



# Client-side Security

Client-side web exploitation :  
attacks and mitigation

**BO** ALGIERS  
**SIDES**

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# Client-side Vs. Server-side

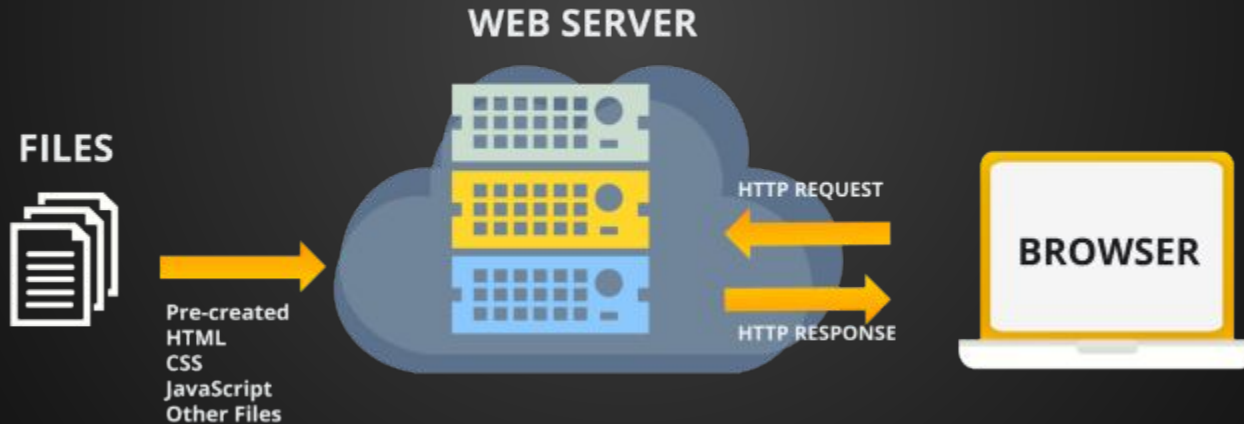
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# Client-side Vs. Server-side

SERVER SIDE

CLIENT SIDE





# Client-side vulnerabilities

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Security incidents and breaches





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# Client-side vulnerabilities

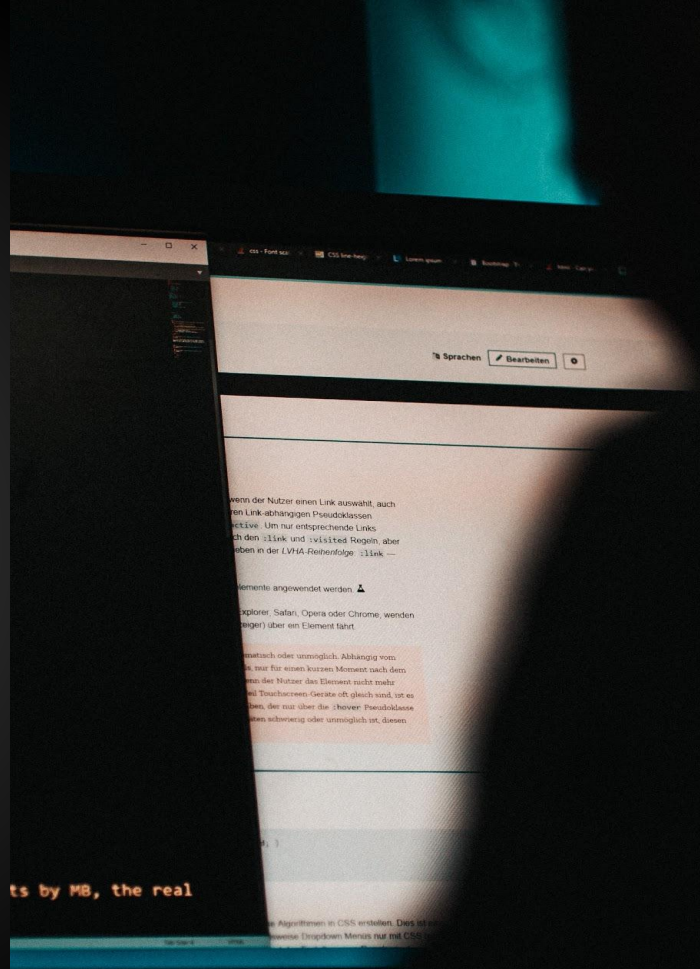
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# Cross Site Scripting

