Debugging your applications effectively with Browser Dev Tools

Kunal Singh

Sr Software Engineer | Freshworks

I talk about software engineering around web technologies and share my experience as I learn and unlearn at work or while I am building my next side project. Apart from this you will either find me annoying my cat or playing football/lifting weights.

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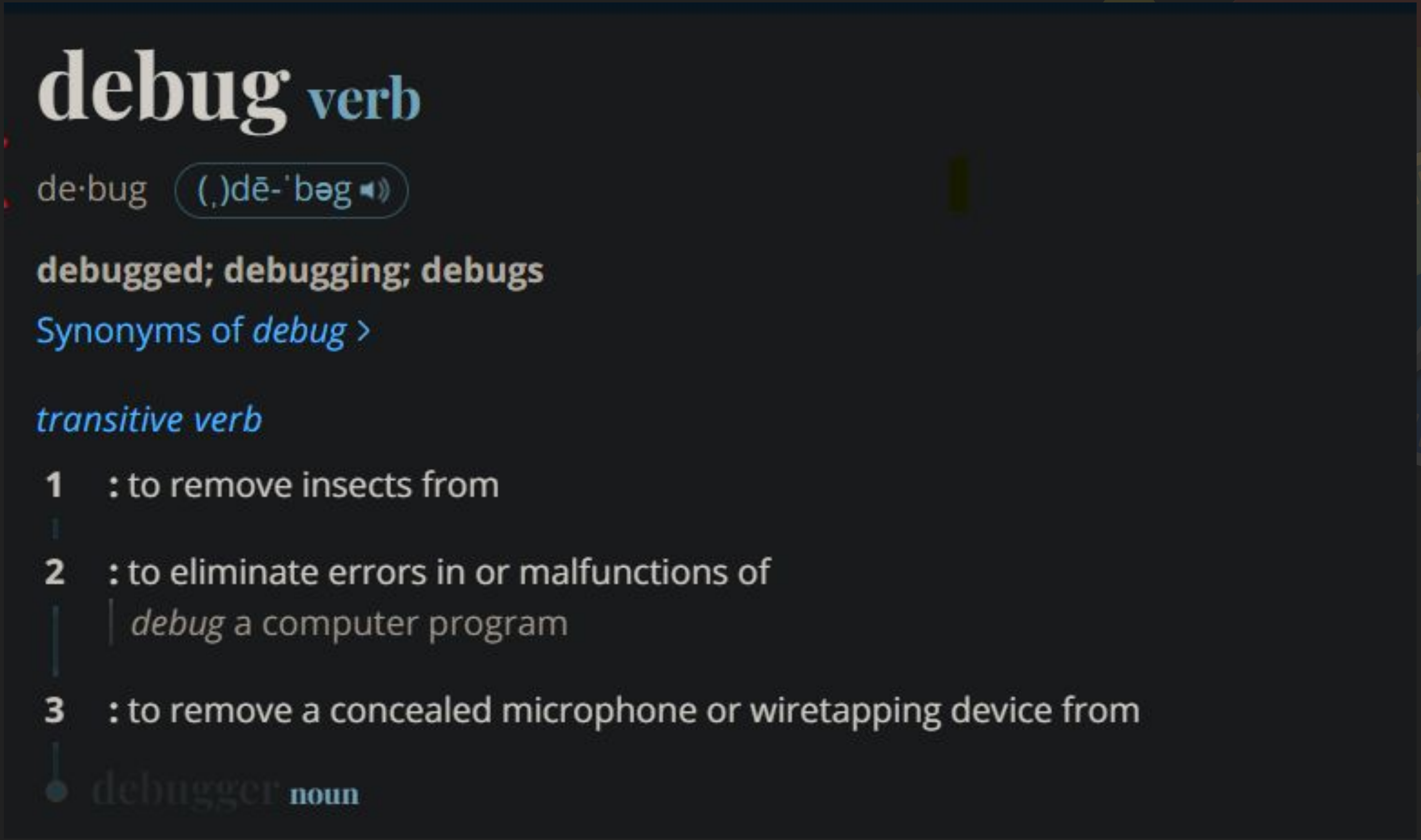
@singhkunal2050



debug verb

de·bug (ˌ)dē-ˈbəg

debugged; debugging; debugs

Synonyms of *debug* ›

transitive verb

1 : to remove insects from

2 : to eliminate errors in or malfunctions of

debug a computer program

3 : to remove a concealed microphone or wiretapping device from

debugger noun

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Sep 9, 1947 CE: World's First Computer Bug

On September 9, 1947, a team of computer scientists reported the world's first computer bug—a moth trapped in their computer at Harvard University.

GRADES
3 - 12

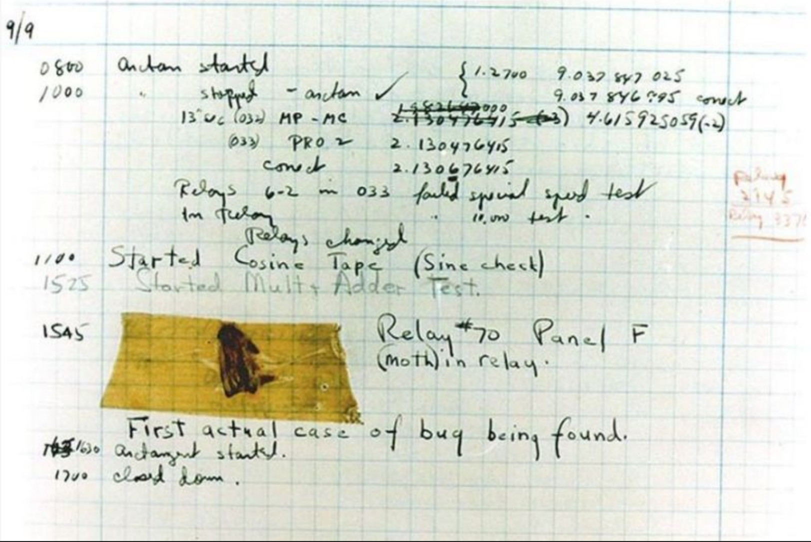
SUBJECTS
English Language Arts, Experiential Learning

PHOTOGRAPH

Computer Bug

"First actual case of bug being found," according to the brainiacs at Harvard, 1945. The engineers who found the moth were the first to literally "debug" a machine.

PHOTOGRAPH COURTESY NAVAL SURFACE WARFARE CENTER, DAHLGREN, VIRGINIA



9/9

0800 Antan started
1000 " stopped - antan ✓ {1.2700 9.037 847 025
9.037 846 995 correct
13" uc (032) MP - MC ~~1.982147000~~ ~~2.130476415~~ (~~-3~~) 4.615925059(-2)
(033) PRO 2 2.130476415
correct 2.130676415
Relays 6-2 in 033 failed special speed test
In relay " 11,000 test.
Relays changed
1100 Started Cosine Tape (Sine check)
1525 Started Mult + Adder Test.
1545 Relay #70 Panel F
(moth) in relay.
First actual case of bug being found.
1630 Antangent started.
1700 closed down.

Relay 2145
Relay 337

Source : https://education.nationalgeographic.org/resource/worlds-first-computer-bug/

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How to debug our web apps Effectively?

1. **Say Hello to your best friend, Browser Dev Tools**

Ctrl + Shift + I OR Command+Option+I

Blogs and Tips

Are You Still Using Basic CSS? Here Are 7 Tricks to Get Ahead of the Curve

#css

Bored of the same old CSS? Unleash 7 hidden gems to take your designs to the next level!

