,column);
            obj.createkey(key,column);
            obj.encrypt(row,column);
            obj.resultE(row,column,obj.encrypt);
            break;
      case 2: obj.creatematrixD(s,key,row,column);
            obj.createkey(key,column);
            obj.decrypt(row,column);
            obj.resultD(row,column,obj.decrypt);
```

```
                break;
            }
            System.out.println("\nDo you want to continue? y/n");
            ch = in.next().charAt(0);
        }while(ch!='n');

    }
}
```

Output:



```
C:\Users\Reshma\Desktop\cnslab\ex3>javac RowColumn.java

C:\Users\Reshma\Desktop\cnslab\ex3>java RowColumn
Menu:
1) Encryption
2) Decryption
1
Enter the string:
defendtheeastwallofthecastle
Enter the key:
german
Encrypted text:
nalc ehwttdttfseeleedsoa feahl
Do you want to continue? y/n
y
Menu:
1) Encryption
2) Decryption
2
Enter the string:
nalcxehwttdttfseeleedsoaxfeahl
Enter the key:
german
Decrypted text:
defendtheeastwallofthecastlexx
Do you want to continue? y/n
n
```