RK.39

RP.1483

Reverse

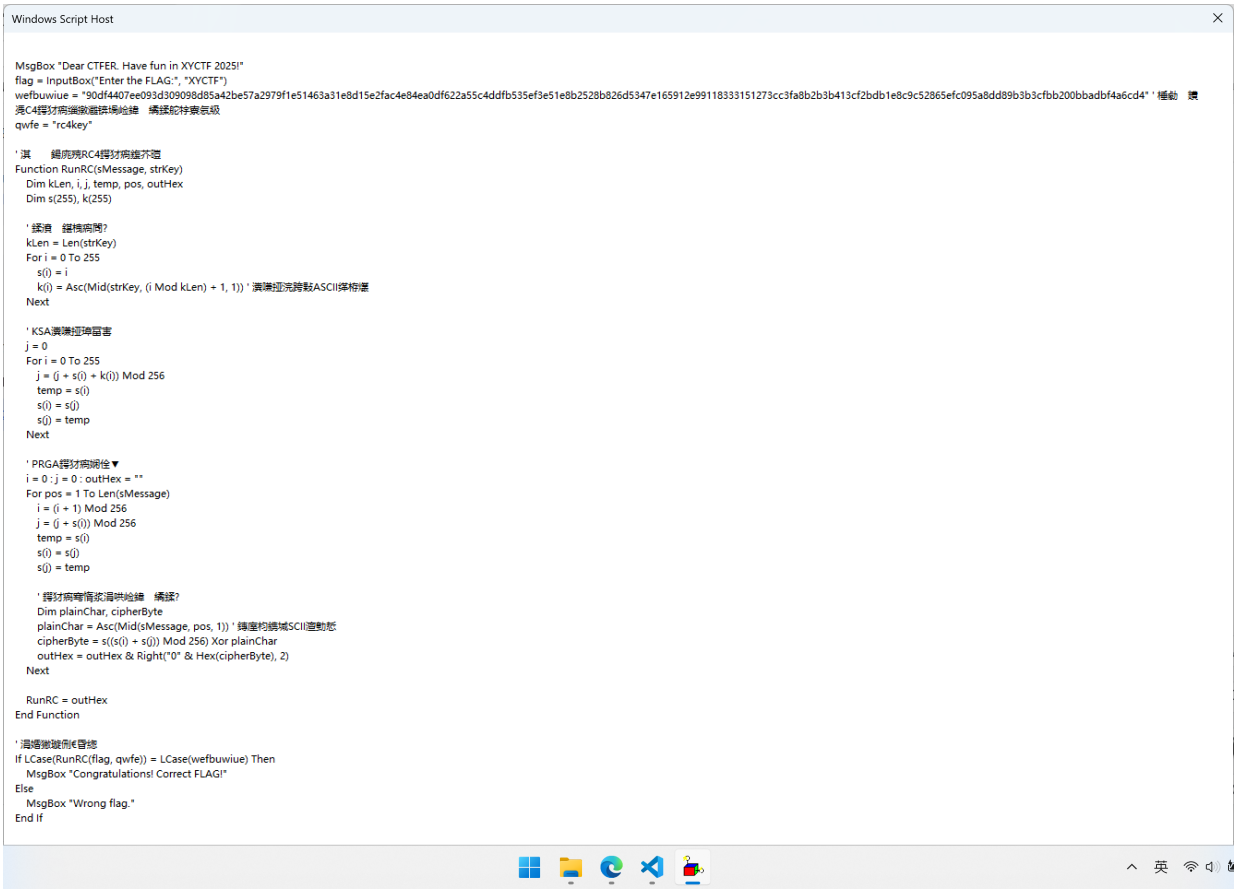
WARMUP | Solved - Spreng

我来签到了

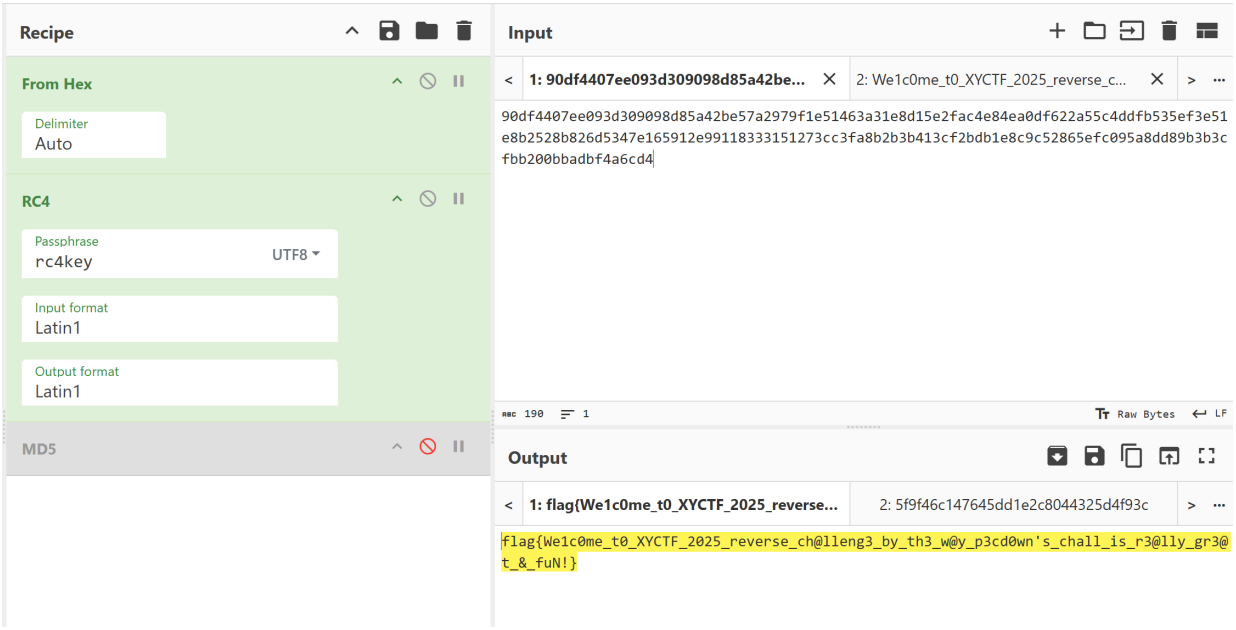
看看VBS里面，源码用char掩盖了。

```
Execute(chr( 667205/8665 ) & chr( -7671+7786 ) & chr( 8541-8438 ) & chr( 422928/6408 ) & chr( -1948+2059 ) & chr( -3066+3186 ) & chr(
756-724 ) & chr( 4080/120 ) & chr( -3615+3683 ) & chr( -1619+1720 ) & chr( -2679+2776 ) & chr( 659718/5787 ) & chr( 302752/9461 ) & chr(
-6627+6694 ) & chr( -4261+4345 ) & chr( 81690/1167 ) & chr( 636180/9220 ) & chr( 538658/6569 ) & chr( -1542+1588 ) & chr( -1644+1676 ) &
chr( 122184/1697 ) & chr( 966411/9963 ) & chr( 2186-2068 ) & chr( -5283+5384 ) & chr( 305056/9533 ) & chr( 66402/651 ) & chr( 1141452/
9756 ) & chr( 882090/8019 ) & chr( -4243+4275 ) & chr( 2669-2564 ) & chr( 83+27 ) & chr( 254880/7965 ) & chr( -1291+1379 ) & chr( -4699
+4788 ) & chr( 4730-4663 ) & chr( -1179+1263 ) & chr( 5274-5204 ) & chr( 210144/6567 ) & chr( -6803+6853 ) & chr( 6655-6607 ) & chr(
4067-4017 ) & chr( 121900/2300 ) & chr( -6158+6191 ) & chr( 11934/351 ) & chr( 64883/4991 ) & chr( 65420/6542 ) & chr( 3781-3679 ) & chr
( 1612-1504 ) & chr( 892788/9204 ) & chr( 927618/9006 ) & chr( -6692+6724 ) & chr( 410591/6731 ) & chr( 6675-6643 ) & chr( 697880/
9560 ) & chr( 4250-4140 ) & chr( 5464-5352 ) & chr( -1082+1199 ) & chr( 3343-3227 ) & chr( 1211-1145 ) & chr( 482406/4346 ) & chr( -5549
+5669 ) & chr( -5150+5190 ) & chr( 4400-4366 ) & chr( -3277+3346 ) & chr( -6649+6759 ) & chr( -5669+5785 ) & chr( -6734+6835 ) & chr(
9757-9643 ) & chr( 109-77 ) & chr( 5620-5504 ) & chr( -2887+2991 ) & chr( -3081+3182 ) & chr( -5109+5141 ) & chr( 699860/9998 ) & chr(
-3603+3679 ) & chr( 1631-1566 ) & chr( 445-374 ) & chr( 294118/5071 ) & chr( -1115+1149 ) & chr( 222376/5054 ) & chr( 8137-8105 ) & chr(
-1653+1687 ) & chr( 357104/4058 ) & chr( 1650-1561 ) & chr( -9501+9568 ) & chr( 1047-963 ) & chr( 2540-2470 ) & chr( 1692-1658 ) & chr(
9947-9906 ) & chr( 9186-9173 ) & chr( -2846+2856 ) & chr( 425187/3573 ) & chr( -3066+3167 ) & chr( 2850-2748 ) & chr( -2992+3090 ) & chr
( 958230/8190 ) & chr( 869295/7305 ) & chr( 3380-3275 ) & chr( -7338+7455 ) & chr( 408848/4048 ) & chr( 9211-9179 ) & chr( -2437
+2498 ) & chr( 1672-1640 ) & chr( 2378-2344 ) & chr( 544749/9557 ) & chr( 351120/7315 ) & chr( 773800/7738 ) & chr( 2033-1931 ) & chr(
-8059+8111 ) & chr( -4731+4783 ) & chr( -9204+9252 ) & chr( -4261+4316 ) & chr( 850521/8421 ) & chr( -7011+7112 ) & chr( 292272/6089 ) &
chr( -8609+8666 ) & chr( -2921+2972 ) & chr( 6772-6672 ) & chr( 487611/9561 ) & chr( -6754+6802 ) & chr( 464835/8155 ) & chr( -939
+987 ) & chr( 421173/7389 ) & chr( -8145+8201 ) & chr( 9368-9268 ) & chr( -7682+7738 ) & chr( -8646+8699 ) & chr( 484612/4996 ) & chr(
286832/5516 ) & chr( -9710+9760 ) & chr( 884156/9022 ) & chr( 7080-6979 ) & chr( 265477/5009 ) & chr( 6+49 ) & chr( 5395-5298 ) & chr(
6645-6595 ) & chr( -9706+9763 ) & chr( -6697+6752 ) & chr( 927-870 ) & chr( 4048-3946 ) & chr( 34398/702 ) & chr( 825675/8175 ) & chr(
```

把Execute换成wscript.echo再运行VBS，源码就出来了。



RC4，CyberChef解掉。



XYCTF{5f9f46c147645dd1e2c8044325d4f93c}

Crypto

Division | Solved - SeanDictioanry

一个简单的MT19937的预测

```
__import__('os').environ['TERM'] = 'xterm'

from pwn import *
from tqdm import *
from random import *
# context.log_level = 'debug'

addr = "39.106.69.240 20502".split()
io = remote(addr[0], int(addr[1]))

tmp = []
for _ in trange(19968//32):
    io.sendlineafter(b": >>>", b"1")
    io.sendlineafter(b": >>>", b"1")
    tmp += [int(io.recvline().decode().strip().split(" = ")[1])]

def construct_a_row(RNG):
    row = []
    for _ in range(19968//32):
        tmp = RNG.getrandbits(32)
        row += list(map(int, bin(tmp)[2:].zfill(32)))
    return row

# 构造线性方程组的矩阵
L = []
for i in trange(19968):
    state = [0]*624  # MT19937使用624个32位整数作为状态
    # 构造一个只有一位为1,其他都为0的序列
    temp = "0"*i + "1"*1 + "0"*(19968-1-i)
    # 将这个序列分成624段,每段32位,转换为整数
    for j in range(624):
        state[j] = int(temp[32*j:32*j+32], 2)

    RNG = Random()
    RNG.setstate((3,tuple(state+[624]),None))
    L.append(construct_a_row(RNG))
```

```
# 将L转换为GF(2)上的矩阵（二进制域）
L = Matrix(GF(2),L)
print(L.nrows(), L.ncols())

def MT19937_re(state):
    try:
        # 构造目标向量R
        R = []
        for i in state:
            R += list(map(int, bin(i)[2:].zfill(32)))

        R = vector(GF(2), R)
        s = L.solve_left(R)  # 这里可能会抛出异常

        # 将解转换为二进制字符串
        init = "".join(list(map(str,s)))
        state = []
        # 将解重新分割成624个32位整数
        for i in range(624):
            state.append(int(init[32*i:32*i+32],2))

        # 创建新的RNG并设置恢复出的状态
        RNG1 = Random()
        RNG1.setstate((3,tuple(state+[624]),None))

        return RNG1

    except Exception as e:
        print(f"[-]{e}")
        pass

RNG = MT19937_re(tmp)
for _ in range(19968//32):
    RNG.getrandbits(32)

a = RNG.getrandbits(11000)
b = RNG.getrandbits(10000)
ans = a//b

io.sendlineafter(b": >>>", b"2")
io.sendlineafter(b": >>>", str(ans).encode())

io.interactive()

# XYCTF{282486a9-5c20-41ad-9fb1-bf508167197e}
```