Dec 27, 2023

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Dec 21, 2023

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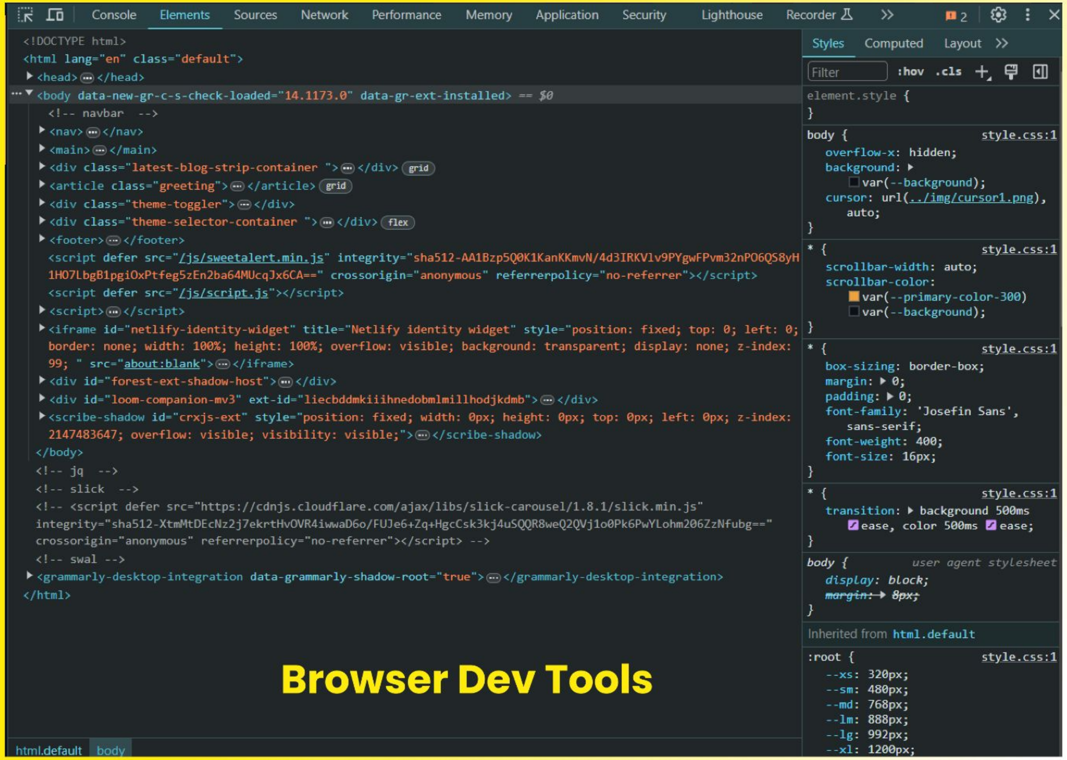

```
<!DOCTYPE html>
<html lang="en" class="default">
  ▶<head>⋯</head>
⋯▼<body data-new-gr-c-s-check-loaded="14.1173.0" data-gr-ext-installed> == $0
    <!-- navbar  -->
   ▶<nav>⋯</nav>
   ▶<main>⋯</main>
   ▶<div class="latest-blog-strip-container ">⋯</div> grid
   ▶<article class="greeting">⋯</article> grid
   ▶<div class="theme-toggler">⋯</div>
   ▶<div class="theme-selector-container ">⋯</div> flex
   ▶<footer>⋯</footer>
    <script defer src="/js/sweetalert.min.js" integrity="sha512-AA1Bzp5Q0K1KanKKmvN/4d3IRKVlv9PYgwFPvm32nPO6QS8yH
    1HO7LbgB1pgiOxPtfeg5zEn2ba64MUcqJx6CA==" crossorigin="anonymous" referrerpolicy="no-referrer"></script>
    <script defer src="/js/script.js"></script>
   ▶<script>⋯</script>
   ▶<iframe id="netlify-identity-widget" title="Netlify identity widget" style="position: fixed; top: 0; left: 0;
    border: none; width: 100%; height: 100%; overflow: visible; background: transparent; display: none; z-index:
    99; " src="about:blank">⋯</iframe>
   ▶<div id="forest-ext-shadow-host">⋯</div>
   ▶<div id="loom-companion-mv3" ext-id="liecbddmkiiihnedobmlmillhodjkdmb">⋯</div>
   ▶<scribe-shadow id="crxjs-ext" style="position: fixed; width: 0px; height: 0px; top: 0px; left: 0px; z-index:
    2147483647; overflow: visible; visibility: visible;">⋯</scribe-shadow>
  </body>
  <!-- jq  -->
  <!-- slick  -->
  <!-- <script defer src="https://cdnjs.cloudflare.com/ajax/libs/slick-carousel/1.8.1/slick.min.js"
  integrity="sha512-XtmMtDEcNz2j7ekrtHvOVR4iwwaD6o/FUJe6+Zq+HgcCsk3kj4uSQQR8weQ2QVj1o0Pk6PwYLohm206ZzNfubg=="
  crossorigin="anonymous" referrerpolicy="no-referrer"></script> -->
  <!-- swal -->
 ▶<grammarly-desktop-integration data-grammarly-shadow-root="true">⋯</grammarly-desktop-integration>
</html>
```

```
element.style {
}
body {                                   style.css:1
  overflow-x: hidden;
  background: ▶
    var(--background);
  cursor: url(../img/cursor1.png),
    auto;
}
* {                                      style.css:1
  scrollbar-width: auto;
  scrollbar-color:
    var(--primary-color-300)
    var(--background);
}
* {                                      style.css:1
  box-sizing: border-box;
  margin: ▶ 0;
  padding: ▶ 0;
  font-family: 'Josefin Sans',
    sans-serif;
  font-weight: 400;
  font-size: 16px;
}
* {                                      style.css:1
  transition: ▶ background 500ms
    ease, color 500ms ease;
}
body {                   user agent stylesheet
  display: block;
  ~~margin: ▶ 8px;~~
}
Inherited from html.default
:root {                                  style.css:1
  --xs: 320px;
  --sm: 480px;
  --md: 768px;
  --lm: 888px;
  --lg: 992px;
  --xl: 1200px;
```

Browser Dev Tools

https://developer.chrome.com/docs/devtools/overview

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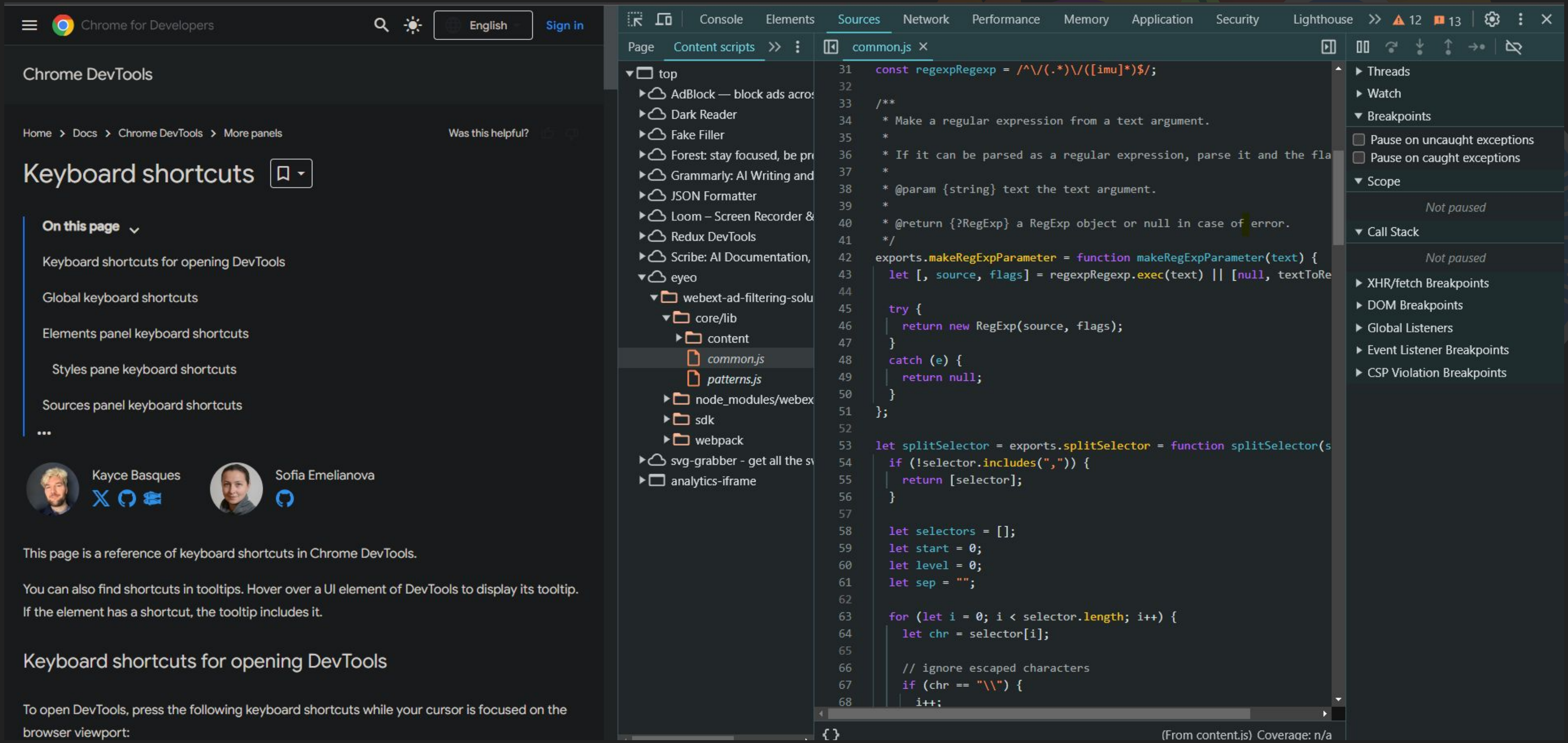
1. **Say Hello to your best friend, Browser Dev Tools**

   - Check Source and generated DOM
   - Inspect Styles and Modify them in real time
   - Check Event Listeners associated to Elements
   - Add Debuggers
   - Check Network Tabs to check resources requests
   - Perform Website Analysis using Lighthouse to check
     - Security | Accessibility | Responsiveness | Speed
   - Check Runtime error logs
   - Perform Mock User Flows
   - Explore all Browser API and and their values with program execution
     - localStorage | cookies | Animations | GeoLocation | Motion Sensors and the list goes on

Sources



Chrome DevTools

Home > Docs > Chrome DevTools > More panels

Was this helpful?

Keyboard shortcuts

On this page

- Keyboard shortcuts for opening DevTools
- Global keyboard shortcuts
- Elements panel keyboard shortcuts
  - Styles pane keyboard shortcuts
- Sources panel keyboard shortcuts
- ...

Kayce Basques

Sofia Emelianova

This page is a reference of keyboard shortcuts in Chrome DevTools.

You can also find shortcuts in tooltips. Hover over a UI element of DevTools to display its tooltip. If the element has a shortcut, the tooltip includes it.

