```
Cipher Text is:  Oler Wefmv Qslh Yqev
Recovered plain text : Khan Sabir Mohd Umar
```

```python
import string


all_letters= string.ascii_letters

dict1 = {}
key = 4

for i in range(len(all_letters)):
    dict1[all_letters[i]] = all_letters[(i+key)%len(all_letters)]


plain_txt= "Khan Sabir Mohd Umar"
cipher_txt=[]


for char in plain_txt:
    if char in all_letters:
        temp = dict1[char]
        cipher_txt.append(temp)
    else:
        temp =char
        cipher_txt.append(temp)

cipher_txt= "".join(cipher_txt)
print("Cipher Text is: ",cipher_txt)


dict2 = {}
for i in range(len(all_letters)):
    dict2[all_letters[i]] = all_letters[(i-key)%(len(all_letters))]

decrypt_txt = []

for char in cipher_txt:
    if char in all_letters:
        temp = dict2[char]
        decrypt_txt.append(temp)
```

```python
import math

def get_encrypt(message):
    temp1=""
    temp2=""
    message.replace(" ", "")
    for i in range (0, len(message)):
        if i%2 == 0:
            temp1 += message[i]

        else:
            temp2 += message[i]

    return temp1+temp2

def get_decrypt(message):
    decrypt_text = ""
    message.replace(" ", "")
    message = message.lower()
    mid = math.ceil(len(message)/2)
    for i in range (0,mid):
        if (i+mid<len(message)):
            decrypt_text += message[i] + message[mid+i]

        else:
            decrypt_text += message[i]

    return decrypt_text

message = input("Enter the message you want to encrypt:")
encrypted = get_encrypt(message)
decrypted = get_decrypt(encrypted)

print("Encrypted text: ",encrypted)
print("Decrypted text: ",decrypted)
```

```
Enter the message you want to encrypt: Hi, I'm Sabir Khan
Encrypted text:   i ' ai hnH,ImSbrKa
Decrypted text:   hi, i'm sabir khan
```

```python
import math

#input variables
p = int(input("Enter p: "))
q = int(input("Enter q: "))
message = int(input("Enter message: "))
#calculate n
n = p*q
#calculate totient
totient = (p-1)*(q-1)
#calculate e
for e in range(2,totient):
    if math.gcd(e,totient)== 1:
        break


for i in range(1,10):
    x = 1 + i*totient
    if x % e == 0:
        d = int(x/e)
        break

local_cipher =pow(message,e)
cipher_text = local_cipher % n


decrypt_t= pow(cipher_text,d)
decrpyted_text = decrypt_t % n

print('n = '+str(n))
print('e = '+str(e))
print('totient = '+str(totient))
print('d = '+str(d))
print('cipher text = '+str(cipher_text))
print('decrypted text = '+str(decrpyted_text))
```

```
Enter p: 34
Enter q: 45
Enter message: 100
n = 1530
e = 5
totient = 1452
d = 581
cipher text = 1090
decrypted text = 100
```

```python
import random

q = int(input("Enter a prime number: "))
g =  int(input("Enter a primitive root: "))

if (g<q):
    # Xa = int(input("Enter the Private Key of A: "))
    Xa = random.randint(1,q)

    Ya = g**Xa % q


    Xb = random.randint(1,q)

    Yb = g**Xb % q


    Ka = Yb ** Xa % q
    Kb = Ya ** Xb % q

    if (Ka==Kb):
        print("Exchange is successful.")

    else:
       print("Exchange is unsuccessful.")

else:
    print("Enter a correct primitive root")
```

```
Enter p: 45
Enter q: 7
Enter message: 45
n = 315
e = 5
totient = 264
d = 53
cipher text = 180
decrypted text = 45
```