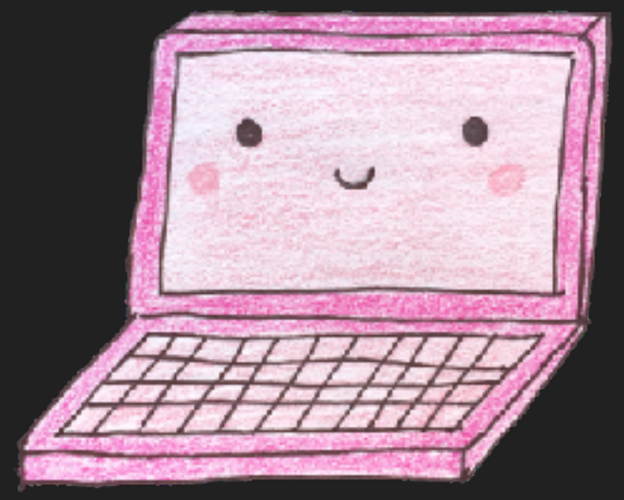
fantastic render performance tricks and why we do them

whee!

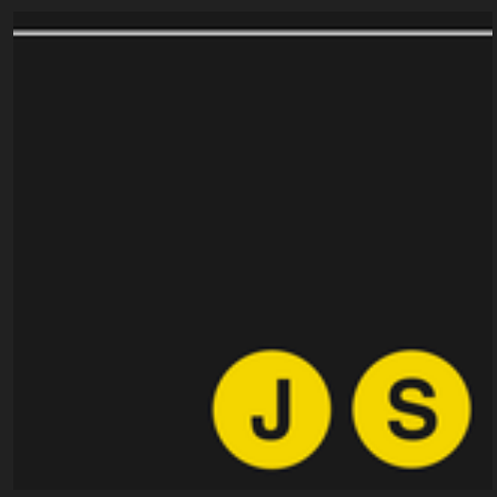


Jenna Zeigen
Slack Full Stack
6/6/19

Senior Frontend Engineer at Slack

Organizer of EmpireJS

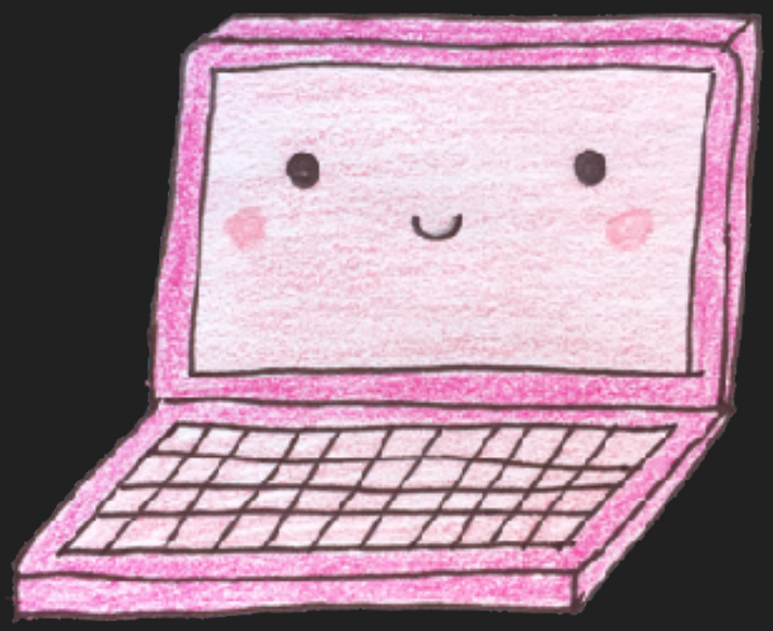
Organizer of BrooklynJS



jenna.is/at-slack-full-stack

@zeigenvector

very online.



[object Object]
@zeigenvector

If you think frontend engineering is lesser or easier, I dare you to delve into the world that is frontend performance optimization.

1:22 AM - 16 May 2018

94 Retweets **408** Likes

loading

+

rendering

loading

(keep things small)

+

rendering

loading

+ (keep things small)
(keep things smart)

rendering

loading

+ (keep things small)
(keep things smart)

rendering

(keep things smooth)

loading

(keep things small)

+

(keep things smart)

rendering

(keep things smooth)

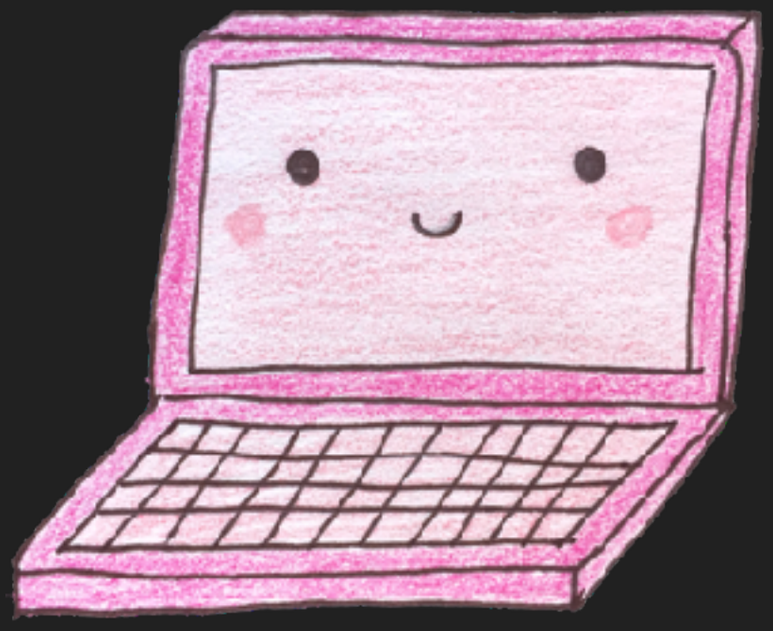
but wait

how do

websites?

how do websites?

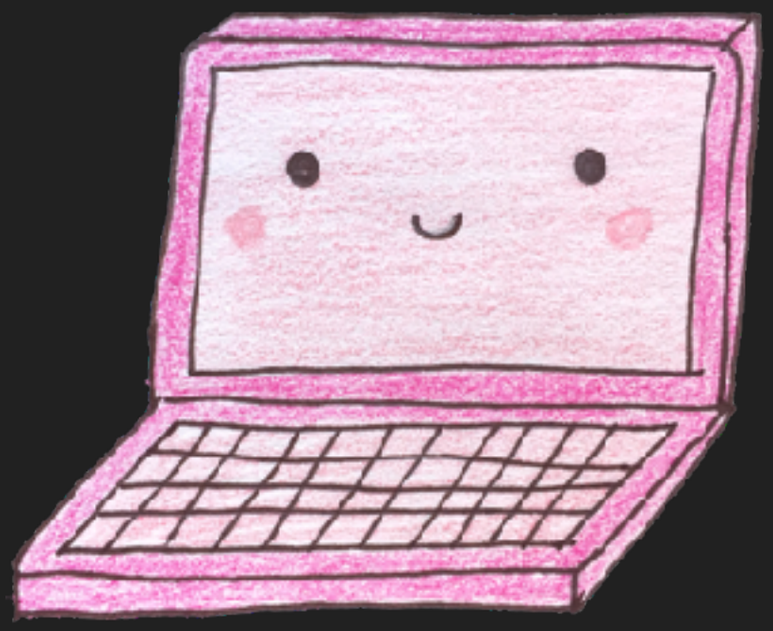
We did everything right,
Bytes are on the client side
♪♪♪



Calvin Harris ft. Ellie Goulding - Outside

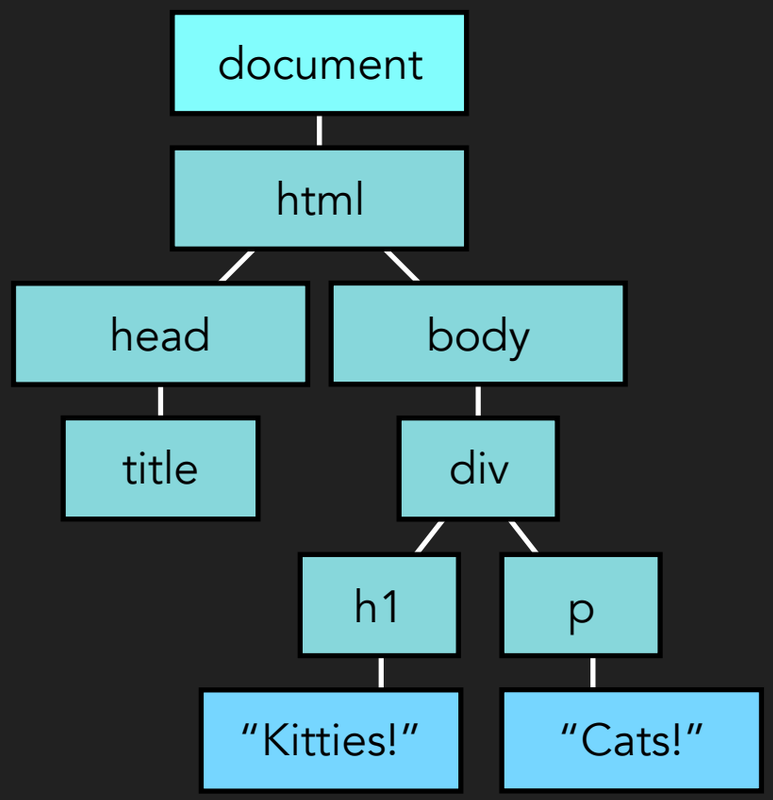
how do websites?