Keyboard shortcuts for opening DevTools

To open DevTools, press the following keyboard shortcuts while your cursor is focused on the browser viewport:

```
const regexpRegexp = /^\/(.*)\/([imu]*)$/;

/**
 * Make a regular expression from a text argument.
 *
 * If it can be parsed as a regular expression, parse it and the fla
 *
 * @param {string} text the text argument.
 *
 * @return {?RegExp} a RegExp object or null in case of error.
 */
exports.makeRegExpParameter = function makeRegExpParameter(text) {
  let [, source, flags] = regexpRegexp.exec(text) || [null, textToRe

  try {
    return new RegExp(source, flags);
  }
  catch (e) {
    return null;
  }
};

let splitSelector = exports.splitSelector = function splitSelector(s
  if (!selector.includes(",")) {
    return [selector];
  }

  let selectors = [];
  let start = 0;
  let level = 0;
  let sep = "";

  for (let i = 0; i < selector.length; i++) {
    let chr = selector[i];

    // ignore escaped characters
    if (chr == "\\") {
      i++;
```

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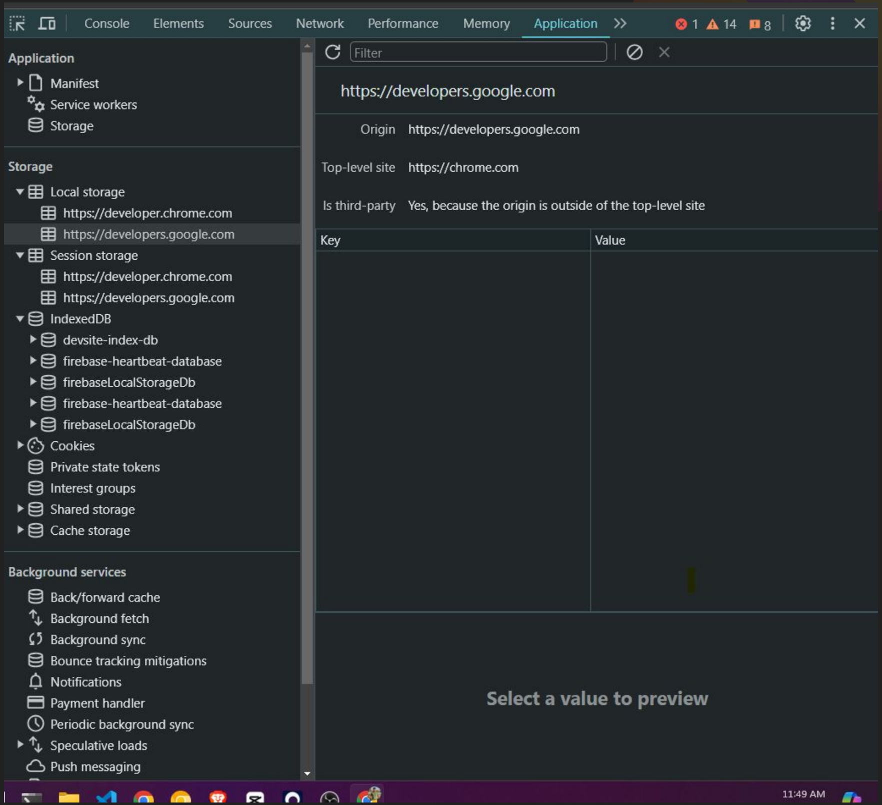
Application



Application
- Manifest
- Service workers
- Storage

Storage
- Local storage
  - https://developer.chrome.com
  - https://developers.google.com
- Session storage
  - https://developer.chrome.com
  - https://developers.google.com
- IndexedDB
  - devsite-index-db
  - firebase-heartbeat-database
  - firebaseLocalStorageDb
  - firebase-heartbeat-database
  - firebaseLocalStorageDb
- Cookies
- Private state tokens
- Interest groups
- Shared storage
- Cache storage

Background services
- Back/forward cache
- Background fetch
- Background sync
- Bounce tracking mitigations
- Notifications
- Payment handler
- Periodic background sync
- Speculative loads
- Push messaging

https://developers.google.com

Origin	https://developers.google.com
Top-level site	https://chrome.com
Is third-party	Yes, because the origin is outside of the top-level site

Key	Value

Select a value to preview

11:49 AM

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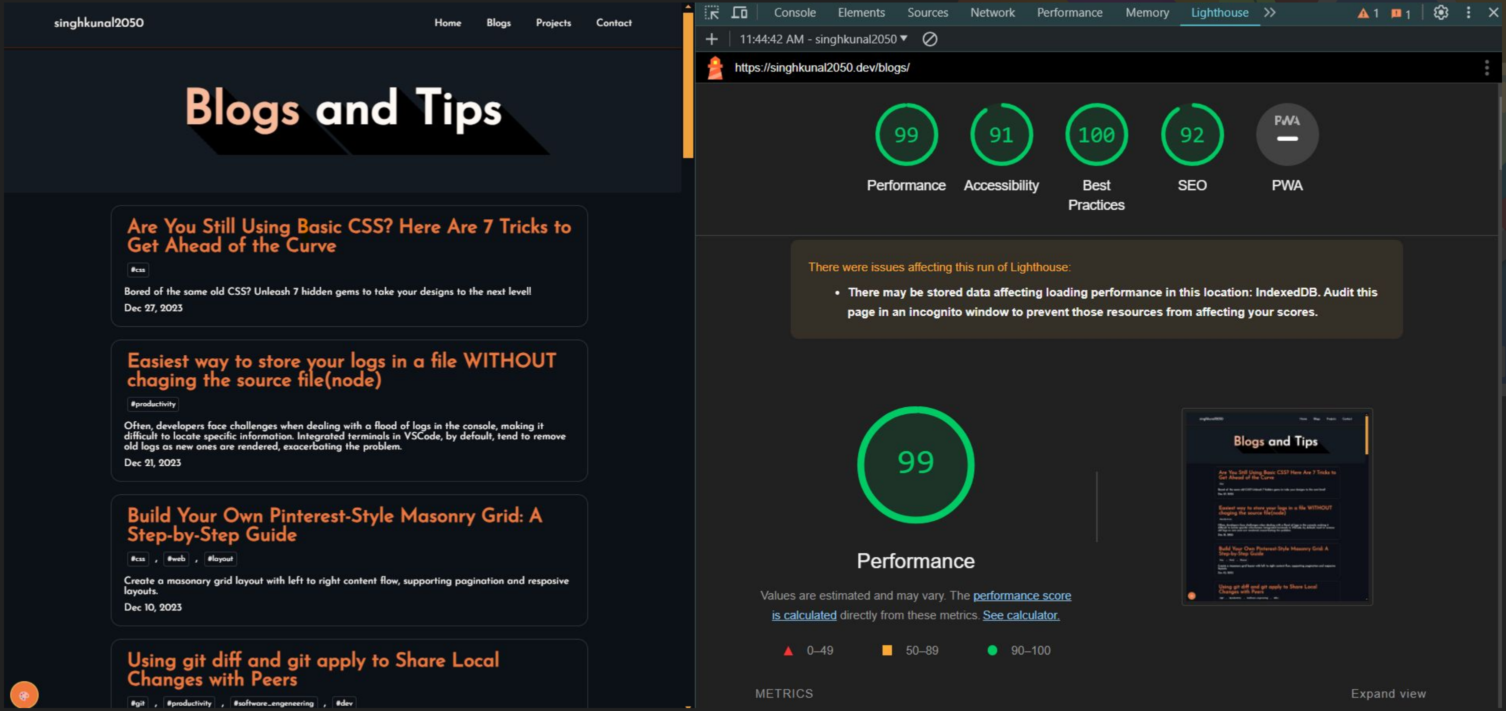
Lighthouse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#git , #productivity , #software_engeneering , #dev

Console Elements Sources Network Performance Memory Lighthouse

11:44:42 AM - singhkunal2050

https://singhkunal2050.dev/blogs/

Performance	Accessibility	Best Practices	SEO	PWA
99	91	100	92	—

There were issues affecting this run of Lighthouse:

- There may be stored data affecting loading performance in this location: IndexedDB. Audit this page in an incognito window to prevent those resources from affecting your scores.

99

Performance

Values are estimated and may vary. The performance score is calculated directly from these metrics. See calculator.

▲ 0–49 ■ 50–89 ● 90–100

METRICS

Expand view

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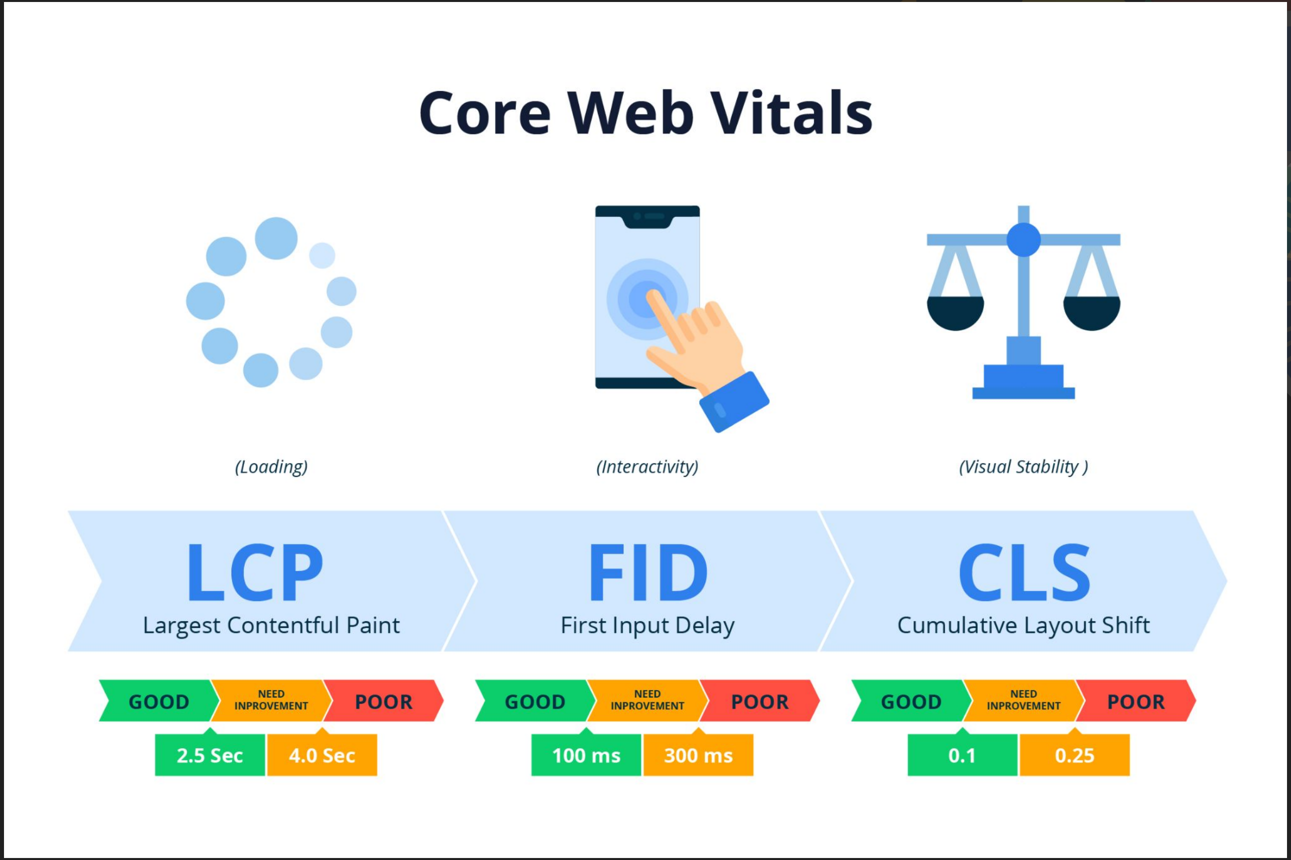
Lighthouse



