Practical 1

Blockchain Technology

2CSDE93

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Date

August 30, 2022

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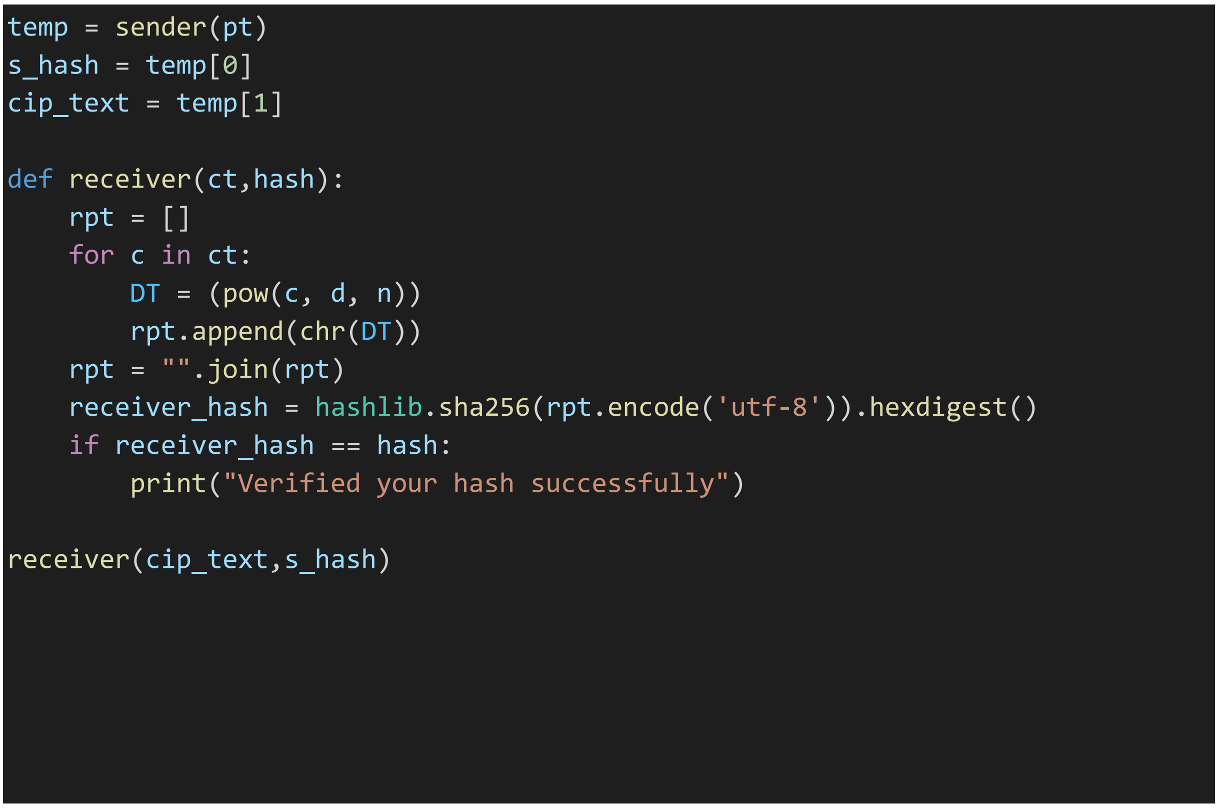
Aim: To implement digital signature to sign and verify authenticated user. Also, show a message when tampering is detected.