Complex_signin | Solved - SeanDictionary

首先我用多项式的方法模拟出了复数的计算，即先定义一个模n的多项式环，同时因为$x^2+1=0$即可对这个多项式环取模得到代表复数的一个商环，然后显然能得到复数立方后，和a，b有关的实部和虚部。即可得到两个联立的方程组。

我尝试联立求解，但是一直报错，所以最后没办法尝试用格求解出来。

先对两个多项式输出查看了一下发现是这样的结构

$$tmp_1 = p_1a^3 + p_2ab^2 + p_3a^2 + p_4ab + p_5b^2 + p_6a + p_7b + p_8 \equiv 0 \ mod \ n$$

$$tmp_2 = q_1a^2b + q_2b^3 + q_3a^2 + q_4ab + q_5b^2 + q_6a + q_7b + q_8 \equiv 0 \ mod \ n$$

$$(k_1,k_2,a^3,a^2b,ab^2,b^3,a^2,ab,b^2,a,b,1)\begin{pmatrix} n & 0 & 0 & 0 & 0 & 0 & 0 & \cdots & 0 \\ 0 & n & 0 & 0 & 0 & 0 & 0 & \cdots & 0 \\ p_1 & 0 & 1 & 0 & 0 & 0 & 0 & \cdots & 0 \\ 0 & q_1 & 0 & 1 & 0 & 0 & 0 & \cdots & 0 \\ p_2 & 0 & 0 & 0 & 1 & 0 & 0 & \cdots & 0 \\ 0 & q_2 & 0 & 0 & 0 & 1 & 0 & \cdots & 0 \\ p_3 & q_3 & 0 & 0 & 0 & 0 & 1 & \cdots & 0 \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \ddots & \vdots \\ p_8 & q_8 & 0 & 0 & 0 & 0 & 0 & \cdots & 1 \end{pmatrix} = (0,0,a^3,a^2b,ab^2,b^3,a^2,ab,b^2,a,b,1)$$

对格规约找到最后一位是1的就能得到a和b了

```
from Crypto.Cipher import ChaCha20
import hashlib
n = 
24240993137357567658677097076762157882987659874601064738608971893024559525024581362454897599976003
24889233946367324175611860099449415072178952592405496047076249980877176069021184193690383923210920
80996405072101411113145630079240469464022163843604054455958549471458007543657177047623100925580894
55516189533635318084532202438477871458797287721022389909953190113597425964395222426700352859740293
83412112313818336755485889612450969560291531291788676906625421938142738510068811091512928394934013
35243654031887537355342905121132019326201065850431227073553815510060146474698840100698784771791477
19913280272028376706421104753
mh = 
[39606044252336372439607509768847078924733567379657527328997838061469118983673129494198287510123800
01393399327170194968129531348378231383617998914660765523016231578454123673136858296545642894452462
10263852973777461084409386774011258165861195880801501038550754508742060129030099424683402969957002
70449643148025957527925452034647677446705198250167222150181312718642480834399766134519333316989347
22144868571122084203201051704598504481367442610429571001560745068220521109877922964733474970604318
05128618892958990504272577212093704234210468111026826489673752199366642465841942247457618429624188
64084904820764122207293014016,
15053801146135239412812153100772352976861411085516247673065559201085791622602365389885455357620354
02597205325293943924774672449213043583081651350561595279144870549288552570942122458436403770480292
34972228191136298741370508749666918863908373640187029811464130667122873610106114050283537286767729
98972695270707666289161746024725705731676511793934556785324668045957177856807914741189938780850108
64392926169279939732683881226200987307217562705120910420922923375471549142836403956413043522758204
26664648663364247735523045552449499765257976166792524705740068202124659241347633862135503601758102
88209936288398862565142167552]
C = 
[53007431749997953293715278701901007031546399604505755751017382255288143311526377337296134192018989
99438654881650485840972631874241916971722270240440949615616728335416336272930427955321451016058933
66724639727678426048868661596005675334366269318109814181932275937586886105125563911291762343074487
58534506432755113432411099690991453452199653214054901093242337700880661006486138424743085527911347
93157173047358205198752044723758688511920542266897187648868470819625526653668008383597266874990221
22850327562864242442841369417677527540785988303172719499813786741766851595167772473059703658436161
05513456452993199192823148760,
21112179095014976702043514329117175747825140730885731533311755299178008997398851800028751416090265
19576017886762623345664259457858800757083893313539667273076500716013590831402830014112783776929768
24796789724550776065190539773837395006648510339089242939903992618380799932076213145841088918140382
36135637105408310569002463379136544773406496600396931819980400197333039720344346032547489037834427
09123304557408662506174839899104101439460223740071321861101543686684269964068080490600837086902154
55179475883220837935818525291925009125795600940158671202127112425236725483921605143457742995689403
90940653232489808850407256752]
enc = 
b'\x9c\xc4n\x8dF\xd9\x9e\xf4\x05\x82!\xde\xfe\x012$\xd0\x8c\xaf\xfb\rEb(\x04)\xa1\xa6\xbaI2J\xd2\x
b2\x898\x11\xe6x\xa9\x19\xOOpn\xf6rs- \xd2\xd1\xbe\xc7\xf51.\xd4\xd2 \xe7\xc6\xca\xe5\x19\xbe'

R.<x,a,b> = PolynomialRing(Zmod(n))

f = (mh[1]+a)*x + mh[0] + b
g = f**3%(x**2+1)

tmp1 = g//x - C[1]
tmp2 = g%x - C[0]
```

```
coffs1 = tmp1.coefficients()
coffs2 = tmp2.coefficients()

ge = [
    [n,0,0,0,0,0,0,0,0,0,0],
    [0,n,0,0,0,0,0,0,0,0,0],
    [coffs1[0],0,1,0,0,0,0,0,0,0,0],
    [coffs1[1],0,0,1,0,0,0,0,0,0,0],
    [0,coffs2[0],0,0,1,0,0,0,0,0,0],
    [0,coffs2[1],0,0,0,1,0,0,0,0,0],
    [coffs1[2],coffs2[2],0,0,0,0,1,0,0,0,0],
    [coffs1[3],coffs2[3],0,0,0,0,0,1,0,0,0],
    [coffs1[4],coffs2[4],0,0,0,0,0,0,1,0,0],
    [coffs1[5],coffs2[5],0,0,0,0,0,0,0,1,0],
    [coffs1[6],coffs2[6],0,0,0,0,0,0,0,0,1,0],
    [coffs1[7],coffs2[7],0,0,0,0,0,0,0,0,0,1]
    ]

Ge = Matrix(ZZ,ge)
L = Ge.LLL()
for i in L:
    if i[-1] == 1:
        a = i[-3]
        b = i[-2]

mh0 = mh[0] + b
mh1 = mh[1] + a
print({ChaCha20.new(key=hashlib.sha256(str(mh0 + mh1).encode()).digest(),
nonce=b'Pr3d1ctmyxjj').decrypt(enc)})

# XYCTF{Welcome_to_XYCTF_Now_let_us_together_play_Crypto_challenge}
```