Core Web Vitals

(Loading)

(Interactivity)

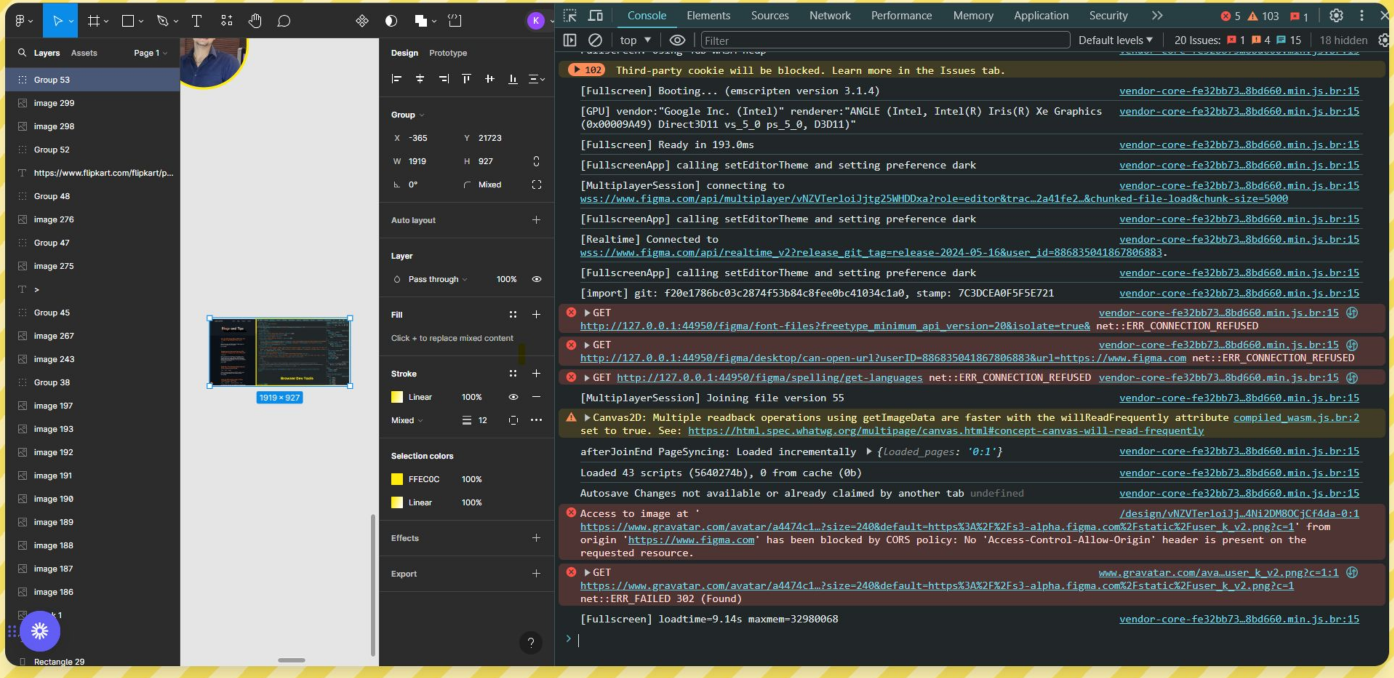
(Visual Stability)

LCP Largest Contentful Paint	FID First Input Delay	CLS Cumulative Layout Shift
GOOD / NEED INPROVEMENT / POOR	GOOD / NEED INPROVEMENT / POOR	GOOD / NEED INPROVEMENT / POOR
2.5 Sec / 4.0 Sec	100 ms / 300 ms	0.1 / 0.25

How to debug our web apps Effectively?

1. Say Hello to your best friend, Browser Dev Tools
2. Effective Logging with console and debuggers

If you work on large scale applications, your console will most likely be bombarded with logs



```
▶ 102  Third-party cookie will be blocked. Learn more in the Issues tab.
[Fullscreen] Booting... (emscripten version 3.1.4)                           vendor-core-fe32bb73…8bd660.min.js.br:15
[GPU] vendor:"Google Inc. (Intel)" renderer:"ANGLE (Intel, Intel(R) Iris(R) Xe Graphics   vendor-core-fe32bb73…8bd660.min.js.br:15
(0x00009A49) Direct3D11 vs_5_0 ps_5_0, D3D11)"
[Fullscreen] Ready in 193.0ms                                                vendor-core-fe32bb73…8bd660.min.js.br:15
[FullscreenApp] calling setEditorTheme and setting preference dark          vendor-core-fe32bb73…8bd660.min.js.br:15
[MultiplayerSession] connecting to                                           vendor-core-fe32bb73…8bd660.min.js.br:15
wss://www.figma.com/api/multiplayer/vNZVTerloiJjtg25WHDDxa?role=editor&trac…2a41fe2…&chunked-file-load&chunk-size=5000
[FullscreenApp] calling setEditorTheme and setting preference dark          vendor-core-fe32bb73…8bd660.min.js.br:15
[Realtime] Connected to                                                      vendor-core-fe32bb73…8bd660.min.js.br:15
wss://www.figma.com/api/realtime_v2?release_git_tag=release-2024-05-16&user_id=886835041867806883.
[FullscreenApp] calling setEditorTheme and setting preference dark          vendor-core-fe32bb73…8bd660.min.js.br:15
[import] git: f20e1786bc03c2874f53b84c8fee0bc41034c1a0, stamp: 7C3DCEA0F5F5E721   vendor-core-fe32bb73…8bd660.min.js.br:15
▶ GET                                                                       vendor-core-fe32bb73…8bd660.min.js.br:15
http://127.0.0.1:44950/figma/font-files?freetype_minimum_api_version=20&isolate=true& net::ERR_CONNECTION_REFUSED
▶ GET                                                                       vendor-core-fe32bb73…8bd660.min.js.br:15
http://127.0.0.1:44950/figma/desktop/can-open-url?userID=886835041867806883&url=https://www.figma.com net::ERR_CONNECTION_REFUSED
▶ GET http://127.0.0.1:44950/figma/spelling/get-languages net::ERR_CONNECTION_REFUSED vendor-core-fe32bb73…8bd660.min.js.br:15
[MultiplayerSession] Joining file version 55                                 vendor-core-fe32bb73…8bd660.min.js.br:15
▶ Canvas2D: Multiple readback operations using getImageData are faster with the willReadFrequently attribute compiled_wasm.js.br:2
set to true. See: https://html.spec.whatwg.org/multipage/canvas.html#concept-canvas-will-read-frequently
afterJoinEnd PageSyncing: Loaded incrementally ▶ {loaded_pages: '0:1'}      vendor-core-fe32bb73…8bd660.min.js.br:15
Loaded 43 scripts (5640274b), 0 from cache (0b)                              vendor-core-fe32bb73…8bd660.min.js.br:15
Autosave Changes not available or already claimed by another tab undefined   vendor-core-fe32bb73…8bd660.min.js.br:15
Access to image at '                                                         /design/vNZVTerloiJj…4Ni2DM8OCjCf4da-0:1
https://www.gravatar.com/avatar/a4474c1…?size=240&default=https%3A%2F%2Fs3-alpha.figma.com%2Fstatic%2Fuser_k_v2.png?c=1' from
origin 'https://www.figma.com' has been blocked by CORS policy: No 'Access-Control-Allow-Origin' header is present on the
requested resource.
▶ GET                                                                       www.gravatar.com/ava…user_k_v2.png?c=1:1
https://www.gravatar.com/avatar/a4474c1…?size=240&default=https%3A%2F%2Fs3-alpha.figma.com%2Fstatic%2Fuser_k_v2.png?c=1
net::ERR_FAILED 302 (Found)
[Fullscreen] loadtime=9.14s maxmem=32980068                                 vendor-core-fe32bb73…8bd660.min.js.br:15
>
```

