Program26 C program for RSA public-key encryption scheme,

#include <stdio.h>

#include <stdlib.h>

#include <math.h>

unsigned long long mod\_exp(unsigned long long base, unsigned long long exp, unsigned long

long modulus) {

unsigned long long result = 1;

base %= modulus;

while (exp > 0) {

if (exp & 1) {

result = (result \* base) % modulus;

}

base = (base \* base) % modulus;

exp >>= 1;

}

return result;

}

unsigned long long encrypt(unsigned long long character, unsigned long long e, unsigned long

long n) {

return mod\_exp(character, e, n);

}

int main() {

unsigned long long p, q, n, phi, e, character;

char message[1000];

p = 9973; // Example prime numbers (should be much larger in practice)

q = 9857;

n = p \* q;

phi = (p - 1) \* (q - 1);

e = 65537;

int i;

printf("Enter the message (all uppercase letters without spaces): ");

scanf("%s", message);

printf("Encrypted message: ");

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

character = message[i] - 'A'; // Convert character to number (A=0, B=1, ..., Z=25)

unsigned long long encrypted\_char = encrypt(character, e, n);

printf("%llu ", encrypted\_char);

}

printf("\n");

return 0;

}

OUTPUT:

Enter the message (all uppercase letters without spaces): HELLO

Encrypted message: 902071 72125342 26806698 26806698 23107213