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SQL-INJECTION VULNERABILITY DETECTION

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Introduction

1. SQL stands for Structured Query Language.

2. SQL injection (SQLi) is a cyberattack that injects malicious SQL code into an application, allowing the attacker to view or modify a database.

3. Cheat codes

- admin' OR '1'='1
- admin or 1=1#
- admin'--

https://demo.testfire.net/login.jsp

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Objectives

- Identify and mitigate SQL injection vulnerabilities in web applications.
- Protect sensitive data from unauthorized access, modification, or deletion.
- Prevent attackers from gaining unauthorized control of web applications.
- Reduce the risk of data breaches and other security incidents.

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Problem Identification

problem # 1

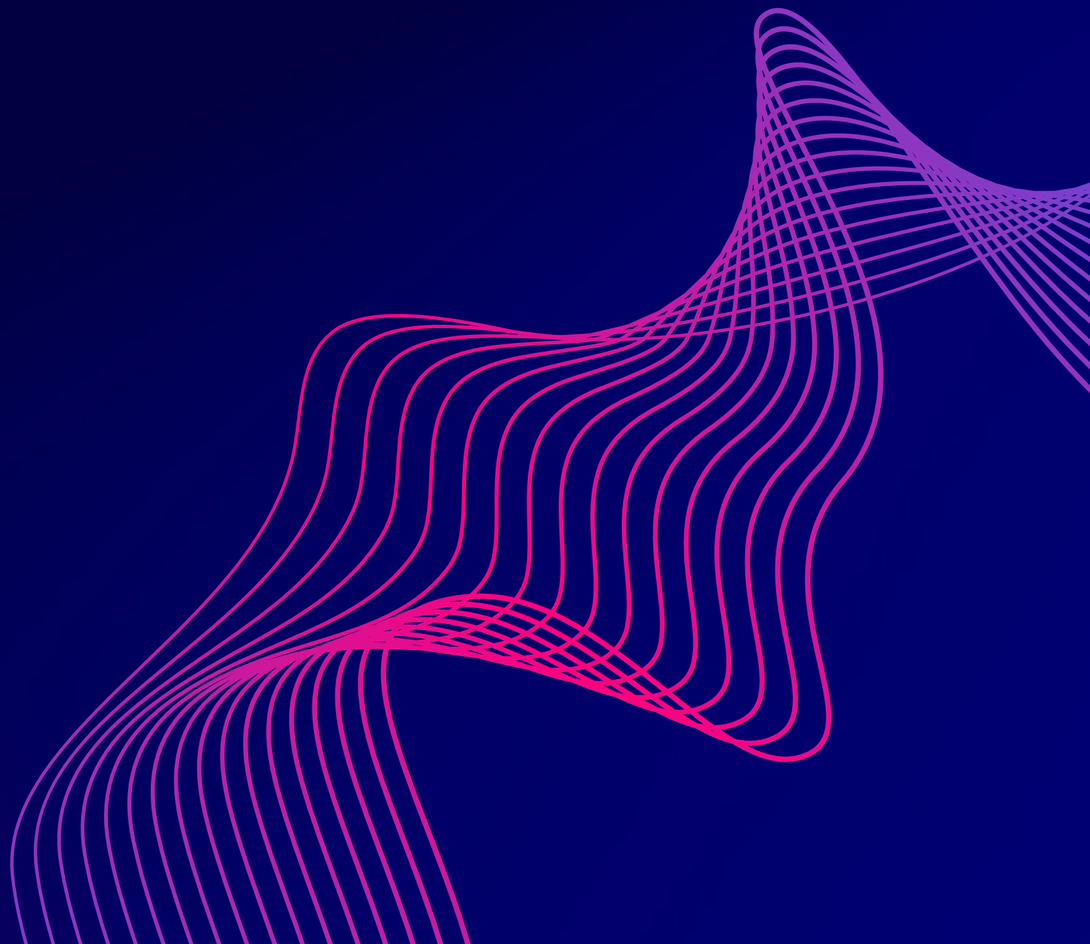
Inadequate Input Validation

problem # 2

Generate false positives and mutated payloads

problem # 3

Use of dynamic SQL



Tools 

- sqlmap
- nikto
- AppScan

Algorithms 

- fuzz technique
- model checking
- Pattern matching

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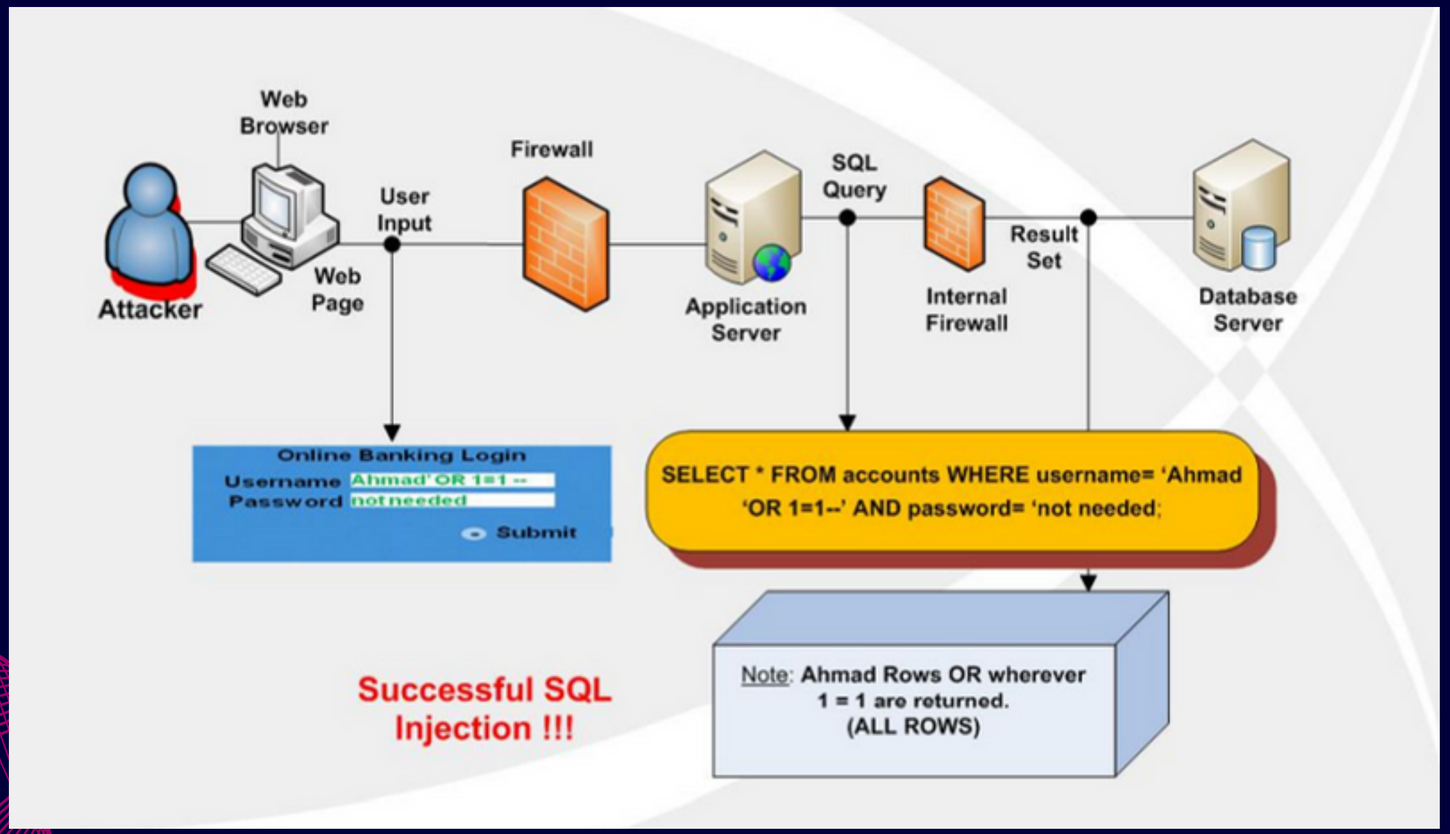
Block Diagram :