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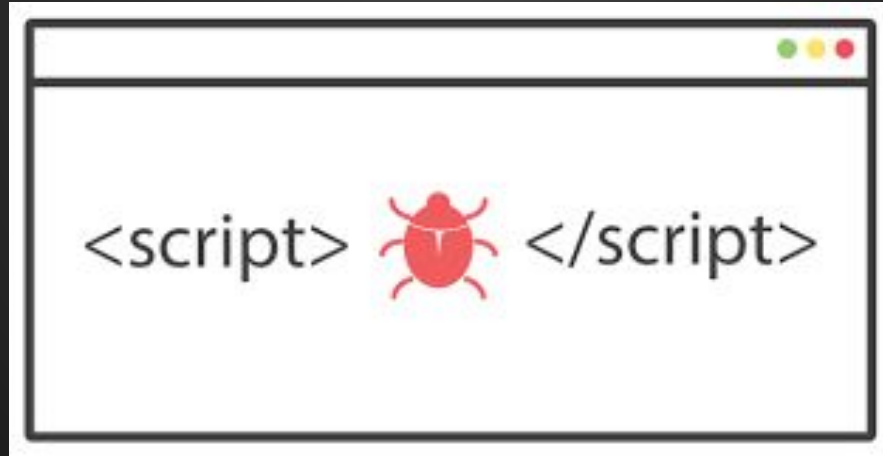




# I. Cross Site Scripting (XSS)

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A type of client side code injection attack. The attacker intends to run harmful scripts in the victim's web browser by embedding malicious code in a web page.



# What you can do with XSS

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**01**

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Hijack a user's  
session

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**02**

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Perform unauthorized  
activities

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**03**

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Perform phishing  
attacks

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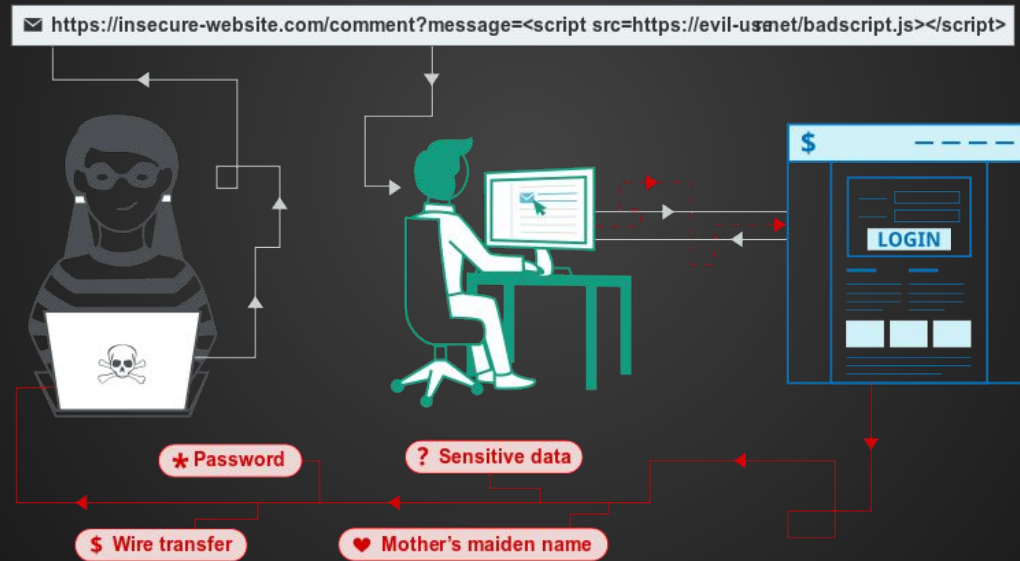
**04**