Are you listening?
(Whoa-oh-oh-oh-oh)
Please come back.
(Whoa-oh-oh-oh-oh)
I'll tell you what do I need
I'll tell you what do I need
Whoa-oh, whoa-oh
♪♪♪

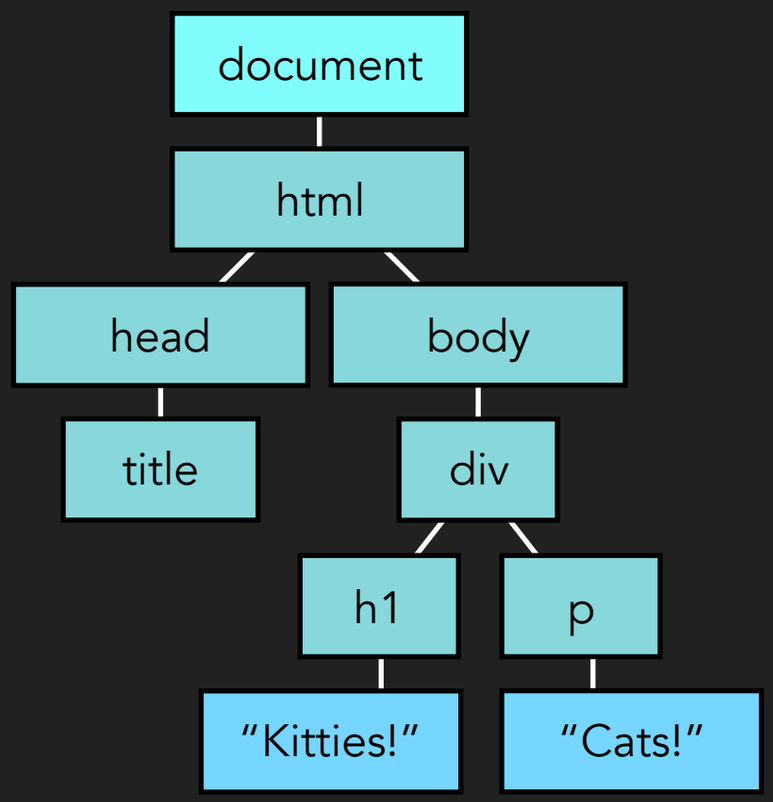


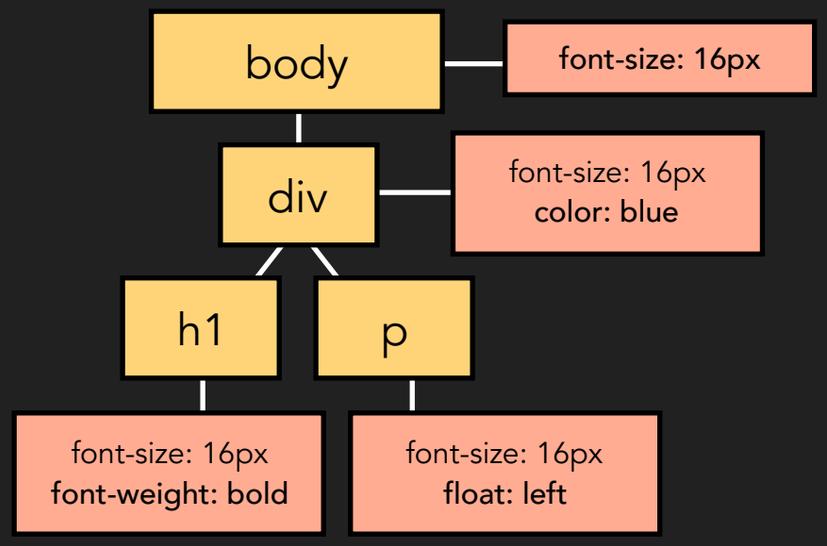
Jimmy Eat World - Sweetness

how do websites?

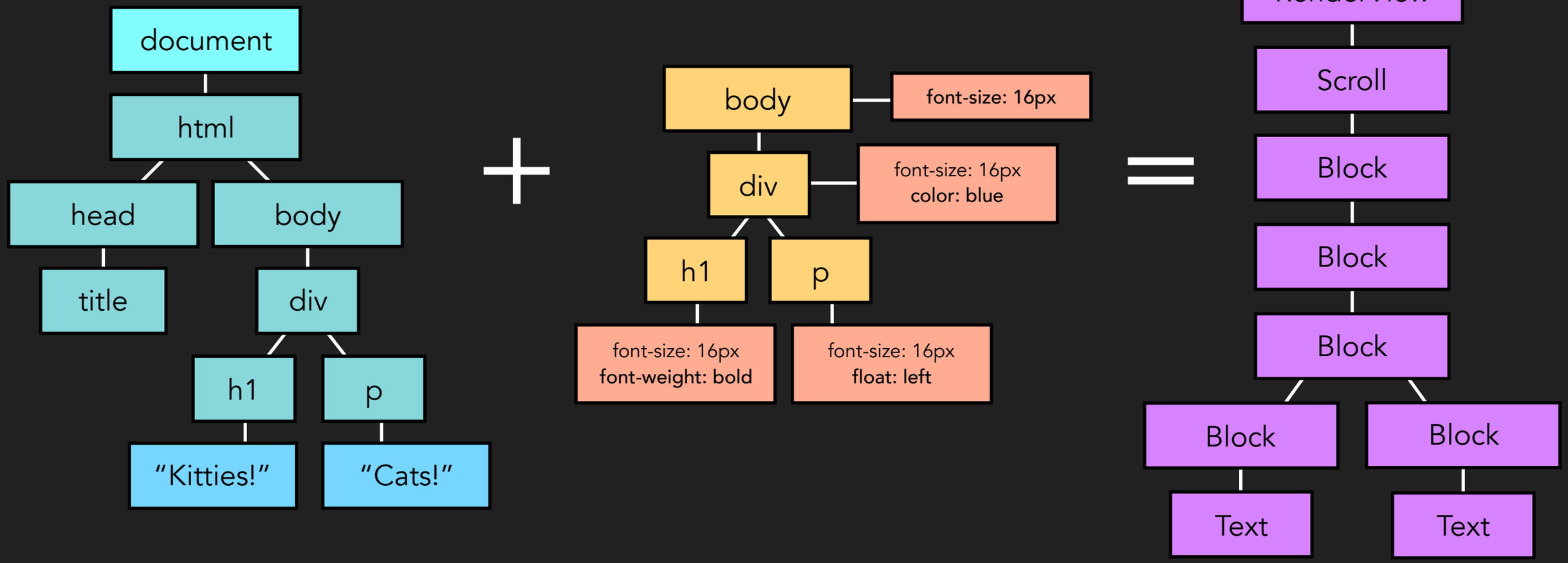


how do websites?



