PSP0201

Week 5

Writeup

Group Name: UrKomputerHasPirus

Members:

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1211101114	Chong Yi Jing	Member
1211101591	Ian Leong Tsung Jii	Member
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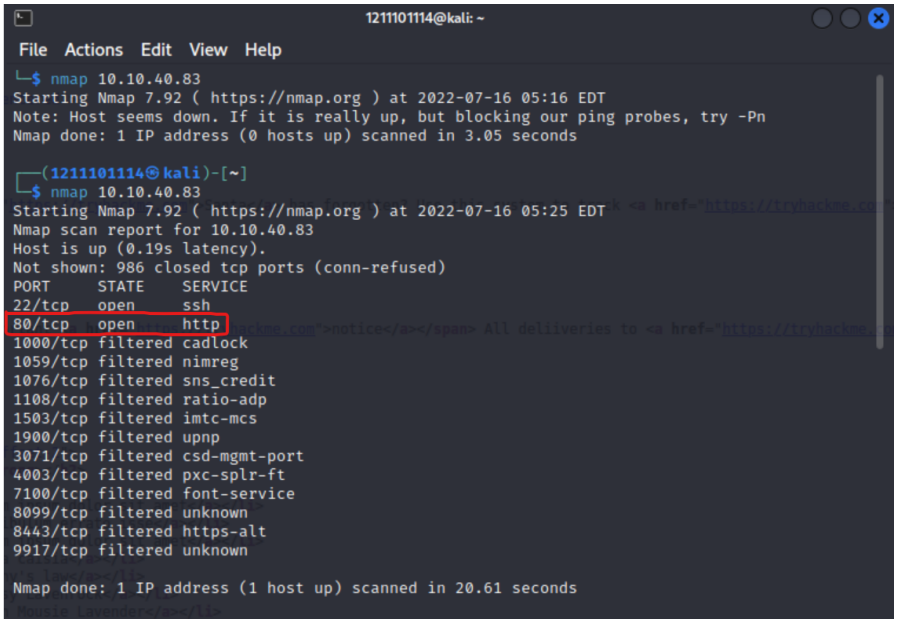
Day 16 : Help! Where is Santa?

Tools used: nmap, Python3

Solution/Walkthrough

Question 1

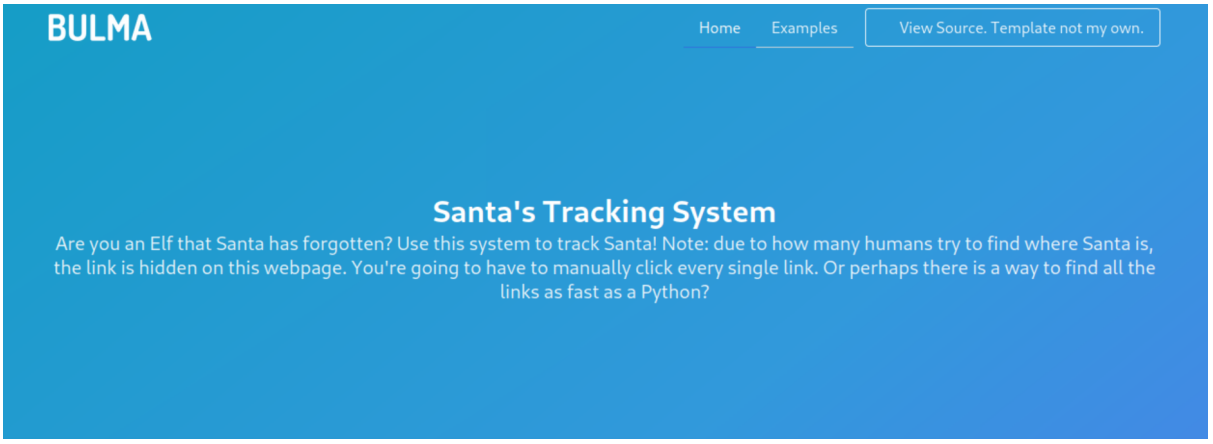
Use nmap to find the http port



Pretty clear that the http is the port for the website.

Question 2

This is the Santa's Tracking System website

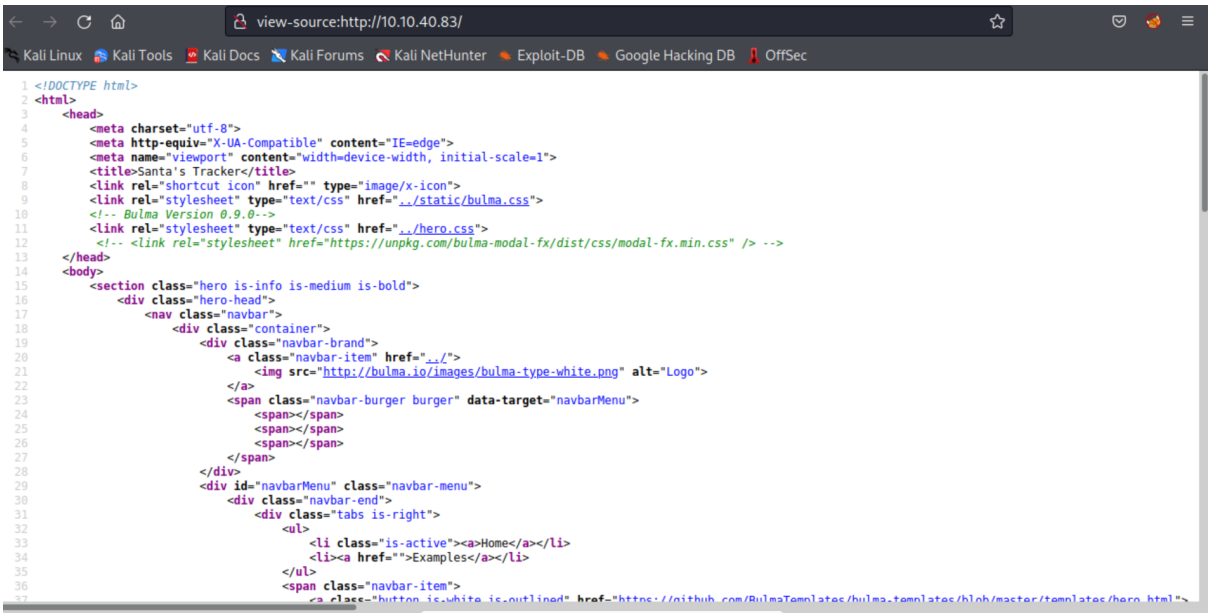


By viewing the page source, we can tell that there are many mentionings of Bulma.io having us safely assume the template being used is BULMA.

```
<html>
    <head>
        <meta charset="utf-8">
        <meta http-equiv="X-UA-Compatible" content="IE=edge">
        <meta name="viewport" content="width=device-width, initial-scale=1">
        <title>Santa's Tracker</title>
        <link rel="shortcut icon" href="" type="image/x-icon">
        <link rel="stylesheet" type="text/css" href="../static/bulma.css">
        <!-- Bulma Version 0.9.0-->
        <link rel="stylesheet" type="text/css" href="../hero.css">
         <!-- <link rel="stylesheet" href="https://unpkg.com/bulma-modal-fx/dist/css/modal-fx.min.css" /> -->
    </head>
    <body>
        <section class="hero is-info is-medium is-bold">
            <div class="hero-head">
                <nav class="navbar">
                    <div class="container">
                        <div class="navbar-brand">
                            <a class="navbar-item" href="../">
                                <img src="http://bulma.io/images/bulma-type-white.png" alt="Logo">
                            </a>
                            <span class="navbar-burger burger" data-target="navbarMenu">
                                <span></span>
                                <span></span>
                                <span></span>
                            </span>
                        </div>
                        <div id="navbarMenu" class="navbar-menu">
                            <div class="navbar-end">
                                <div class="tabs is-right">
                                    <ul>
                                        <li class="is-active"><a>Home</a></li>
                                        <li><a href="">Examples</a></li>
                                    </ul>
                                    <span class="navbar-item">
                                        <a class="button is-white is-outlined" href="https://github.com/BulmaTemplates/bulma-templates/blob/master/templates/hero.html">
                                            <span class="icon">
```