Reed | Sloved - SeanDictionary

这道题目挺有意思的，就是每次用随机数然后处理作为新的种子，也就是说这个随机数生成器更类似于LCG那种输出只与上一次状态有关，因此极易进入循环，于是就可以尝试寻找出一个较短的循环，就能确定a和b的取值范围了

用如下脚本确定出长度为2的循环，初始seed为52331392593937

```
import random
from tqdm import trange

a = 1145140
b = 19198100

l = 0
while True:
    for x in trange(a,b+1):
        random.seed(x**2+1)
        for _ in range(l):
            tmp = random.randint(a,b)
            random.seed(tmp**2+1)
        if x == random.randint(a,b):
            print(x**2+1,l+1)
            break
    else:
        l += 1
        continue
    break

# 52331392593937 2
```

然后就知道$a, b \in \{17593903, 7234044\}$排列组合尝试一下就能解出flag了

```
import string

table = string.ascii_letters + string.digits
enc = [9363323, 9363323, 4550699, 2946491, 9363323, 4550699, 9572863, 4760239, 19093341, 11177071,
12781279, 12728894, 14333102, 4760239, 15937310, 6312062, 4760239, 7916270, 7916270, 14333102,
12781279, 17593903, 15937310, 7968655, 11177071, 9520478, 14333102, 4707854, 7916270, 9363323,
15727770, 9363323, 15727770, 17331978, 9363323, 10967531]

# 17593903, 7234044
a = 17593903
b = 17593903

for i in enc:
    tmp = (i-b)%19198111*pow(a,-1,19198111)%19198111
    print(table[tmp], end='')

# XYCTF{114514fixedpointissodangerous1919810}
```

勒索病毒

用NTRU生成密钥然后用国密4对内容进行加密

逆向的时候有个密钥文件没注意到，实际上很好做的

Choice | Sloved - SeanDictionary

题目给的random库里是这样定义的choice函数

```
    def _randbelow_with_getrandbits(self, n):
        "Return a random int in the range [0,n).  Defined for n > 0."

        getrandbits = self.getrandbits
        k = n.bit_length() - 1
        r = getrandbits(k)  # 0 <= r < 2**k
        while r >= n:
            r = getrandbits(k)
        return r
```

很显然每次choice时生成的下标是一定小于n的，也就是说while循环不会进行，（我还特地去翻了一下我本地的random库py3.9.13版本，对比一下发现，这里就无法判断进行了几次getrandbits

```
    def _randbelow_with_getrandbits(self, n):
        "Return a random int in the range [0,n).  Returns 0 if n==0."

        if not n:
            return 0
        getrandbits = self.getrandbits
        k = n.bit_length()  # don't use (n-1) here because n can be 1
        r = getrandbits(k)  # 0 <= r < 2**k
        while r >= n:
            r = getrandbits(k)
        return r
```