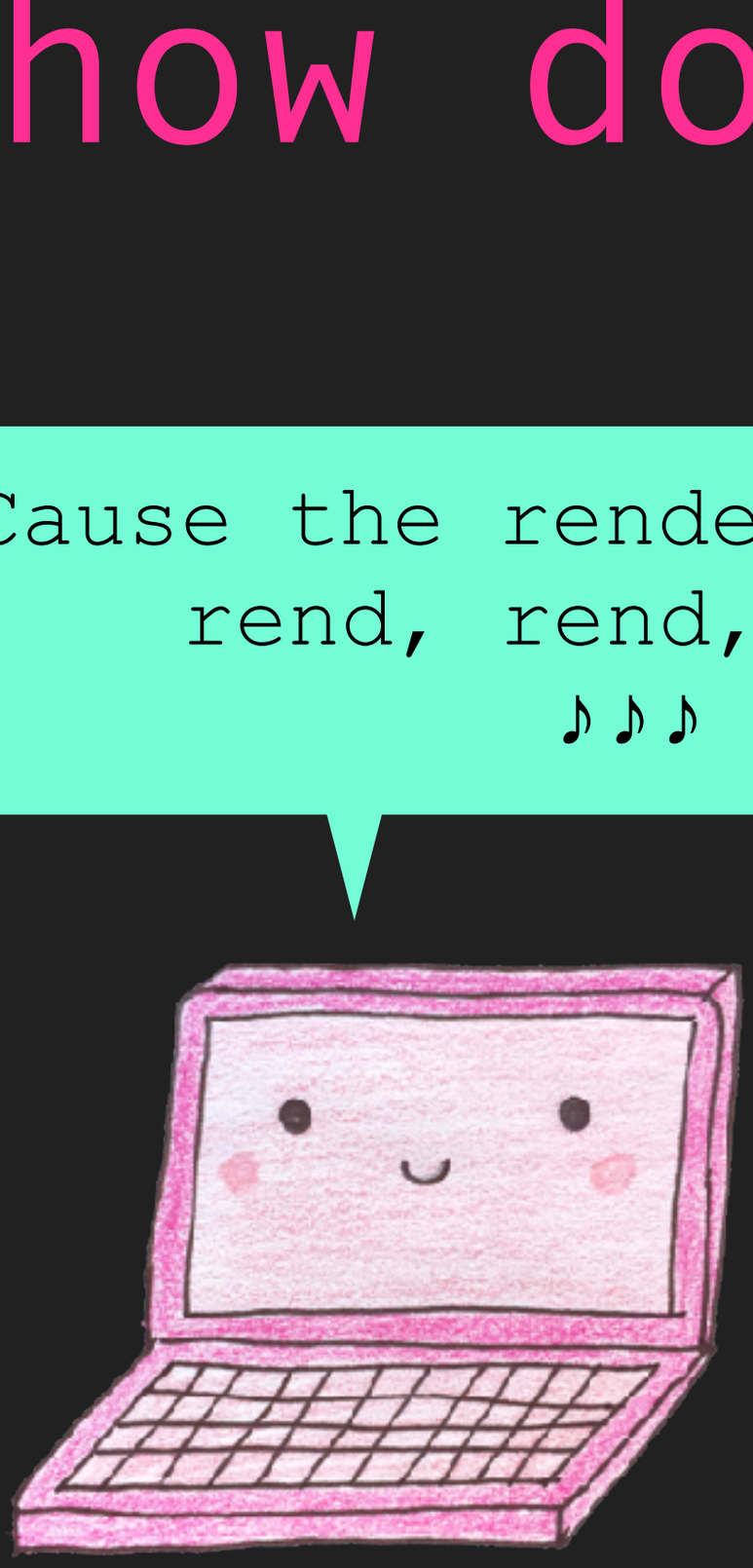


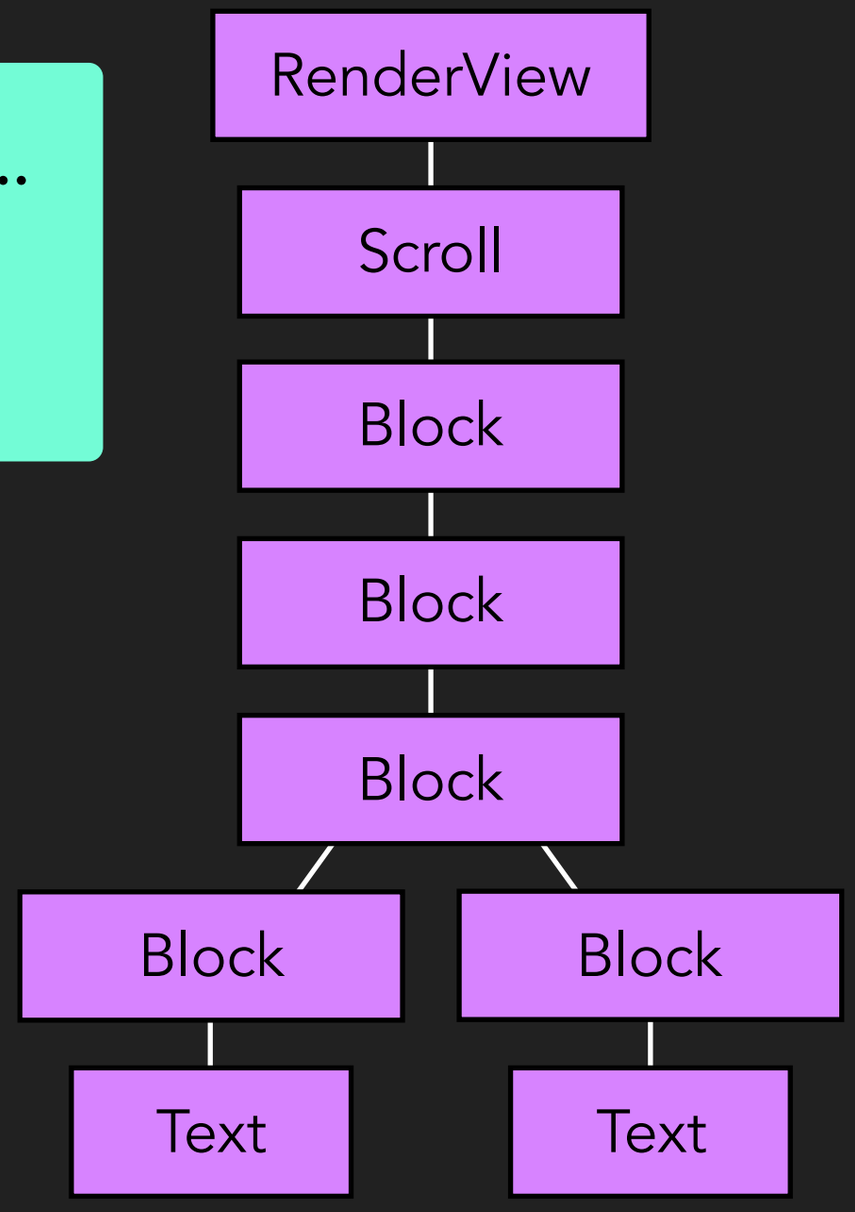
how do websites?



how do websites?

