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Introduction to XSS

Pen and the Art of Cross-Site Scripting

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Overview

1. Perspective
2. Fundamentals
3. Vulnerability
4. Vectors
5. Exploit
6. Advanced
7. Mitigation
8. Parting

Perspective


Flinders
UNIVERSITY


HEAD
FULL
OF
HEART


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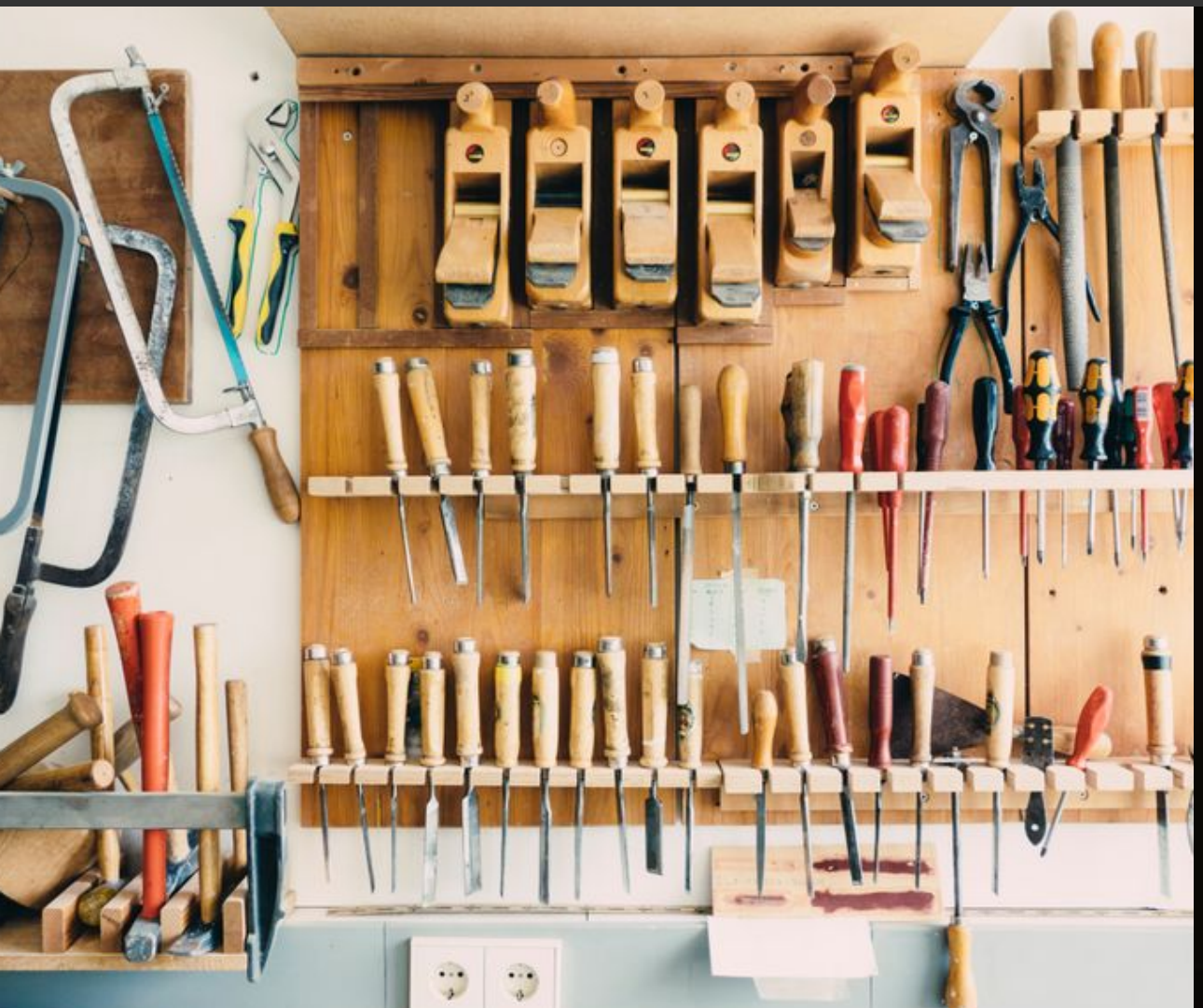
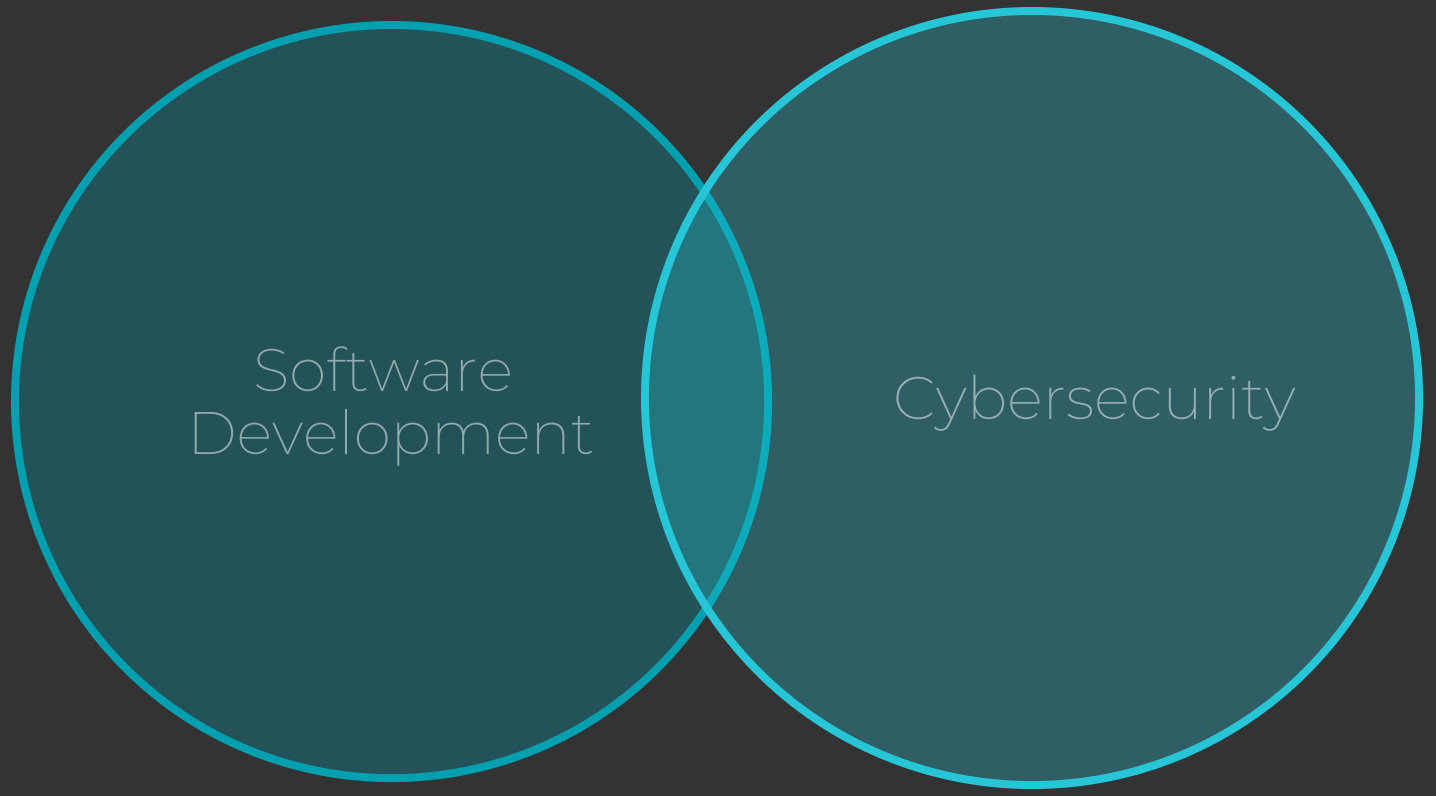
Things I Like to Do