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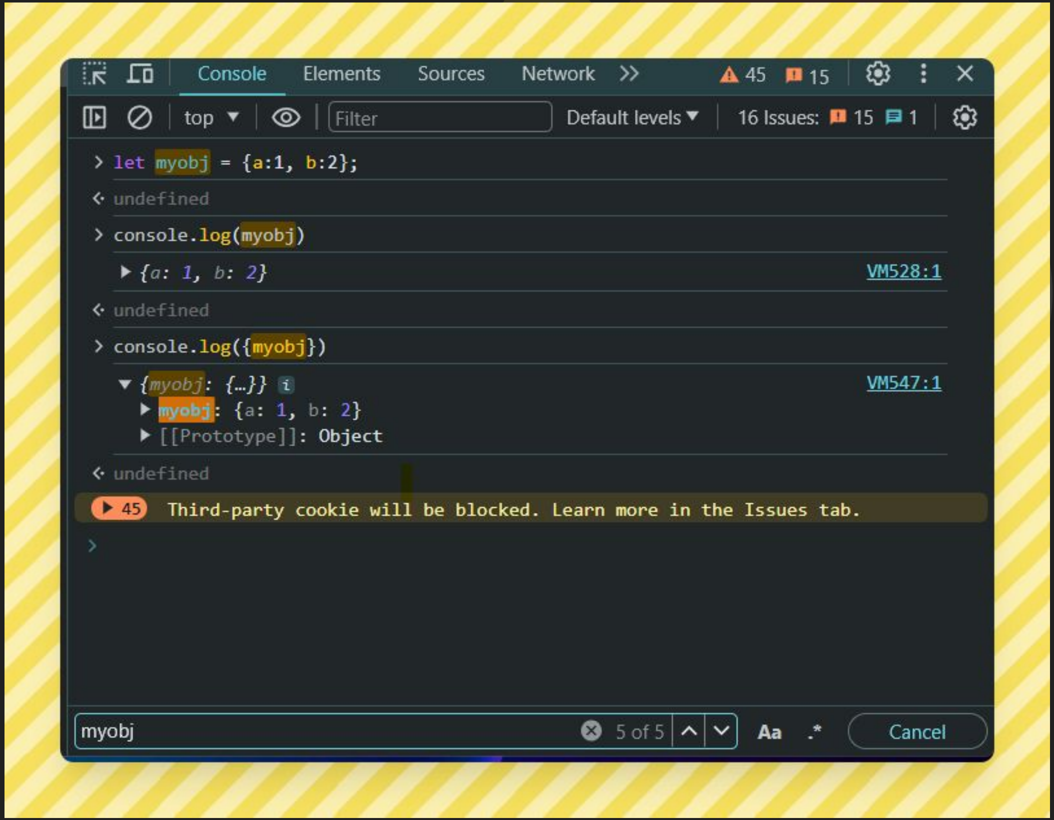
Log With Context

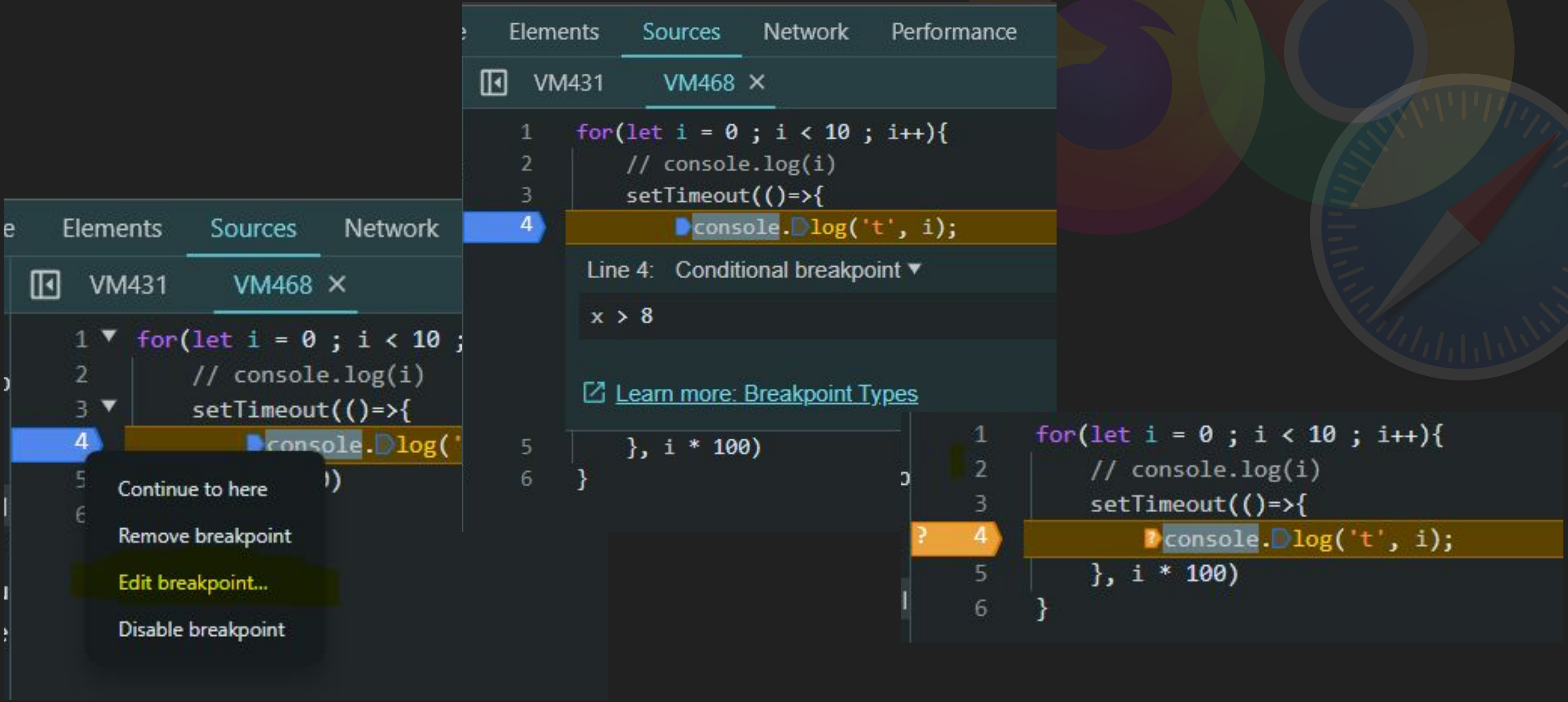
- Can be easily searched
- Gives more context of what is logged



```
> let myobj = {a:1, b:2};
<· undefined
> console.log(myobj)
  ▶ {a: 1, b: 2}                                          VM528:1
<· undefined
> console.log({myobj})
  ▼ {myobj: {…}} i                                        VM547:1
    ▶ myobj: {a: 1, b: 2}
    ▶ [[Prototype]]: Object
<· undefined
▶ 45  Third-party cookie will be blocked. Learn more in the Issues tab.
>
```

Adding print statements everywhere
Using Debugger
yuva krishna memes

Conditional Debuggers



```
for(let i = 0 ; i < 10 ;
    // console.log(i)
    setTimeout(()=>{
        console.log('
```

Elements
Sources
Network
Performance
VM431
VM468 ×
Line 4: Conditional breakpoint ▾
Learn more: Breakpoint Types

```
for(let i = 0 ; i < 10 ; i++){
    // console.log(i)
    setTimeout(()=>{
        console.log('t', i);
```

```
x > 8
```

```
    }, i * 100)
}
```

```
for(let i = 0 ; i < 10 ; i++){
    // console.log(i)
    setTimeout(()=>{
        console.log('t', i);
    }, i * 100)
}
```

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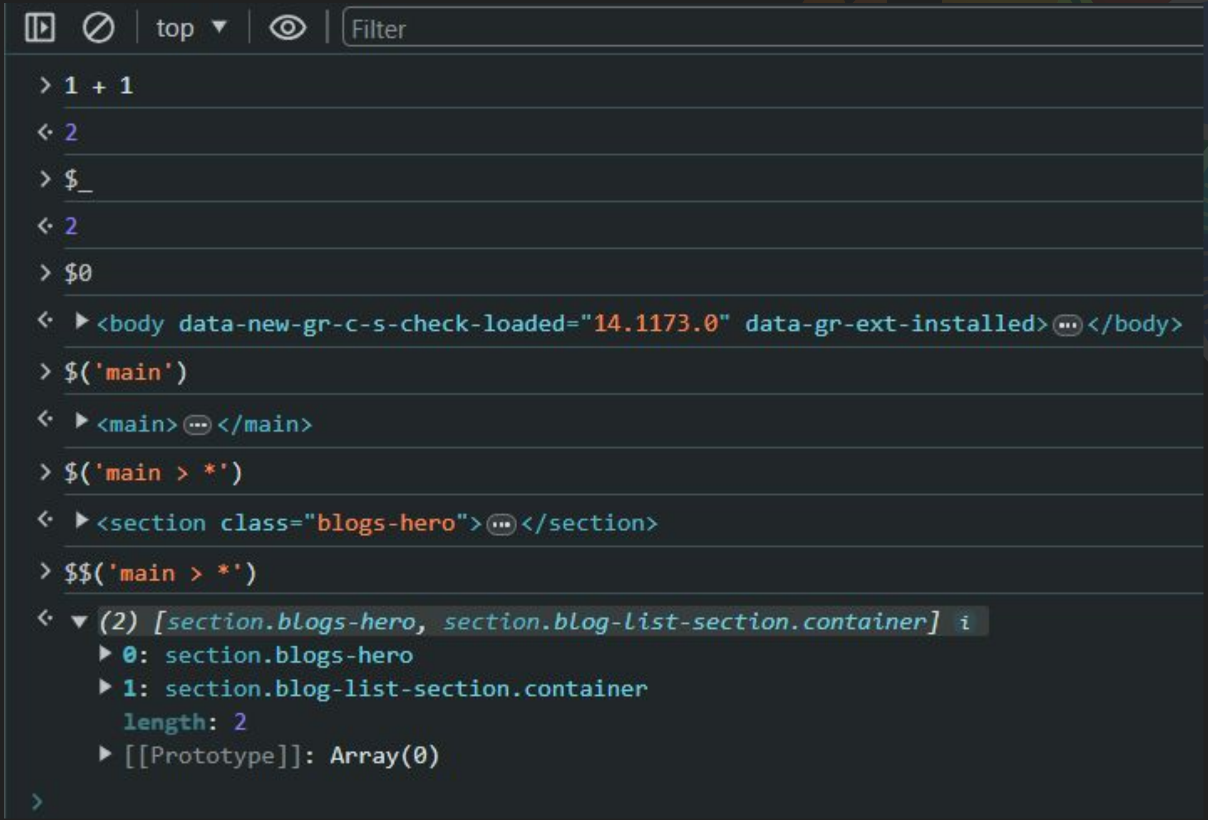
Using Browser Shorthands in Console



```
> 1 + 1
<· 2
> $_
<· 2
> $0
<· ▶ <body data-new-gr-c-s-check-loaded="14.1173.0" data-gr-ext-installed>…</body>
> $('main')
<· ▶ <main>…</main>
> $('main > *')
<· ▶ <section class="blogs-hero">…</section>
> $$('main > *')
<· ▼ (2) [section.blogs-hero, section.blog-list-section.container] i
     ▶ 0: section.blogs-hero
     ▶ 1: section.blog-list-section.container
       length: 2
     ▶ [[Prototype]]: Array(0)
>
```