Cause the render's gonna…
rend, rend, rend?
♪♪♪

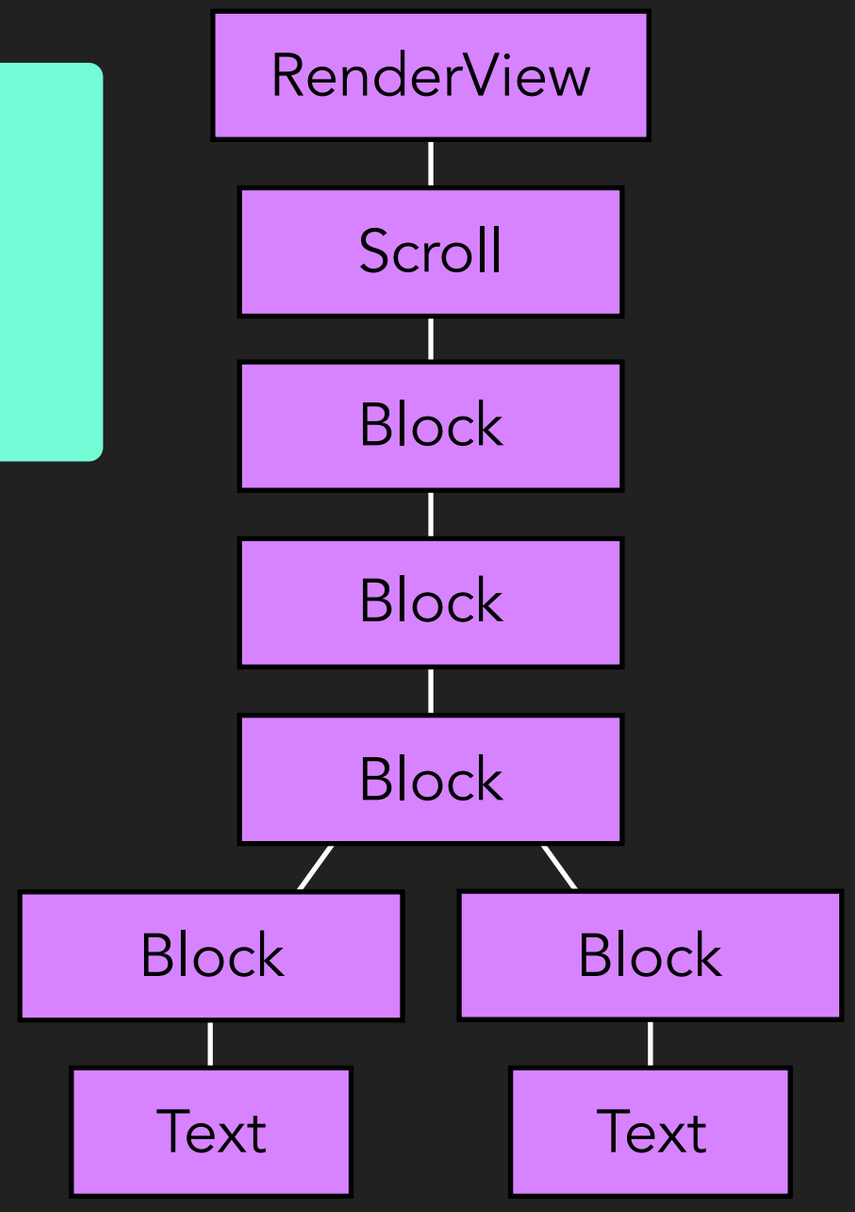




Taylor Swift - Shake it Off

how do websites?

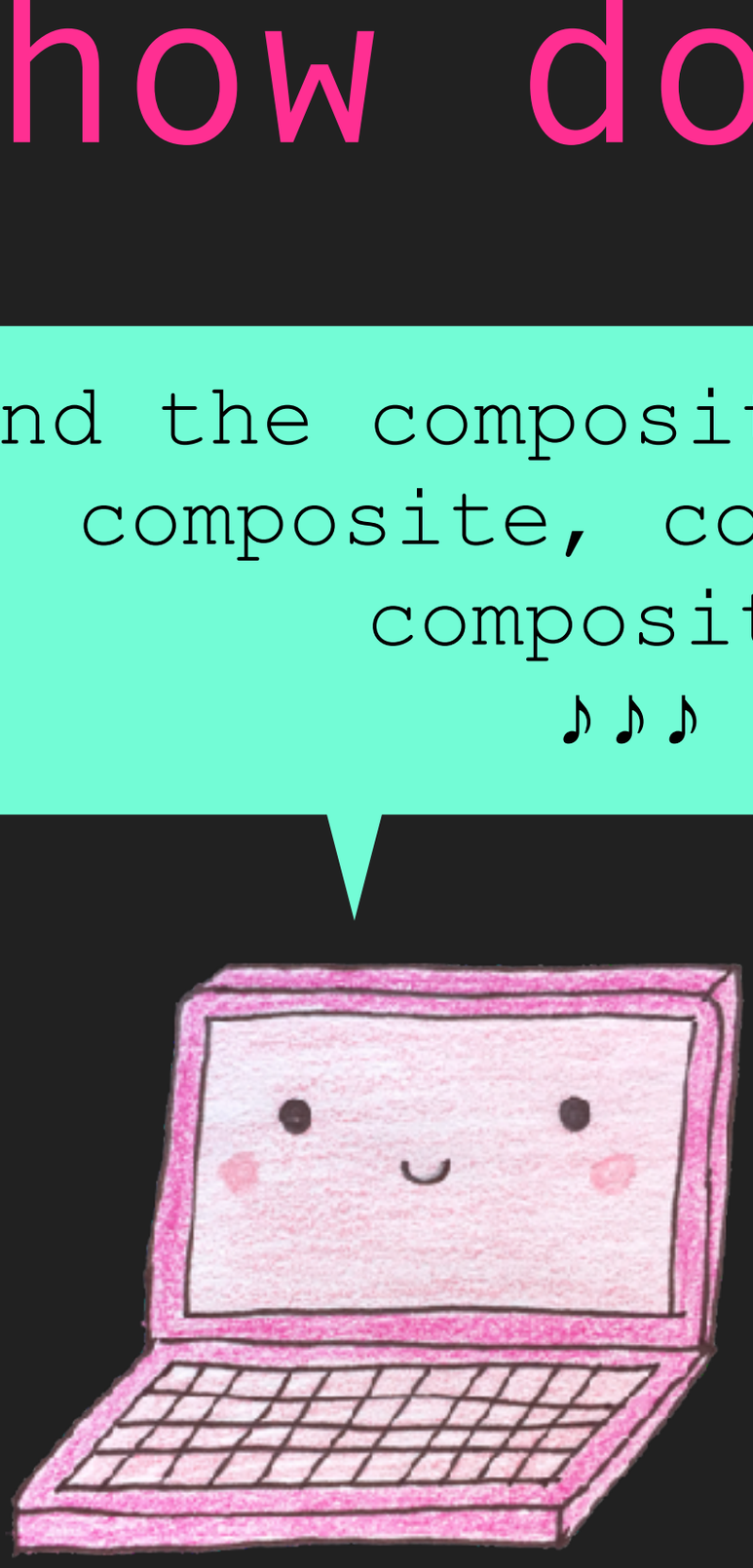
And the painter's gonna paint, paint, paint…
♪♪♪

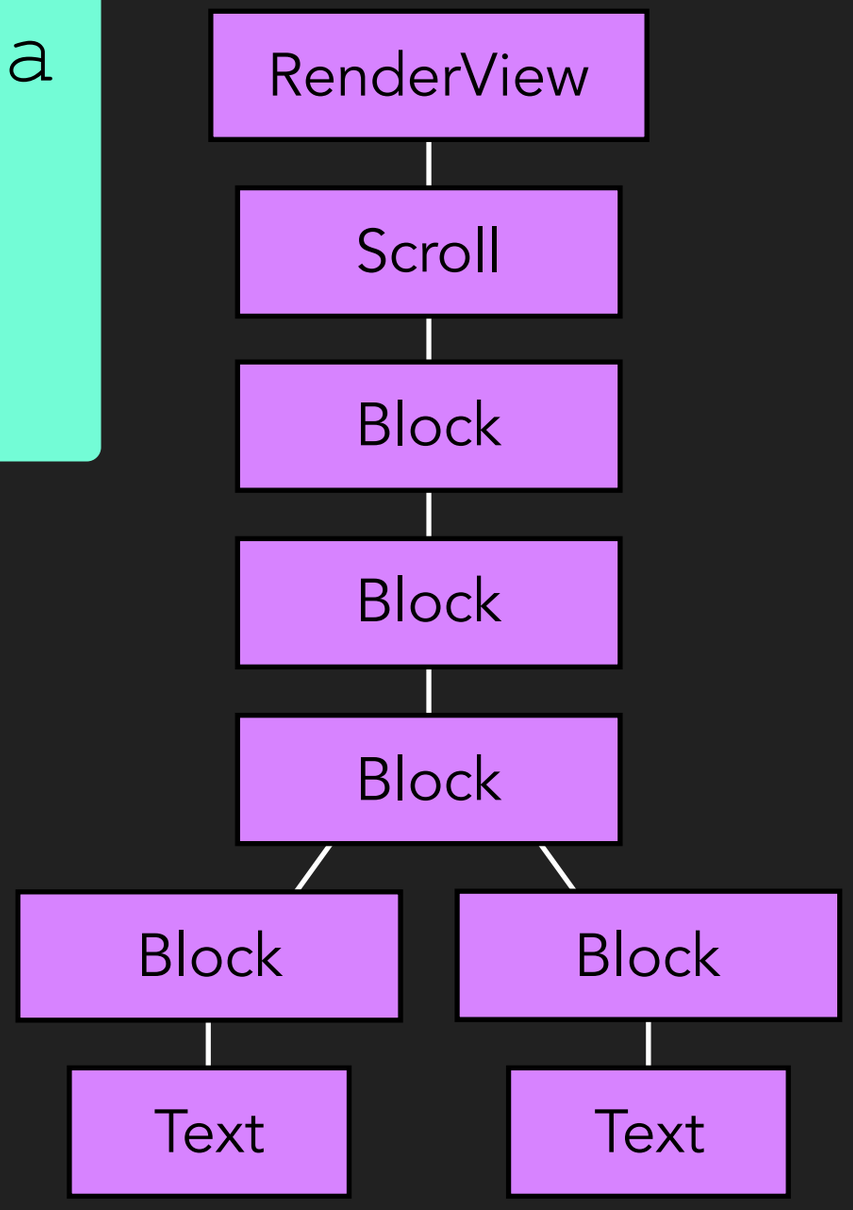


Taylor Swift - Shake it Off

how do websites?