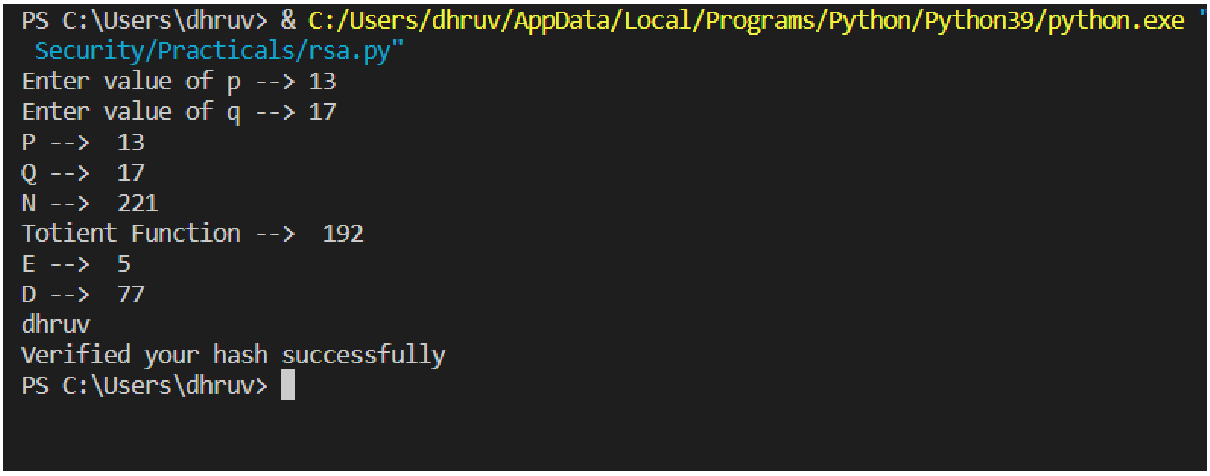
Code: (Python3)

```
import hashlib

def gcd(a,b):
    if(a==0):
        return b
    return gcd(b%a,a)
p =int(input("Enter value of p --> "))
q =int(input("Enter value of q --> "))
print("P --> ",p)
print("Q --> ",q)
n = p*q
print("N --> ",n)
TF = ((p-1)*(q-1))
print("Totient Function --> ",TF)
for i in range(2,TF):
    if(gcd(i,TF)==1):
        e=i
        break
print("E --> ",e)

for k in range(2,TF):
    if((k*e % TF)==(1 % TF )):
        d = k
print("D --> ",d)

pt = input()

ct = []

def sender(pt):
    plaintext = list(pt)
    sender_hash = hashlib.sha256(pt.encode('utf-8')).hexdigest()
    for i in range(len(plaintext)):
        asc = ord(plaintext[i])
        ct.append(pow(asc, e, n))
    return [sender_hash,ct]
```

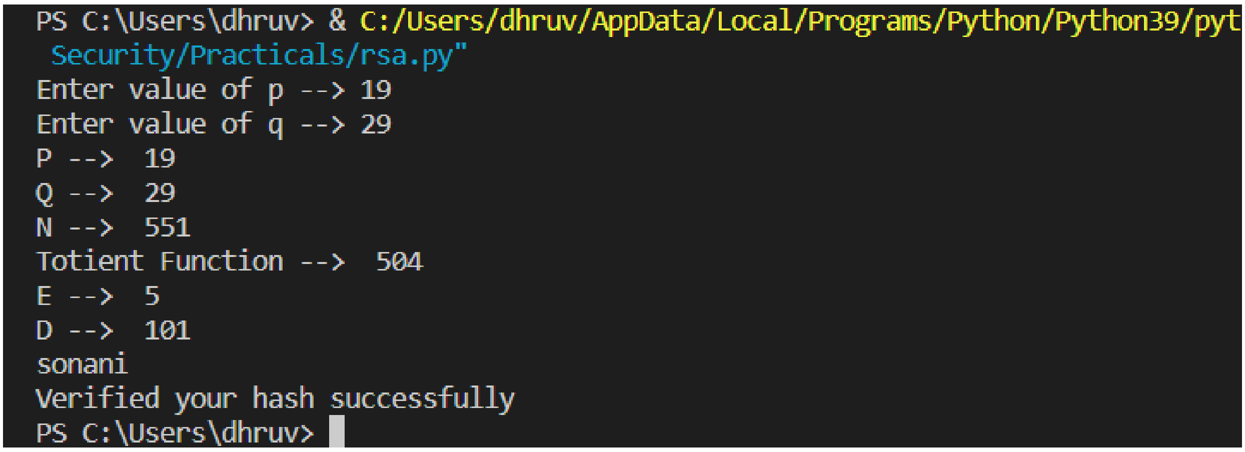


```
temp = sender(pt)
s_hash = temp[0]
cip_text = temp[1]

def receiver(ct,hash):
    rpt = []
    for c in ct:
        DT = (pow(c, d, n))
        rpt.append(chr(DT))
    rpt = "".join(rpt)
    receiver_hash = hashlib.sha256(rpt.encode('utf-8')).hexdigest()
    if receiver_hash == hash:
        print("Verified your hash successfully")

receiver(cip_text,s_hash)
```

Output:



```
PS C:\Users\dhruv> & C:/Users/dhruv/AppData/Local/Programs/Python/Python39/python.exe "
 Security/Practicals/rsa.py"
Enter value of p --> 13
Enter value of q --> 17
P -->  13
Q -->  17
N -->  221
Totient Function -->  192
E -->  5
D -->  77
dhruv
Verified your hash successfully
PS C:\Users\dhruv> 
```



```
PS C:\Users\dhruv> & C:/Users/dhruv/AppData/Local/Programs/Python/Python39/pyt
 Security/Practicals/rsa.py"
Enter value of p --> 19
Enter value of q --> 29
P -->  19
Q -->  29
N -->  551
Totient Function -->  504
E -->  5
D -->  101
sonani
Verified your hash successfully
PS C:\Users\dhruv> 
```