**Triple DES**

**CODE:-**

**#include <stdio.h>**

**#include <stdint.h>**

**int IP[64] = {**

**58,50,42,34,26,18,10,2, 60,52,44,36,28,20,12,4,**

**62,54,46,38,30,22,14,6, 64,56,48,40,32,24,16,8,**

**57,49,41,33,25,17,9,1, 59,51,43,35,27,19,11,3,**

**61,53,45,37,29,21,13,5, 63,55,47,39,31,23,15,7**

**};**

**int FP[64] = {**

**40,8,48,16,56,24,64,32, 39,7,47,15,55,23,63,31,**

**38,6,46,14,54,22,62,30, 37,5,45,13,53,21,61,29,**

**36,4,44,12,52,20,60,28, 35,3,43,11,51,19,59,27,**

**34,2,42,10,50,18,58,26, 33,1,41,9,49,17,57,25**

**};**

**uint64\_t permute(uint64\_t in, int\* table) {**

**uint64\_t out = 0;**

**for (int i = 0; i < 64; i++) {**

**out <<= 1;**

**out |= (in >> (64 - table[i])) & 1;**

**}**

**return out;**

**}**

**uint64\_t des(uint64\_t block, uint64\_t key) {**

**block = permute(block, IP);**

**uint32\_t L = block >> 32, R = block & 0xFFFFFFFF, temp;**

**for (int i = 0; i < 16; i++) {**

**temp = R;**

**R = L ^ (R ^ (uint32\_t)(key & 0xFFFFFFFF));**

**L = temp;**

**}**

**return permute(((uint64\_t)R << 32) | L, FP);**

**}**

**uint64\_t triple\_des(uint64\_t blk, uint64\_t k1, uint64\_t k2, uint64\_t k3, int dec) {**

**return dec ?**

**des(des(des(blk, k3), k2), k1) :**

**des(des(des(blk, k1), k2), k3);**

**}**

**int main() {**

**int choice;**

**uint64\_t msg, k1, k2, k3;**

**printf("Triple DES (3DES)\n1. Encrypt\n2. Decrypt\nChoose: ");**

**scanf("%d", &choice);**

**printf("Enter 16-digit hex message: ");**

**scanf("%llx", &msg);**

**printf("Enter 16-digit hex key1: ");**

**scanf("%llx", &k1);**

**printf("Enter 16-digit hex key2: ");**

**scanf("%llx", &k2);**

**printf("Enter 16-digit hex key3: ");**

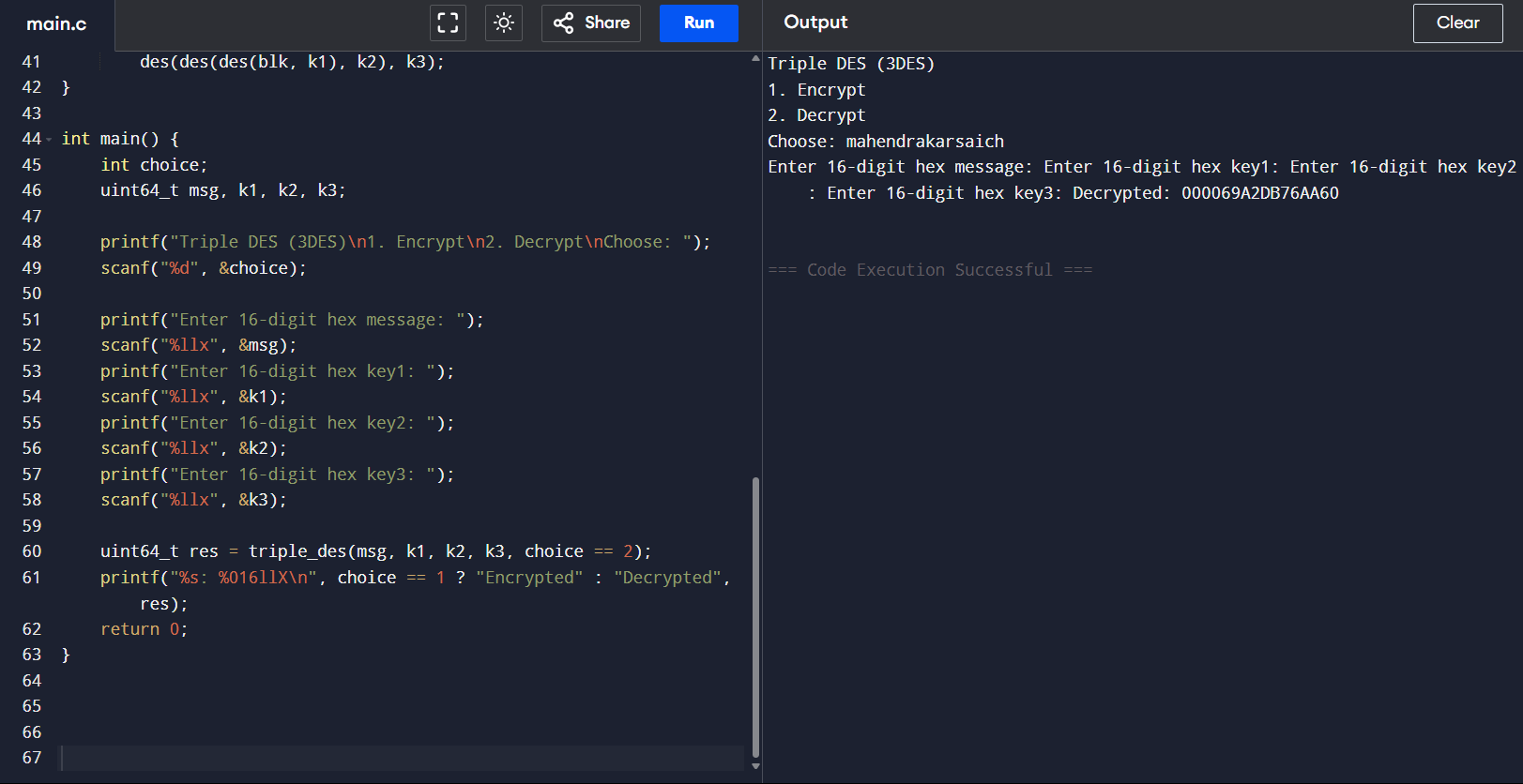
**scanf("%llx", &k3);**

**uint64\_t res = triple\_des(msg, k1, k2, k3, choice == 2);**

**printf("%s: %016llX\n", choice == 1 ? "Encrypted" : "Decrypted", res);**

**return 0;**

**}**

****