Question 3

After entering Santa's Tracker by entering "10.10.40.83:80", you can right click the page OR use Ctrl + U to open the source page.




```
<!DOCTYPE html>
<html>
    <head>
        <meta charset="utf-8">
        <meta http-equiv="X-UA-Compatible" content="IE=edge">
        <meta name="viewport" content="width=device-width, initial-scale=1">
        <title>Santa's Tracker</title>
        <link rel="shortcut icon" href="" type="image/x-icon">
        <link rel="stylesheet" type="text/css" href="../static/bulma.css">
        <!-- Bulma Version 0.9.0-->
        <link rel="stylesheet" type="text/css" href="../hero.css">
         <!-- <link rel="stylesheet" href="https://unpkg.com/bulma-modal-fx/dist/css/modal-fx.min.css" /> -->
    </head>
    <body>
        <section class="hero is-info is-medium is-bold">
            <div class="hero-head">
                <nav class="navbar">
                    <div class="container">
                        <div class="navbar-brand">
                            <a class="navbar-item" href="../">
                                <img src="http://bulma.io/images/bulma-type-white.png" alt="Logo">
                            </a>
                            <span class="navbar-burger burger" data-target="navbarMenu">
                                <span></span>
                                <span></span>
                                <span></span>
                            </span>
                        </div>
                        <div id="navbarMenu" class="navbar-menu">
                            <div class="navbar-end">
                                <div class="tabs is-right">
                                    <ul>
                                        <li class="is-active"><a>Home</a></li>
                                        <li><a href="">Examples</a></li>
                                    </ul>
                                    <span class="navbar-item">
```

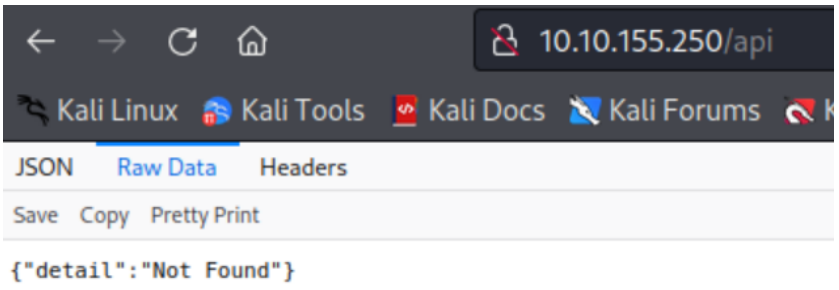
After some filtering through the code, you should be able to find the directory for the API.

```
<footer class="footer">
    <div class="container">
        <div class="columns">
            <div class="column is-3 is-offset-2">
                <h2><strong>Category</strong></h2>
                <ul>
                    <li><a href="#">Lorem ipsum dolor sit amet</a></li>
                    <li><a href="#">Vestibulum errato isse</a></li>
                    <li><a href="#">Lorem ipsum dolor sit amet</a></li>
                    <li><a href="#">Aisia caisia</a></li>
                    <li><a href="#">Murphy's law</a></li>
                    <li><a href="#">Flimsy Lavenrock</a></li>
                    <li><a href="#">Maven Mousie Lavender</a></li>
                </ul>
            </div>
            <div class="column is-3">
                <h2><strong>Category</strong></h2>
                <ul>
                    <li><a href="#">Labore et dolore magna aliqua</a></li>
                    <li><a href="#">Kanban airis sum eschelor</a></li>
                    <li><a href="http://machine_ip/api/api_key">Modular modern free</a></li>
                    <li><a href="#">The king of clubs</a></li>
                    <li><a href="#">The Discovery Dissipation</a></li>
                    <li><a href="#">Course Correction</a></li>
                    <li><a href="#">Better Angels</a></li>
                </ul>
            </div>
            <div class="column is-4">
                <h2><strong>Category</strong></h2>
                <ul>
```

OR

If it wasn't obvious enough just put in "/api/"

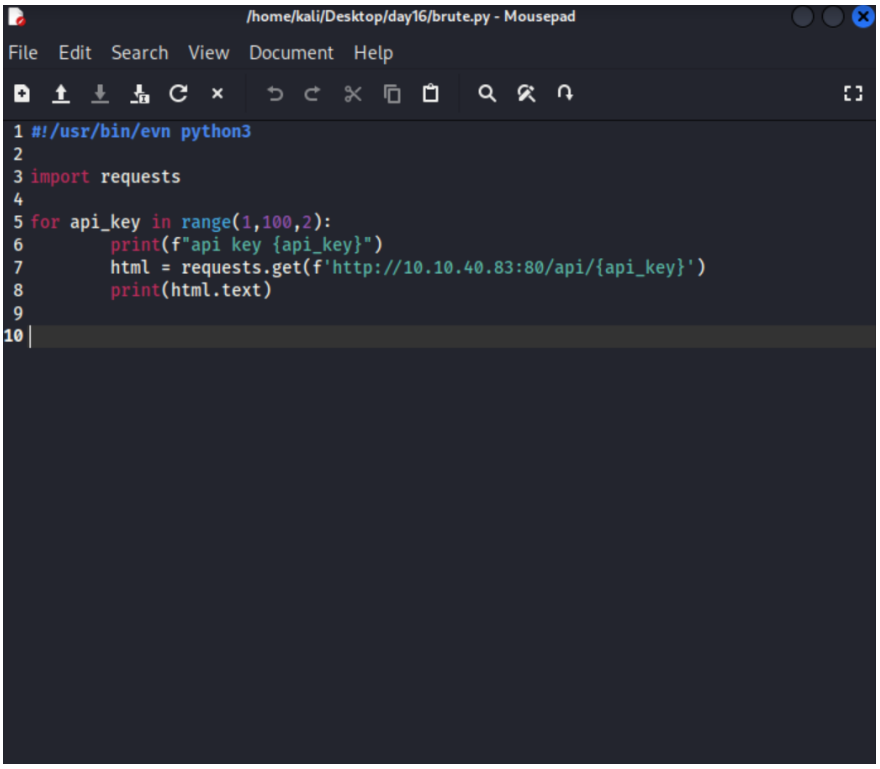
Question 4



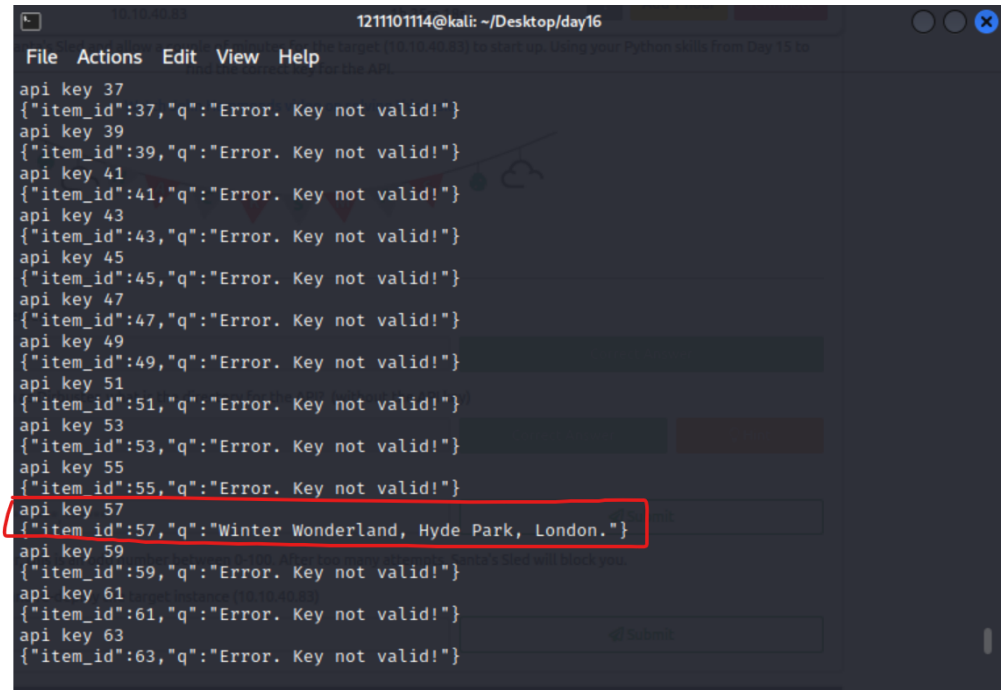
By opening the raw data on "machine_ip/api/" it's shown that the website's response is {"detail":"Not Found"}

Question 5

Create this file and run the python file in order to find which API key is valid



After creating this, run the script in order to find the correct API key. The correct API key should stick out like a sore thumb compared to the other prints.