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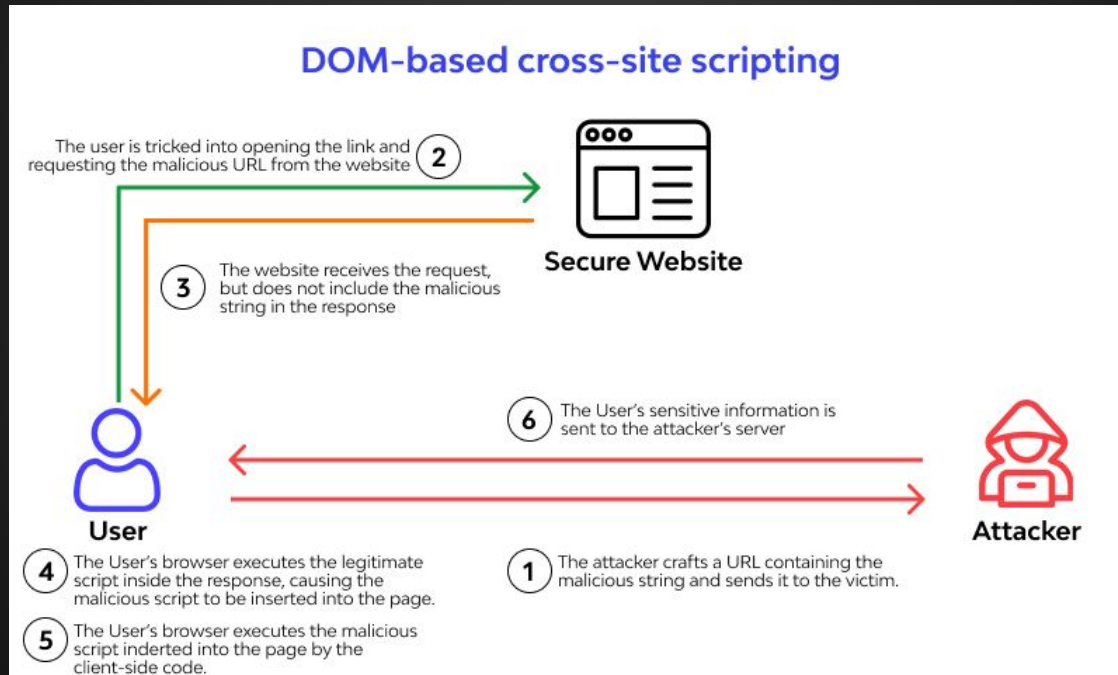
Steal sensitive  
information

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# I. Cross Site Scripting - Reflected

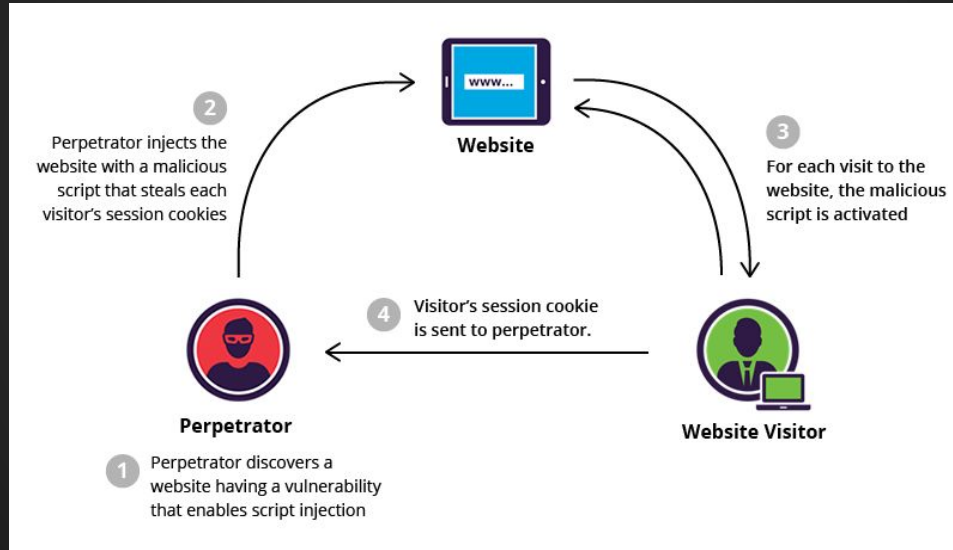


# I. Cross Site Scripting - DOM



# I. Cross Site Scripting - Stored

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# Cross Site Request Forgery