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Project Statements

- SQL injection attacks are a serious security vulnerability that can allow attackers to gain unauthorized access to sensitive data.
- Static analysis tools are not always effective at detecting SQL injection vulnerabilities, especially those that are protected by white or black lists.
- There is a need for a more effective way to detect SQL injection vulnerabilities, especially in web applications with complex input validation logic.

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Preventing SQL injection

1. Parameterized Queries (Prepared Statements)

2. Least Privilege Principle

3. Web Application Firewalls (WAFs)

4. Regular Security Testing

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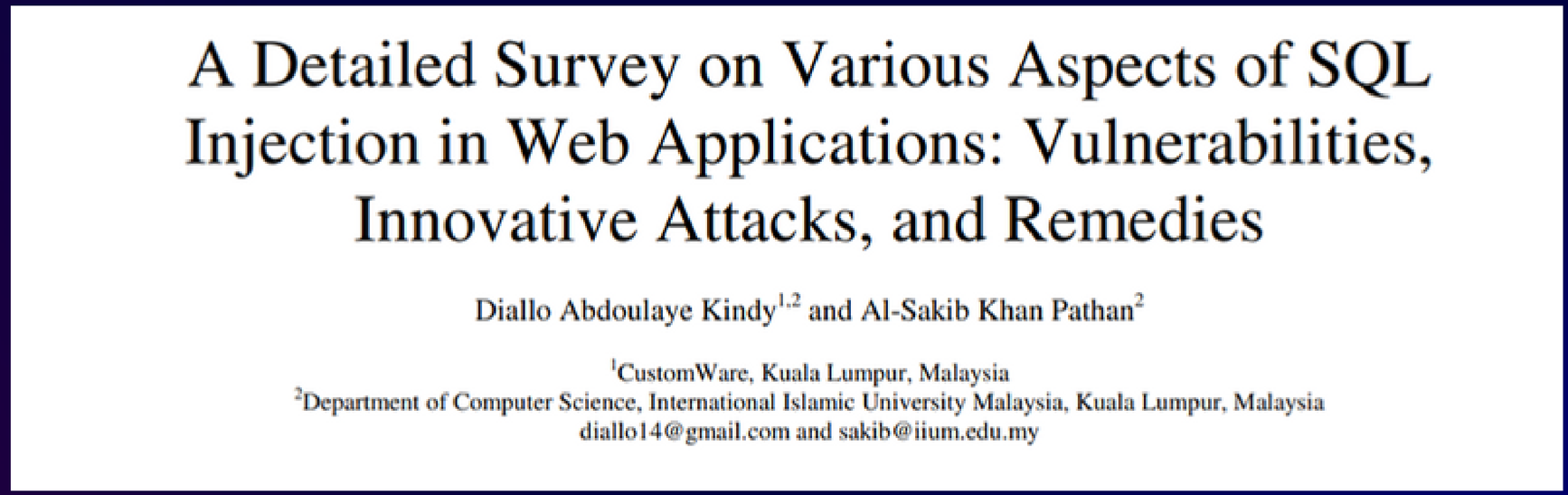
Base Paper



A Detailed Survey on Various Aspects of SQL Injection in Web Applications: Vulnerabilities, Innovative Attacks, and Remedies

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Link : https://arxiv.org/ftp/arxiv/papers/1203/1203.3324.pdf

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3	"OWASPD – Open Web Application Security Proj ect. Top ten most critical web application vulnerabilities," 2005.
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