And the compositor's gonna composite, composite, composite…
♪♪♪

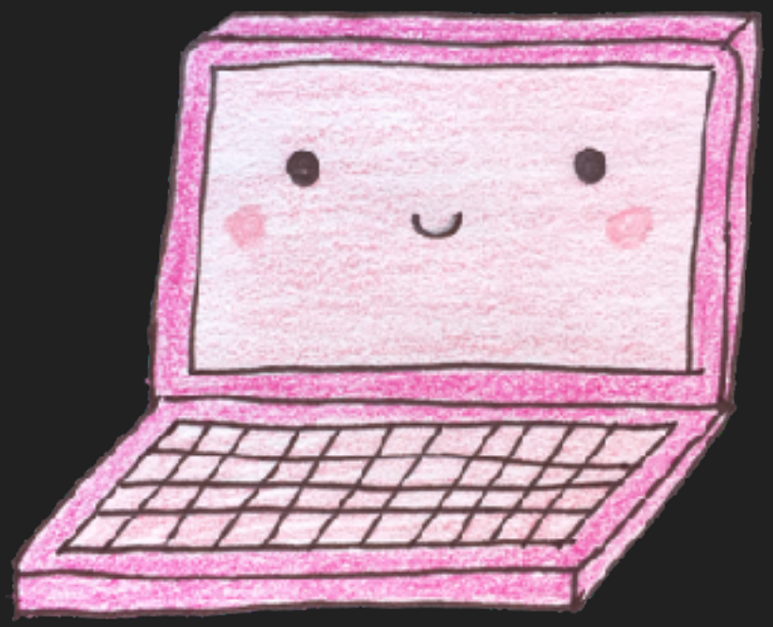




Taylor Swift - Shake it Off

how do websites?

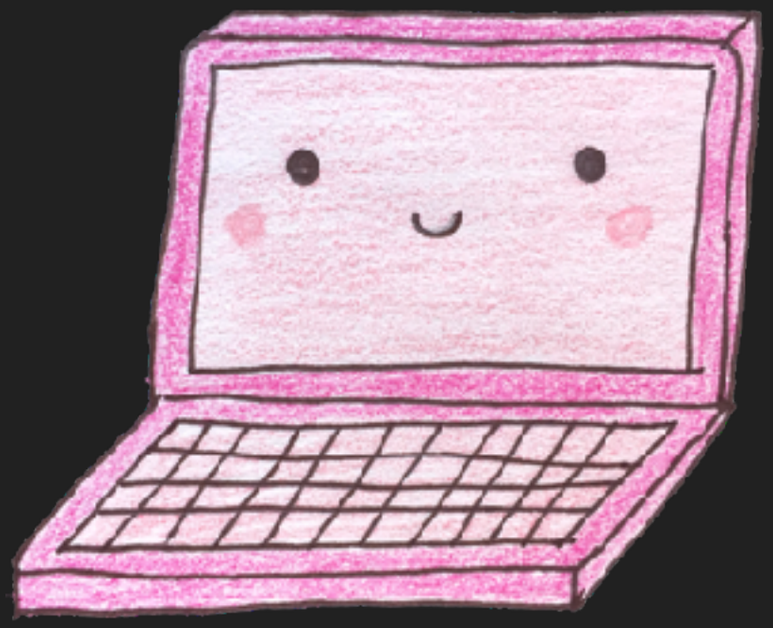
Do it allll agaaaain
♪♪♪



Katy Perry - Last Friday Night (T.G.I.F.)

how do ~~websites~~ brains

Every frame you forsake
Every move you make
Every time you break
Every paint you take
I'll be watching you
♪♪♪



The Police - Every Breath You Take

how do websites?

Layout → Painting → Compositing

this. sick. feat.
♪♪♪

Taylor Swift - Shake it Off

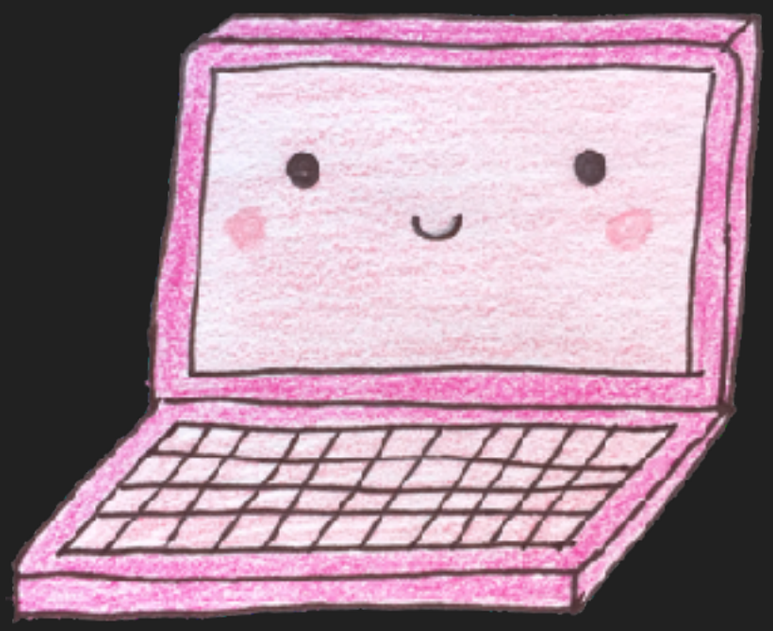
how do websites?

Loop loop ba-doop loop ba-doop
Loop ba-doop ba-doop
Ba-doop loop ba-doop loop
Ba-doop loop ba-doop, ba-doop,
ba-doop
♪♪♪

Salt-N-Pepa - Shoop

how do websites?

Here’s to never ending circles
And building them on top of me
And here's to another no, then
You won’t get a render
You won’t get a render
♪♪♪

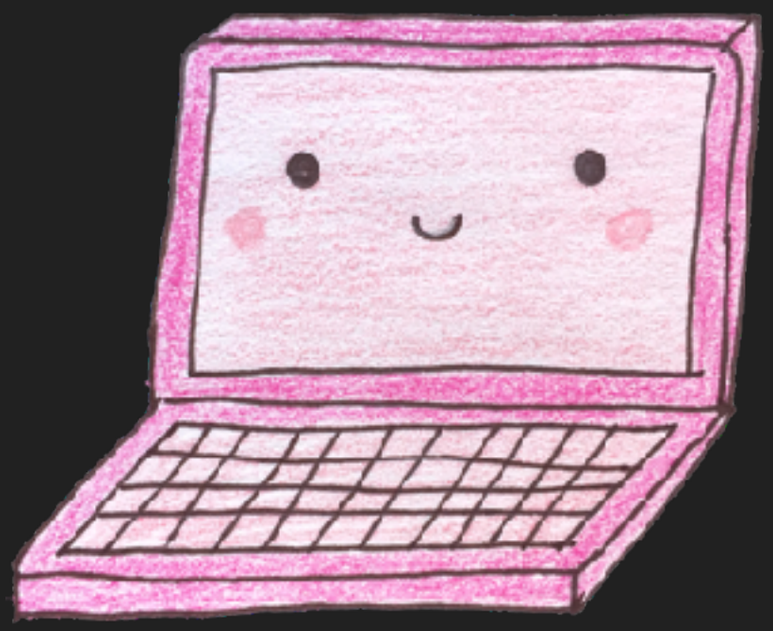


CHVRCHES - Never Ending Circles

keep
things
smooth

keep things smooth

You got the kind of scrollin'
That can be so ~smooth~, yeah
Get rid of jank, make it real
Or else forget about it
♪♪♪