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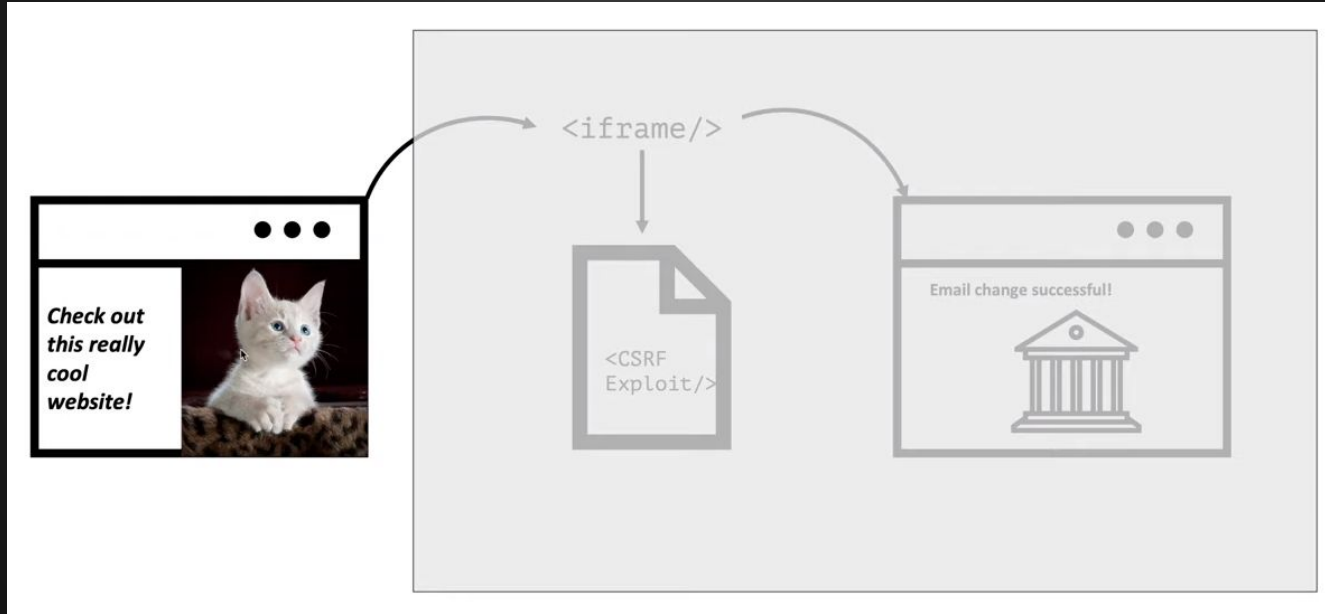


## II. Cross Site Request Forgery

CSRF is an attack where the attacker causes the victim user to carry out an action unintentionally while that user is authenticated .



## II. Cross Site Request Forgery



# What you can do with CSRF

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**01**

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Change  
email

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**02**

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Transfer  
amount

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**03**

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Delete records  
(emails, blogs, etc)

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**04**

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Perform high  
privilege actions

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## II. Cross Site Request Forgery

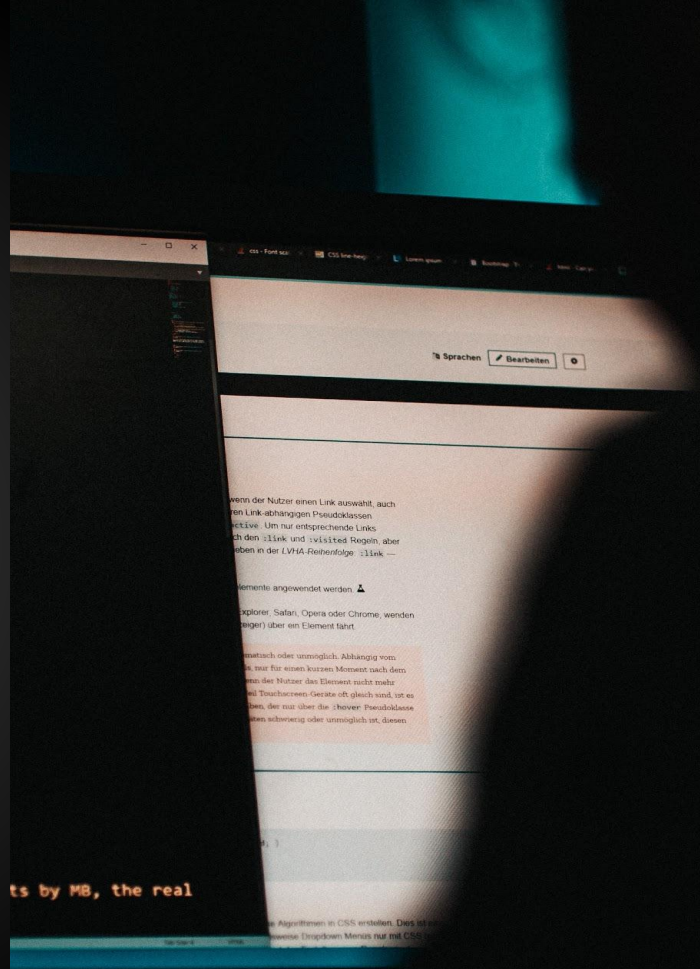
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CSRF conditions:

- A relevant action.
- Cookie-based session handling.
- No unpredictable request parameters.