Build Stuff + Break Stuff



Where My Interests Lie

Right in that middle bit



Building Security Tools
Secure Software Development

Fundamentals

Anatomy of a Webpage

HTML

Content

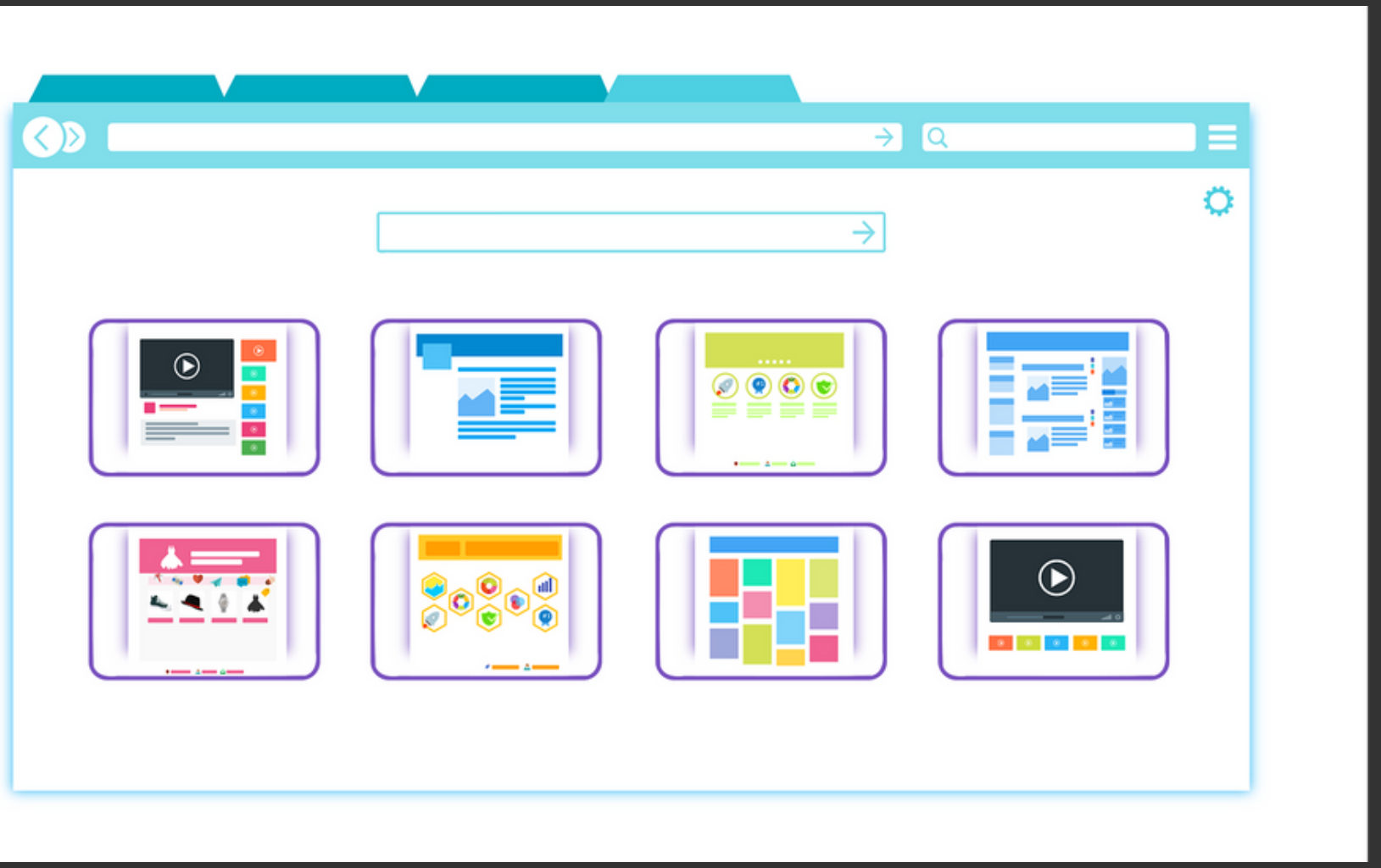
JS

Behaviour

CSS

Styling

Web Browser



Apache Cordova

Electron

React Native

Progressive Web Application

Vulnerability

OWASP Top 10

1. Injection
2. Broken Authentication
3. Sensitive Data Exposure
4. XML External Entities (XXE)
5. Broken Access Control
6. Security Misconfiguration
7. Cross-Site Scripting
8. Insecure Deserialisation
9. Using Components with Known Vulnerabilities
10. Insufficient Logging & Monitoring