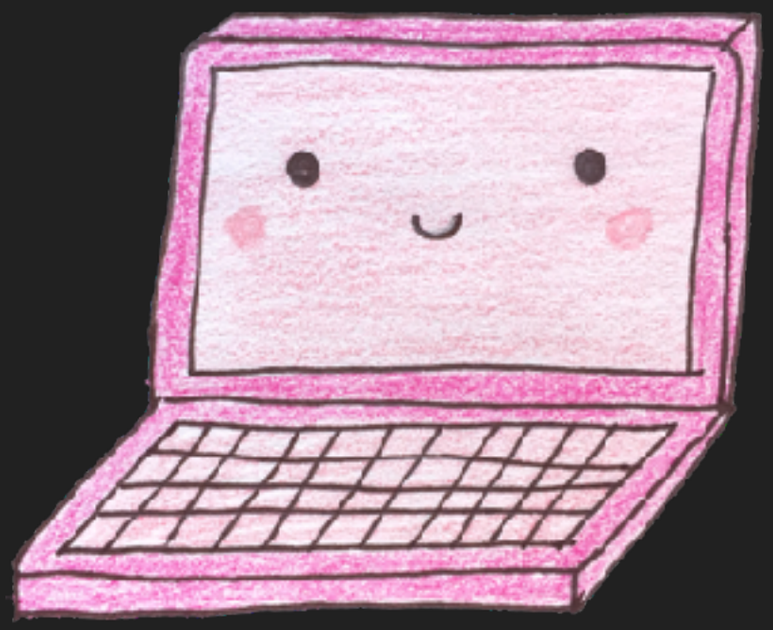


Santana ft. Rob Thomas - Smooth

keep things smooth

debounce or throttle inputs

Debouncing all the calls again
Whoa-oh!
♪♪♪



Sugarcult - Bouncing off the Walls Again
https://css-tricks.com/debouncing-throttling-explained-examples/

keep things smooth

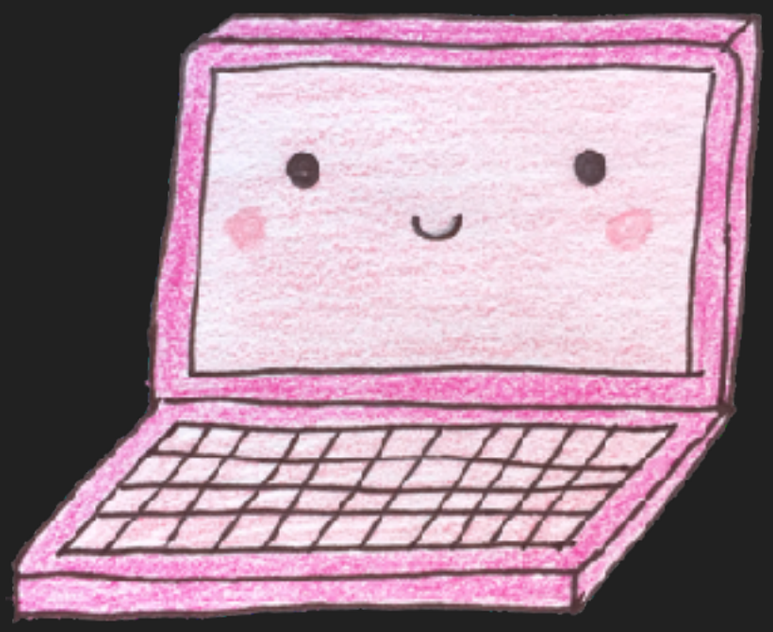
debounce or throttle inputs

```
import { debounce } from 'lodash';


this.onUserInput =
  debounce(this.onUserInput, 50);
```

keep things smooth

use requestAnimationFrame

Baby, I'm not always
There when you call,
But I'm always on time
And I gave you my all,
Now baby, be mine
♪♪♪



Ja Rule ft. Ashanti - On Time

keep things smooth

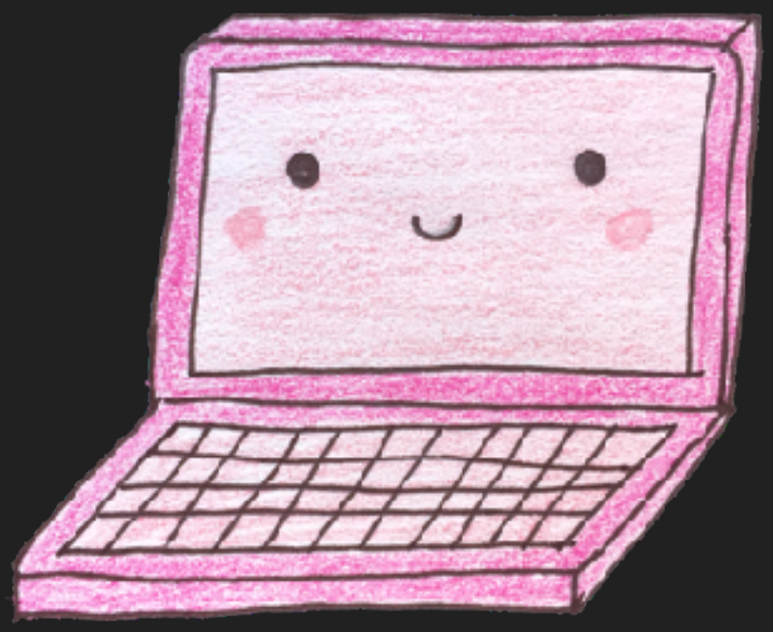
use requestAnimationFrame

```
window.addEventListener('resize', (e) => {
   if (this.bottomSpan < window.innerWidth) {
      window.requestAnimationFrame(
         this.drawTriangles.bind(this)
      );
      this.bottomSpan = window.innerWidth;
   }
});
```

keep things smooth

use web workers

Give it away
Give it away
Give it away
Give it away now
♪♪♪

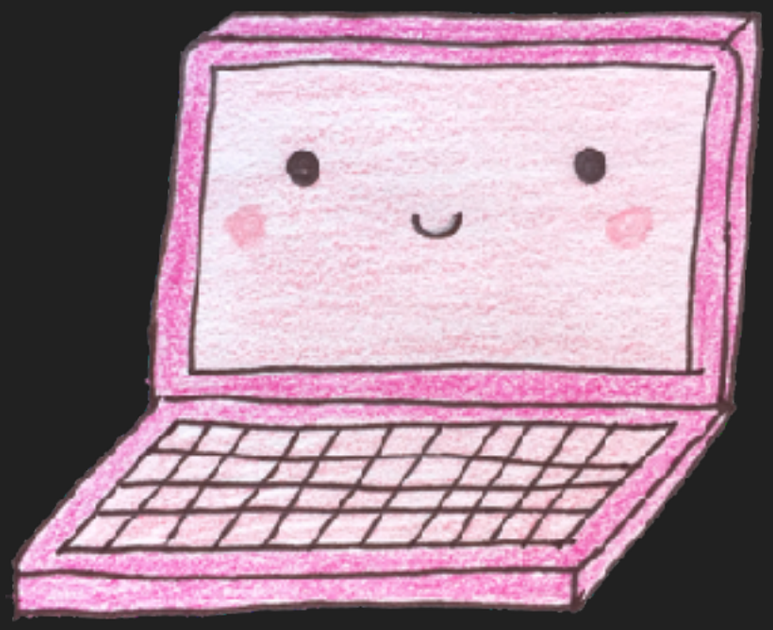


Red Hot Chili Peppers - Give it Away

keep things smooth

use web workers

When what you have
Will take too long
Move along, move along
Like I know you do
♪♪♪



The All-American Rejects - Move Along

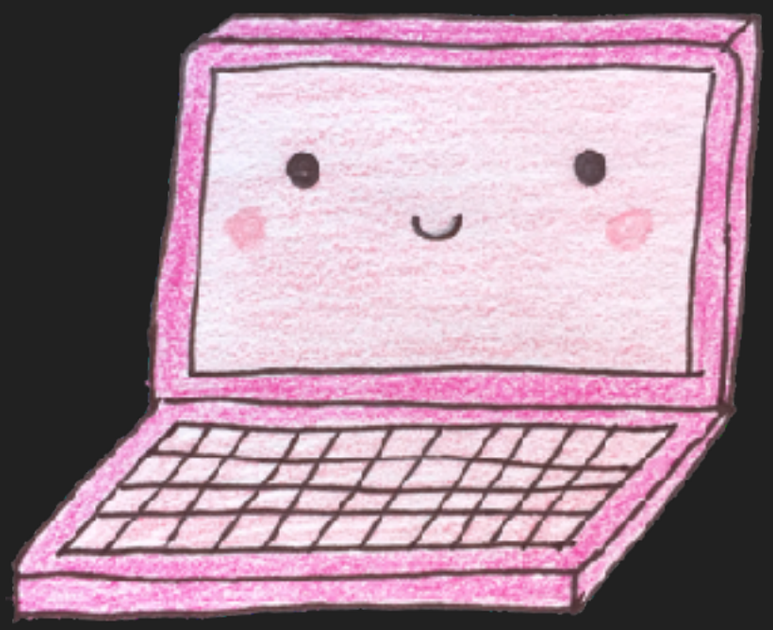
keep things smooth

avoid triggering reflows

Let me style, let me style,
But don't trigger a reflow
With scrollTo(), scrollIntoView()
With offsetHeight() and
offsetLeft()

Let me style, let me style,
But don't force a new layout
With scrollTo(), scrollIntoView()
With getBoundingClientRect()

