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#include <stdio.h>
#include <string.h>

#define MOD 26


int mod(int a, int m) {
    int res = a % m;
    return res < 0 ? res + m : res;
}


int mod_inverse(int a, int m) {
    a = mod(a, m);
    for (int x = 1; x < m; x++) {
        if ((a * x) % m == 1) return x;
    }
    return -1;
}


void encrypt(char *message, int key_matrix[2][2], char *encrypted) {
    int vector[2];
    for (int i = 0; i < 2; i++) {
        vector[i] = message[i] - 'A';
    }

    for (int i = 0; i < 2; i++) {
        encrypted[i] = mod(key_matrix[i][0] * vector[0] + key_matrix[i][1] * vector[1], MOD) + 'A';
    }
    encrypted[2] = '\0';
}


void decrypt(char *cipher, int key_matrix[2][2], char *decrypted) {
    int det = mod(key_matrix[0][0]*key_matrix[1][1] - key_matrix[0][1]*key_matrix[1][0], MOD);
    int det_inv = mod_inverse(det, MOD);

    if (det_inv == -1) {
        printf("Key matrix not invertible modulo 26.\n");
        return;
    }

    int inv_matrix[2][2];
    inv_matrix[0][0] = mod( key_matrix[1][1] * det_inv, MOD);
    inv_matrix[0][1] = mod(-key_matrix[0][1] * det_inv, MOD);
    inv_matrix[1][0] = mod(-key_matrix[1][0] * det_inv, MOD);
    inv_matrix[1][1] = mod( key_matrix[0][0] * det_inv, MOD);

    int vector[2];
    for (int i = 0; i < 2; i++) {
        vector[i] = cipher[i] - 'A';
    }

    for (int i = 0; i < 2; i++) {
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        decrypted[i] = mod(inv_matrix[i][0] * vector[0] + inv_matrix[i][1] * vector[1], MOD) + 'A';
    }
    decrypted[2] = '\0';
}

int main() {
    char message[3], encrypted[3], decrypted[3];
    int key_matrix[2][2];

    printf("Enter 2-letter message: ");
    scanf("%2s", message);

    printf("Enter 2x2 key matrix:\n");
    for (int i = 0; i < 2; i++) {
        for (int j = 0; j < 2; j++) {
            scanf("%d", &key_matrix[i][j]);
        }
    }

    encrypt(message, key_matrix, encrypted);
    printf("Encrypted text: %s\n", encrypted);

    decrypt(encrypted, key_matrix, decrypted);
    printf("Decrypted text: %s\n", decrypted);

    return 0;
}
```