Thus Santa is currently in “Winter Wonderland, Hyde Park, London.”

Question 6

Referring to the screenshot above, this implies that the correct API key is 57.

Thought Process :

To begin with, we started using nmap on the given machine_ip in hopes of finding the port for the website. Through the nmap scan it was pretty obvious that the http service was the website. After opening the website, we went straight for the page source, we were able to extract the website using plenty of BULMA templates and a hint as to how to find the api we needed. It states that the link follows the given domains “http://machine_ip/api/api_key”. But if we were to simply brute force it 1 by 1, we would most certainly be IP banned and fail the task. To avoid this, we simply made a simple Python script in order to get a number of responses from the website. Running the script it followed the given instructions and went through 1 api key at a time. Soon enough, we’ve received a unique response from api key 57 which returned “Winter Wonderland, Hyde Park, London.” which was as clear as day that it had to be Santa’s location.

Day 17 : ReverseELFneering

Tools used: radare2, SSH

Solution/Walkthrough

Question 1

Referring to the info given in THM, it shows the sizes of different data types

3. Register me this, register me that...

The core of assembly language involves using registers to do the following:

- Transfer data between memory and register, and vice versa
- Perform arithmetic operations on registers and data
- Transfer control to other parts of the program Since the architecture is x86-64, the registers are 64 bit and Intel has a list of 16 registers:

Initial Data Type	Suffix	Size (bytes)
Byte	b	1
Word	w	2
Double Word	l	4
Quad	q	8
Single Precision	s	4
Double Precision	l	8

Question 2

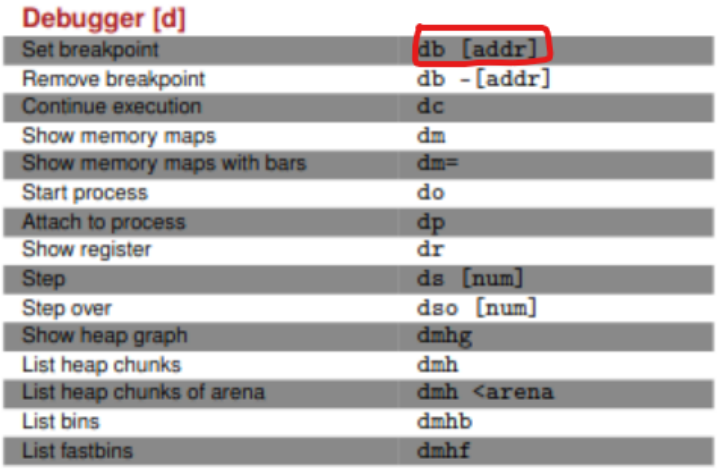
This one is pretty simple, referring to the radare2 Cheatsheet (provided by THM). It shows that to analyse all is “aa”

Analysis [a]

Analyse all	`aa[a[a]]`
Analyse function calls	`aac`
Analyse consecutive function	`aat`
Graphviz output	`ag <addr>`
ASCII Graph	`agf`
Xrefs from	`axf`
Xrefs to	`axt`
Rename function	`afn`
Rename locals/args	`afvn`
List functions	`afl`

Question 3

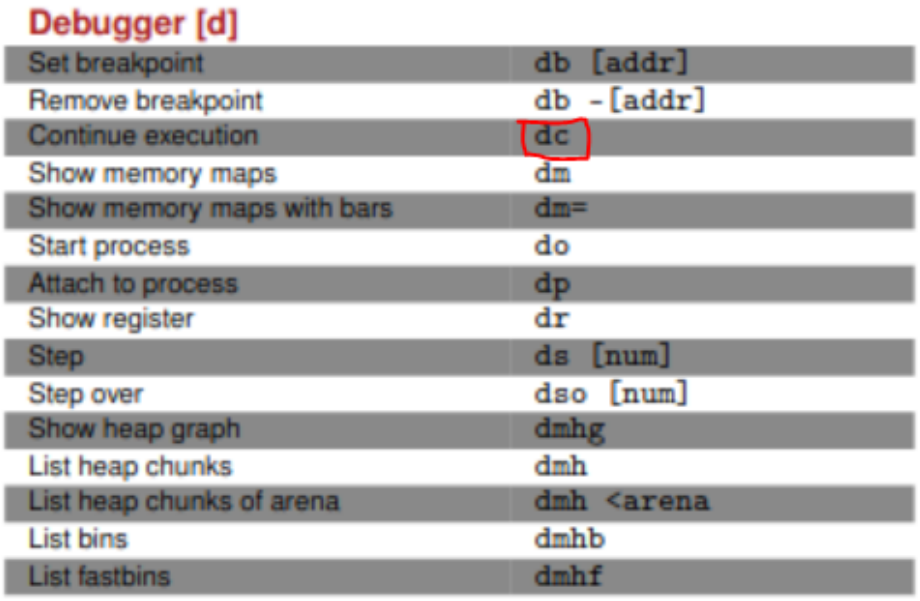
Also by referring to the cheatsheet. Setting a breakpoint is “db”



Debugger [d]	
Set breakpoint	db [addr]
Remove breakpoint	db -[addr]
Continue execution	dc
Show memory maps	dm
Show memory maps with bars	dm=
Start process	do
Attach to process	dp
Show register	dr
Step	ds [num]
Step over	dso [num]
Show heap graph	dmhg
List heap chunks	dmh
List heap chunks of arena	dmh <arena
List bins	dmhb
List fastbins	dmhf

Question 4

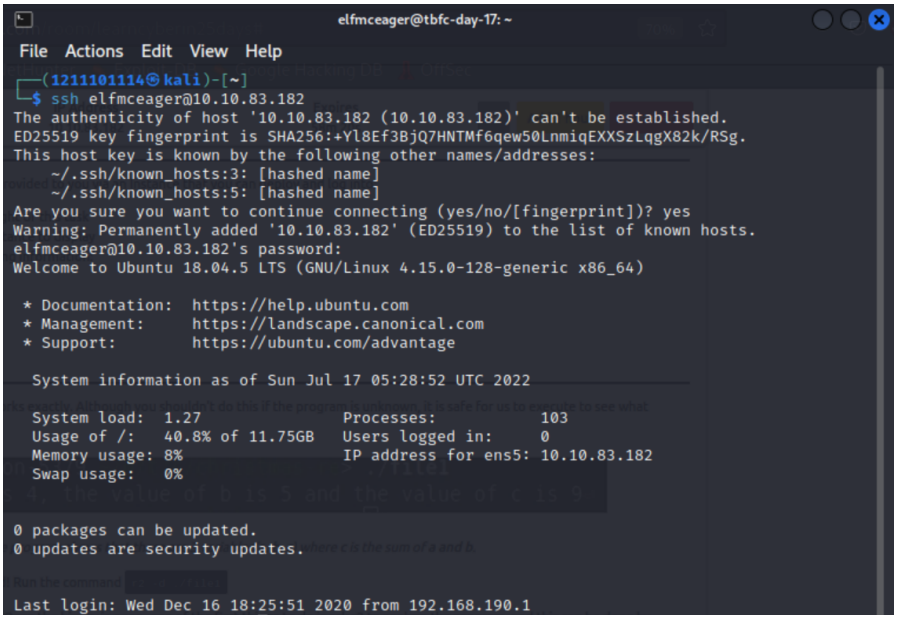
Additionally, by referring to the cheat sheet, we find out that the command is “dc”