然后就能从给出的choice生成的列表得到每次输出的随机数然后逆向即可。

但是这里有个问题，异或时候也生成了随机数，但是不知道是多少位的，但可以确定这里的位数一定大于等于enc的位数，然后爆破一下即可

```
from Crypto.Util.number import *
from tqdm import trange
from random import *

for i in range(5):
```

```
enc = 504276437181905317688477790910531046130335929625529 7
```

```
    r = [224, 55, 218, 253, 150, 84, 208, 134, 18, 177, 244, 54, 122, 193, 249, 5, 121, 80, 230,
21, 236, 33, 226, 3, 120, 141, 212, 33, 69, 195, 78, 112, 0, 62, 64, 197, 10, 224, 64, 191, 17,
112, 196, 143, 209, 92, 10, 198, 174, 181, 96, 118, 175, 145, 111, 41, 113, 206, 137, 37, 56, 227,
252, 84, 18, 145, 81, 124, 202, 14, 255, 144, 200, 13, 230, 218, 208, 210, 222, 101, 211, 114,
222, 12, 190, 226, 62, 118, 87, 152, 118, 245, 196, 4, 92, 251, 238, 142, 114, 13, 113, 247, 171,
8, 138, 20, 169, 192, 221, 223, 60, 56, 188, 70, 184, 202, 195, 246, 71, 235, 152, 255, 73, 128,
140, 159, 119, 79, 1, 223, 239, 242, 60, 228, 205, 90, 210, 5, 165, 35, 176, 75, 21, 182, 220,
212, 240, 212, 77, 124, 52, 140, 85, 200, 207, 31, 177, 82, 76, 152, 128, 124, 205, 216, 252, 34,
27, 198, 186, 61, 161, 192, 158, 226, 40, 127, 69, 162, 24, 46, 208, 183, 99, 165, 1, 221, 184,
40, 147, 136, 236, 245, 228, 197, 86, 15, 201, 95, 115, 18, 131, 79, 86, 12, 122, 63, 200, 192,
244, 205, 229, 36, 86, 217, 249, 170, 5, 134, 99, 33, 214, 10, 120, 105, 233, 115, 230, 114, 105,
84, 39, 167, 18, 10, 77, 236, 104, 225, 196, 181, 105, 180, 159, 24, 4, 147, 131, 143, 64, 201,
212, 175, 203, 200, 19, 99, 24, 112, 180, 75, 222, 204, 204, 13, 210, 165, 135, 175, 132, 205,
247, 28, 178, 76, 240, 196, 240, 121, 132, 21, 8, 45, 203, 143, 206, 6, 11, 51, 47, 87, 88, 35,
63, 168, 251, 11, 254, 11, 46, 72, 210, 230, 184, 114, 88, 194, 99, 229, 144, 1, 226, 44, 133, 10,
42, 234, 112, 100, 248, 247, 66, 221, 72, 229, 236, 4, 65, 203, 65, 61, 23, 181, 190, 87, 1, 76,
113, 48, 178, 42, 175, 49, 78, 159, 104, 229, 213, 223, 13, 249, 216, 60, 144, 203, 156, 23, 129,
148, 87, 37, 79, 227, 141, 202, 210, 245, 236, 121, 129, 78, 7, 121, 42, 82, 184, 222, 96, 100,
189, 62, 102, 176, 198, 1, 153, 242, 23, 191, 197, 176, 115, 206, 122, 50, 104, 70, 170, 29, 52,
189, 157, 99, 82, 187, 201, 78, 25, 75, 126, 118, 160, 250, 53, 112, 143, 161, 251, 221, 44, 255,
232, 115, 182, 77, 31, 217, 228, 97, 112, 236, 21, 160, 127, 9, 220, 22, 97, 159, 239, 25, 140,
206, 210, 148, 105, 184, 41, 56, 92, 141, 3, 200, 165, 14, 161, 219, 177, 40, 189, 75, 48, 146,
130, 151, 100, 144, 239, 22, 19, 246, 166, 231, 228, 68, 254, 16, 99, 95, 32, 177, 216, 170, 125,
211, 100, 142, 251, 16, 64, 83, 161, 184, 242, 248, 239, 141, 171, 135, 48, 20, 34, 250, 13, 70,
236, 172, 22, 241, 171, 25, 18, 204, 36, 248, 253, 203, 138, 10, 130, 249, 15, 157, 244, 154, 41,
4, 231, 64, 20, 212, 126, 160, 48, 154, 171, 250, 199, 113, 32, 186, 126, 217, 3, 236, 115, 37,
174, 75, 222, 125, 55, 86, 65, 96, 56, 254, 226, 213, 244, 36, 199, 164, 160, 126, 191, 29, 50,
135, 234, 165, 122, 132, 68, 133, 129, 0, 220, 72, 87, 172, 93, 15, 131, 37, 119, 240, 43, 239,
105, 45, 244, 6, 34, 111, 151, 144, 54, 46, 159, 6, 5, 160, 32, 4, 180, 246, 39, 220, 85, 209,
145, 41, 88, 137, 110, 101, 113, 115, 204, 11, 53, 152, 177, 240, 193, 220, 136, 84, 221, 12, 43,
74, 122, 251, 236, 53, 175, 36, 46, 246, 181, 137, 246, 53, 189, 171, 240, 104, 8, 126, 56, 122,
245, 155, 130, 31, 16, 20, 212, 147, 33, 165, 82, 117, 244, 167, 235, 115, 244, 94, 173, 195, 34,
36, 33, 218, 39, 13, 90, 196, 172, 207, 105, 73, 255, 187, 221, 162, 242, 186, 122, 140, 241, 120,
98, 44, 81, 172, 201, 150, 238, 111, 147, 24, 214, 192, 125, 102, 157, 53, 219, 172, 123, 218,
222, 71, 138, 117, 188, 32, 104, 10, 188, 118, 58, 254, 36, 104, 212, 76, 209, 15, 6, 33, 149, 15,
225, 76, 8, 157, 48, 70, 127, 19, 126, 77, 216, 133, 132, 30, 33, 113, 117, 134, 238, 57, 20, 121,
26, 184, 229, 202, 90, 28, 42, 230, 42, 159, 19, 191, 162, 205, 241, 67, 177, 216, 191, 164, 146,
90, 228, 232, 149, 163, 135, 130, 193, 196, 178, 215, 216, 155, 238, 20, 36, 196, 153, 207, 177,
149, 40, 172, 139, 12, 134, 142, 154, 225, 179, 95, 248, 190, 8, 154, 246, 229, 102, 121, 197,
116, 135, 163, 128, 109, 112, 114, 143, 164, 134, 233, 45, 244, 22, 141, 211, 214, 122, 14, 93,
49, 251, 85, 95, 95, 191, 210, 245, 181, 142, 125, 110, 33, 195, 150, 197, 173, 86, 50, 127, 187,
129, 67, 119, 58, 134, 119, 36, 151, 136, 122, 157, 22, 171, 195, 48, 178, 232, 228, 177, 6, 124,
50, 163, 161, 32, 49, 197, 157, 188, 86, 208, 226, 208, 63, 173, 21, 192, 148, 194, 208, 251, 95,