Static Web Pages

Dynamic Web Pages

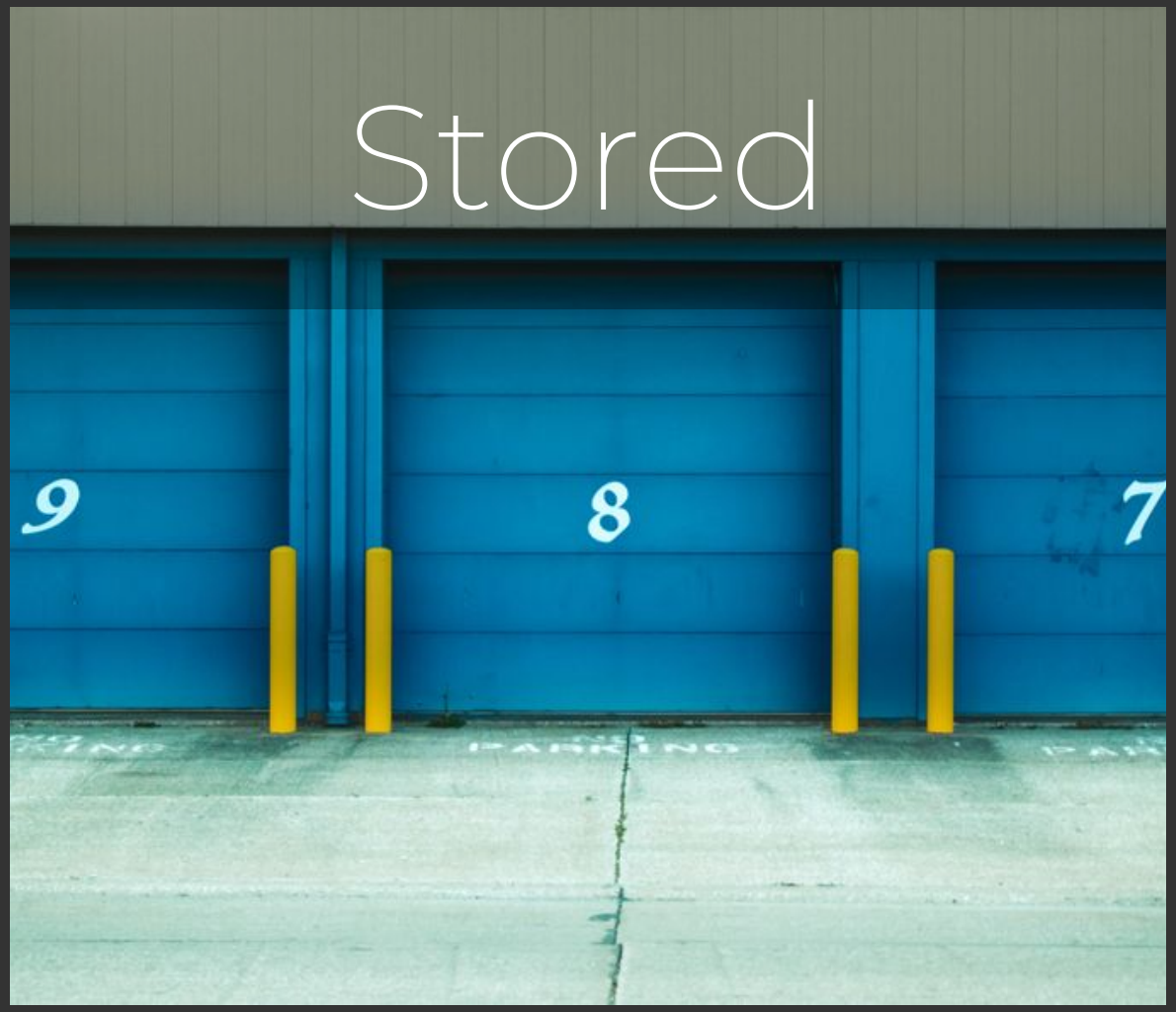
Conditions for XSS

1. Data enters web application from untrusted source
2. Data loaded into dynamic page without being validated

Types of XSS

Reflected

Stored



Vectors

Reflected XSS Vectors

1. Crafted URL
2. Malicious third-party webpage
3. Reflected form data

Demo

REFLECTED XSS

Stored XSS Vectors

1. User input saved to database
   - Form data
   - Messages / forum posts
2. Logs

Demo

STORED XSS

Demo

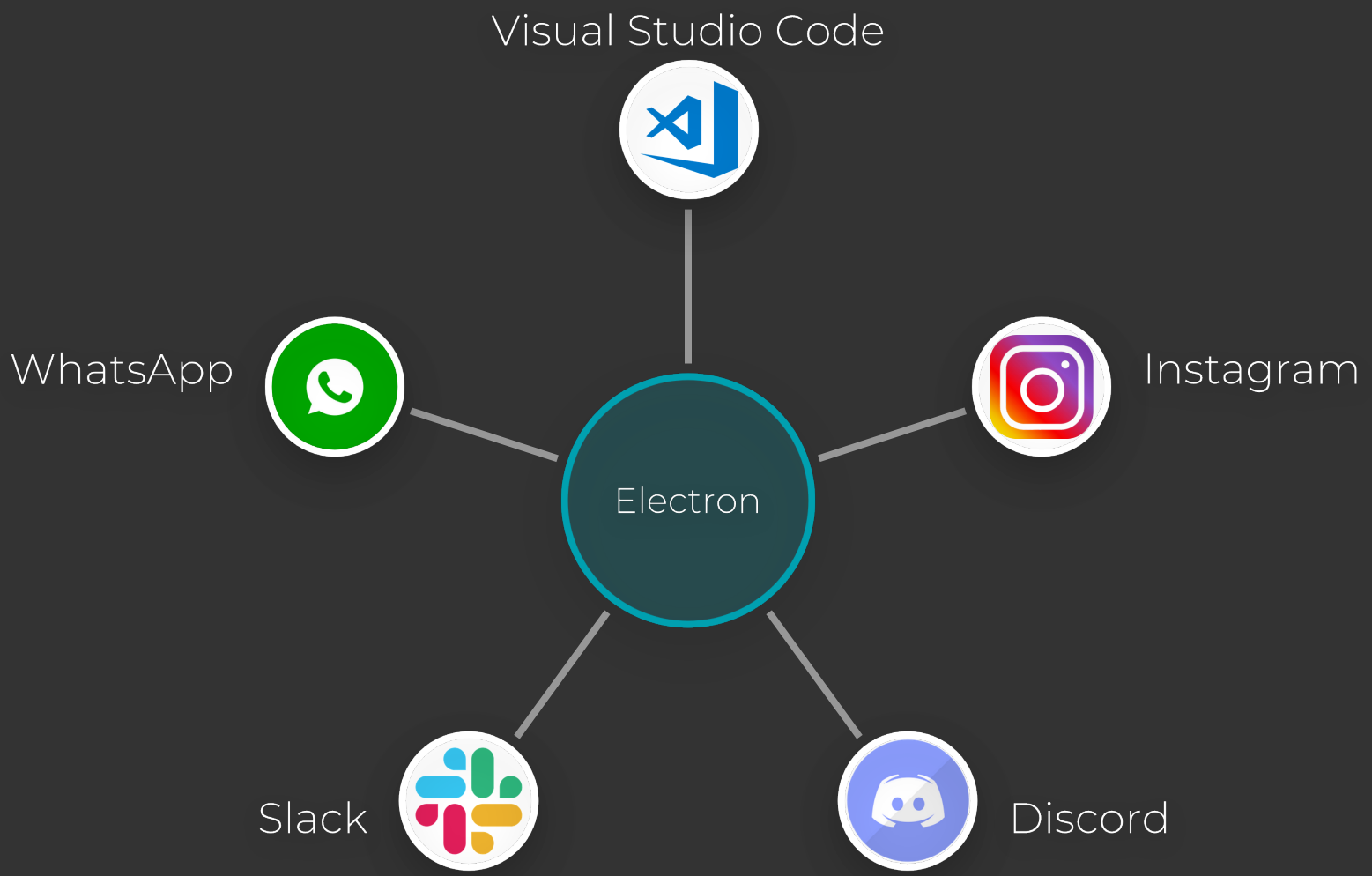
MARKDOWN

Exploits

Demo

Advanced

Electron is Everywhere



Electron RCE Demo

Advanced Attacks

- Authenticated Requests
  Send requests to vulnerable site as victim
- Web Proxy
  Use a webpage as another user
- Service Workers
  Persistent JS execution after browser tab is closed
- Internal Network Scanning
  Pingsweep and port scan internal resources
