

Computer System- B Security

Introduction to Web Security P4

SQL injection

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SQL Injection Attack

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- Often this user input is used literally in the construction of a SQL query submitted to a database. For example:
 - `SELECT user FROM table WHERE name = 'user_input';`
- An SQL injection attack involves placing SQL statements in the user input (again, data-code confusion!)

SQL: Standard Query Language

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Table: CS166		
First_Name	Last_Name	Code_ID
Bernardo	Palazzi	345
Roberto	Tamassia	122
Alex	Heitzman	543
.....

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**A field or
Column**



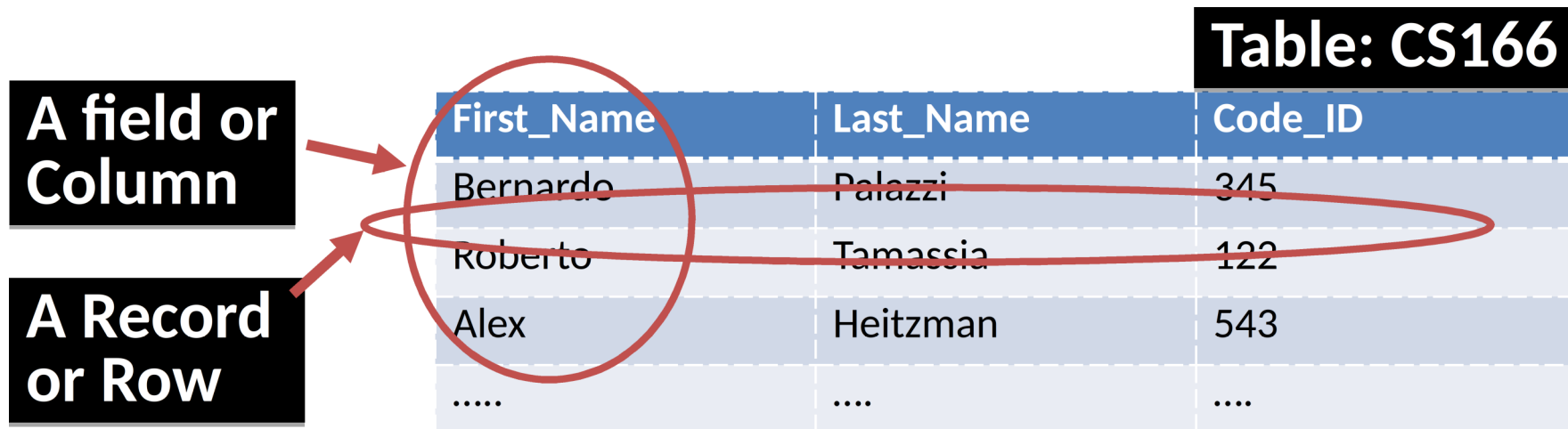
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The diagram illustrates a database table structure with annotations. A red circle highlights the first three rows of the table, and a red arrow points from the text 'A Record or Row' to this circle. Another red arrow points from the text 'A field or Column' to the 'First_Name' column header. A red oval highlights the first three rows of the 'Code_ID' column.

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SQL Syntax

```
SELECT column_name(s) or *  
FROM table_name  
WHERE column_name operator value
```

- **SELECT** statement is used to select data **FROM** one or more tables in a database
- **WHERE** clause is used to filter records

Result-set is stored in a result table

- **;** is statement terminator and **--** is remark beginning

Login Authentication Query

- Standard query to authenticate users:
 - `select * from users where user='$usern' AND pwd='$password'`
- Classic SQL injection attacks
 - Server side code sets variables \$username and \$passwd from user input to web form
 - Variables passed to SQL query
 - `select * from users where user='$username' AND pwd='$passwd'`

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 - Variables passed to SQL query
 - `select * from users where user='$username' AND pwd='$passwd'`
- Special strings can be entered by attacker
 - `select * from users where user='M' OR '1=1' AND pwd='M' OR '1=1'`
- Result: access obtained without password

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- Query modify:
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 - `$usern="M' OR '1=1";`
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 - `$usern="M' ; drop table user;"?`

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- ```
select user, pwd from users where
user='$usern'
```
- ```
$usern=escape (“M' ;drop table user;”)
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- `Escape(“t ' c”)` gives as a result `“t \' c”`
 - `select user, pwd from users where user='$usern'`
 - `$usern=escape(“M' ;drop table user;”)`
- The result is the safe query:
 - `select user,pwd from users where user='M\' drop table user;\'`