117, 34, 116, 217, 130, 150, 97, 206, 101, 201, 88, 137, 163, 90, 104, 129, 4, 191, 99, 50, 115,
8, 145, 116, 250, 180, 193, 229, 128, 92, 55, 26, 6, 154, 68, 0, 66, 77, 126, 192, 170, 218, 252,
127, 192, 29, 107, 152, 231, 190, 202, 130, 116, 229, 193, 63, 13, 48, 220, 238, 126, 74, 232, 19,
242, 71, 159, 9, 196, 187, 111, 243, 81, 244, 193, 95, 166, 85, 22, 240, 32, 1, 114, 11, 64, 114,
149, 217, 207, 194, 1, 33, 245, 14, 101, 119, 32, 233, 214, 139, 71, 103, 125, 54, 17, 86, 140,
132, 221, 45, 227, 136, 203, 156, 223, 73, 43, 82, 190, 119, 22, 14, 115, 0, 192, 105, 147, 210,
146, 47, 89, 210, 18, 225, 126, 210, 240, 55, 219, 247, 106, 190, 50, 35, 13, 255, 236, 253, 82,
244, 117, 139, 1, 72, 182, 19, 170, 173, 59, 175, 10, 95, 66, 253, 178, 139, 45, 5, 24, 59, 9,
222, 58, 46, 79, 48, 39, 175, 196, 249, 249, 70, 126, 118, 69, 165, 155, 119, 67, 221, 20, 133,
16, 99, 41, 132, 11, 12, 35, 70, 87, 43, 197, 103, 33, 201, 3, 195, 142, 128, 135, 121, 26, 185,
2, 73, 235, 70, 219, 49, 227, 133, 241, 34, 6, 9, 109, 66, 50, 177, 114, 119, 101, 91, 144, 41,
246, 40, 81, 113, 203, 226, 87, 8, 0, 73, 212, 5, 95, 112, 230, 4, 28, 206, 93, 252, 30, 195, 197,
226, 165, 120, 3, 124, 169, 66, 227, 113, 55, 101, 135, 141, 71, 84, 202, 19, 145, 25, 92, 50, 80,
53, 63, 85, 184, 196, 93, 254, 47, 252, 182, 150, 115, 20, 181, 178, 87, 162, 50, 190, 228, 125,
240, 134, 10, 142, 173, 206, 250, 49, 186, 201, 118, 146, 246, 244, 199, 9, 55, 253, 123, 103,
200, 206, 79, 168, 216, 99, 192, 191, 236, 214, 248, 111, 115, 74, 155, 165, 150, 40, 86, 224,
240, 133, 69, 34, 52, 13, 63, 61, 116, 182, 144, 177, 101, 164, 77, 217, 65, 218, 150, 142, 249,
165, 160, 220, 120, 25, 36, 157, 134, 223, 11, 46, 121, 75, 182, 126, 104, 91, 204, 45, 49, 175,
10, 48, 83, 150, 96, 244, 10, 149, 76, 124, 189, 149, 200, 252, 175, 124, 146, 126, 230, 70, 194,
243, 63, 204, 224, 115, 140, 115, 110, 86, 22, 193, 5, 11, 18, 177, 159, 94, 160, 38, 188, 139,
89, 1, 200, 163, 138, 8, 140, 169, 54, 29, 225, 22, 5, 99, 144, 247, 239, 106, 77, 29, 141, 206,
89, 236, 4, 32, 104, 115, 206, 204, 15, 100, 66, 199, 15, 89, 24, 246, 99, 224, 207, 7, 205, 142,
```

```
203, 28, 87, 16, 110, 93, 72, 73, 206, 48, 59, 170, 152, 224, 2, 74, 9, 125, 140, 82, 206, 159, 0,
117, 237, 252, 47, 200, 75, 133, 68, 239, 109, 169, 25, 168, 202, 240, 5, 67, 125, 173, 233, 6,
148, 38, 182, 13, 141, 149, 39, 119, 189, 122, 49, 173, 153, 78, 103, 211, 65, 224, 52, 10, 35,
233, 88, 66, 43, 120, 255, 71, 169, 215, 250, 218, 205, 163, 164, 226, 46, 178, 25, 88, 59, 98,
199, 167, 134, 244, 167, 210, 20, 246, 159, 163, 252, 114, 5, 168, 52, 47, 177, 159, 255, 236,
166, 49, 36, 61, 10, 130, 135, 220, 101, 202, 69, 150, 100, 217, 98, 203, 217, 166, 33, 169, 203,
230, 194, 224, 15, 249, 205, 52, 41, 124, 191, 223, 148, 251, 147, 133, 85, 149, 214, 198, 5, 134,
91, 201, 191, 204, 152, 240, 37, 34, 236, 211, 182, 142, 207, 1, 188, 67, 87, 222, 220, 7, 78, 49,
129, 236, 98, 120, 217, 204, 77, 106, 89, 250, 182, 15, 18, 27, 143, 13, 27, 61, 223, 213, 196,
190, 24, 35, 104, 100, 220, 60, 194, 174, 169, 20, 167, 75, 162, 26, 253, 213, 59, 219, 187, 253,
160, 249, 61, 122, 113, 223, 55, 57, 198, 53, 138, 94, 154, 18, 132, 233, 183, 71, 7, 22, 50, 196,
181, 202, 103, 86, 31, 119, 83, 130, 165, 242, 170, 31, 35, 175, 117, 95, 89, 247, 221, 186, 47,
236, 241, 77, 194, 111, 148, 45, 101, 88, 41, 0, 33, 139, 15, 127, 156, 72, 234, 217, 170, 218,
216, 31, 4, 73, 150, 78, 49, 178, 13, 178, 46, 102, 93, 184, 110, 205, 132, 190, 43, 87, 194, 35,
188, 166, 9, 97, 184, 202, 113, 45, 150, 62, 106, 108, 19, 162, 85, 212, 188, 131, 38, 67, 23,
136, 208, 87, 63, 69, 6, 209, 242, 45, 13, 228, 14, 233, 8, 71, 43, 51, 89, 46, 195, 101, 132,
254, 154, 183, 220, 115, 221, 255, 174, 150, 65, 141, 176, 57, 144, 16, 115, 252, 144, 139, 52,
205, 224, 75, 190, 192, 2, 231, 30, 238, 149, 22, 200, 137, 244, 239, 185, 212, 145, 230, 200, 8,
249, 109, 26, 226, 195, 133, 140, 103, 50, 230, 180, 47, 196, 226, 105, 13, 239, 135, 20, 214,
152, 211, 208, 81, 213, 48, 187, 232, 77, 139, 16, 79, 204, 216, 56, 41, 41, 58, 192, 245, 1, 104,
85, 42, 107, 94, 142, 12, 247, 90, 254, 116, 72, 193, 219, 54, 247, 5, 28, 60, 140, 10, 185, 86,
148, 101, 198, 96, 181, 245, 61, 25, 186, 29, 57, 176, 188, 9, 239, 93, 198, 110, 248, 23, 87,
193, 161, 107, 40, 38, 186, 205, 148, 197, 127, 144, 69, 19, 47, 132, 82, 23, 170, 83, 224, 235,
49, 190, 44, 145, 65, 66, 141, 78, 1, 254, 24, 157, 7, 23, 227, 28, 81, 176, 22, 92, 139, 188, 48,
183, 229, 139, 205, 174, 131, 189, 241, 21, 146, 204, 58, 249, 167, 217, 174, 43, 41, 56, 181,
