**ASSIGNMENT NO : 7**

NAME: Jyotiraditya B Patil

PRN : 21510087

Q – IMPLEMENT RSA ALGORITHM

#include<bits/stdc++.h>

using namespace std;

// Returns gcd of a and b

int gcd(int a, int h)

{

    int temp;

    while (1) {

        temp = a % h;

        if (temp == 0)

            return h;

        a = h;

        h = temp;

    }

}

// Code to demonstrate RSA algorithm

int main()

{

    // Two random prime numbers

    double p = 3;

    double q = 7;

    // First part of public key:

    double n = p \* q;

    // Finding other part of public key.

    // e stands for encrypt

    double e = 2;

    double phi = (p - 1) \* (q - 1);

    while (e < phi) {

        // e must be co-prime to phi and

        // smaller than phi.

        if (gcd(e, phi) == 1)

            break;

        else

            e++;

    }

    // Private key (d stands for decrypt)

    // choosing d such that it satisfies

    // d\*e = 1 + k \* totient

    int k = 2; // A constant value

    double d = (1 + (k \* phi)) / e;

    // Message to be encrypted

    double msg = 12;

    printf("Message data = %lf", msg);

    // Encryption c = (msg ^ e) % n

    double c = pow(msg, e);

    c = fmod(c, n);

    printf("\nEncrypted data = %lf", c);

    // Decryption m = (c ^ d) % n

    double m = pow(c, d);

    m = fmod(m, n);

    printf("\nOriginal Message Sent = %lf", m);

    return 0;

}

OUTPUT :

