1 .Write a C program for Caesar cipher involves replacing each letter of the alphabet with the letter standing k places further down the alphabet, for k in the range 1 through 25.

Code:

#include <stdio.h>

#include <stdlib.h>

#include <string.h>

#include <ctype.h>

// Function to encrypt a message using Caesar cipher

void caesarEncrypt(char message[], int key) {

int i;

char ch;

// Normalize the key to be between 0-25

key = key % 26;

for (i = 0; message[i] != '\0'; i++) {

ch = message[i];

// Encrypt uppercase letters

if (isupper(ch)) {

message[i] = ((ch - 'A' + key) % 26) + 'A';

}

// Encrypt lowercase letters

else if (islower(ch)) {

message[i] = ((ch - 'a' + key) % 26) + 'a';

}

// Leave non-alphabetic characters unchanged

}

}

// Function to decrypt a message encoded with Caesar cipher

void caesarDecrypt(char message[], int key) {

// To decrypt, we can use the encrypt function with a negative key

// We add 26 to ensure the key is positive, then take modulo 26

caesarEncrypt(message, (26 - (key % 26)) % 26);

}

// Function to display the alphabet shift for better understanding

void displayShiftedAlphabet(int key) {

printf("Original: ABCDEFGHIJKLMNOPQRSTUVWXYZ\n");

printf("Shifted: ");

// Normalize the key to be between 0-25

key = key % 26;

for (int i = 0; i < 26; i++) {

printf("%c", 'A' + ((i + key) % 26));

}

printf("\n\n");

}

int main() {

char message[1000];

int key, choice;

// Get user input

printf("===== CAESAR CIPHER PROGRAM =====\n\n");

printf("Enter a message: ");

fgets(message, sizeof(message), stdin);

// Remove newline character from message

if (message[strlen(message) - 1] == '\n') {

message[strlen(message) - 1] = '\0';

}

printf("Enter the shift value (1-25): ");

scanf("%d", &key);

// Validate key

if (key < 1 || key > 25) {

printf("Invalid shift value. Please enter a value between 1 and 25.\n");

return 1;

}

// Display the alphabet shift

displayShiftedAlphabet(key);

// Menu for encryption or decryption

printf("Choose an operation:\n");

printf("1. Encrypt\n");

printf("2. Decrypt\n");

printf("Enter your choice (1/2): ");

scanf("%d", &choice);

// Process based on choice

if (choice == 1) {

caesarEncrypt(message, key);

printf("\nEncrypted message: %s\n", message);

} else if (choice == 2) {

caesarDecrypt(message, key);

printf("\nDecrypted message: %s\n", message);

} else {

printf("Invalid choice. Please run the program again.\n");

return 1;

}

return 0;

}

Output:

