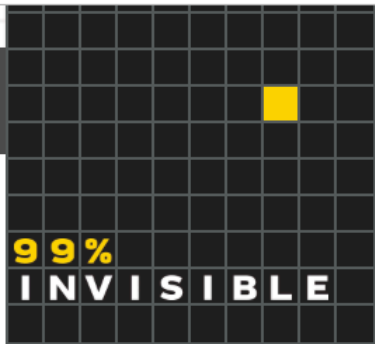


Making Motion Inclusive

Val Head
@vlh

An Event Apart Boston 2019
#aeabos



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On Average



EXPLORE



Architecture



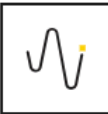
Infrastructure



Cities



Objects



Sounds



Visuals



Technology

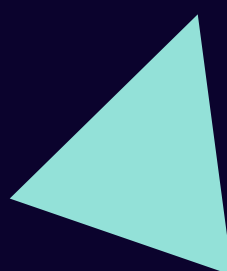
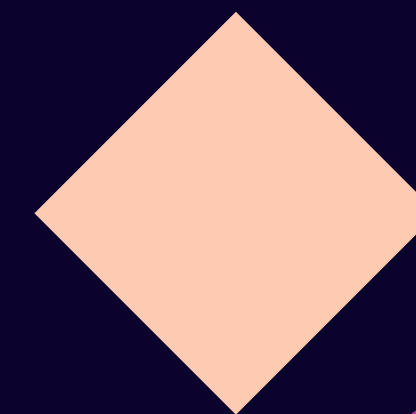


History

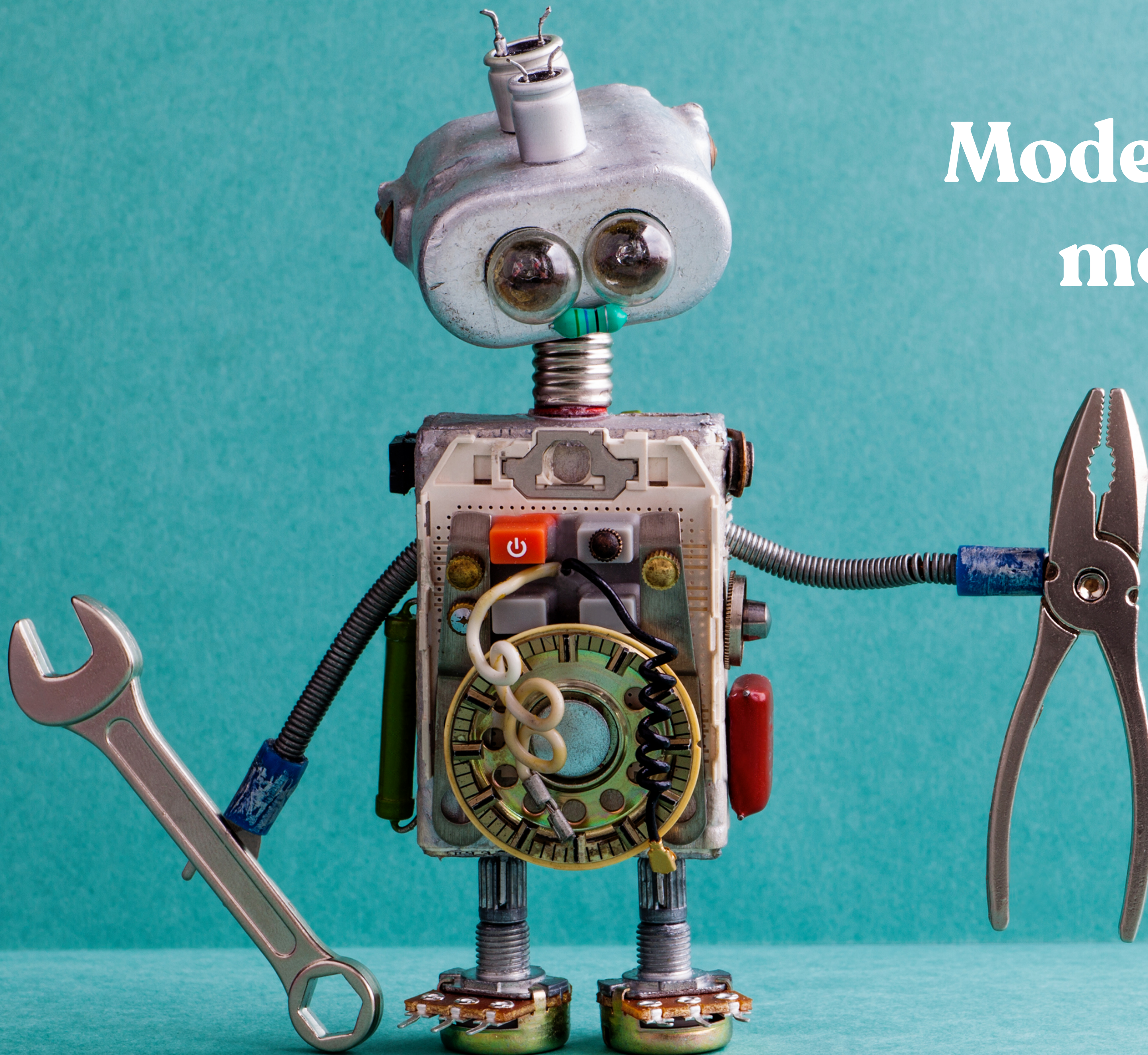
SPONSORS


Playlist (1)

Inclusive Design?