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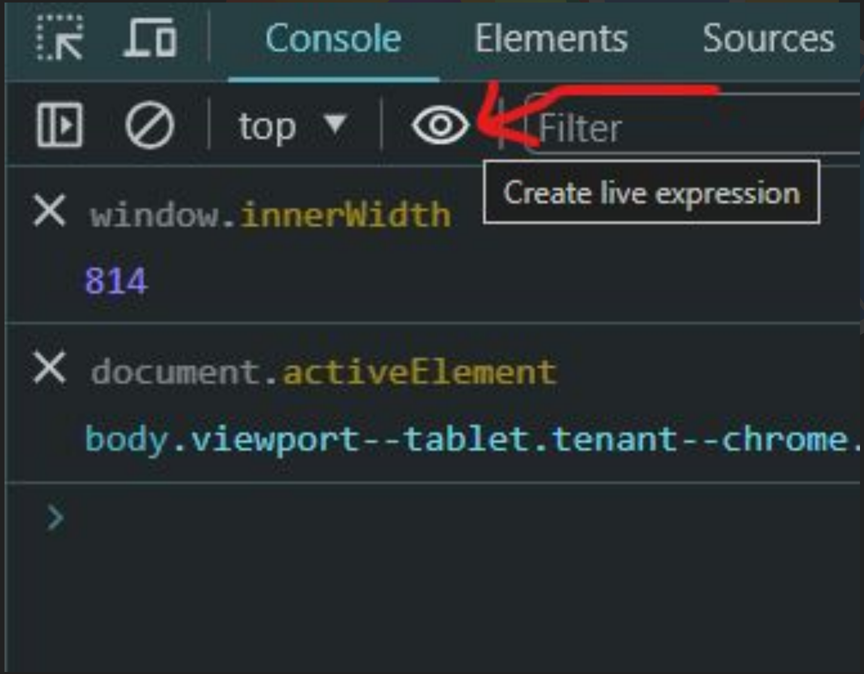
Live Expressions

If you find yourself typing the same JavaScript expression in the Console repeatedly, you might find it easier to create a Live Expression. With Live Expressions, you type an expression once and then pin it to the top of your Console. The value of the expression updates in near real time.



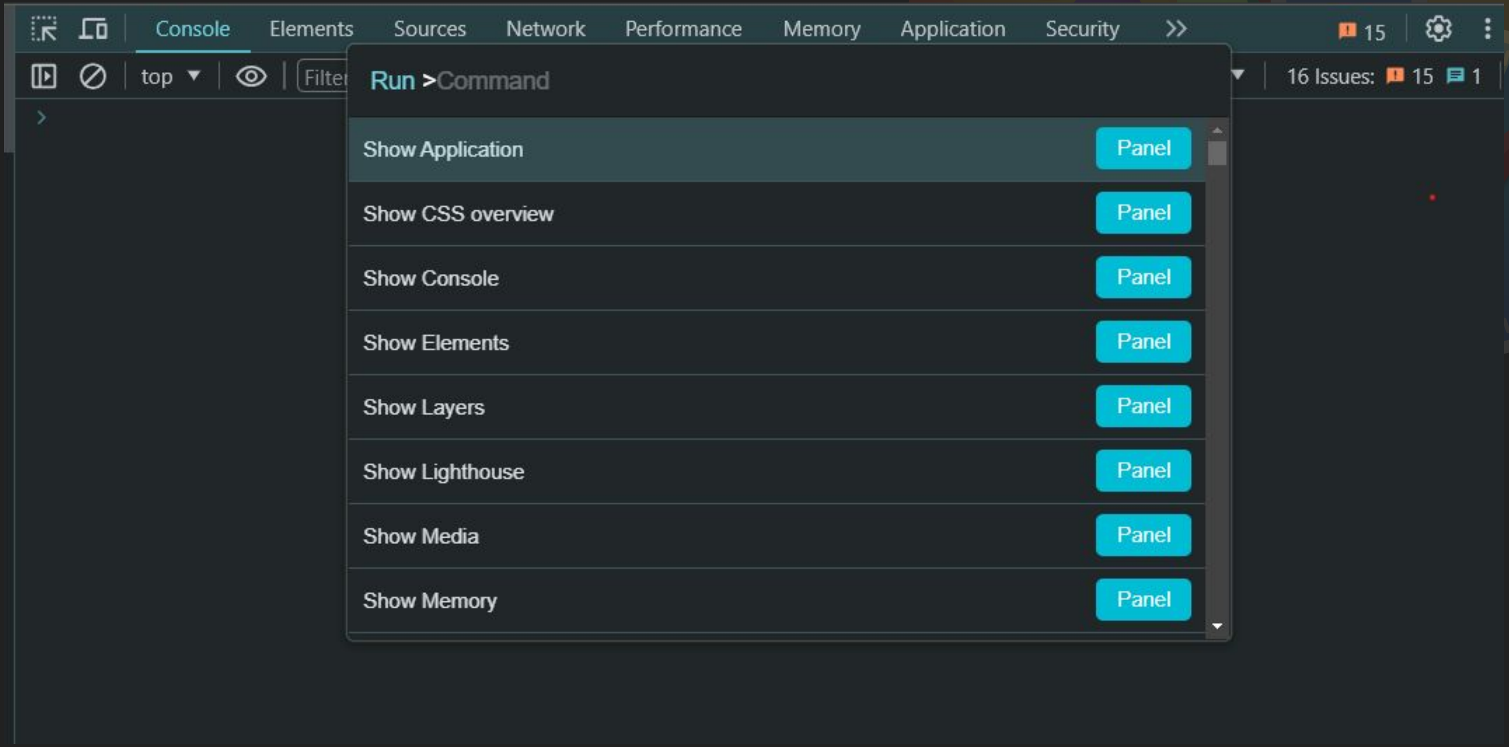
```
window.innerWidth
814
document.activeElement
body.viewport--tablet.tenant--chrome.
```

How to debug our web apps Effectively?

1. Say Hello to your best friend, Browser Dev Tools
2. Effective Logging with console and debuggers
3. Using Browser Command Palette

It can get really overwhelming to have so many tools at your disposal and hence having a command palette gives us an easy way to access most if not all the tools from developer tools

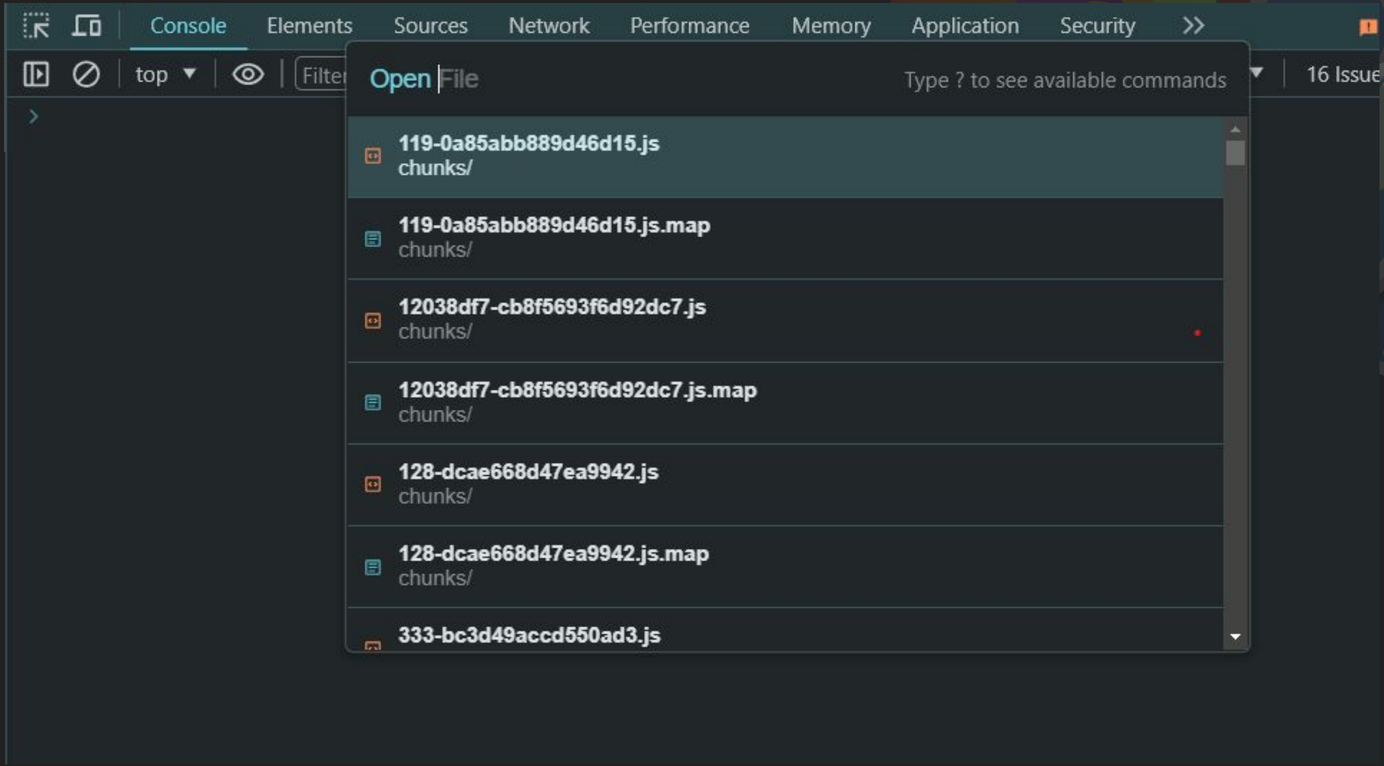
Once your Dev tools is opened Hit Ctrl + Shift + P for Command Pallete



