NAME: JASWANTH S
REG NO: 727721EPCI021

21CSI603-Cryptography, Network Security and Application Security

Tutorial – 1

AIM:

To Implement Vigenère Cipher using Java, to Encrypt and Decrypt the text given by the user.

DESCRIPTION:

Encryption:

- Takes a plaintext and a key as input.
- Iterates through each character in the plaintext.
- For each alphabetic character, it combines the plaintext character with the corresponding key character to produce the encrypted character using modular arithmetic.
- Builds the encrypted text character by character.
- Returns the encrypted text.

Decryption:

- Takes an encrypted text and a key as input.
- Similar to the encrypt method but performs the reverse operation to decrypt the text.
- Uses modular arithmetic to find the decrypted character.
- Builds the decrypted text character by character.
- Returns the decrypted text.

Sample Input and Output:

- The provided sample input is the plaintext "HELLO WORLD" and the key "KEY."
- The output demonstrates the encryption and decryption processes, resulting in the encrypted text "RIJVSUYVJN" and the decrypted text "HELLO WORLD."

CODE:

```
import java.util.*;

public class Main {

   public static void main(String[] args) {

      Scanner sc = new Scanner(System.in);

      System.out.print("Enter the Plain text : ");
```

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```
String plainText = sc.nextLine();
plainText = plainText.toUpperCase();
System.out.print("Enter the Key text : ");
String keyText = sc.nextLine();
keyText = keyText.toUpperCase();

//length equalling
int lengthOfThePlainText = plainText.length();
int lengthOfTheKeyText = keyText.length();
int difference = lengthOfThePlainText - lengthOfTheKeyText;
int index = 0;
while(lengthOfThePlainText > lengthOfTheKeyText){
   keyText = keyText + keyText.charAt(index);
   index++;
   lengthOfTheKeyText++;
}
System.out.println();
System.out.println("Plain Text  : "+plainText);
System.out.println("Key Text    : "+keyText);

//encryption
String encryptedText = "";
System.out.print("Encrypted / Cipher text : ");
for(int i=0; i<plainText.length(); i++){
   int x1 = plainText.charAt(i);  // getting charAt plain text
   x1 = x1 - 65;                  // converting ascii to [A:0 - Z:25]
   int x2 = keyText.charAt(i);    // getting charAt key text
   x2 = x2 - 65;
   int x = (x1+x2) % 26;
   x = x + 65;
```

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```
            encryptedText = encryptedText + (char) x;
        }
        System.out.println(encryptedText);

        // decryption
        String decryptedText = "";
        System.out.print("Decrypted / Plain text  : ");
        for(int i=0; i<encryptedText.length(); i++){
            int x1 = encryptedText.charAt(i);
            x1 = x1 - 65;
            int x2 = keyText.charAt(i);
            x2 = x2 - 65;
            int x = x1 - x2;
            if(x<0) x = 26 + x;
            x = x + 65;
            decryptedText = decryptedText + (char)x;
        }
        decryptedText = decryptedText.toUpperCase();
        System.out.println(decryptedText);
    }
}
```

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OUTPUT:

```
C:\Users\sjasw\.jdks\openjdk-21.0.2\bin\java.exe "-javaagent:C:\
Enter the Plain text : HELLOWORLD
Enter the Key text : KEY

Plain Text  : HELLOWORLD
Key Text    : KEYKEYKEYK
Encrypted / Cipher text : RIJVSUYVJN
Decrypted / Plain text  : HELLOWORLD

Process finished with exit code 0
```

RESULT:

Thus, to Implement Vigenère Cipher using Java, to Encrypt and Decrypt the text given by the user is successfully implemented and verified.