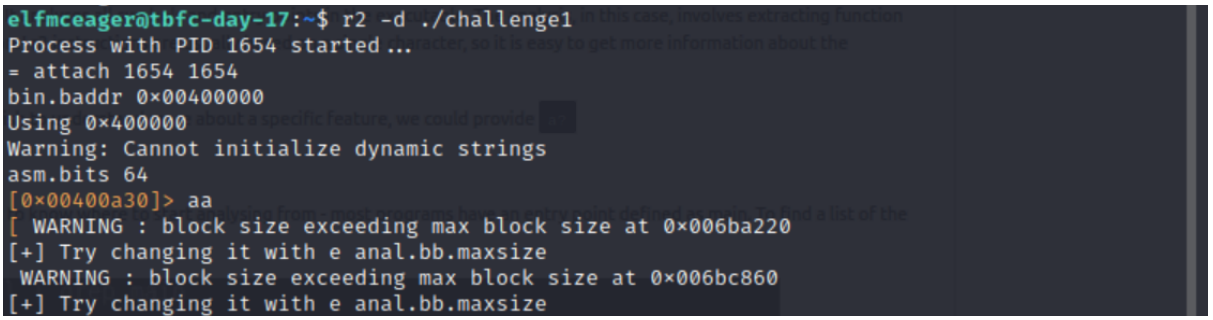
Debugger [d]	
Set breakpoint	db [addr]
Remove breakpoint	db -[addr]
Continue execution	dc
Show memory maps	dm
Show memory maps with bars	dm=
Start process	do
Attach to process	dp
Show register	dr
Step	ds [num]
Step over	dso [num]
Show heap graph	dmhg
List heap chunks	dmh
List heap chunks of arena	dmh <arena
List bins	dmhb
List fastbins	dmhf

Question 5

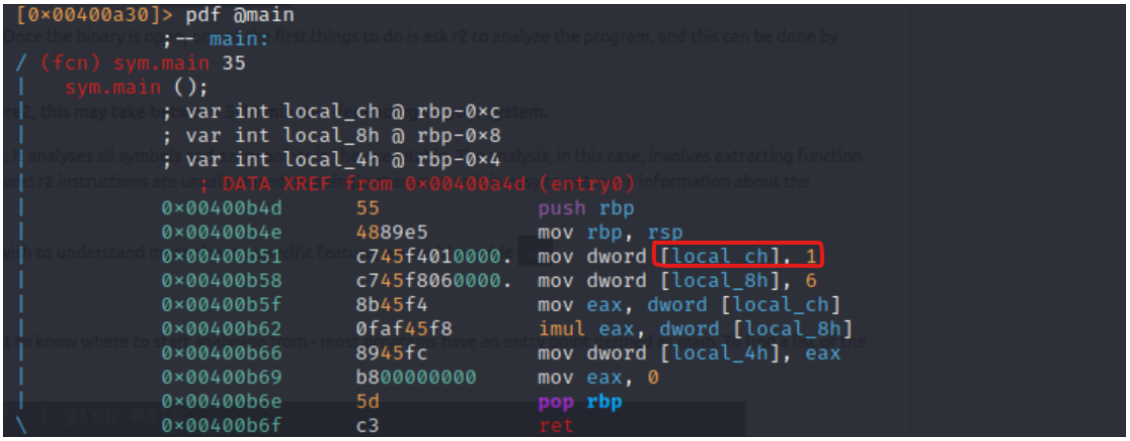
We can start by opening the cmd prompt and using ssh with command “ssh elfmceagar@*machine_ip*”. Then logging into it with the “adventofcyber” password



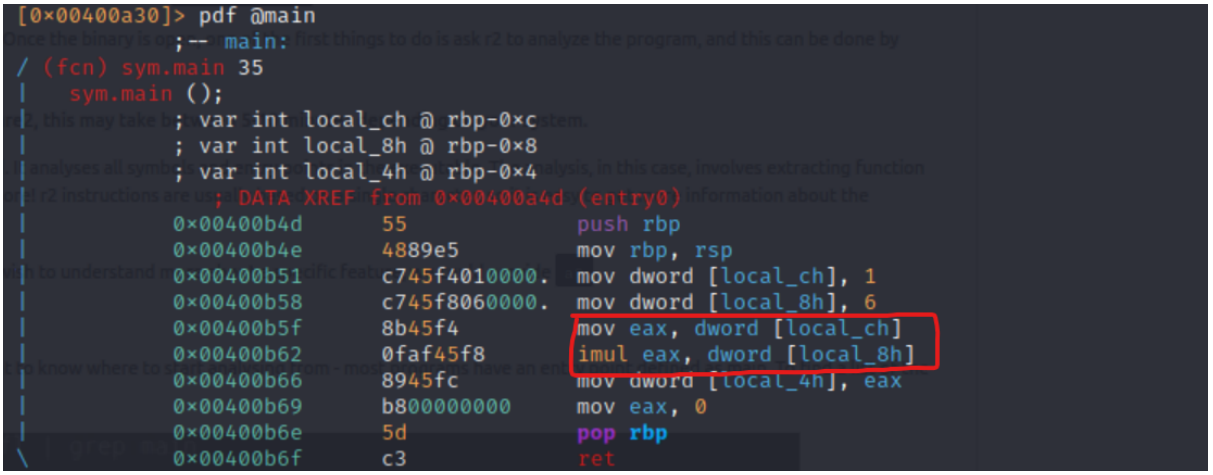
Then using radare2 input the command : “r2 -d ./challenge1” to open the file challenge1 using radare2. Then continue by using the “aa” command to analyse the system



Using “pdf@main” you’ll be able to find the value of local_ch which is 1

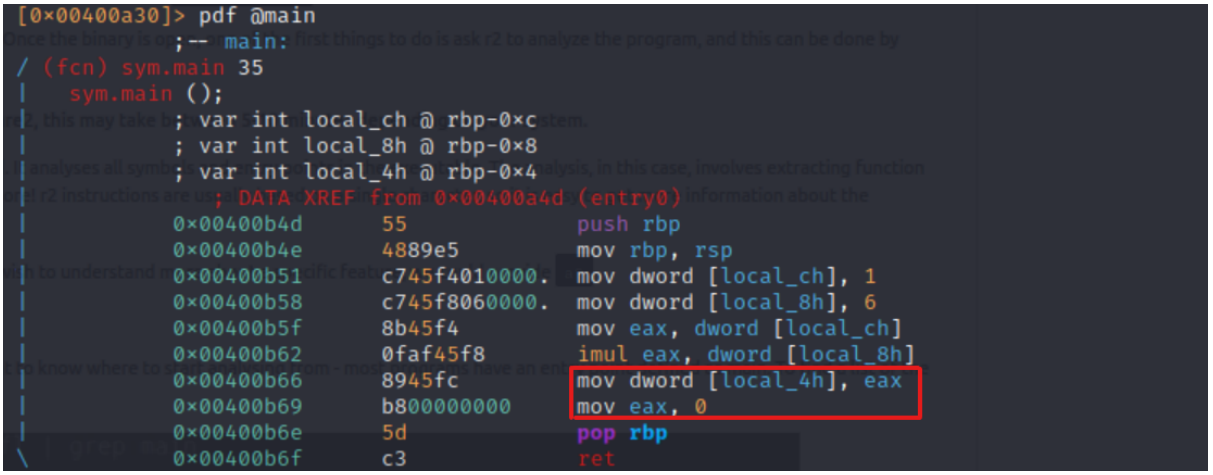


Question 6



By reading this, we can understand that we're moving local_ch = 1 into *eax* and then multiplying it with local_ch = 6. Hence giving us a value of 6

Question 7



By observing this, it's understood that local_4h = 6 as it takes the value of eax.

Thought Process:

In doing this task, the first thing we did was to understand all the given commands and how it functions by following the guide given by THM to understand radare2. After receiving the challenge, what we first seeked to do was to connect to the machine_ip given. To do that we used "SSH" to login into the given machine_ip under Elf McEager. After inputting the details and logging in, we used radare2 to open the challenge1 file using the radare2 command "r2 -d ./challenge1". As soon as we got access, we just went ahead and analysed the whole system "aa". As to get the main details and find out more about the file, we used "pdf@main" to get the details of sym.main. After getting the details required, by reading the 3rd column we were able to retrieve the values of local_ch and local_8h as well as to discover other details on which details were moved into eax and how the values of eax changed step by step until it was set to the value 0.