Modern thinking for
modern times.





“Inclusive design doesn’t mean you’re designing one thing for all people. You’re designing a diversity of ways to participate so that everyone has a sense of belonging.”

–Susan Goltsman

Animation UX

(and accessibility and inclusion too!)

Animation helps with:

Visual continuity

Reducing cognitive load

Guiding tasks

Connecting across contexts

... and more

Designing Interface Animation

designinginterfaceanimation.com

FIGURE 2.12
Safari's save file
animation follows an
arced path from
the download link
to the downloads
folder in your dock.
I've superimposed
the approximate arc
followed in this image,
and you can see it in
action in this video:
<https://vimeo.com/162712118>.

32

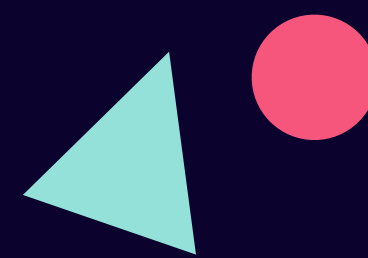
CHAPTER 2

 Rosenfeld

DESIGNING INTERFACE ANIMATION
Meaningful Motion for User Experience

by VAL HEAD Foreword by Ethan Marcotte

WCAG



2.2.2

Pause, Stop, Hide

Pause, Stop, Hide

Provide a way to pause, stop, or hide any moving, blinking, scrolling content (that lasts more than 5s) unless that moving, blinking, or scrolling content is an essential activity.

Common places where this might apply:

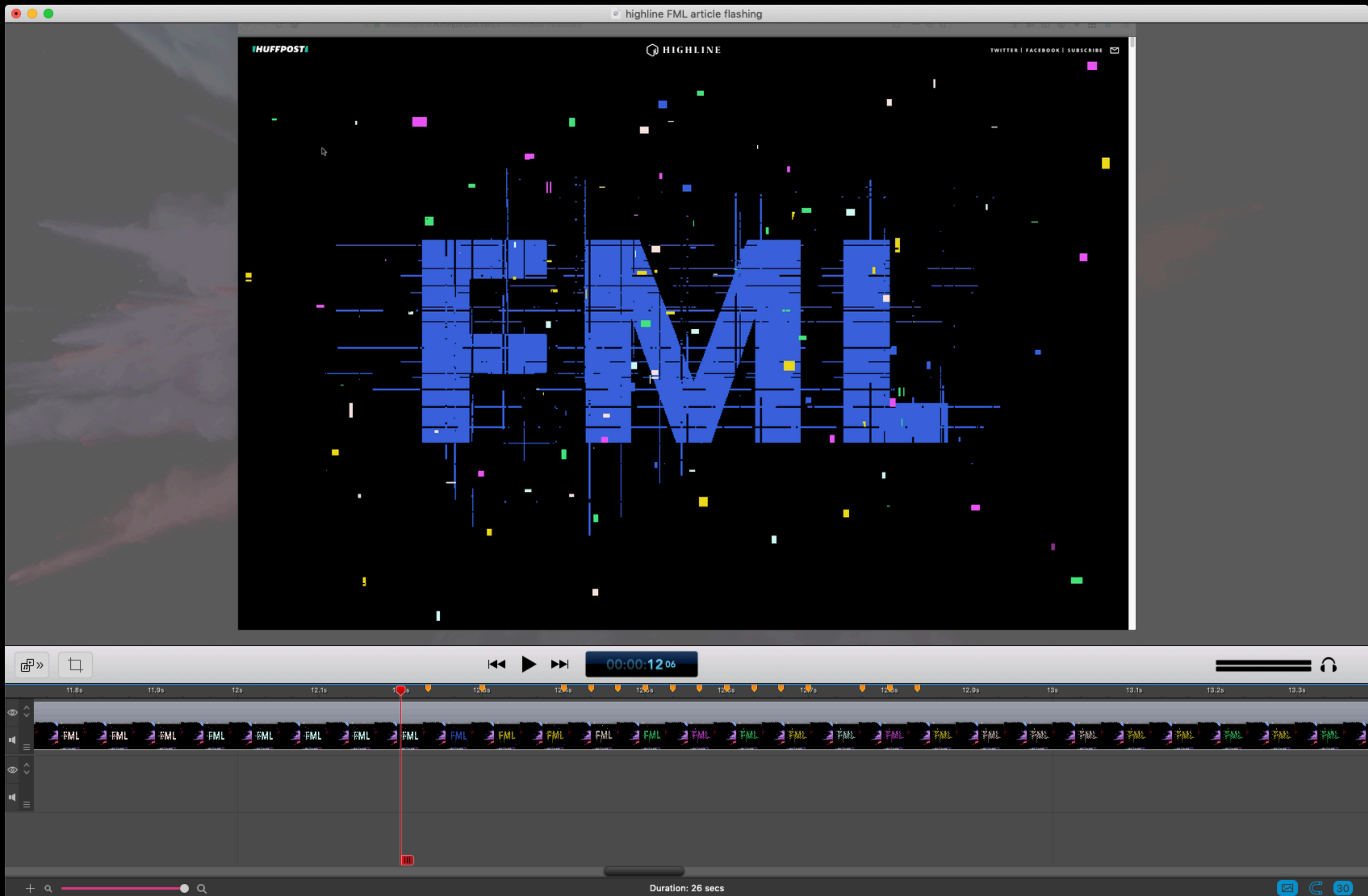
- Auto-advancing carousels
- Autoplaying videos
- Animated background videos or animations