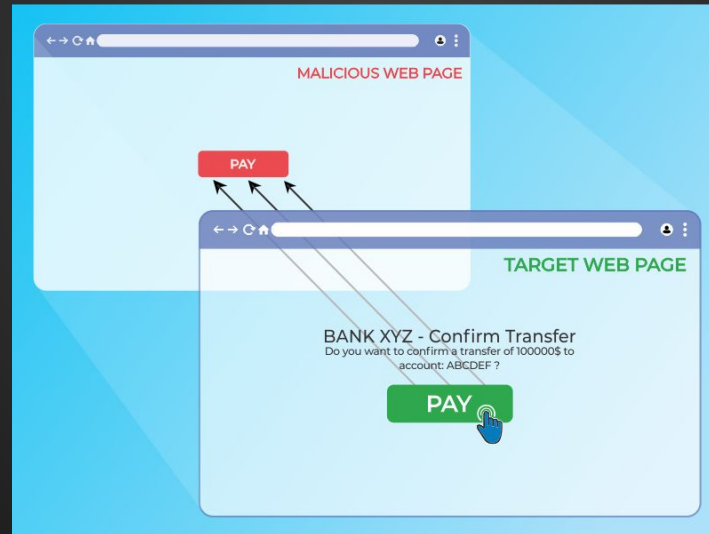
# Clickjacking



### III. Clickjacking

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Clickjacking is a type of attack in which a user is tricked into clicking on a webpage element that is either invisible or disguised as another element.



### III. Clickjacking

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01

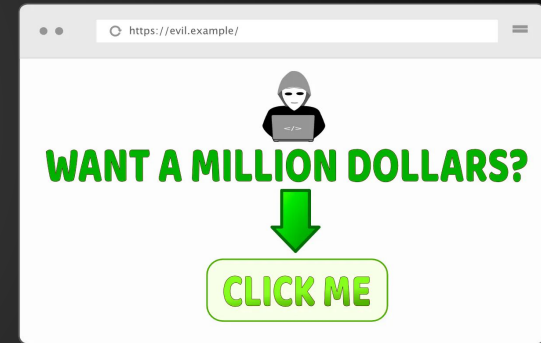
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02

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03

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### III. Clickjacking - Types

