**Name:** Arham Sharif

**Seat No.:** EB21102022

**Section:** B

**Subject:** Network Security & Cryptography

**Language:** JavaScript

**LAB# 1**

**CESEAR CIPHER**

**Objective:** Design and implement a simple encoding and decoding program in JavaScript that allows users to input a string, encode it using a specified algorithm, and then decode it back to the original form. This lab aims to reinforce understanding of string manipulation, algorithmic concepts, and basic programming skills while demonstrating the principles of encoding and decoding.

**Technique:** Substitution

**Code:**

const simpleInc = 3;

const simpleCharArr = Array.from({ length: 26 }, (\_, i) => String.fromCharCode(97 + i));

const simpleLenCharArr = simpleCharArr.length;

"""-----------------ENCODE------------------"""

# Function Can Encode Char

const encodeCharSimple = (char) => {

let encodeChar = '';

let index = -1;

for (let i = 0; i < simpleLenCharArr; i++) {

if (simpleCharArr[i] === char) {

index = i + simpleInc;

if (index >= simpleLenCharArr) {

index %= simpleLenCharArr;

}

encodeChar = simpleCharArr[index];

break;

}

}

if (index !== -1) {

return encodeChar;

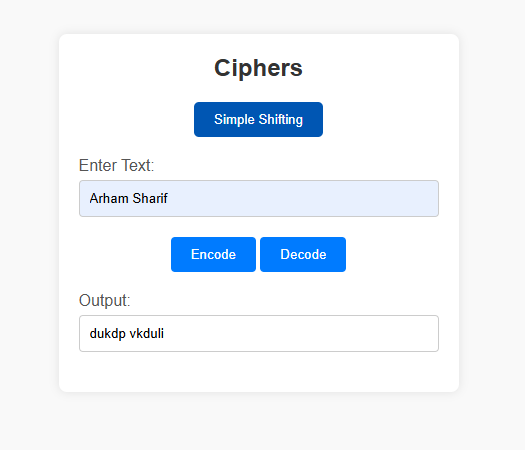
} else {

return char;

}

}

**Output:**



**Code:**

"""-----------------DECODE------------------"""

# Function to Decode Char

const decodeCharSimple = (char) => {

let decodeChar = '';

let index = -1;

for (let i = 0; i < simpleLenCharArr; i++) {

if (simpleCharArr[i] === char) {

index = i - simpleInc;

if (index < 0) {

index += simpleLenCharArr;

}

decodeChar = simpleCharArr[index];

break;

}

}

if (index !== -1) {

return decodeChar;

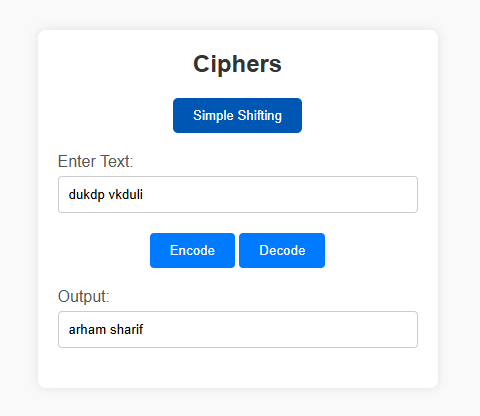
} else {

return char;

}

}

**Output:**



**LAB# 2**

**VIGENÈRE** **CIPHER**

**Objective:** Design and implement the Vigenère cipher, a classical encryption technique that uses a keyword to encrypt and decrypt messages.