2.3.1

**Three flashes or
below threshold**

Three flashes or below threshold

Don't include anything that flashes more than three times in any one second unless the flashing is below the general flash threshold red flash threshold.



Mazarine



BY CLICKING ON “LET’S PLAY” YOU ACCEPT THE USE OF COOKIES TO START THIS GAME.
WARNING: THIS GAME IS NOT RECOMMENDED FOR PEOPLE WITH PHOTSENSITIVE EPILEPSY.

LET'S PLAY



2.3.3

Animation from interactions

Animation from interactions

Motion animation triggered by interaction can be disabled unless the animation is essential for functionality or the information being conveyed.

motion animation (definition):

Addition of steps between conditions to create the illusion of movement or to give a sense of a smooth transition. For example, an element which moves into place or changes size while appearing is considered to be animated. An element which appears instantly without transitioning is not using animation.

Motion animation does not include changes of color, blurring or opacity.



A Venn diagram consisting of two concentric circles. The outer circle is light purple and contains the word "Animation". The inner circle is a darker shade of purple and contains the word "Motion". The inner circle is centered within the outer circle, illustrating that Motion is a subset of Animation.

Animation

Motion

How to meet this criteria?

- Avoid using unnecessary animation
- Provide a control for users to turn off non-essential animations from user interaction
- Take advantage of the reduce motion feature in the user-agent or operating system

FEATURES

#ACCESSIBILITY

#SCROLLING

#MIGRAINES ARE
TERRIBLE

#MOTION

Your Interactive Makes Me Sick

Why your coolest scrolly features can cause problems, and what to do about it

By [Eileen Webb](#)

Posted on: March 1, 2018



source.opennews.org/articles/motion-sick/



A LIST APART

Accessibility for Vestibular Disorders: How My Temporary Disability Changed My Perspective

by [Facundo Corradini](#) · April 04, 2019

Published in [Accessibility](#), [User Experience](#)

Accessibility can be tricky. There are plenty of conditions to take into consideration, and many technical limitations and weird exceptions that make it quite hard to master for most designers and developers.

I never considered myself an accessibility *expert*, but I took great pride in making my projects Web Content Accessibility Guidelines (WCAG) compliant...ish. They would pass most automated tests, show perfectly in the accessibility tree, and work quite well with keyboard navigation. I would even try (and fail) to use a screen reader every now and then.

But life would give me a lesson I would probably never learn otherwise: last October, my *abled* life took a drastic change—I started to feel extremely dizzy, with a constant

sensation of falling or spinning to the right. I was suffering from a bad case of vertigo.

alistapart.com/article/accessibility-for-vestibular/


Vestibular disorders defined:

Vestibular disorders defined:

Any disease, damage, or injury to the vestibular system—the system around our inner ear and brain that processes sensory information involved in controlling balance and eye movements—falls under the umbrella of a vestibular disorder.



A mismatch

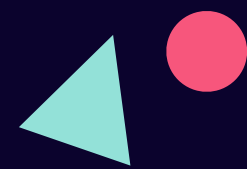


“I’m not suggesting you shouldn’t make more cool interactive news stories, or use motion in interesting ways. But I’m advocating here for some guidelines to help make your story a better experience for all your readers.”