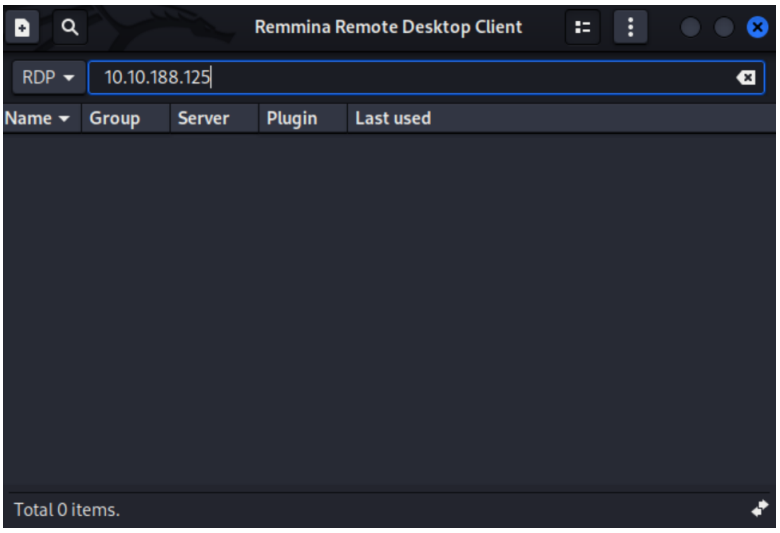
Day 18: The Bits of Christmas

Tools used : Remmina, ILSpy

Solution/Walkthrough

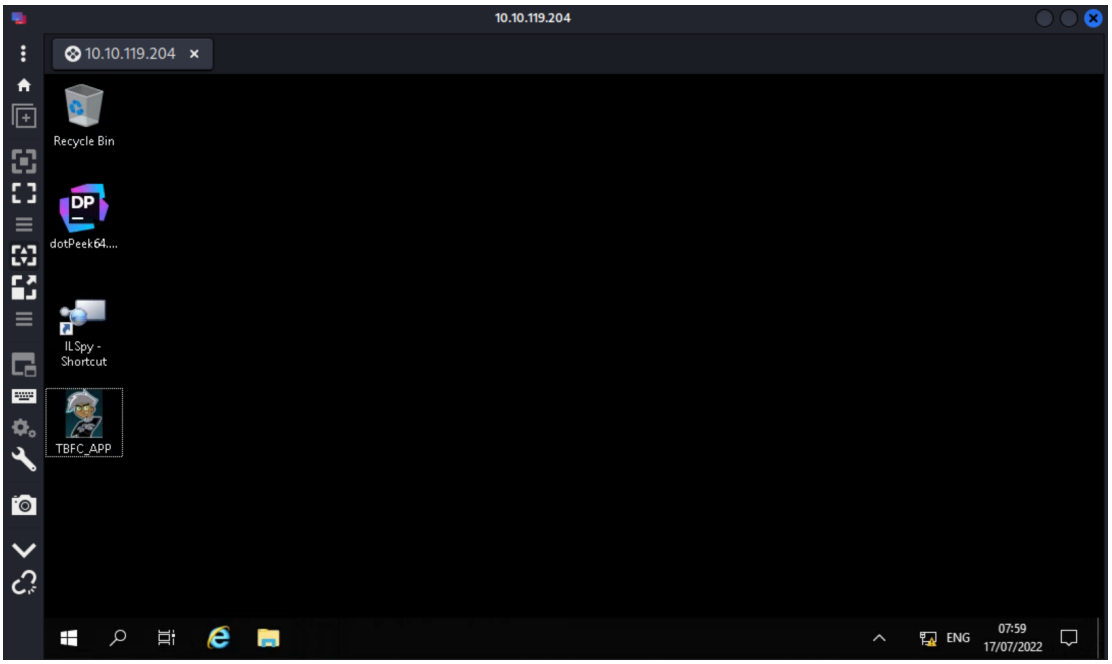
Question 1

After downloading Remmina (sudo apt install remmina), you should be able to open it and connect using the provided machine_ip.

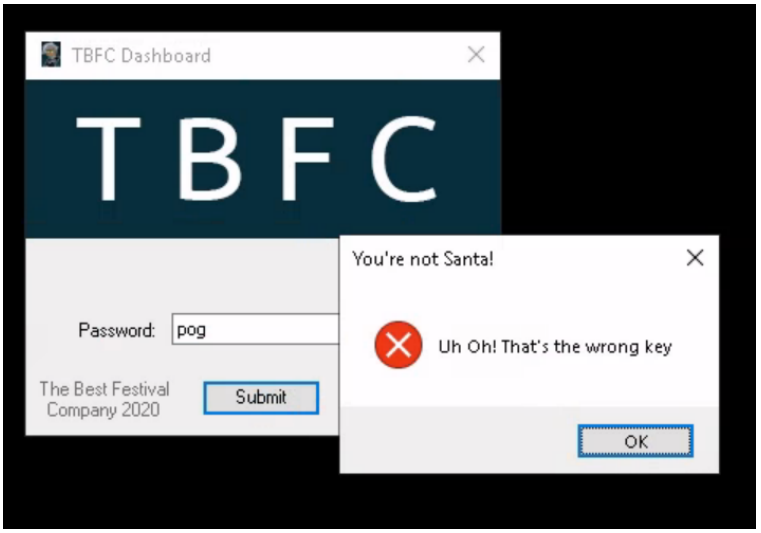


After filling in the provided credentials as follows :
Username : cmnatic
Password : Adventofcyber!

You'll shortly be greeted by this



Now to open the TBFC_APP and input the wrong password. Which will show this

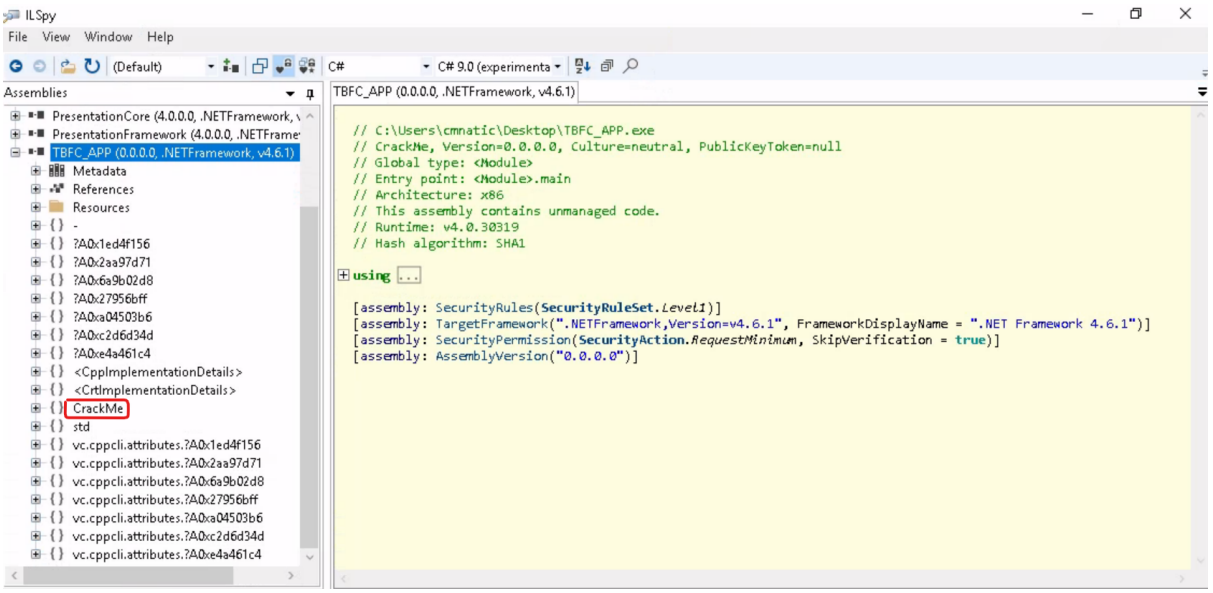


The answer is *"Uh Oh! That's the wrong key"*

Question 2

By using the all-powerful ability of *Observation,* you can tell TBFC stands for "The Best Festival Company"

Question 3



The module to have definitely caught the eye would be "CrackMe"

Question 4

Pretty obvious that we want to get into the nitty gritty “Main” details of the form itself rather “About” it