Run >Command

Show Application	Panel
Show CSS overview	Panel
Show Console	Panel
Show Elements	Panel
Show Layers	Panel
Show Lighthouse	Panel
Show Media	Panel
Show Memory	Panel

Ctrl + P for Opening Files from source Bundles



Open File

Type ? to see available commands

119-0a85abb889d46d15.js
chunks/

119-0a85abb889d46d15.js.map
chunks/

12038df7-cb8f5693f6d92dc7.js
chunks/

12038df7-cb8f5693f6d92dc7.js.map
chunks/

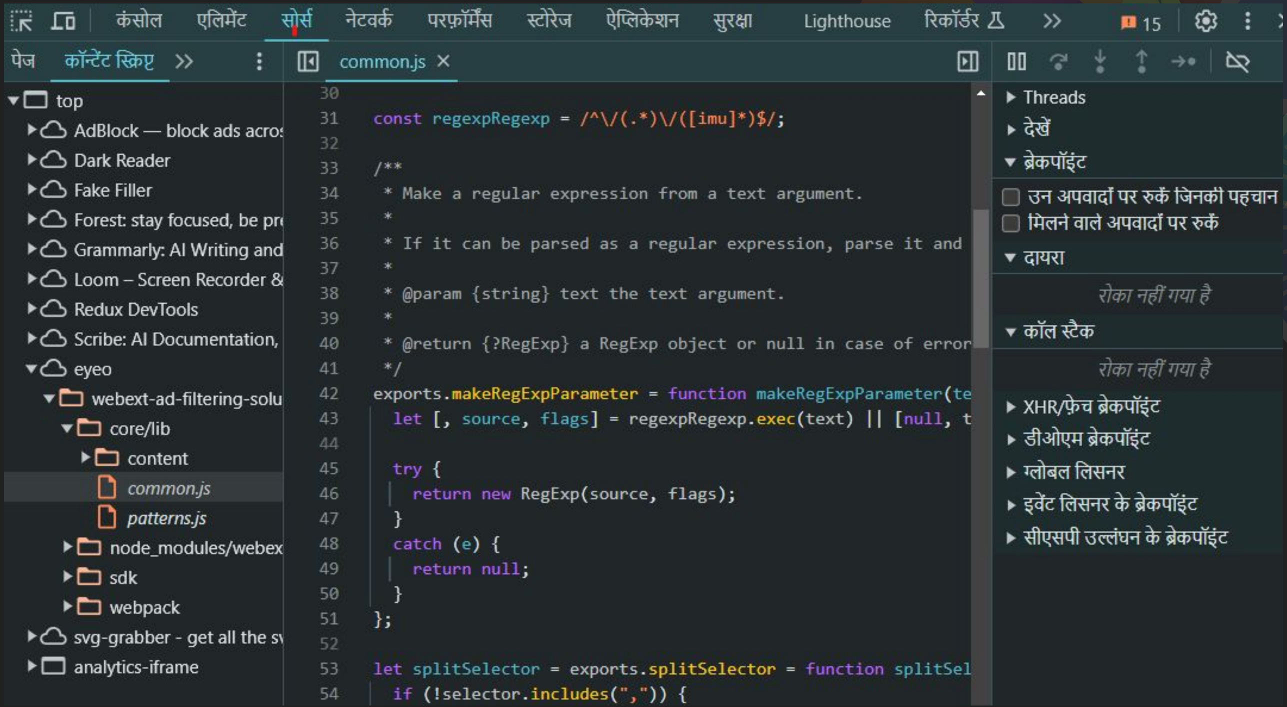
128-dcae668d47ea9942.js
chunks/

128-dcae668d47ea9942.js.map
chunks/

333-bc3d49accd550ad3.js

3. Using Browser Command Palette

- toggle between devtool tabs like (console,elements, networks, sources, lighthouse etc)
- show event listeners of elements
- Change prefers colors scheme to debug theming
- Many More Options
- Fun fact: we can also change the language of Developers tools using Command Palette (even Hindi)



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  try {
    return new RegExp(source, flags);
  }
  catch (e) {
    return null;
  }
};

let splitSelector = exports.splitSelector = function splitSel
  if (!selector.includes(",")) {
```

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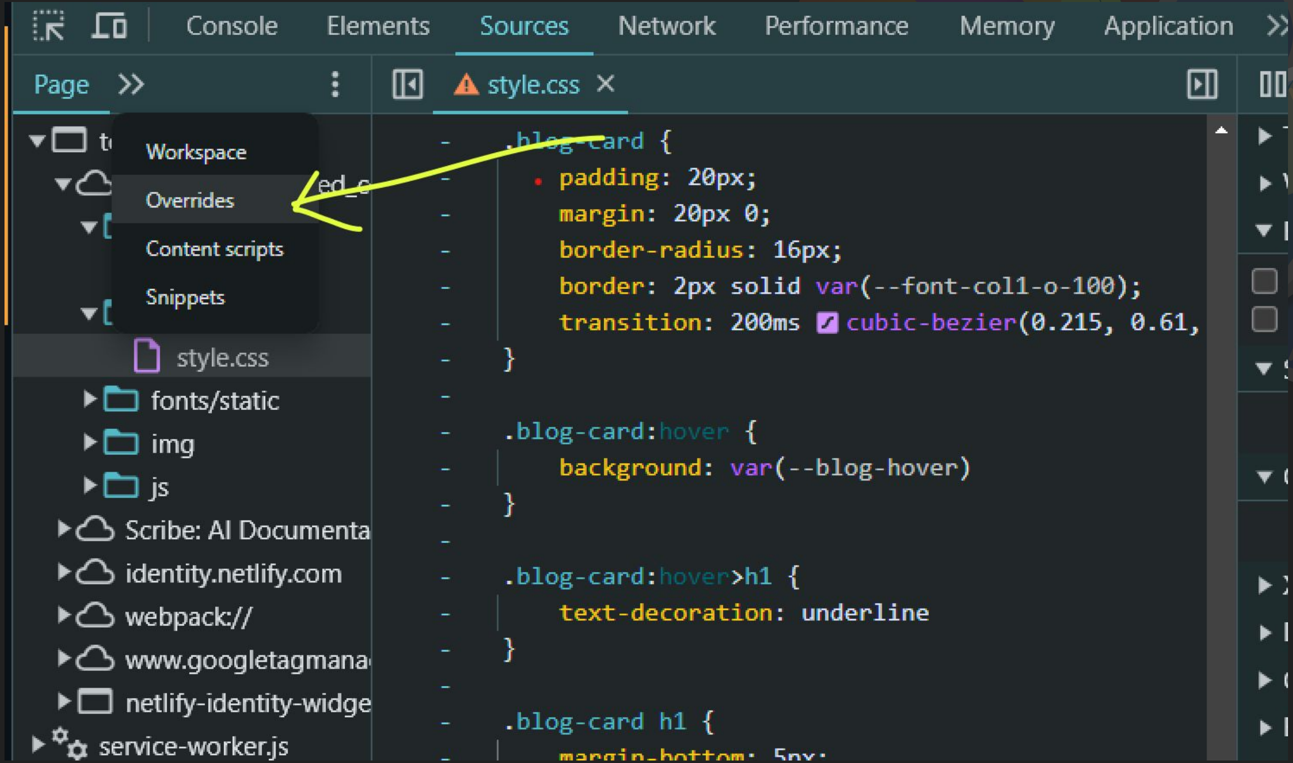
3. Using Browser Command Palette
4. Debugging Production with Browser Overrides

Browser Overrides



```
.blog-card {
    padding: 20px;
    margin: 20px 0;
    border-radius: 16px;
    border: 2px solid var(--font-col1-o-100);
    transition: 200ms cubic-bezier(0.215, 0.61,
}

.blog-card:hover {
    background: var(--blog-hover)
}

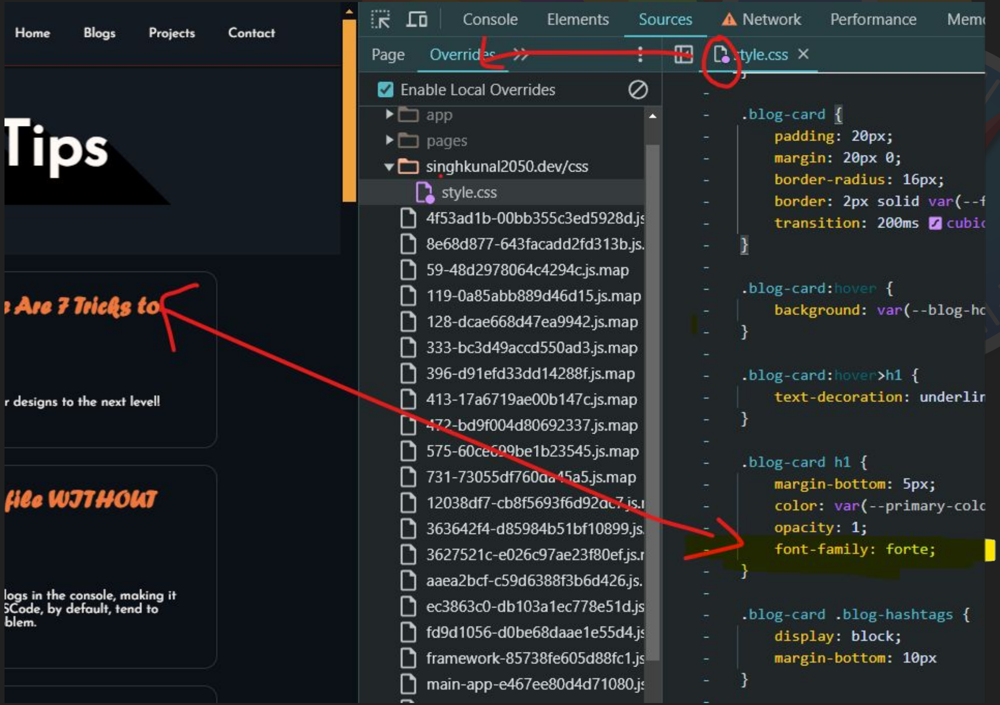
.blog-card:hover>h1 {
    text-decoration: underline
}

.blog-card h1 {
    margin-bottom: 5px;
```

singhkunal2050.dev

Browser Overrides

We can keep changing the source and refresh pages move across page and then use this overridden content to change the source later



Tips

Are 7 Tricks to

designs to the next level!

file WITHOUT

logs in the console, making it
SCode, by default, tend to
blem.

