Program and Output

Program :

```
import java.util.*;

class ProductCipher{

public static void main(String args[]){

      System.out.println("Enter the input to be encrypted : ");

        String substitutionInput = new Scanner(System.in).nextLine();

        System.out.println("Enter the Number : ");

        int n = new Scanner(System.in).nextInt();

        // Substitution encryption

        StringBuffer substitutionOutput = new StringBuffer();

        for(int i=0;i<substitutionInput.length();i++){

        char c = substitutionInput.charAt(i);

        substitutionOutput.append((char)(c+5));

        }

      System.out.println("\nSubstituted text : ");

        System.out.println(substitutionOutput);

        // Transposition encryption

      String transpositionInput = substitutionOutput.toString();
```

```
        int modulus;

        if((modulus = transpositionInput.length()%n) != 0){

           modulus = n-modulus;

           // 'modulus' is now the number of blanks/padding (X) to be
appended

           for(;modulus!=0;modulus--){

              transpositionInput += "/";

           }

          }

          StringBuffer transpositionOutput = new StringBuffer();

        System.out.println("\nTransposition Matrix : ");

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

          for(int j=0;j<transpositionInput.length()/n;j++){
          char c = transpositionInput.charAt(i+(j*n));
          System.out.println(c);
          transpositionOutput.append(c);
          }
          System.out.println();
          }
          System.out.println("\nFinal encrypted text:");
          System.out.println(transpositionOutput);
          // Transposition decryption
          n = transpositionOutput.length()/n;
          StringBuffer transpositionPlaintext = new StringBuffer();
          for(int i=0;i<n;i++){
          for(int j=0;j<transpositionOutput.length()/n;j++){
```

```
            char c = transpositionOutput.charAt(i+(j*n));
            transpositionPlaintext.append(c);
            }
            }
            // Substitution decryption
            StringBuffer plaintext = new StringBuffer();
            for(int i=0; i<transpositionPlaintext.length();i++){
            char c = transpositionPlaintext.charAt(i);
            plaintext.append((char) (c-5));
            }
            System.out.println("\nPlaintext: ");
            System.out.println(plaintext);
        }

}
```

Output :