Question 5

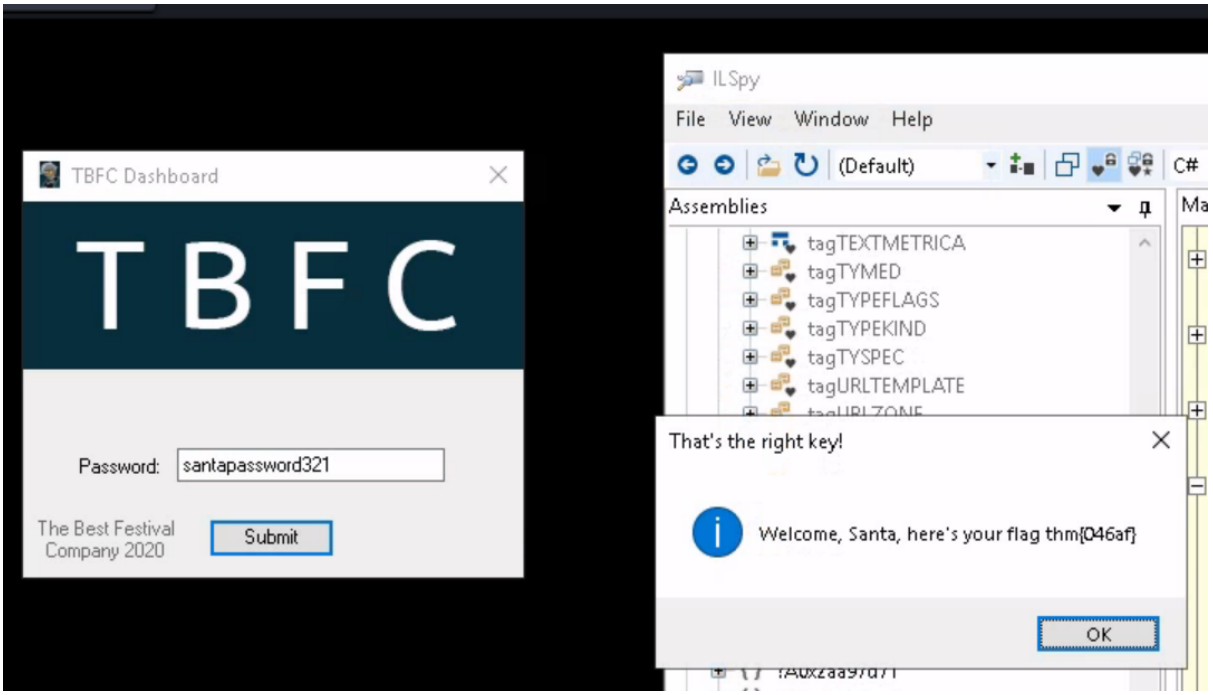
```
private void MainForm_Load(object sender, EventArgs e)
...

private void buttonExit_Click(object sender, EventArgs e)
...

private void buttonAbout_Click(object sender, EventArgs e)
...

private unsafe void buttonActivate_Click(object sender, EventArgs e)
{
    IntPtr value = Marshal.StringToHGlobalAnsi(textBoxKey.Text);
    sbyte* ptr = (sbyte*)System.Runtime.CompilerServices.Unsafe.AsPointer(ref <Module>.??_C@_0BB@IKKDFEPG@santapassword321@);
    void* ptr2 = (void*)value;
    byte b = *(byte*)ptr2;
    byte b2 = 115;
    if ((uint)b >= 115u)
    {
        while ((uint)b <= (uint)b2)
        {
            if (b != 0)
            {
                ptr2 = (byte*)ptr2 + 1;
                ptr++;
                b = *(byte*)ptr2;
                b2 = (byte)(*ptr);
                if ((uint)b < (uint)b2)
                {
                    break;
                }
```

After some snooping around, it slowly becomes clear where the important details can be found, particularly in “buttonActivate_Click” since how else would we “Activate” the application.

Question 6

```
    IntPtr value = Marshal.StringToHGlobalAnsi(textBoxKey.Text);
    sbyte* ptr = (sbyte*)System.Runtime.CompilerServices.Unsafe.AsPointer(ref <Module>.??_C@_0BB@IKKDFEPG@santapassword321@);
    void* ptr2 = (void*)value;
    byte b = *(byte*)ptr2;
    byte b2 = 115;
    if ((uint)b >= 115u)
```

Looking closely, it's pretty easy to make up as to what the password is, so why not give it a shot in the TBFC app?



Sure enough, that turned out to be Santa's password !

Question 7

Refer to the screenshot above, the flag is thm{046af}

Thought Process :

First of all, would've been to open Remmina and access the given IP and fill in the details as the instructions follow. Shortly after, we tried using the TBFC app, however we do not know Santa's password. So instead we tried opening the TBFC app using ILSpy instead to look for anything which may give indicators. Sure enough, we find the "CrackMe" section sticking out like a sore thumb. Choosing between "AboutForm" and the "MainForm" it's pretty obvious as to which contains the data we're looking for. Now looking at the main form, we look back as to what we could possibly need to be able to access into the TBFC app itself, we continue to look into the different sections, we notice that "buttonActivate_Click" contained some familiar details such as the "You're not Santa!" message box. Sure enough, it looked pretty clear as to what may be the password which we soon after found out was "santapassword321" and heck the flag was also in there : thm{046af}.