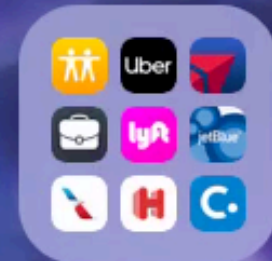
–Eileen Webb

source.opennews.org/articles/motion-sick/

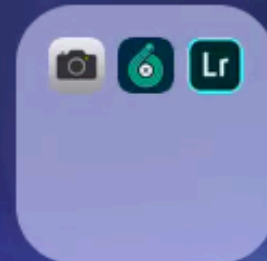
**Motion that
potentially triggers**



Scaling and zooming



Travel



Photoifying



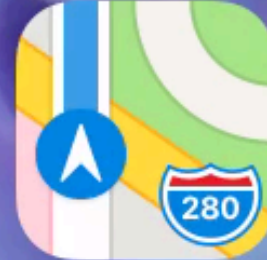
Instagram



Photos



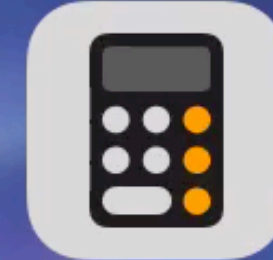
Safari



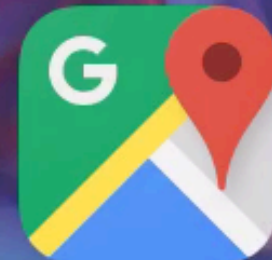
Maps



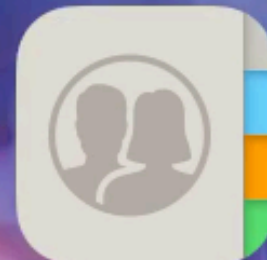
Clock



Calculator



Google Maps



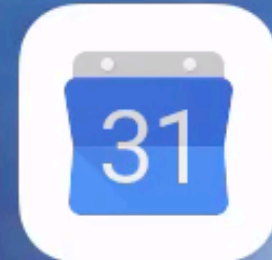
Contacts



Settings



Sleep Cycle



GoogleCalen...



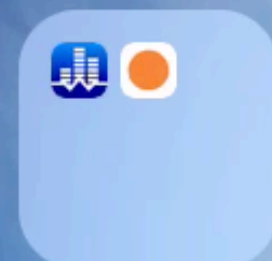
Swarm



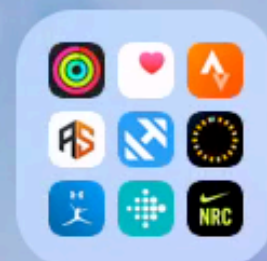
Weather



Slack



Calm



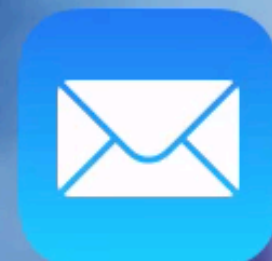
So Fit!!



Notes



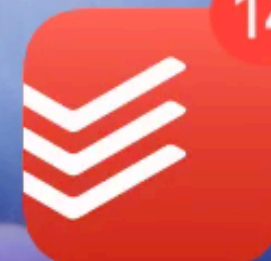
Sonos



Mail



Dark Sky



Todoist



Forest



Spinning and vortex effects





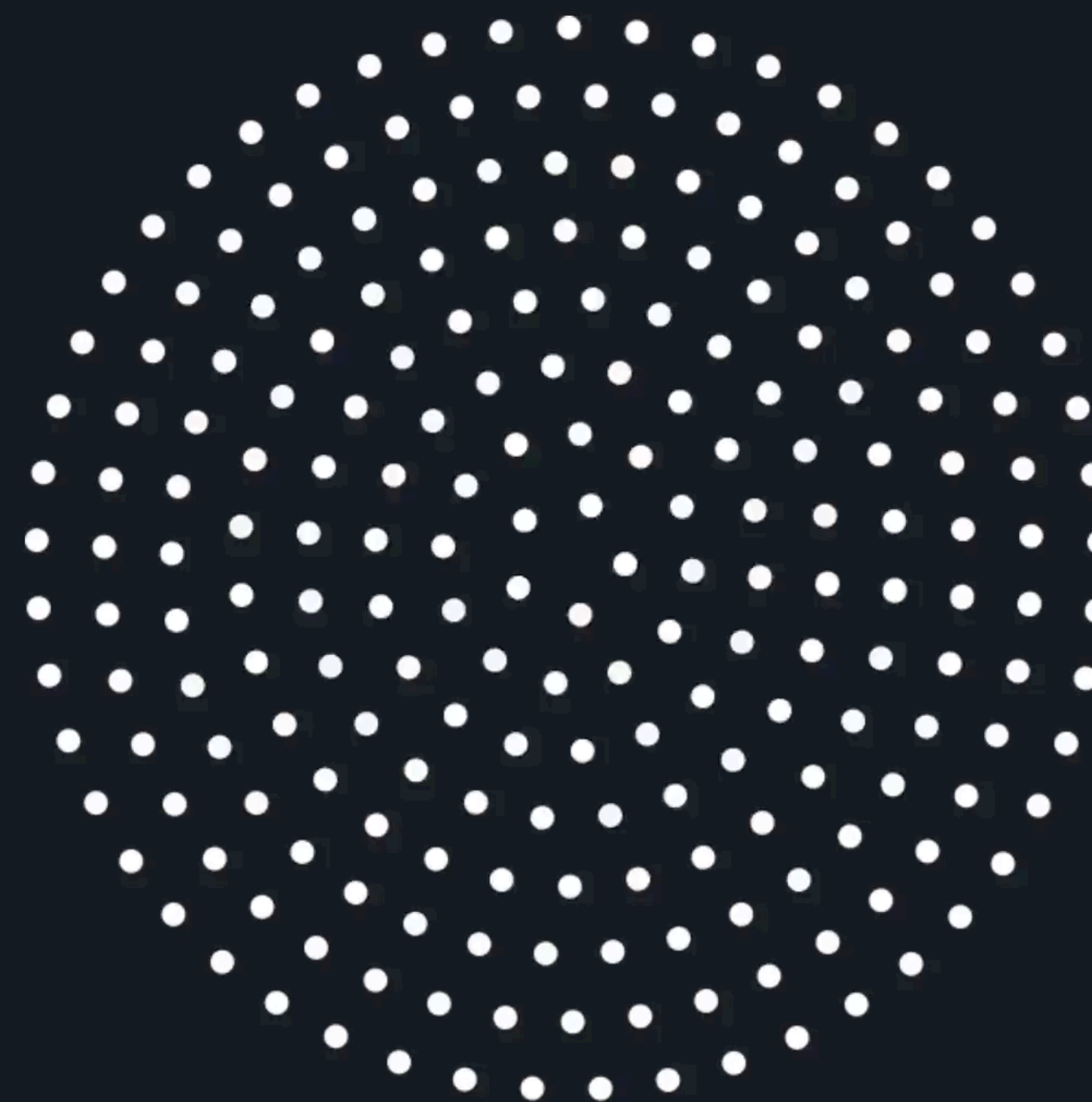
[Demo](#) [Download](#) [License](#)

