```
import sympy
import math


def GCD(x,y):
    r=x%y
    if(r==0):
        return y
    else:
        return GCD(y,r)

def val_e(phi_n):
    for i in range(2 , phi_n):
        if (GCD(i,phi_n)==1):
            break
    return i

def val_d(e , phi_n):
    for i in range(phi_n):
        if ((e*i)%phi_n==1):
            break
    return i

plain = int(input("Enter plain text/Cipher text integer value: "))
p = int(input("Enter prime p: "))
q = int(input("Enter prime q: "))

while(not (sympy.isprime(p) and sympy.isprime(q))):
    print("Enter value of primes please!")
    p = int(input("Enter prime p: "))
    q = int(input("Enter prime q: "))

n = p*q
print("The value of n calculated is: " , n)
phi_n=(p-1)*(q-1)
print("Totient Function calculated is: " , phi_n)
e = val_e(phi_n)
print("The value of encryption key e is: ", e)

d = val_d(e,phi_n)
print("The value of decryption key d is: ", d)
ch = int(input("Press 1 for Encryption otherwise 2 for Decryption Operation
and 3 to Exit this program: "))
while(ch == 1 or ch == 2):
    match ch:
        case 1:
            print("The value of cipher text is: " , pow(plain,e)%n)
```

```
            ch = int(input("Press 1 for Encryption otherwise 2 for Decryption
Operation and 3 to exit this program: "))

        case 2:
            print("The value of plain text integer is " ,pow(plain,d)%n)
            ch = int(input("Press 1 for Encryption otherwise 2 for Decryption
Operation and 3 to exit this program: "))
```

output:-

```
Enter plain text/Cipher text integer value: 6
Enter prime p: 3
Enter prime q: 5
The value of n calculated is:  15
Totient Function calculated is:  8
The value of encryption key e is:  3
The value of decryption key d is:  3
Press 1 for Encryption otherwise 2 for Decryption Operation and 3 to Exit this
program: 1
The value of cipher text is:  6
Press 1 for Encryption otherwise 2 for Decryption Operation and 3 to exit this
program: 2
The value of plain text integer is  6
Press 1 for Encryption otherwise 2 for Decryption Operation and 3 to exit this
program: 3
```