```
app
pages
singhkunal2050.dev/css
    style.css
4f53ad1b-00bb355c3ed5928d.js
8e68d877-643facadd2fd313b.js
59-48d2978064c4294c.js.map
119-0a85abb889d46d15.js.map
128-dcae668d47ea9942.js.map
333-bc3d49accd550ad3.js.map
396-d91efd33dd14288f.js.map
413-17a6719ae00b147c.js.map
472-bd9f004d80692337.js.map
575-60ce699be1b23545.js.map
731-73055df760da45a5.js.map
12038df7-cb8f5693f6d92dc7.js.
363642f4-d85984b51bf10899.js
3627521c-e026c97ae23f80ef.js.
aaea2bcf-c59d6388f3b6d426.js.
ec3863c0-db103a1ec778e51d.js
fd9d1056-d0be68daae1e55d4.js
framework-85738fe605d88fc1.js
main-app-e467ee80d4d71080.js
```

```css
.blog-card {
    padding: 20px;
    margin: 20px 0;
    border-radius: 16px;
    border: 2px solid var(--f
    transition: 200ms cubic
}

.blog-card:hover {
    background: var(--blog-ho
}

.blog-card:hover>h1 {
    text-decoration: underlin
}

.blog-card h1 {
    margin-bottom: 5px;
    color: var(--primary-colo
    opacity: 1;
    font-family: forte;
}

.blog-card .blog-hashtags {
    display: block;
    margin-bottom: 10px
}
```

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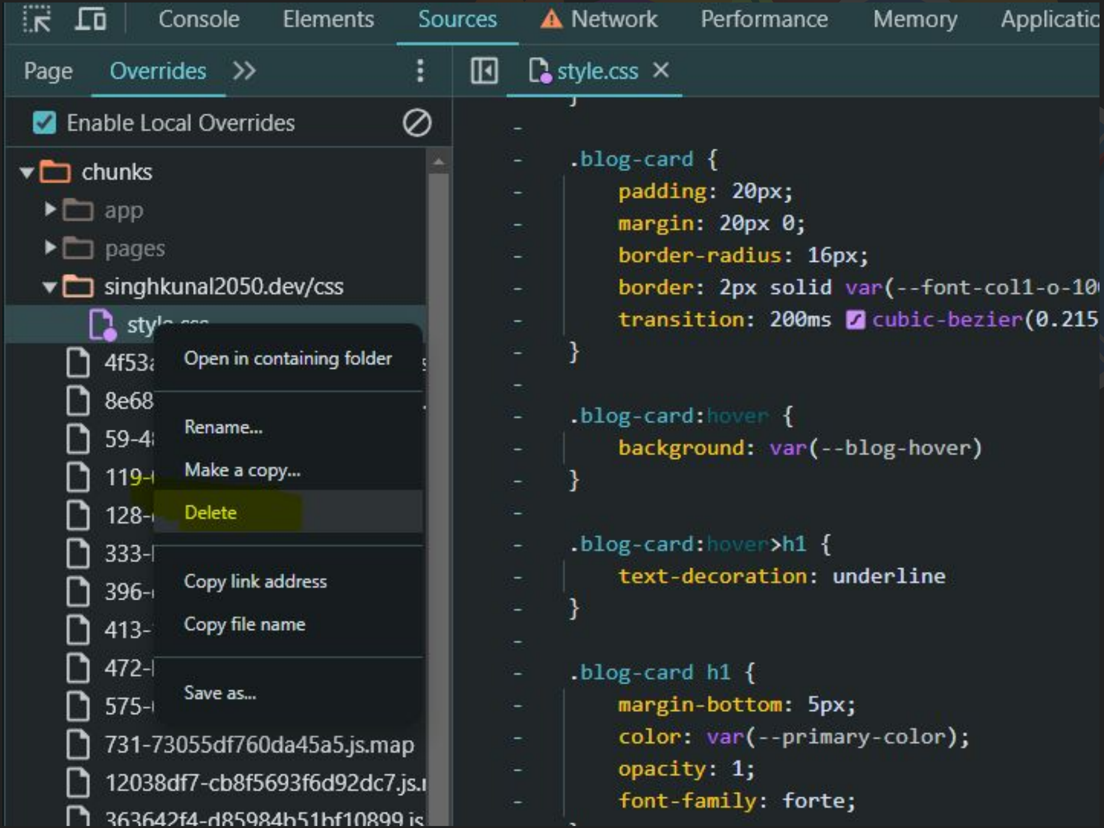
Browser Overrides

To remove override just
Delete the overridden file



```css
.blog-card {
    padding: 20px;
    margin: 20px 0;
    border-radius: 16px;
    border: 2px solid var(--font-col1-o-10
    transition: 200ms cubic-bezier(0.215
}

.blog-card:hover {
    background: var(--blog-hover)
}

.blog-card:hover>h1 {
    text-decoration: underline
}

.blog-card h1 {
    margin-bottom: 5px;
    color: var(--primary-color);
    opacity: 1;
    font-family: forte;
```

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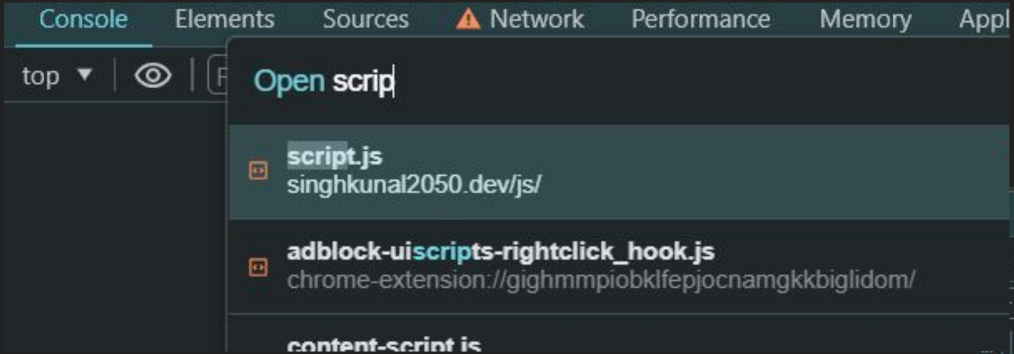
Same applies to javascript files too

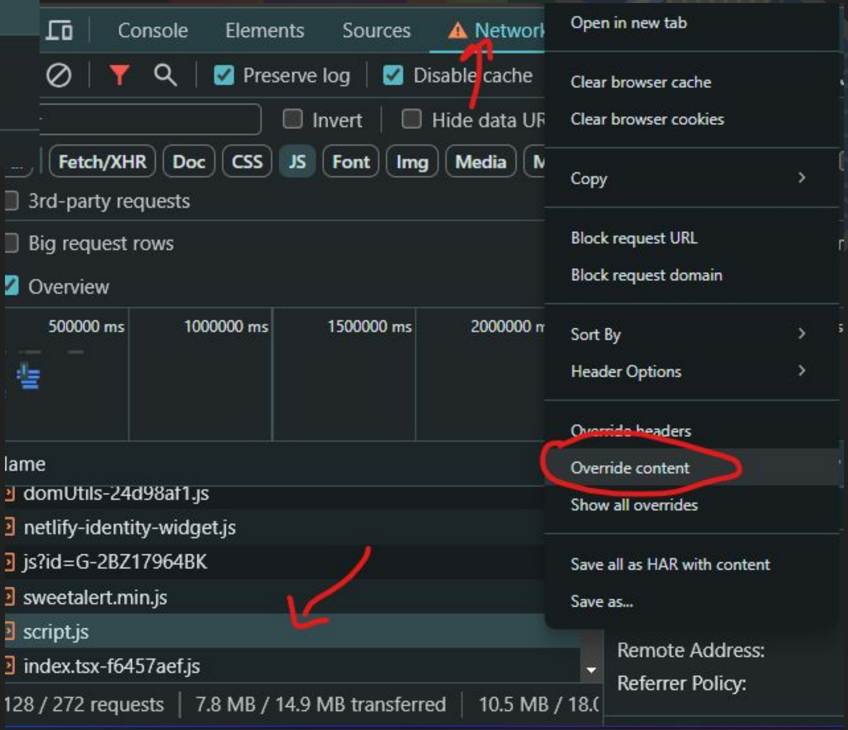


script.js
singhkunal2050.dev/js/

adblock-uiscripts-rightclick_hook.js
chrome-extension://gighmmpiobklfepjocnamgkkbiglidom/

content-script.js

We can override any file that is the part of the source bundle which, We can find these files either by command palette file explorer or the sources tab or even the networks tab



domUtils-24d98af1.js
netlify-identity-widget.js
js?id=G-2BZ17964BK
sweetalert.min.js
script.js
index.tsx-f6457aef.js

128 / 272 requests | 7.8 MB / 14.9 MB transferred | 10.5 MB / 18.

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Any Questions?