**Key:** zautnq

**Matrix:**

zabcdefghijklmnopqrstuvwxy

abcdefghijklmnopqrstuvwxyz

uvwxyzabcdefghijklmnopqrst

tuvwxyzabcdefghijklmnopqrs

nopqrstuvwxyzabcdefghijklm

qrstuvwxyzabcdefghijklmnop

**Code:**

const vigenereCharArr = Array.from({ length: 26 }, (\_, i) => String.fromCharCode(97 + i));

function generateVigenereRandomKey(length) {

const charset = vigenereCharArr.join("");

let key = '';

for (let i = 0; i < length; i++) {

const randomIndex = Math.floor(Math.random() \* charset.length);

key += charset[randomIndex];

}

return key;

}

// Function to generate the Vigenère character array based on the key

function generateVigenereCharArr(key) {

const charArr = [];

for (let i = 0; i < key.length; i++) {

const shift = key.charCodeAt(i) - 97; // Get the shift amount for each character in the key

const shiftedChars = vigenereCharArr.slice(shift).concat(vigenereCharArr.slice(0, shift));

charArr.push(shiftedChars);

}

return charArr;

}

// Function to save Vigenère key and character array to local storage

function saveVigenereToLocalStorage(key, charArr) {

localStorage.setItem('vigenereKey', key);

localStorage.setItem('vigenereCharArr', JSON.stringify(charArr));

}

// Function to retrieve Vigenère key and character array from local storage

function getVigenereFromLocalStorage() {

const key = localStorage.getItem('vigenereKey');

const charArr = JSON.parse(localStorage.getItem('vigenereCharArr'));

return { key, charArr };

}

// Generate random key and character array

const randomKey = generateVigenereRandomKey(6); // Change the length as needed

const randomCharArr = generateVigenereCharArr(randomKey);

// Save them to local storage

saveVigenereToLocalStorage(randomKey, randomCharArr);

"""-----------------ENCODE------------------"""

# Function Can Encode Char

function encryptVigenereShifting(message) {

const { key, charArr } = getVigenereFromLocalStorage();

let result = '';

for (let i = 0, j = 0; i < message.length; i++) {

const c = message.charAt(i);

const index = vigenereCharArr.indexOf(c);

if (index !== -1) {

result += charArr[j % key.length][index];

j++;

} else {

result += c;

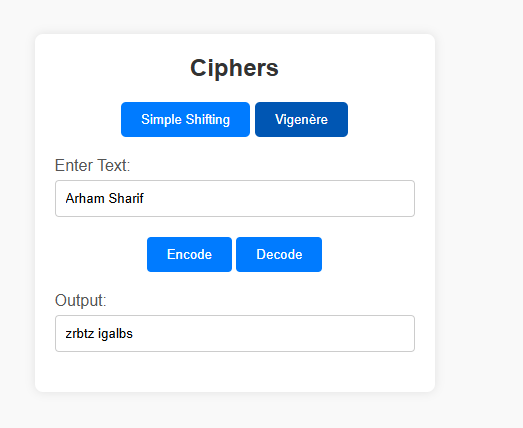
}

}

return result;

}

**Output:**



**Code:**

"""-----------------DECODE------------------"""

function decryptVigenereShifting(message) {

const { key, charArr } = getVigenereFromLocalStorage();

let result = '';

for (let i = 0, j = 0; i < message.length; i++) {

const c = message.charAt(i);

const rowIndex = j % key.length;

const charIndex = charArr[rowIndex].indexOf(c);

if (charIndex !== -1) {

result += vigenereCharArr[charIndex];

j++;

} else {

result += c;

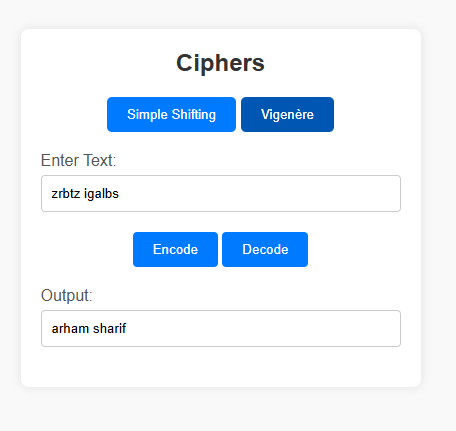
}

}

return result;

}

**Output:**

****