Lunar Popup

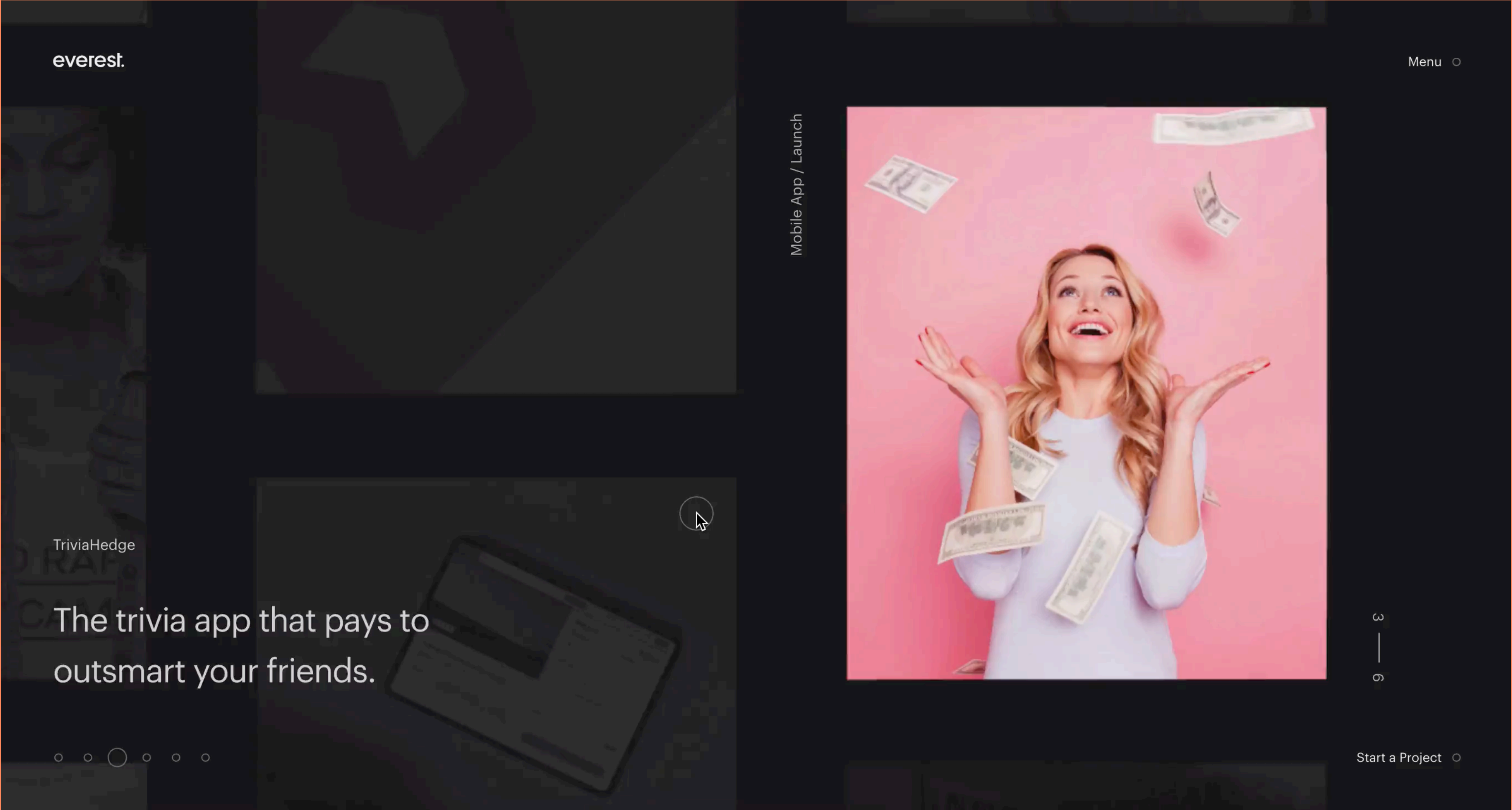
Every Popup is beautifully designed, coded in
html/css, seamlessly animated and ready-to-use on
your website and its Absolutely free.

Download ↓

Show Demos ↗



**Multi-speed or multi-
directional movement**



Hey, about that parallax...