♪♪♪

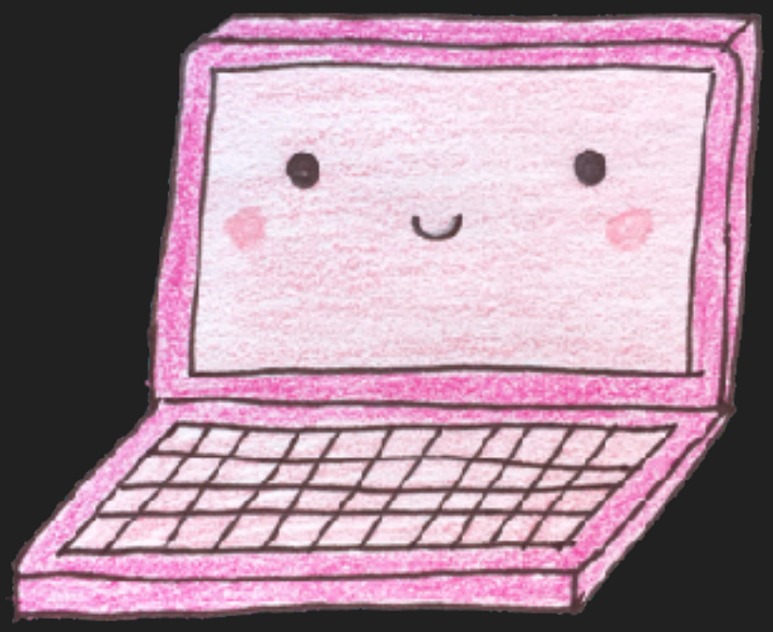


Enya - Orinoco Flow

keep things smooth

avoid triggering reflows

Style away, style away,
style away,
Style away, style away,
style away
♪♪♪

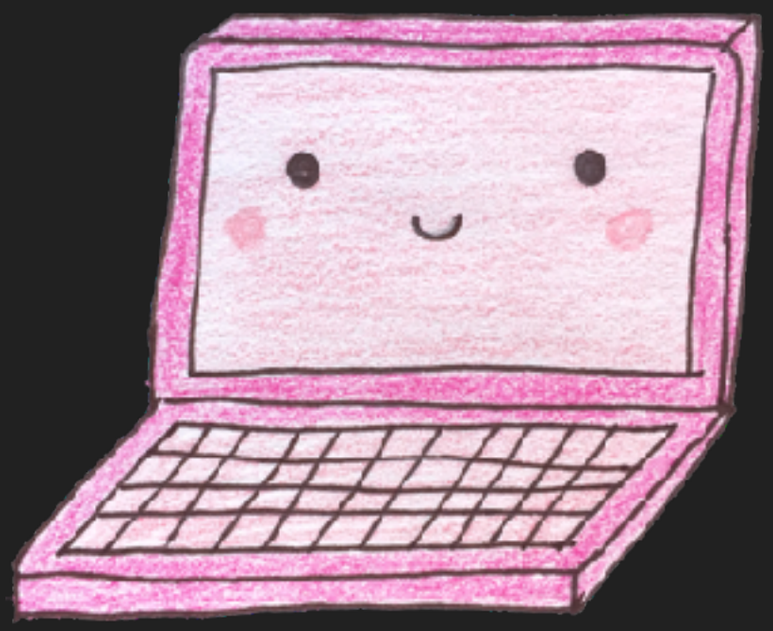


Enya - Orinoco Flow

keep things smooth

animate with transform + opacity

I, I, I, I, I, I
Know how to transform
I transform, I transform
I'm a transformer
I, I, I, I, I, I
Know how to transform
I transform (I can do it!)
I'll transform (I can do it!)
I'm a transformer
♪♪♪



Gnarls Barkley - Transformer

keep things smooth

animate with transform + opacity

```
.zoomy {
  position: absolute;
  top: 100px;
  left: 30px;
  width: 100px;
  height: 100px;

  animation: move 3s ease infinite;
}

@keyframes move {
  50% {
     top: 200px;
     left: 130px;
  }
}
```

https://codepen.io/chriscoyier/pen/pBCax

keep things smooth

animate with transform + opacity

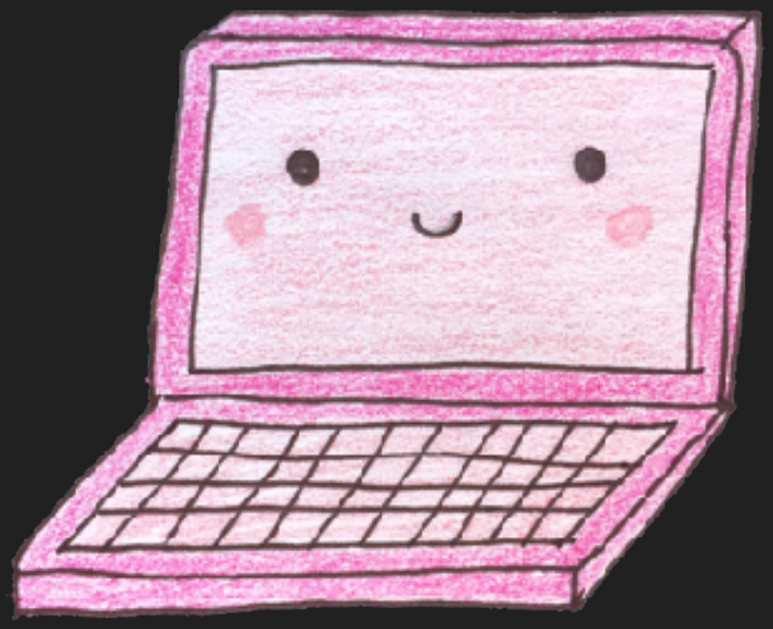
```
.zoomy {
  position: absolute;
  top: 100px;
  left: 30px;
  width: 100px;
  height: 100px;

  animation: move 3s ease infinite;
}

@keyframes move {
  50% {
     transform: translate(100px, 100px);
  }
```

Https://codepen.io/chriscoyier/pen/kyctm

keep things smooth

animate with transform + opacity

Layout → Painting → Compositing



keep things smooth

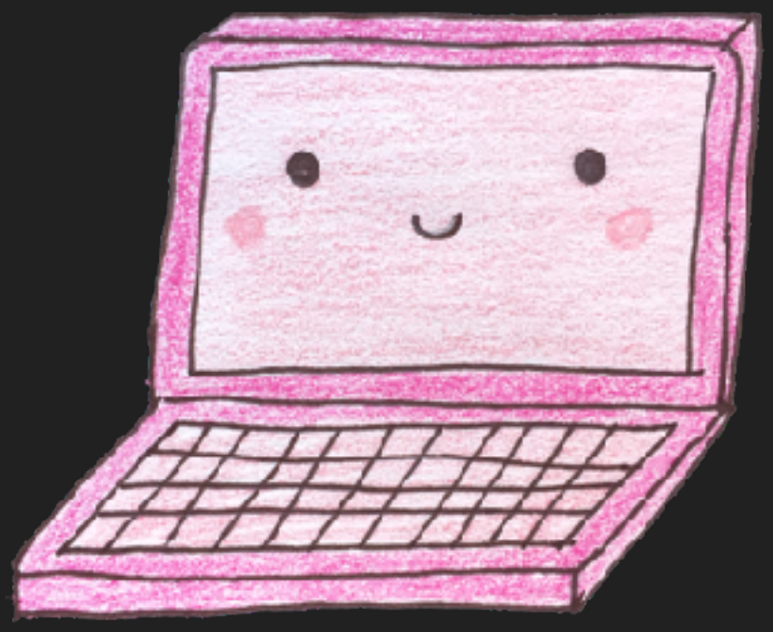
animate with transform + opacity

```
.moving-element {
  will-change: transform;
}
```

keep things smooth

use a css methodology

CSS, take it easy
For there is something
that we can do.
CSS, take it easy
BEM it for me
Or BEM it for you.
♪♪♪