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*Likejacking*

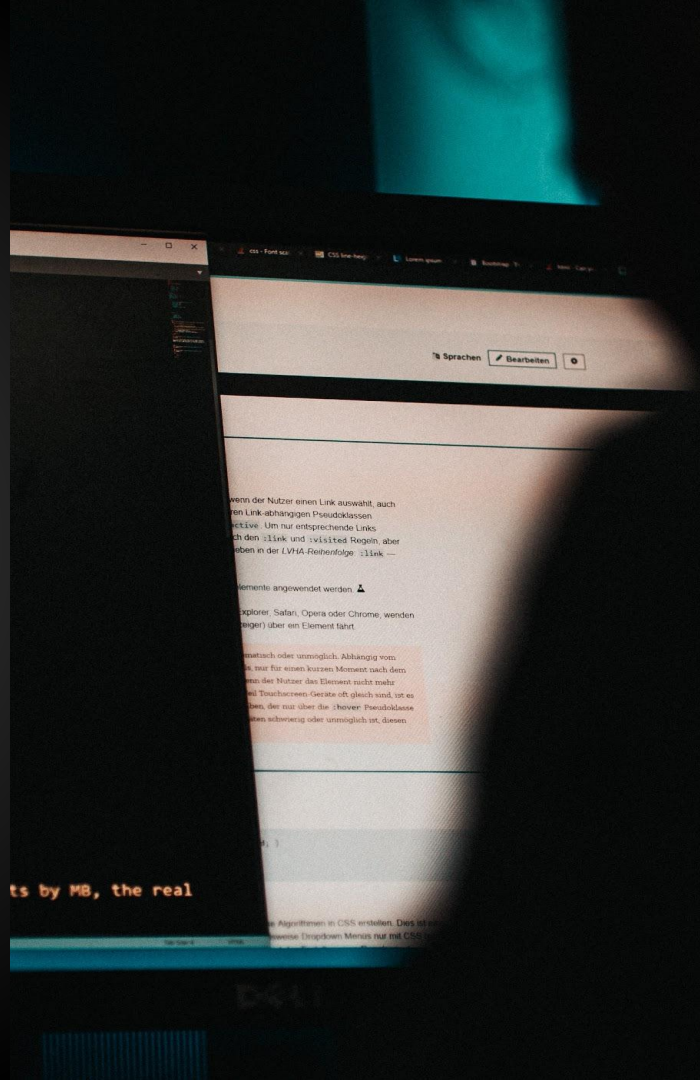
*Cookiejacking*

*Filejacking*

*Cursorjacking*

*Password manager attacks*

# SOP / CORS





# I. Same Origin Policy

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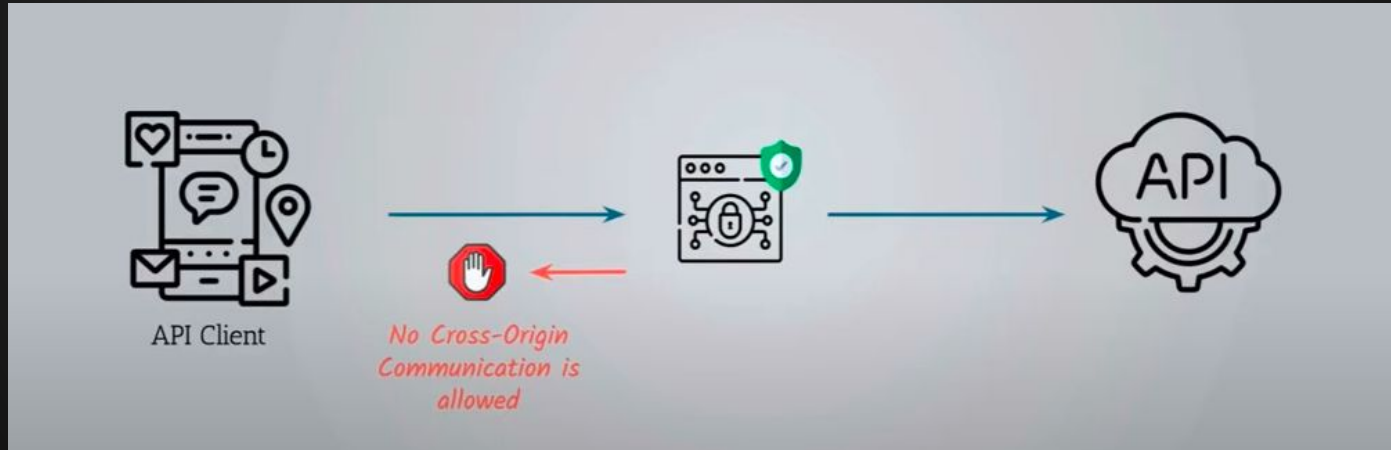
Same Origin Policy is a security mechanism that limits how a document or script loaded from one origin interacts with a resource from another.

Origin

<https://www.cors.org:9600>

## II. Cross-Origin Resource Sharing (CORS)

Cross Origin Resource sharing is another browser mechanism which enables controlled access to resources located outside of a given domain.



## II. Cross-Origin Resource Sharing (CORS)

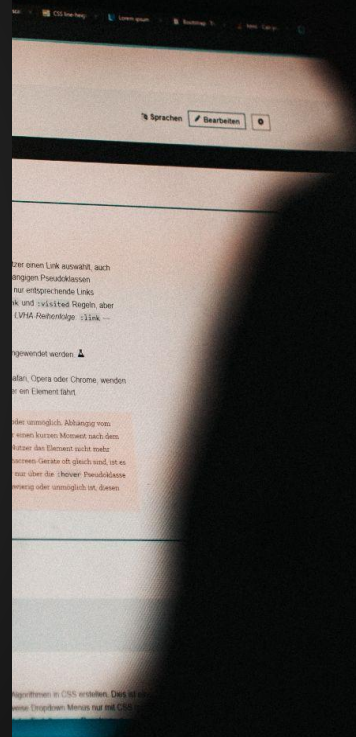
**Access-Control-Allow-Origin** header permits us to specify the origins that can fetch our API.