Scroll

Tw

Lk

In

Git

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What Parallax Lacks

by [Katie Sherwin](#) on January 20, 2019
 Topics: [Visual Design](#)

Summary: Parallax-scrolling effects add visual interest, but they often create usability issues, such as content that is slow to load or hard to read. Consider if the benefits are worth the cost.

Several years ago, a colleague and I ventured out to test a new design trend that was winning web-design awards and earning praise on designer forums. That trend was parallax scrolling. We were not impressed. More importantly, neither were users (for reasons I'll explain below). After a short couple of years, the parallax trend slowly faded away, likely because those early adopters saw the same results we did: harm to the user experience or lukewarm user reactions, at best. The outcomes didn't justify the work that went into creating and maintaining elaborate parallax-scrolling effects, and so the trend dwindled in popularity. For a while.

Fast forward to today. Just when we thought the web was safe, parallax scrolling is making a comeback. Like a sequel to a movie, our testing today reveals a familiar cast and storyline: unimpressed users and a range of usability issues. In this sequel, however, parallax scrolling is more restrained than the original. If the earlier parallax implementations were a horror show of usability issues, the modern version is closer to a PG-13 family comedy: not particularly entertaining, but also not likely to send people screaming to close the tab.

Constant animation
near text

Her parents also did “little things, like they would pay for my cell phone. That makes a huge difference.”

☺☺
THERE'S A BIG PART 🏠 OF
ME THAT'S LIKE, WOULD
I HAVE MADE IT IN
THIS CAREER IF I HAD
STUDENT LOANS? ☺☺

Caroline Moss, co-author of *Hey Ladies!: The Story of 8 Best Friends, 1 Year, and Way, Way Too Many Emails*, tells me that if her parents hadn't paid for her college education, she wouldn't have the career she does right now. “There are people who've worked really hard to get where they are, but have also gotten where they are because of a leg up. And maybe there's not a ton of understanding that some people will never get the opportunities that you have, because they'll never be able to do a free internship, or they'll never be able to afford to live in New York City.” There's also a part of her that's jealous when she looks at someone her own age who's already bought a house.

“Then I find out it was a gift, they inherited money, and I'm like, Oh, OK, it's not even worth comparing. ... I don't think they should be humiliated, but if it's just the truth, I didn't pay for this, it makes me feel better.”

In her first book, *You're So Money*, Farnoosh Torabi revealed that her parents

Large movements



Cloudinary

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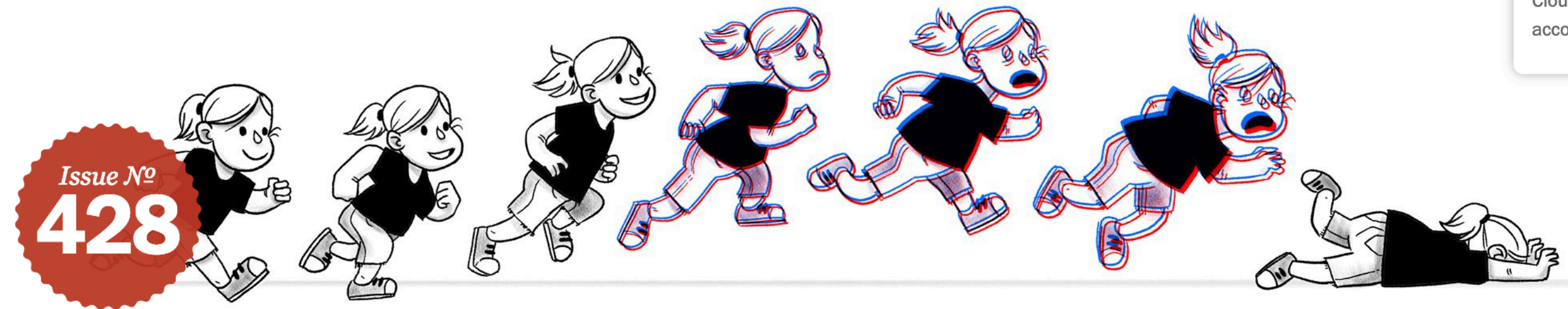


Illustration by [Sue Lockwood](#)

Designing Safer Web Animation For Motion Sensitivity

by [Val Head](#) · September 08, 2015

Published in [Accessibility](#), [Interaction Design](#)

It's no secret that a lot of people consider scrolljacking and parallax effects annoying and overused. But what if motion does more than just annoy you? What if it also makes you ill?

That's a reality that people with visually-triggered vestibular disorders have to deal

ted interfaces increasingly become the norm, more people have begun to

11 comments

alistapart.com/article/designing-safer-web-animation-for-motion-sensitivity

Responsive Design for Motion

May 15, 2017

by James Craig

[@cookiecrock](#)

WebKit now supports the `prefers-reduced-motion` media feature, part of [CSS Media Queries Level 5, User Preferences](#). The feature can be used in a CSS `@media` block or through the `window.matchMedia()` interface in JavaScript. Web designers and developers can use this feature to serve alternate animations that avoid motion sickness triggers experienced by some site visitors.

To explain who this media feature is for, and how it's intended to work, we'll cover some background. Skip directly to the [code samples](#) or [prefers-reduced-motion demo](#) if you wish.