212, 42, 188, 6, 117, 93, 178, 160, 129, 15, 76, 150, 207, 245, 227, 247, 130, 171, 114, 204, 101,
176, 55, 43, 138, 149, 90, 124, 45, 96, 181, 221, 16, 121, 210, 51, 210, 164, 68, 64, 154, 167,
91, 69, 35, 153, 212, 10, 125, 235, 203, 166, 145, 9, 174, 86, 65, 70, 112, 194, 140, 92, 170, 49,
191, 157, 218, 199, 152, 151, 247, 208, 182, 209, 34, 245, 5, 173, 105, 175, 159, 71, 251, 198,
246, 214, 99, 58, 70, 154, 52, 39, 88, 149, 179, 202, 86, 240, 108, 200, 83, 250, 62, 213, 113,
138, 73, 106, 141, 192, 204, 90, 251, 208, 28, 124, 30, 134, 119, 144, 68, 23, 204, 181, 186, 76,
156, 71, 8, 104, 186, 87, 221, 134, 122, 72, 244, 203, 121, 181, 65, 90, 185, 131, 230, 133, 54,
158, 186, 168, 201, 178, 155, 172, 164, 22, 130, 111, 90, 209, 2, 167, 23, 176, 63, 139, 89, 63,
15, 238, 110, 204, 85, 36, 127, 68, 240, 177, 31, 2, 81, 147, 205, 192, 214, 173, 103, 130, 10,
100, 232, 125, 216, 163, 209, 171, 168, 243, 145, 6, 170, 41, 142, 250, 145, 57, 139, 224, 221,
189, 48, 141, 232, 146, 92, 216, 154, 126, 223, 8, 90, 82, 138, 221, 240, 223, 87, 209, 165, 17,
52, 154, 91, 12, 121, 212, 238, 46, 215, 217, 147, 136, 139, 251, 91, 39, 188, 244, 251, 52, 110,
22, 126, 200, 231, 153, 103, 203, 120, 219, 118, 172, 53, 141, 203, 75, 163, 150, 194, 27, 208, 9,
186, 6, 85, 46, 243, 135, 66, 40, 79, 206, 250, 20, 85, 123, 35, 164, 44, 85, 104, 66, 51, 177,
125, 189, 165, 226, 13, 75, 78, 225, 252, 226, 138, 81, 171, 172, 175, 122, 145, 68, 254, 37, 153,
39, 113, 237, 232, 220, 80, 193, 181, 21, 197, 186, 56, 202, 239, 213, 135, 41, 6, 85, 54, 135,
214, 95, 102, 23, 192, 153, 235, 110, 26, 14, 84, 220, 142, 236, 192, 8, 117, 205, 249, 92, 148,
149, 77, 235, 205, 232, 21, 48, 14, 84, 187, 124, 218, 166, 155, 183, 62, 10, 123, 53, 63, 79,
101, 193, 3, 61, 29, 39, 99, 22, 197, 75, 10, 165, 44, 215, 210, 181, 74, 235, 200, 247, 158, 187,
200, 102, 22, 150, 73, 42, 131, 28, 17, 180, 133, 205, 23, 228, 226, 219, 175, 207, 81, 53, 141,
114, 140, 59, 218, 169, 7, 219, 139, 75, 210, 97, 236, 157, 21, 109, 195, 128, 54, 5, 55, 217,
127, 49, 62, 59, 101, 95, 86, 255, 22, 186, 94, 151, 114, 93, 19, 198, 159, 174, 142, 132, 195,
157, 206, 161, 107, 255, 106, 196, 250, 191, 86, 221, 196, 36, 29, 37, 50, 224, 42, 20, 89, 212,
252, 191, 157, 237, 10, 157, 80, 42, 234, 180, 1, 183, 186, 239, 129, 14, 125, 114, 66, 203, 120,
114, 37, 214, 37, 73, 153, 182, 165, 87, 177, 75, 220, 210, 105, 154, 149, 114, 13, 202, 128, 55,
128, 96, 158, 150, 57, 86, 106, 127, 160, 57, 80, 255, 107, 241, 95, 121, 14, 110, 160, 119, 211,
150, 156, 185, 158, 221, 110, 76, 255, 119, 15, 245, 1, 238, 139, 100, 250, 220, 147, 193, 51,
144, 123, 139, 13, 26, 158, 95, 148, 251, 82, 227, 119, 92, 132, 219, 248, 239, 217, 101, 88, 121,
10, 148, 203, 156, 156]
    bits = int(enc).bit_length()+i

    def construct_a_row(RNG):
        row = []
        RNG.getrandbits(bits)
        for _ in range(19968//8):
            tmp = RNG.getrandbits(8)
            row += list(map(int, bin(tmp)[2:].zfill(8)))
        return row

    # 构造线性方程组的矩阵
```

```
    L = []
    for i in trange(19968):
        state = [0]*624  # MT19937使用624个32位整数作为状态
        # 构造一个只有一位为1,其他都为0的序列
        temp = "0"*i + "1"*1 + "0"*(19968-1-i)
        # 将这个序列分成624段,每段32位,转换为整数
        for j in range(624):
            state[j] = int(temp[32*j:32*j+32], 2)

        RNG = Random()
        RNG.setstate((3,tuple(state+[624]),None))
        L.append(construct_a_row(RNG))

    # 将L转换为GF(2)上的矩阵（二进制域）
    L = Matrix(GF(2),L)
    print(L.nrows(), L.ncols())

    def MT19937_re(state):
        try:
            # 构造目标向量R
            R = []
            for i in state:
                R += list(map(int, bin(255-i)[2:].zfill(8)))

            R = vector(GF(2), R)
            s = L.solve_left(R)  # 这里可能会抛出异常

            # 将解转换为二进制字符串
            init = "".join(list(map(str,s)))
            state = []
            # 将解重新分割成624个32位整数
            for i in range(624):
                state.append(int(init[32*i:32*i+32],2))

            # 创建新的RNG并设置恢复出的状态
            RNG1 = Random()
            RNG1.setstate((3,tuple(state+[624]),None))

            return RNG1

        except Exception as e:
            print(f"[-]{e}")
            pass

    RNG = MT19937_re(r)
    tmp = RNG.getrandbits(bits)
    print(long_to_bytes(int(enc ^^ tmp)))

# × 0 b'\x07>_0h_51mple_r@nd0m___'
# × 1 b'\x19\xf3_0h_51mple_r@nd0m___'
# × 2 b'$h_0h_51mple_r@nd0m___'
# √ 3 b'___0h_51mple_r@nd0m___'
# × 4 b'\xa90_0h_51mple_r@nd0m___'
```