Mika - Relax, Take it Easy

keep things smooth

use a css methodology

```
.box:nth-last-child(-n+1) .title {
  /* styles */
}
```

keep things smooth

use a css methodology

```
.Box_title--special {
  /* styles */
}
```

always
measure
first

always measure first

synthetic measurements

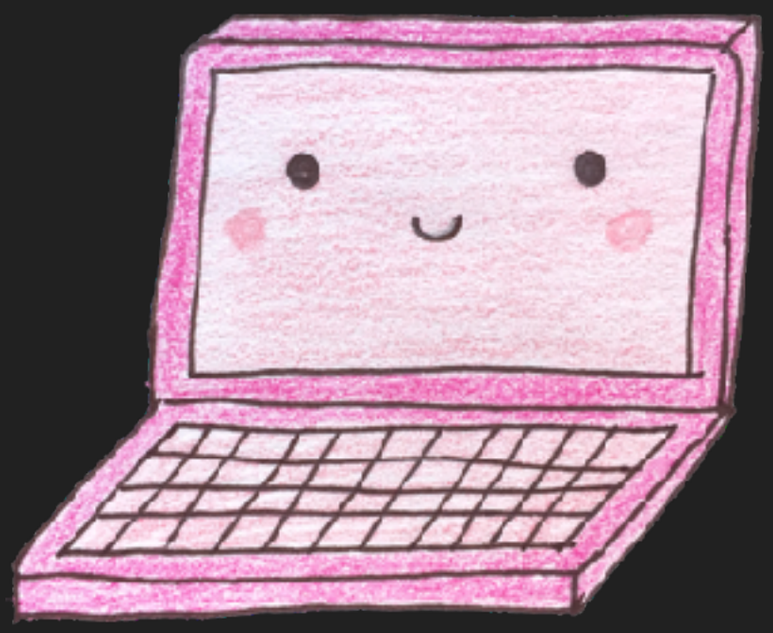
Is someone getting the test,
the test, the test,
the test of you?
♪♪♪

Foo Fighters - The Best of You

always measure first

real user measurements

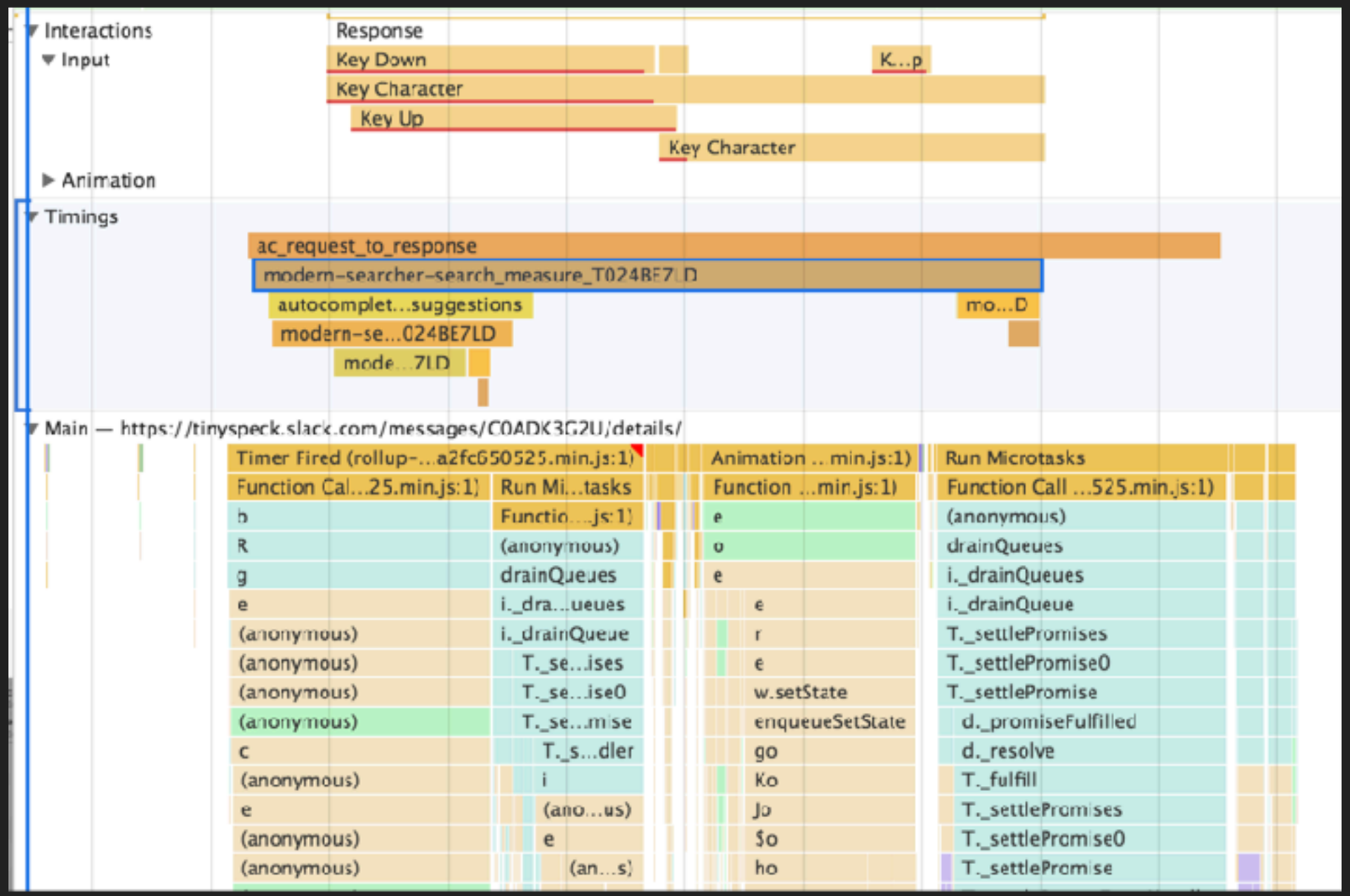
Ain’t it fun
Timing in the real world
Ain’t it good
Testing in their Chrome
♪♪♪



Paramore - Ain't it Fun

always measure first

🔥 personal fave: flamegraphs 🔥



seriously,
always
measure
first

keep things small, keep things smart, keep things smooth

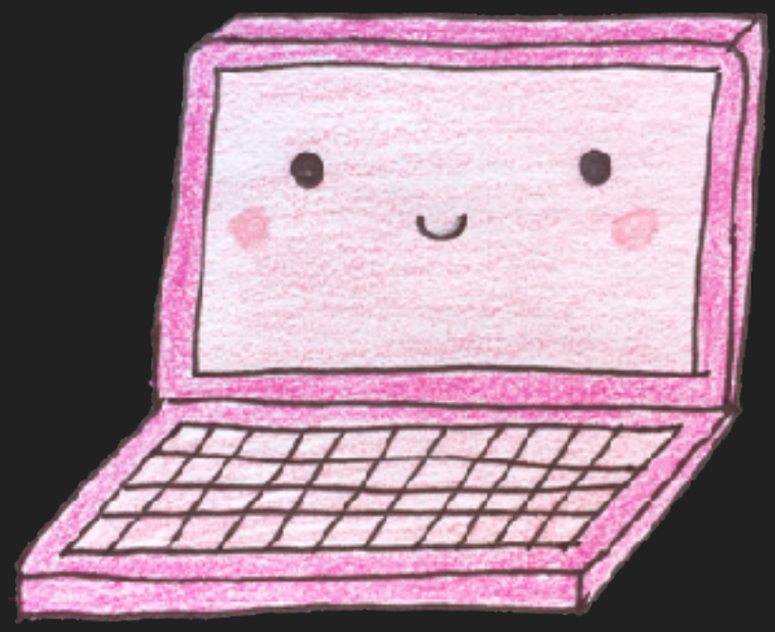
Resources

- Front-End Performance Checklist 2018
- Optimizing the Critical Rendering Path
- Rendering Performance
- Philip Roberts: What the heck is the event loop anyway?
- window.requestAnimationFrame()
- Using Web Workers
- Assessing Loading Performance in Real Life with Navigation and Resource Timing
- Reduce the Scope and Complexity of Style Calculations
- CSS Triggers
- What forces layout / reflow
- High Performance Browser Networking
- Server Farm to Table, Annotated
- Fantastic Render Performance Tricks and Why We Do Them (aka the full talk)

Complete Tracklist

Calvin Harris ft. Ellie Goulding - Outside
Jimmy Eat World - Sweetness
Taylor Swift - Shake it Off
Katy Perry - Last Friday Night (T.G.I.F)
The Police - Every Breath You Take
Salt-N-Pepa - Shoop
CHVRCHES - Never Ending Circles
Santana ft. Rob Thomas - Smooth
Sugarcult - Bouncing off the Walls Again
Ja Rule ft. Ashanti - On Time
Red Hot Chili Peppers - Give it Away
The All-American Rejects - Move Along
Enya - Orinoco Flow
Gnarls Barkley - Transformer
Mika - Relax, Take it Easy
Foo Fighters - The Best of You
Paramore - Ain't it Fun

something witty about a POP server…



Thanks!

jenna.is/at-slack-full-stack

@zeigenvector