Motion as a Usability Tool

CSS [transforms](#) and [animations](#) were proposed by WebKit engineers nearly a decade ago as an abstraction of [Core Animation](#) concepts wrapped in a familiar CSS syntax. The standardization of [CSS Transforms/CSS Animations](#) and adoption by other browsers helped pave the way for web developers of all skill levels. Richly creative animations were finally within reach, without incurring the security risk and battery cost associated with plug-ins.

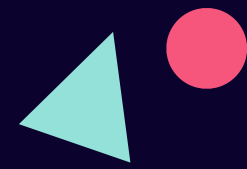
The perceptual utility of appropriate, functional motion can increase the understandability and —yes— *accessibility* of a user interface. There are numerous articles on the benefits of animation to increase user engagement:

webkit.org/blog/7551/responsive-design-for-motion/

Not on the list...

animated colour changes, opacity
fades, small movements

Prefers-reduced-motion



2013

2014

2015

2016

iOS 7 released

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US Politics

Business

Tech

Science

iPhone

Craig Grannell

Fri 27 Sep 2013 13.23 EDT

f

3,051

426

Why iOS 7 is making some users sick

The introduction of fake zooms, parallax, sliding and other changes in Apple's new iPhone and iPad software has a very real effect on people with vestibular disorders



▲ iOS 7: zooms, transitions and other changes in the new version of Apple's mobile operating system are making some people feel sick

Apple's new mobile operating system for the iPhone and iPad, iOS 7, is stark and minimal, yet dynamic. It makes frequent use of zoom and slide animations; the home screen boasts parallax, with icons apparently floating

most viewed in US

Live Trump ordered officials to give Kushner security clearance despite concerns, report says - live

Viral 'Momo challenge' is a malicious hoax, say charities

Parents: don't panic about Momo - worry about YouTube Kids instead

Keza MacDonald

Trump was out of his depth in Hanoi. This failure is his greatest flop yet

2013

2014

2015

2016

iOS 7 released

Reduce motion setting
added to iOS

BuzzFeed News

REPORTING TO YOU

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TRENDINGBrexitOtto WarmbierTrump OrganizationMomo ChallengeTrump-Kim SummitLuke Perry



TECH

A New iOS Update Means Your Phone Won't Make You Throw Up Anymore

Looks like they weren't crazy after all.