XYCTF{___0h_51mple_r@nd0m___}

复复复复数 | 复现 - SeanDictionary

这里涉及到了四元数的数学概念

魔改了一下四元数的定义，新增了矩阵表示

套用了一下四元数的矩阵表示，然后用solve_right就可以直接解矩阵了

后面是不互质的做法，需要涉及到开方，不过这个exp为什么不用开方就能做出来呢，因为实际上这道题对应m的元素阶是小于群阶的，然而我们一直用群阶p^4-1来寻找d此时自然会要用到CRT来合并。但是对于题目的数据用$\frac{p^4-1}{3}$作为元素阶也是可以的，因此可以直接用这个互质的阶来计算私钥，然后求解RSA即可

```
from Crypto.Util.number import *

class ComComplex:
    def __init__(self, value=[0,0,0,0]):
        if type(value) == str:
            self.value = [int(i[:-1]) if i[-1] in 'ijk' else int(i) for i in value.split('+')]
            self.matrix_init()
        elif type(value) == list:
            self.value = value
            self.matrix_init()
        else:
            self.matrix = Matrix(ZZ,value)
            self.value = [self.matrix[0][0], self.matrix[1][0], self.matrix[2][0], self.matrix[3]
[0]]
    def matrix_init(self):
        a,b,c,d = self.value
        self.matrix = Matrix(ZZ,[
            [a, -b, -c, -d],
            [b,  a, -d,  c],
            [c,  d,  a, -b],
            [d, -c,  b,  a]
        ])
    def __str__(self):
        s = str(self.value[0])
        for k,i in enumerate(self.value[1:]):
            if i >= 0:
                s += '+'
            s += str(i) +'ijk'[k]
        return s
    def __add__(self,x):
        return ComComplex([i+j for i,j in zip(self.value,x.value)])
    def __mul__(self,x):
        a = self.value[0]*x.value[0]-self.value[1]*x.value[1]-self.value[2]*x.value[2]-
self.value[3]*x.value[3]
        b = self.value[0]*x.value[1]+self.value[1]*x.value[0]+self.value[2]*x.value[3]-
self.value[3]*x.value[2]
        c = self.value[0]*x.value[2]-
self.value[1]*x.value[3]+self.value[2]*x.value[0]+self.value[3]*x.value[1]
        d = self.value[0]*x.value[3]+self.value[1]*x.value[2]-
self.value[2]*x.value[1]+self.value[3]*x.value[0]
        return ComComplex([a,b,c,d])
    def __mod__(self,x):
        return ComComplex([i % x for i in self.value])
    def __pow__(self, x, n=None):
        tmp = ComComplex(self.value)
        a = ComComplex([1,0,0,0])
        while x:
            if x & 1:
                a *= tmp
            tmp *= tmp
            if n:
                a %= n
                tmp %= n
            x >>= 1
        return a

hint = "375413371936+452903063925i+418564633198j+452841062207k"
```

```
gift =
"812331224452011941323160919186697683691661697301391867093219963108403801592436831707791945461178517995087005556007998703473583666810970544594688748100372 9+205088674716644993487087687988544333832178016962676117539413287148772991610688857004121 71i+228024589688321517774497441201851224208719299718179376436415896374026799275585038817078 68j+402244995975224563231221790217605946183507809742970950233168342123322065263995368841028 63k"
c =
"212391106108596254648968182832931369624606731443797421732310126161911908195602305474921714075911012622738456373731638115041135121458776339519085497285769160263024788009541257401354037620169924991531279387552806754098200127027800103+243985262818403292226606287690156103120847458446106706989203713053538886945191355782690238739886411614499241246657312429932905618746256549770131620084308547863495800901699884583938207876653427937163110051781013421405365361538738 25i+454263195658745168411899817583580429527368329341797784836025032153531302297318832317844660682535207280523021387812048834958275399436558518771726810218182822514140449168894606027833249440309299879910592119091608601250476473373801 25j+967045823317282013321572227067044827711426272235214159759532559830589546064179749830565163382877922604924982730145075822471552182397427788860555754261549604756377483395825744535421825865734249428356408465678095818059532593319573 85k"
P =
812331224452011941323160919186697683691661697301391867093219963118272426336217489510454530536496078123369081007721053909136213431062340817326847538931510 9
n =
408713495380933615345467409596399184629824932933932227692519320046890365817329617301604051766392980053993030281090124694858194866782889226223493799859404283664530068697313752856923001112586828837146686963124061670340088332769524367
e = 65547

hint, gift, c = map(ComComplex, [hint, gift, c])

_, p, q, r = ComComplex(matrix(Zmod(P), hint.matrix).solve_right(matrix(Zmod(P),
gift.matrix))).value
assert n == p*q*r

m = pow(c, int(pow(e,-1,(p**4-1)*(q**4-1)*(r**4-1)//27)), n)
print(m)
for i in m.value:
    print(long_to_bytes(int(i)).decode(), end='')

# flag{Quaternion_15_ComComComComplexXXX!!!?}
```

