

CSE610: Web Programming & Security

1. Introduction

Seongil Wi

Who am I?

about:Seongil Wi



- Assistant professor
- Security researcher

- Office: E106, 301-8
- Office Hour: Wednesday, 2~3pm (by appointment)
 - 🏠 Homepage: <https://seongil-wi.github.io/>
 - ✉ Email: seongil.wi@unist.ac.kr

- MBTI: ISFJ



My Research



- UNIST CSE / WebSec Lab. (Web Security Lab)

- 🏠 Homepage: <https://websec-lab.github.io/>



- Research keywords:
 - **Web and Software Security**
 - Client/Server-side Security
 - Web Vulnerability Discovery



- Finding **security bugs** in web components (applications, browsers, ...)
- Finding **emerging web threats**
- Analyzing online **criminal activities**
- Using...
 - Dynamic/static analysis
 - Clone detection
 - AI techniques
 - Etc.

Making *web ecosystems*
more *secure!*

This Course

Web Programming and Security

This Course

Web Programming and Security

The Web has won

- Used by billions of people to store/retrieve information



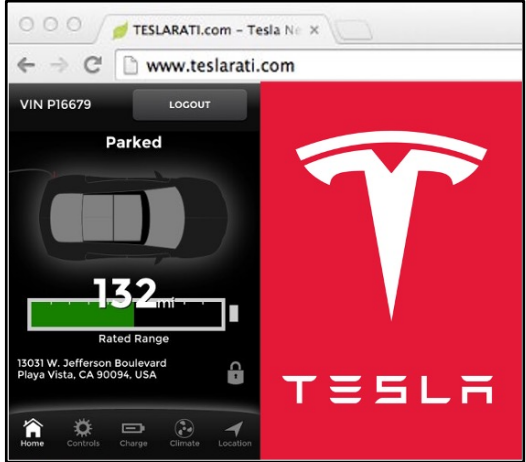
2B users monthly



2.3M searches per second



- User interface for emerging systems



Self-driving car



Cryptocurrency

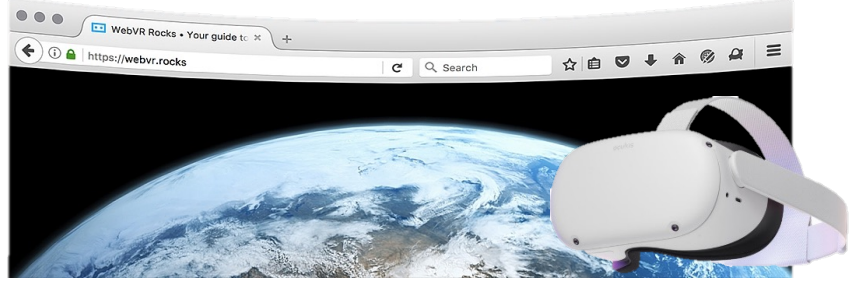


AI models

- Large coverage in desktop/mobile application



WebView



WebVR

... and the hackers with it

- Used by billions of people to store/retrieve information

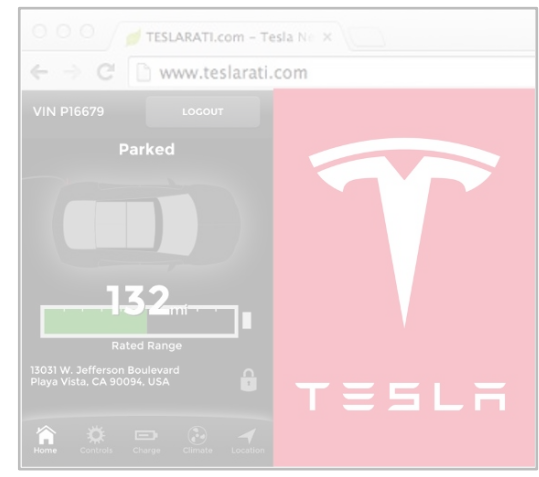
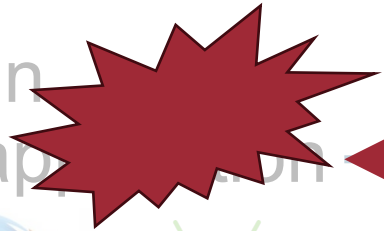
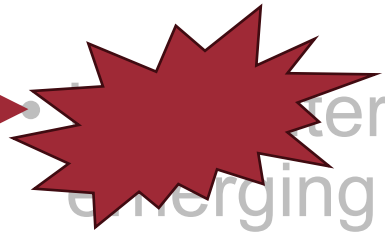


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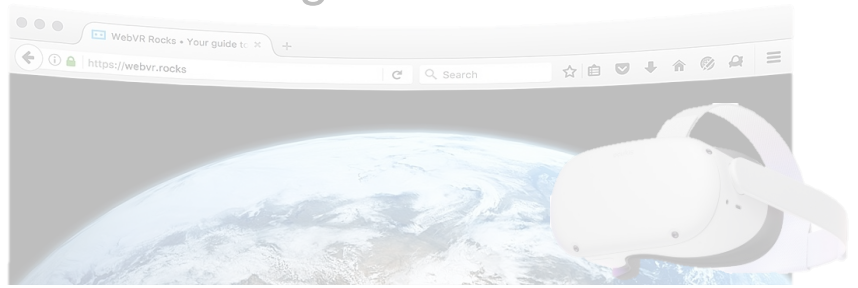
Self-driving car



Cryptocurrency



AI models

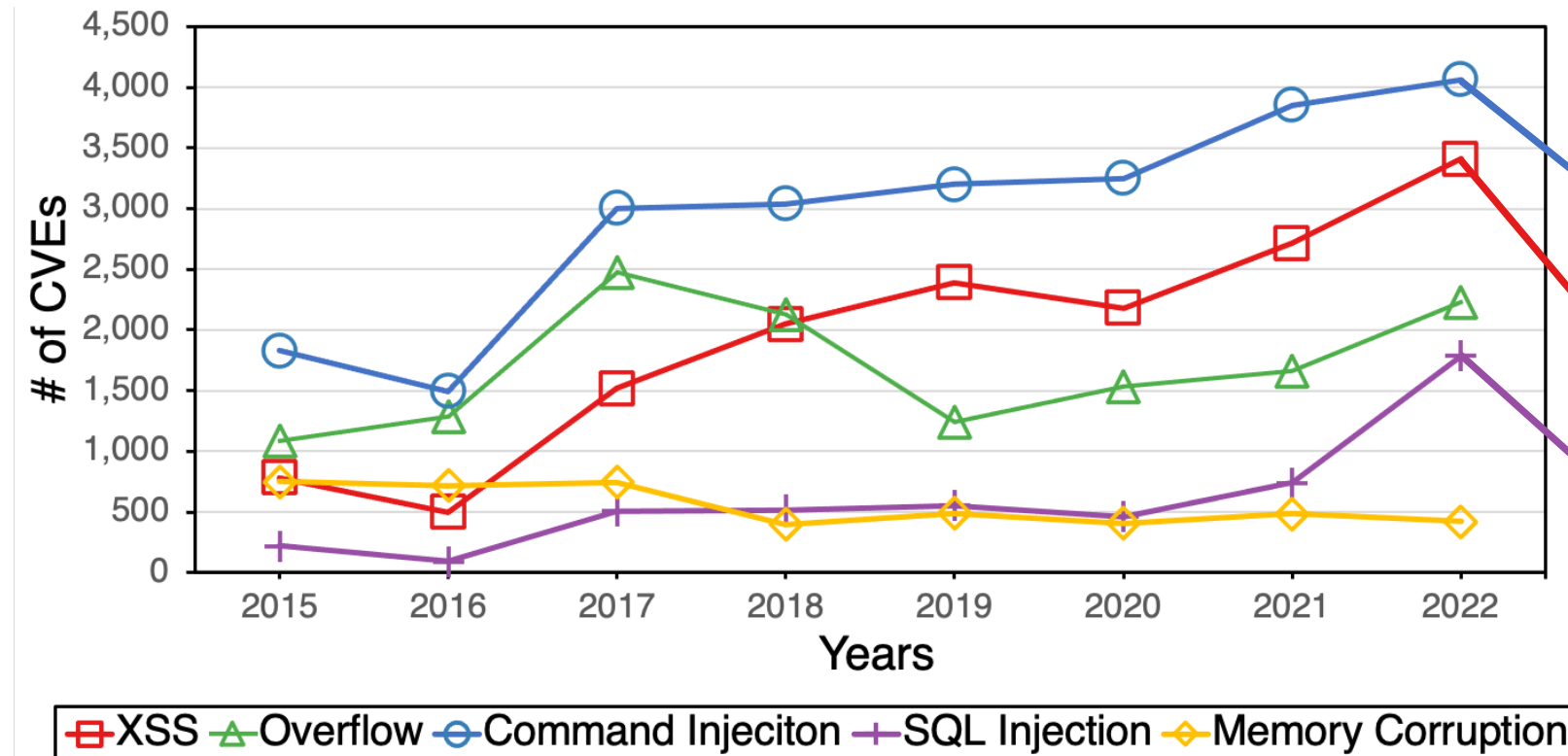


WebVR

Interface for emerging systems

Why Web Security?

- *Web attacks* accounted for **48.6%** of all reported threats



Web attacks

- Initiate denial-of-service (DoS) attacks
- Access to sensitive information
- Enable remote code execution

... and the hackers with it



Crypto

2FA compromise led to \$34M Crypto.com hack

Anita Ramaswamy @anitaramaswamy / 3:13 AM GMT+9 • January 21, 2022 [Comment](#)



Companies paid \$4.2M bug bounties



Jonathan Greig
January 17th, 2023

Norton LifeLock says 925,000 accounts targeted by credential-stuffing attacks

Briefs Cybercrime

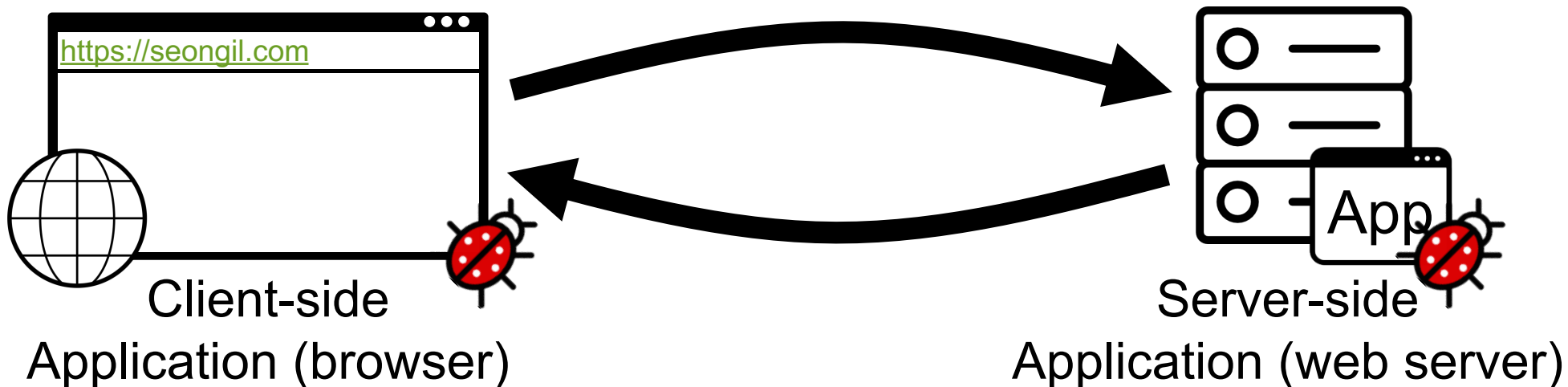
Web skimming hackers infiltrate over 40 ecommerce websites - that we know of

News By Abigail Opiah published December 08, 2022

Web threats are critical!

Introduction to Web Security

- We are going to study and discuss the web attacks and defenses.
- Web Programming Basic
- Server-side Web Attacks & Defenses
- Client-side Web Attacks & Defenses



Web Programming & Security



- We will address important topics in web security and privacy
- What will you learn from here?
 - What the main causes of attacks and vulnerabilities?
 - How can you address them?
 - What's the best thing you can do to mitigate such risks?
- We are going to study and discuss the state-of-the-art web attacks and defenses!

Prerequisite



- Programming Language
- Compiler / Program Analysis
- Basic OS
- Computer Security (CSE467)

Course Information



- **Class will be on Tuesdays and Thursdays, 4 PM – 5:15 PM**
- **Course Website:**
 - <https://websec-lab.github.io/courses/2024s-cse610>
- **Syllabus:** See the course website

Grading



- **Participation: 5%**
 - Active participation including questions, discussions, and projects (online or offline)
- **Midterm exam: 20%** (No final exam!)
- **Homework: 15%**

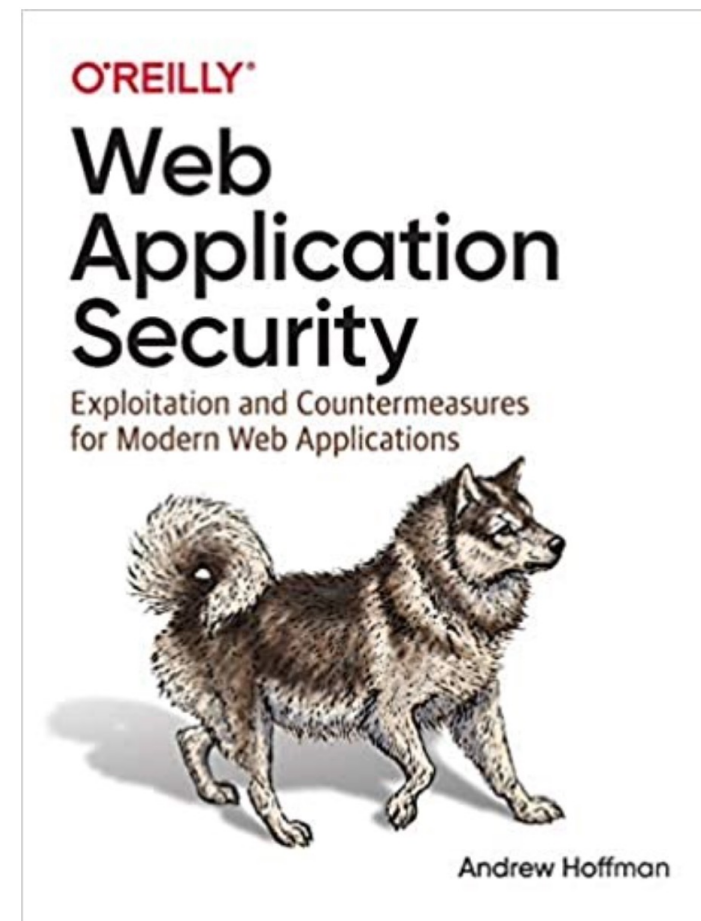
- **Paper Presentation: 20%**

- **Project: 40%**

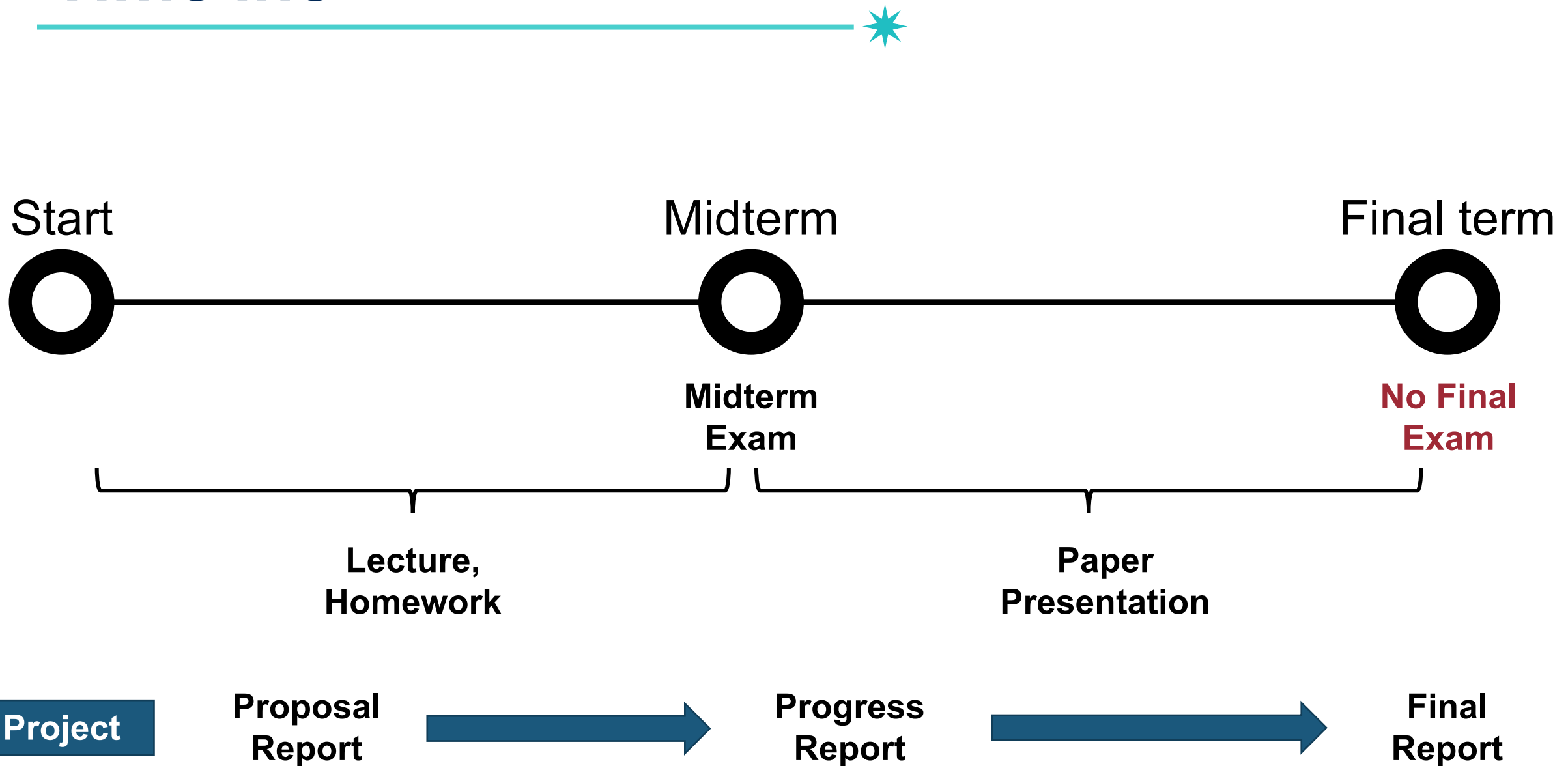
Logistics



- **No official textbook required**
 - Slides and mandatory readings should be sufficient
- **Optional book**
 - “Web Application Security” book by Andrew Hoffman
- **You should attend lectures**
 - Not mandatory but highly encouraged



Timeline



Paper Presentation



- 25 mins for one person
 - The list of presentation papers will be provided
 - Selection of papers for presentation will be on a first-come, first-served basis
 - Further details will be announced later!

Project



- 1~2 persons for one team
- The topics must be related to the web security/Web-related security
- Submit your proposal by **3/15**
- Further details will be announced later!

FYI: Project Ideas



- Analyze a system or service
 - Implement static/dynamic analysis tool to find SQL Injection/XSS vulnerabilities
 - Manually find interesting vulnerabilities or side-channel attacks in a service
 - In-depth study on browser vulnerabilities
- Investigate a privacy protection service
 - Find out identifier types in multiple services and organizations

FYI: Project Ideas



- Automatic penetration tests
 - IoT devices, routers and others
- Extract secret keys from applications
- Finding phishing websites using novel approaches
- Web Tracker
- Cross-site communication
- Dark web security
- ...

Question?