

```
1  /* NAME : SOMNATH SHAW
2   * REGD NO : 2241019426
3   * SECTION : 2241027
4   */
5
6  import java.util.*;
7
8  public class AffineChiper {
9
10     public static void main(String[] args) {
11
12         Scanner input_paraphrase = new Scanner(System
13             .in);
14         System.out.println("Enter a paraphrase: ");
15         String input_string = input_paraphrase.
16             nextLine();
17         input_paraphrase.close();
18         String plaintext = input_string;
19
20         String ciphertext = encrypt(plaintext);
21         String decrypted = decrypt(ciphertext);
22         System.out.println("Ciphertext: " +
23             ciphertext);
24         System.out.println("Decrypted text: " +
25             decrypted);
26     }
27
28     public static String encrypt(String plaintext
29     ) {
30         // Encryption meaning converting
31         human-readable plaintext into incomprehensible text,
32         which is known as ciphertext. This means taking
33         readable data and changing it so that it appears
34         random. Encryption involves using a cryptographic key
35         , a set of mathematical values both the sender and
36         recipient agree on.
37
38         int k1 = 5;
39         int k2 = 7;
40         char[] ciphertext = new char[plaintext.length
```

```

30    ()];
31
32        for (int i = 0; i < plaintext.length(); i
33            ++ ) {
34            char character_check = plaintext.charAt(i
35            );
36            if (Character.isUpperCase(character_check
37            )){
38                int k3 = plaintext.charAt(i) - 'A';
39                int encrypted = (k3 * k1 +k2) % 26;
40                ciphertext[i] = (char)(encrypted + 'A
41                ');
42            } else {
43                int k3 = plaintext.charAt(i) - 'a';
44                int encrypted = (k3 * k1 +k2) % 26;
45                ciphertext[i] = (char)(encrypted + 'a
46                ');
47            }
48        }
49        return new String(ciphertext);
50    }
51
52    public static String decrypt(String ciphertext
53    ) {
54        // Decryption meaning conversion of
55        encrypted data into its original form.It is
56        generally a reverse process of encryption. It decodes
57        the encrypted information so that an authorized user
58        can only decrypt the data because decryption
59        requires a secret key or password.
60        int k1 = 5;
61        int k2 = 7;
62        char[] plaintext = new char[ciphertext.length
63        ()];
64
65        int k1_inverse = 0;
66        for (int i = 0; i < 26; i++) {
67            if ((k1 * i) % 26 == 1) {
68                k1_inverse = i;
69                break;

```

```
59         }
60     }
61
62     for (int i = 0; i < ciphertext.length(); i
        ++ ) {
63         char character_check = ciphertext.charAt(
            i);
64         if (Character.isUpperCase(character_check
            )){
65             int k3 = ciphertext.charAt(i) - 'A';
66             int decrypted = ((k3 - k2 + 26)*
                k1_inverse) % 26;
67             plaintext[i] = (char)(decrypted + 'A'
                );
68
69             } else {
70                 int k3 = ciphertext.charAt(i) - 'a';
71                 int decrypted = ((k3 - k2 + 26)*
                    k1_inverse) % 26;
72                 plaintext[i] = (char)(decrypted + 'a'
                    );
73             }
74         }
75         return new String(plaintext);
76     }
77
78 }
79
```

# Affine Chiper Project

## Description & Output

The above program is a Java implementation of Affine Chiper, which is a type of monoalphabetic substitution chiper. The program takes an input string from the user, encrypts it using a key (5 and 7), and then decrypts it back to the original input string. The encryption process involves replacing each character in the plaintext with a character shifted by a constant value, while the decryption process involves reversing this process to retrieve the original plaintext. The program is case sensitive and handles both uppercase and lowercase letters. The encryption and decryption functions use modular arithmetic to ensure that the characters stay within the alphabet range.

### INPUT:

Enter a paraphrase : Somnath

### OUTPUT:

Chiper text : Tzpuhyq

Decrypted text : Somnath