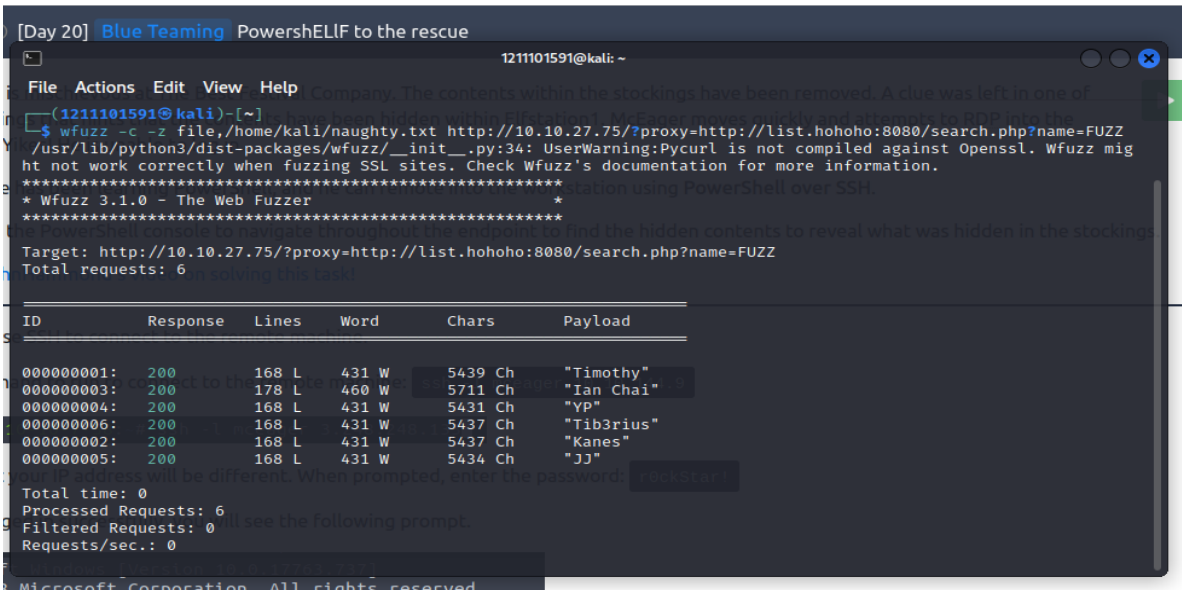
Day 19: The Naughty or Nice List

Tools used: Kali Linux, Wfuzz, CyberChef

Solution/Walkthrough

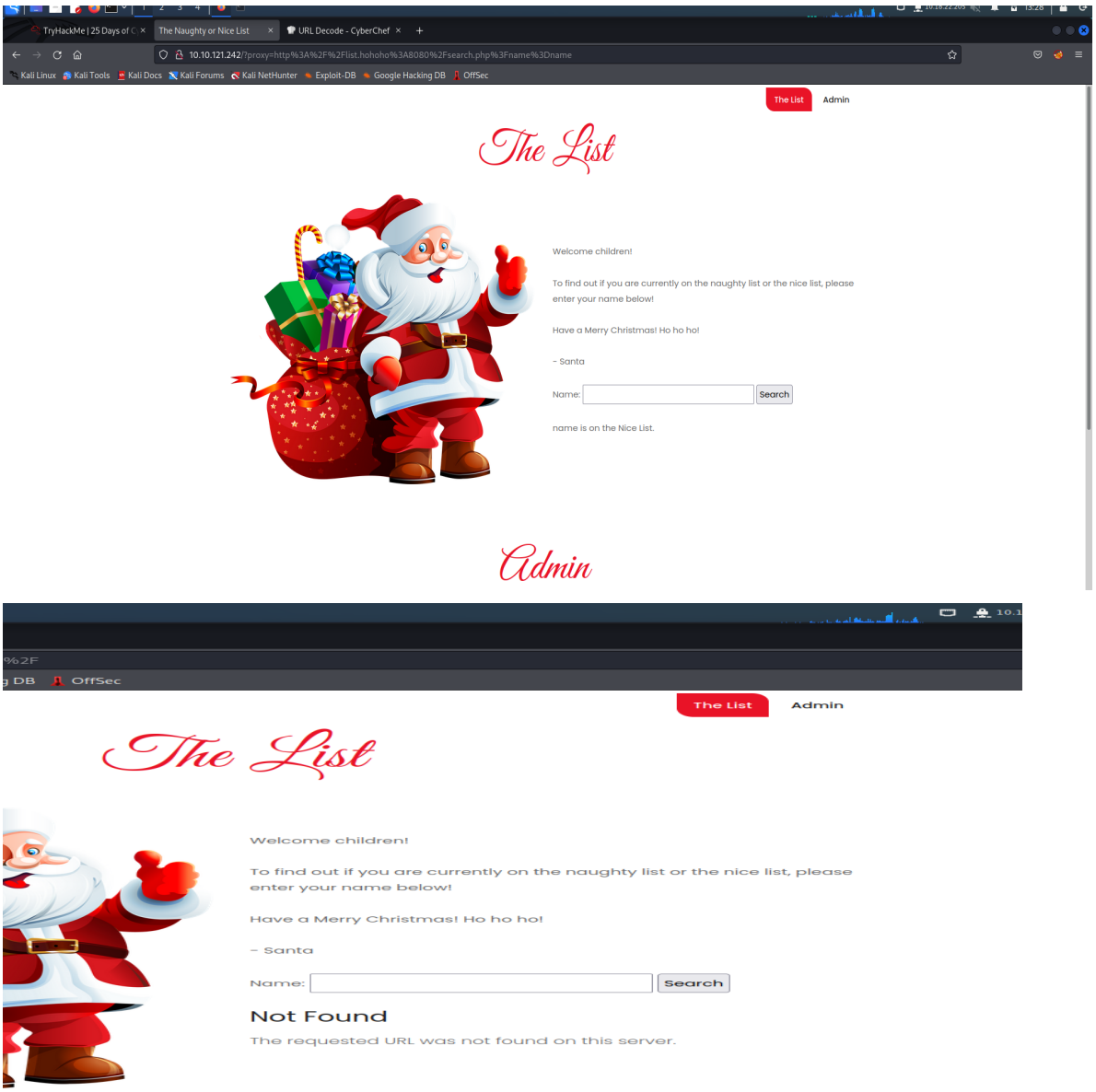
Question 1

After making a text file called naughty.txt and putting in the values given to us on google forms we used Wfuzz to iterate through the values to determine who is naughty and nice.



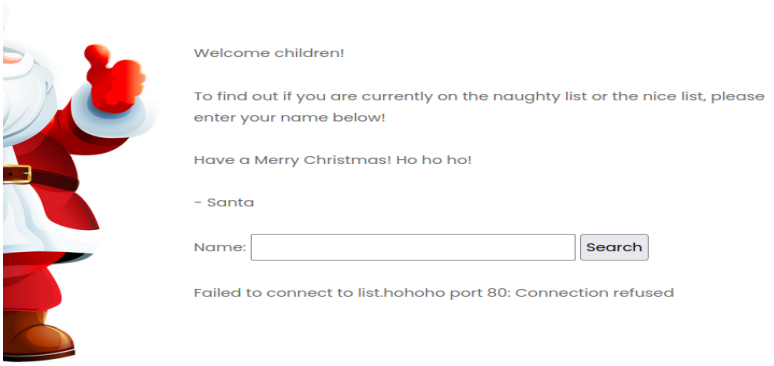
Question 2

Next we entered a name into the form and clicked the search button. This will give us a url. We can then decode this url by using CyberChef. We then used this new url to try and access the root of the website. This returns us with a Not Found error.



Question 3

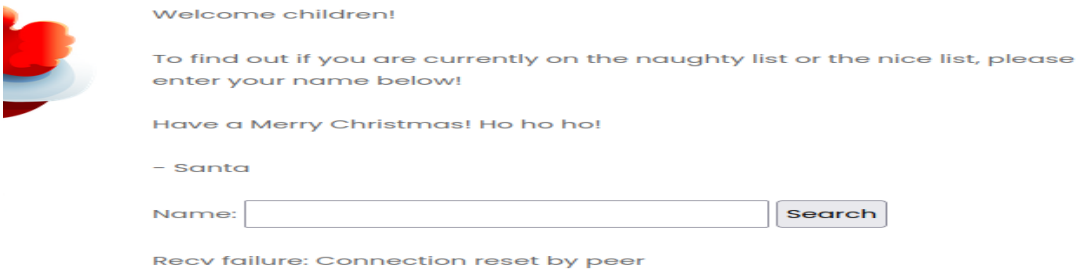
We changed the port to 80 and it returned us with a connection refused error.



Admin

Question 4

Next we changed the port to 22 and it returned us with a Recv failure.



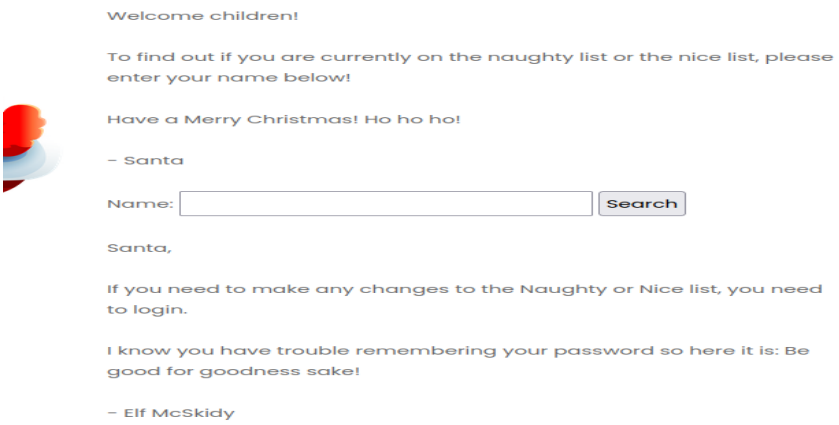
Admin

Question 5

Next we replaced the list.hohoho hostname with "localhost". This time, it shows us that our search has been blocked by their security team.