# Mitigations

How to protect?

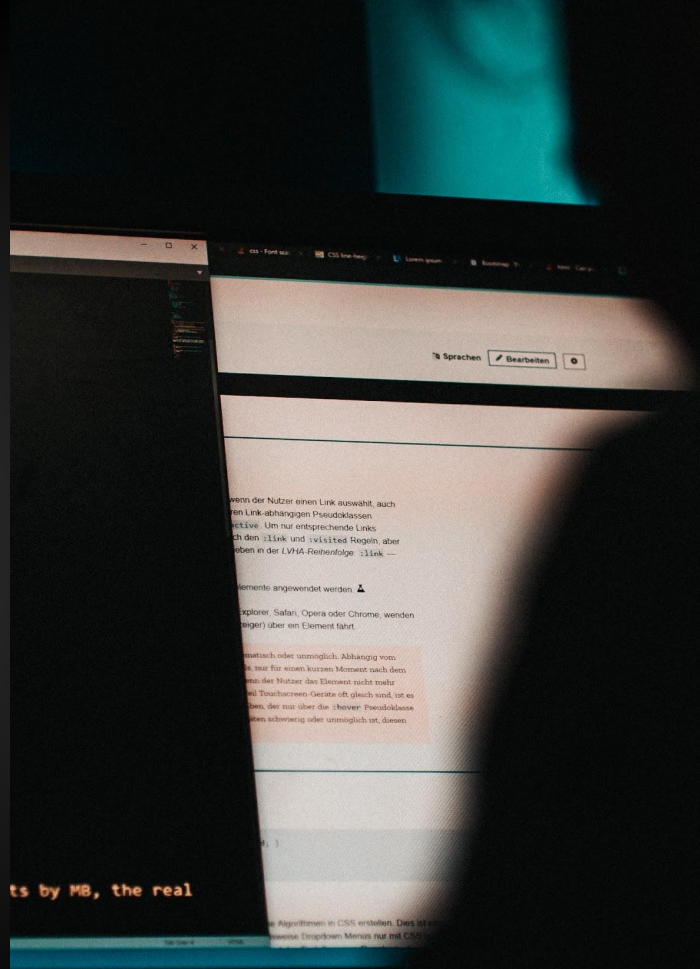
```
11 height: 100%;  
12 }  
13  
14 .block {  
15 width: 100%;  
16 height: 500px;  
17 margin: 0 auto 10px auto;  
18 padding: 0 auto;  
19 line-height: 0;  
20 }  
21  
22 h2 {  
23 font-family: sans-serif;  
24 font-weight: bold;  
25 text-align: center;  
26 font-size: 30px;  
27 z-index: 1;  
28 transform: rotate(1deg);  
29 }  
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34 .column {  
35  
36 z-index: -1;  
37 width: 100%;  
38 display: block;  
39 font-size: 12px;  
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# Mitigations

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# I. XSS

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## ○ User Input Sanitization

- ```
userInput.replace(/</g, "&lt;").replace(/>/g, "&gt;")  
            .replace(/'/g, "2#39;").replace(/"/g, "&quot;")  
            .replace(/&/g, "&amp;");
```

- Use DOMPurify

## ○ HttpOnly cookies

- ```
resp.set_cookie("name", value = "value", httponly = True)
```

## ○ Using CSP

- ```
Content-Security-Policy: script-src 'self'
```

## II. CSRF

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### CSRF-TOKEN

- Unpredictable with high entropy, as For session tokens in general.
- Tied to the user's session.
- Strictly validated in every case before the relevant action is executed.



# III. Clickjacking

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- **X-Frame-Options**

- `X-Frame-Options: DENY`
- `X-Frame-Options: SAMEORIGIN`

- **Using cookie's sameSite origin**

- `resp.set_cookie("name", value = "value", samesite="Strict")`

- **Using CSP**

- `Content-Security-Policy: script-src-elem <source>`

# Conclusion

---

If you find a vulnerability, you go ahead and fix it. You don't base your security on:

- ❖ Luck
- ❖ Difficulty of exploitation
- ❖ Requiring intimate knowledge of your code which you assume no one has.

# Thank you for your attention

## Any questions?

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