Misc

XGCTF | Solved - Yolo

不做评价了吧

先是找到LamentXU在西瓜杯出的题目，在ctfshow中有西瓜杯的归档，一眼就知道和污染链有关系，不多说了，然后在这位师傅的博客中找的关于polluted的博客https://dragonkeeep.top/category/CISCN%E5%8D%8E%E4%B8%9C%E5%8D%97WEB-Polluted/?highlight=pol

然后文章内容和评论我都找过，发现没啥用，然后我F12查了源码，找到串有zmxh的base64编码，解码后就是flag

`flag{1t_I3_t3E_s@Me_ChAl1eNge_aT_a1L_P1e@se_fOrg1ve_Me}`

会飞的雷克萨斯 | Sloved - SeanDictioanry

搜一下店名就能定位了，然后标注中铁店，意味这里是中铁城市中心的沿街商铺

flag{四川省内江市资中县春岚北路中铁城市中心内}

签个到吧 | Solved - Yolo，Spreng

注意到代码有一定规律，于是这样分行。

```
>++++++++++++++++++[<++++++>-+-+-+-]<[-]
>++++++++++++[<+++++++++>-+-+-+-]<[-]
>++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
[<+>-+-+-+-]<[-]
>++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++[<+>-+-+-+-]<[-]
>++++++++++++++++++++++++++++++++++++++++[<+++>-+-+-+-]<[-]
>++++++++++++++++++++++++++++++[<+++>-+-+-+-]<[-]
>++++++++++++++++++[<+++>-+-+-+-]<[-]
>++++++++++++[<+++++++++>-+-+-+-]<[-]
>++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++[<+>-+-+-+-]<[-]
>++++++++[<++++++>-+-+-+-]<[-]
>++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++++++++[<+>-+-+-+-]<[-]
>++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++[<+>-+-+-+-]<[-]
>++++++++++++++++++[<+++++>-+-+-+-]<[-]
>++++++++++++++++++++++++++++[<++++>-+-+-+-]<[-]
>++++++++[<++++++>-+-+-+-]<[-]
>++++++++++++++++++[<+++++>-+-+-+-]<[-]
>++++++++++++[<++++++++>-+-+-+-]<[-]
>++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++[<+>-+-
+-+-]<[-]
>++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++[<+>-+-+-+-]<[-]
>++++++++++++[<+++++++>-+-+-+-]<[-]
>++++++++++[<+++++++>-+-+-+-]<[-]
>++++++++++++++++++[<+++++>-+-+-+-]<[-]
>++++++++++[<+++++>-+-+-+-]<[-]
>++++++++[<++++++>-+-+-+-]<[-]
>++++++++++[<+++++>-+-+-+-]<[-]
>++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++[<+>-+-+-+-]<[-]
>++++++++++++++++++[<+++++>-+-+-+-]<[-]
>++++++++++++++++++++++[<+++>-+-+-+-]<[-]
>++++++++++[<++++++++++>-+-+-+-]<[-]
>++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++[<++>-+-+-+-]<[-]
>++++++++[<++++++>-+-+-+-]<[-]
>++++++++++[<+++++>-+-+-+-]<[-]
>++++++++++++++++++[<+++++>-+-+-+-]<[-]
>+++++++[<+++++++>-+-+-+-]<[-]
>++++++++++++++++++++++++++++++[<++++>-+-+-+-]<[-]
>++++++++++[<+++>-+-+-+-]<[-]
>++++++++++++++++++++++++++[<+++++>-+-+-+-]<[-]
```

每行的格式相似，例如这样一句，用python翻译一下。这一行计算的值就是4*6=24，但被<[-]给清零了，所以直接运行没有回显。

```python
# >++++[<++++++>-+-+-+-]<[-]
data = [0, 0]
ptr = 0
ptr += 1
data[ptr] += 4
while data[ptr] != 0:
```

```
    ptr -= 1
    data[ptr] += 6
    ptr += 1
    data[ptr] -= 1

print(data) # [24, 0]
ptr -= 1
while data[ptr] != 0:
    data[ptr] -= 1
print(data) # [0, 0]
```

Brainfuck程序可以用下面的替换方法翻译成C语言（假设ptr是char*类型）：

Brainfuck	C
>	++ptr;
<	--ptr;
+	++*ptr;
-	--*ptr;
.	putchar(*ptr);
,	*ptr =getch();
[	while (*ptr) {
]	}

我们可以写脚本，把每行的乘积给算出来再转换成字符。或者简单点，在[-]前加一个.来输出。