- RCE on Internal Network
  Pivot from victim to internal network

Mitigation

XSS Mitigation Techniques (code)

1. Encode / sanitise on save to database
2. Encode / sanitise on inserting into web page
3. Parse JSON / XML safely
4. Use a trusted sanitisation library
5. Use a modern JS Framework

XSS Mitigation Techniques (browser)

1. HttpOnly (cookie flag)
2. Content Security Policy (header)
3. X-XSS-Protection (header)

Parting Notes

What Hasn't Been Covered

1. Finding XSS Vulnerabilities
2. Crafting Exploits
3. Bypassing WAFs
4. Browser Security

Want To Lean More?

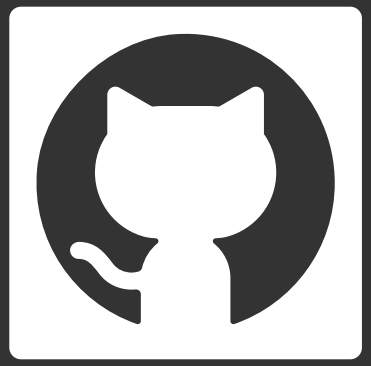
1. Hack the Box
2. Pentester Labs
3. Cybrary
4. OSCP
5. Twitter

Do This Professionally

1. Penetration Testing
2. Bug Bounty Programs
3. Security Research

Thanks!

vulnerable.pennington.io



github.com/JakobRPennington/Vulnerable

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