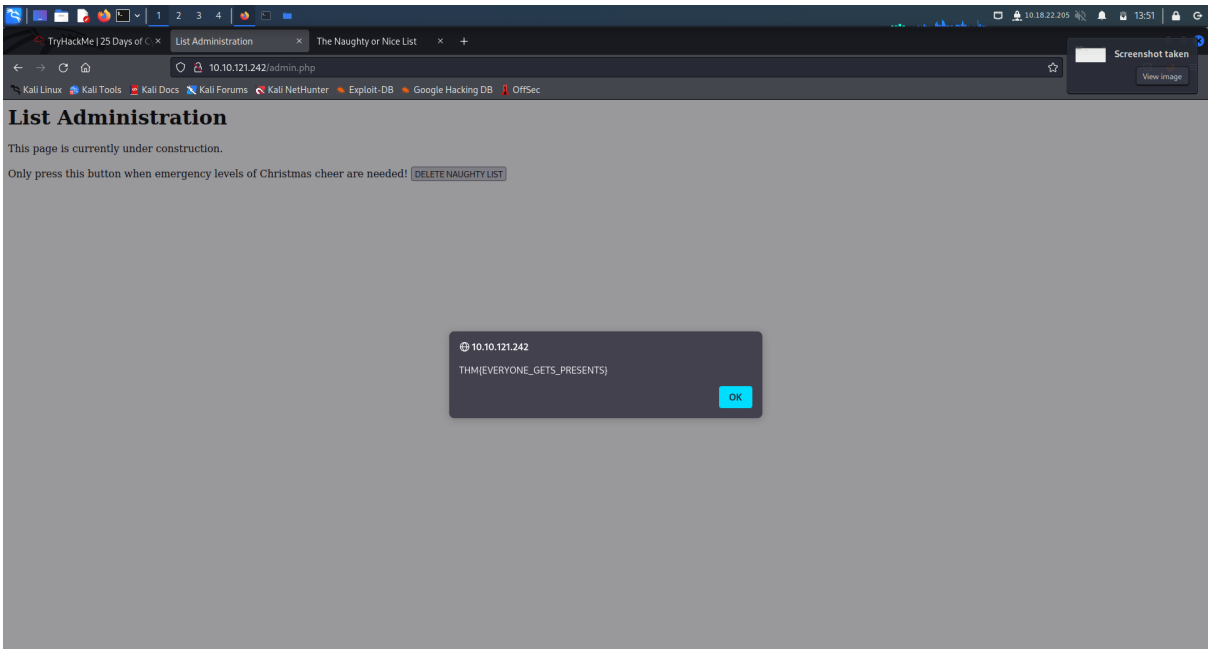
Question 6

We can however bypass this by using localtest.me, which resolves every subdomain to 127.0.0.1. This will return a message which will give us Santa's password which is "Be good for goodness sake!".



Question 7

After logging in to Santa's account we can delete the naughty list. This will return to us the challenge flag.



Thought process/ Methodology

From the url we got after pressing the search button, we know the hostname is list.hohoho. But since this is not a valid hostname on the internet, it most likely refers to a backend machine. We can try to exploit this by using Server-Side Request Forgery (SSRF). The first thing we did was to fetch the root of the same site. We were greeted with a “url was not found on the server” message. This indicates that we were able to make the server request the modified URL and return the response. Next we changed the port number from 8080 to 80. The message now changes to "Failed to connect to list.hohoho port 80: Connection refused" which suggests that port 80 is not open on list.hohoho. Next we changed the port number to 22. The message now changes to "Recv failure: Connection reset by peer" which suggests that port 22 is open but did not understand what was sent as it was a http request. Next we tried to access services running locally on the server. We did this by replacing the list.hohoho hostname with "localhost". This will return a message that shows that our search has been blocked by the security team. We can however bypass this by using localtest.me, which resolves every subdomain to 127.0.0.1. This returned us with the password to Santa’s account which can then be used to log in as admin and delete the naughty list. The flag will then be shown to us.

Day 20: BlueTeaming - PowershELIF to the rescue

Tools used: Linux, Powershell, SSH

Solution/walkthrough:

Question 1

"man ssh" and scrolling down shows us the function of -l flag

```
-l login_name
        Specifies the user to log in as on the remote machine.  This also may be specified on a per-host
        basis in the configuration file.
```

Question 2

SSH into the machine with credentials provided

```
┌──(1211102272㉿kali)-[~]
└─$ ssh -l mceager 10.10.213.169

The authenticity of host '10.10.213.169 (10.10.213.169)' can't be established.
ED25519 key fingerprint is SHA256:X2ViBklLQoHmAsXFoem36jkL9faKH+Fr2lt2dd/kIWY.
This host key is known by the following other names/addresses:
    ~/.ssh/known_hosts:14: [hashed name]
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '10.10.213.169' (ED25519) to the list of known hosts.
mceager@10.10.213.169's password:
```

Initiate powershell

```
Microsoft Windows [Version 10.0.17763.737]
(c) 2018 Microsoft Corporation. All rights reserved.

mceager@ELFSTATION1 C:\Users\mceager>powershell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

PS C:\Users\mceager>
```

Change directory to /Documents and Get-ChildItem -Hidden -File to find the hidden file

```
PS C:\Users\mceager> Set-Location .\Documents\
PS C:\Users\mceager\Documents> Get-ChildItem -Hidden -File


    Directory: C:\Users\mceager\Documents


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a-hs-        12/7/2020  10:29 AM            402 desktop.ini
-arh--       11/18/2020   5:05 PM             35 e1fone.txt


PS C:\Users\mceager\Documents>
```

Use “Get-Content ./e1fone.txt” to get the text

```
PS C:\Users\mceager\Documents> Get-Content .\e1fone.txt
All I want is my '2 front teeth'!!!
PS C:\Users\mceager\Documents>
```

Question 3

Set-Location to /desktop

```
PS C:\Users\mceager> Set-Location .\Desktop\
```

Find the hidden folder and “Set-Location” to it

```
PS C:\Users\mceager\Desktop> Get-ChildItem -Hidden


    Directory: C:\Users\mceager\Desktop


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
d--h--        12/7/2020  11:26 AM                elf2wo
-a-hs-        12/7/2020  10:29 AM            282 desktop.ini


PS C:\Users\mceager\Desktop> Set-Location .\elf2wo\
```

Find the file and output the contents

```
PS C:\Users\mceager\Desktop\elf2wo> Get-ChildItem


    Directory: C:\Users\mceager\Desktop\elf2wo


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a----        11/17/2020  10:26 AM             64 e70smsW10Y4k.txt


PS C:\Users\mceager\Desktop\elf2wo> Get-Content .\e70smsW10Y4k.txt
I want the movie Scrooged <3!
```

Question 4

Change to windows directory

```
PS C:\Users\mceager\Desktop\elf2wo> Set-Location ..
PS C:\Users\mceager\Desktop> Set-Location ..
```

```
S C:\> Set-location .\Windows\
```

```
PS C:\Windows> Set-Location .\System32\
PS C:\Windows\System32> Get-ChildItem
```

As a result of a too cluttered folder, we used ‘Filter ‘*3*’ to find the hidden directory

```
PS C:\Windows\System32> Get-ChildItem -Hidden -Directory -Filter '*3*'


    Directory: C:\Windows\System32


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
d--h--        11/23/2020   3:26 PM                3lfthr3e
```

Question 5

Find the word count of the file by using “Measure-Object” along with the pipe command

```
PS C:\Windows\System32\3lfthr3e> Get-ChildItem -Hidden


    Directory: C:\Windows\System32\3lfthr3e


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-arh--        11/17/2020  10:58 AM          85887 1.txt
-arh--        11/23/2020   3:26 PM       12061168 2.txt


PS C:\Windows\System32\3lfthr3e> Measure-Object .\1.txt
PS C:\Windows\System32\3lfthr3e> Get-Content .\1.txt | Measure-Object


Count    : 9999
Average  :
Sum      :
Maximum  :
Minimum  :
Property :
```

Question 6

Find the 2 words in the file by piping the output using “Select-Object” with the “-Index” flag set to 551 and 6991 respectively

```
PS C:\Windows\System32\3lfthr3e> Get-Content .\1.txt | Select-Object -Index 551
Red
PS C:\Windows\System32\3lfthr3e> Get-Content .\1.txt | Select-Object -Index 6991
Ryder
```

Question 7

Find the aligning phrase from the last question using the string “redryder”

```
PS C:\Windows\System32\3lfthr3e> Get-Content .\2.txt | Select-String "redryder"

redryderbbgun
```

Methodology/ thought process:

First, we used “man ssh” to show to manual pages, then slowly scrolled down until we saw the function of -l flag which is “login_name”. Then, we use SSH to access the machine, then initiate the powershell to perform our operations, we then find the hidden directory named “e1fone.txt” then output the contents, revealing the answer, this was confusing as another file “elfone.txt”, also exists which wasted some time.. After that, we changed directories to /Desktop to find the hidden file, then also output the contents. The next step was to switch to

/Windows/System32/ , as the Directory was too cluttered, we used “filter ‘*3*’” to find the hidden directory, after that we used “measure-object” to find out out the word count. To index the file we used “Select-Object -Index” on positions 551 and 6991, which is “red” and “ryder”, to find the aligning phrase, we piped the “Select-String ‘redryder’” into Get-Content and got “redryderbbgun”.