**Charlie Warzel**
BuzzFeed News Reporter

Posted on October 22, 2013, at 3:55 p.m. ET

TweetShareCopy



2013

2014

2015

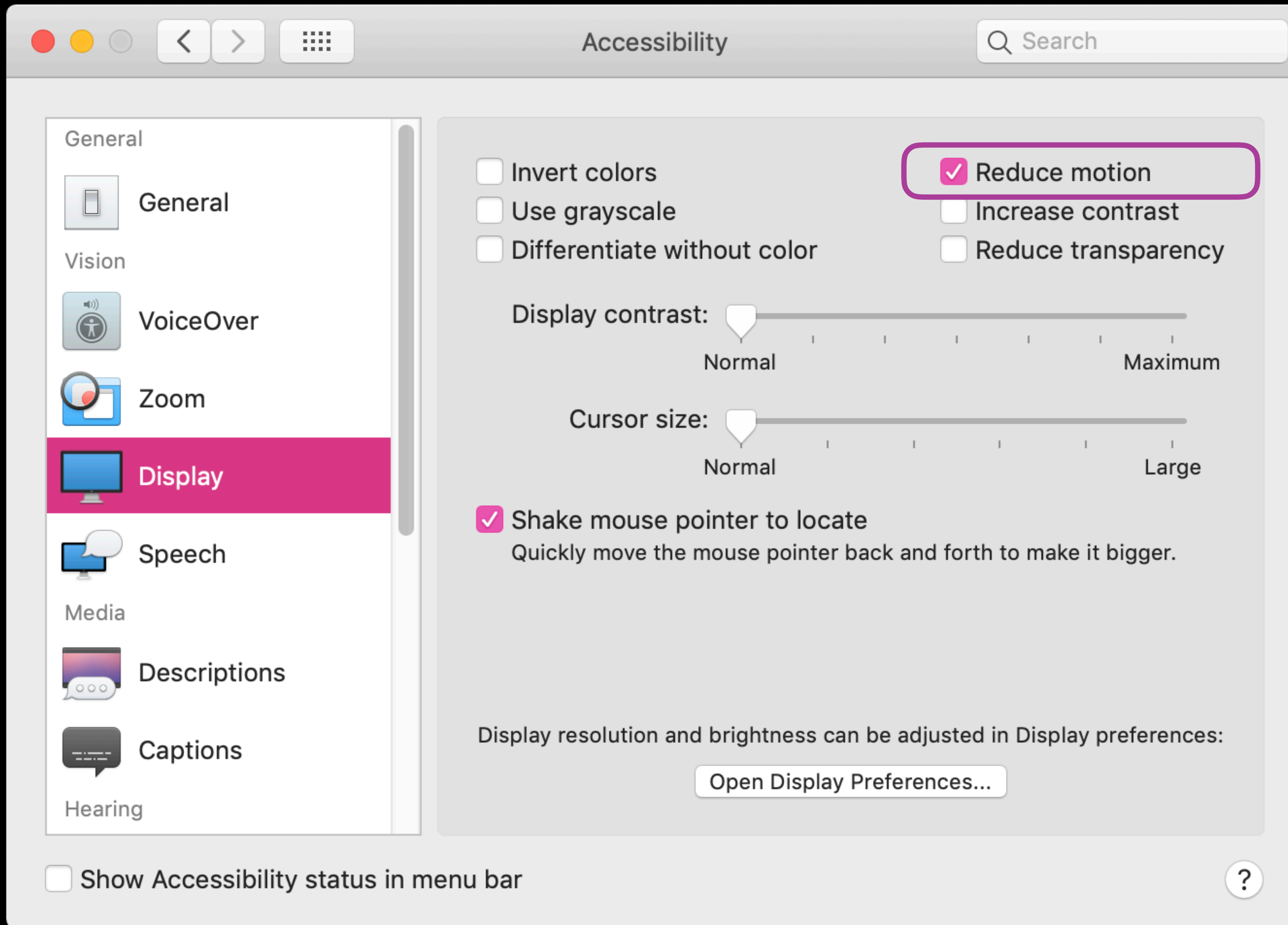
2016

iOS 7 released

Reduce motion setting
added to iOS

prefers-reduced-motion
proposed

Reduce motion settings
Added to macOS



Simplify and personalize Windows

Show animations in Windows

☒ On

Show transparency in Windows

☒ On

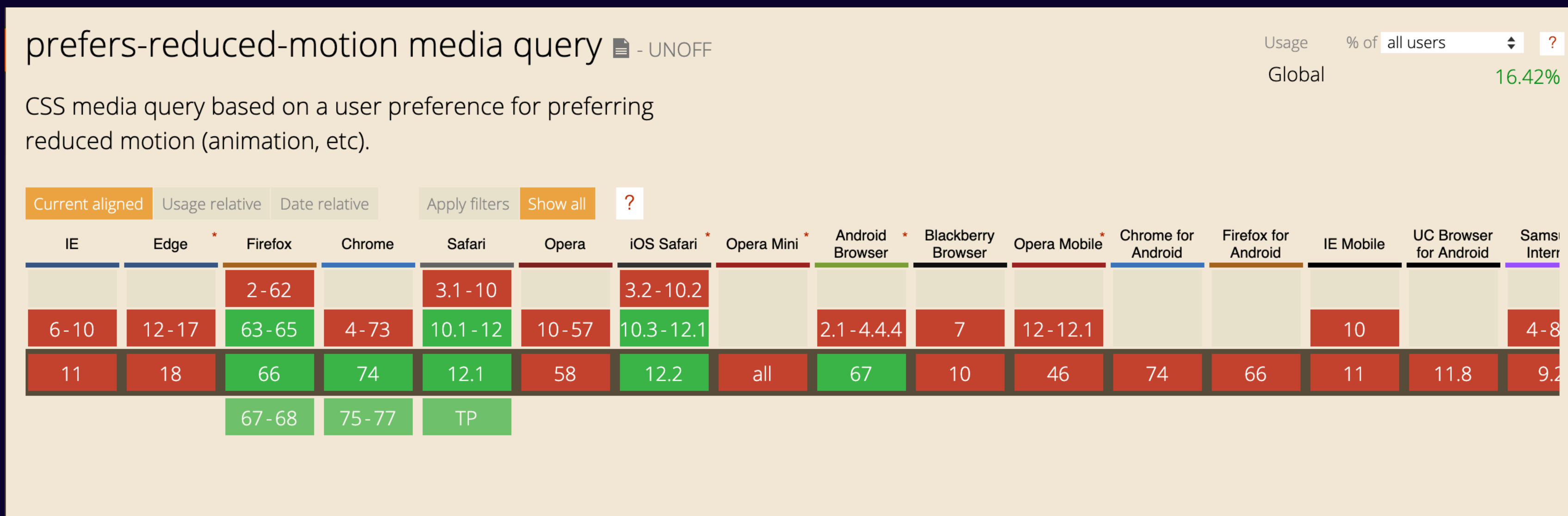
Automatically hide scroll bars in Windows

☒ On

Show notifications for

5 seconds ▼

Browser support:



Safari > 10.1, iOS Safari > 10.3, Firefox > 63, Chrome > 74

CSS

```
@media (prefers-reduced-motion: reduce)
{
    /* alternative behaviour */
}
```

JS

```
let motionQuery = matchMedia('(prefers-reduced-motion)');
```

```
const handleReduceMotionChanged = () => {  
  if (motionQuery.matches) //reduced behaviour;  
}
```

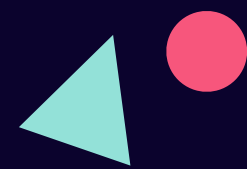
```
motionQuery.addListener(handleReduceMotionChanged);  
handleReduceMotionChanged();
```

“The prefers-reduced-motion media feature is used to detect if the user has requested the system minimize the amount of animation or motion it uses.”

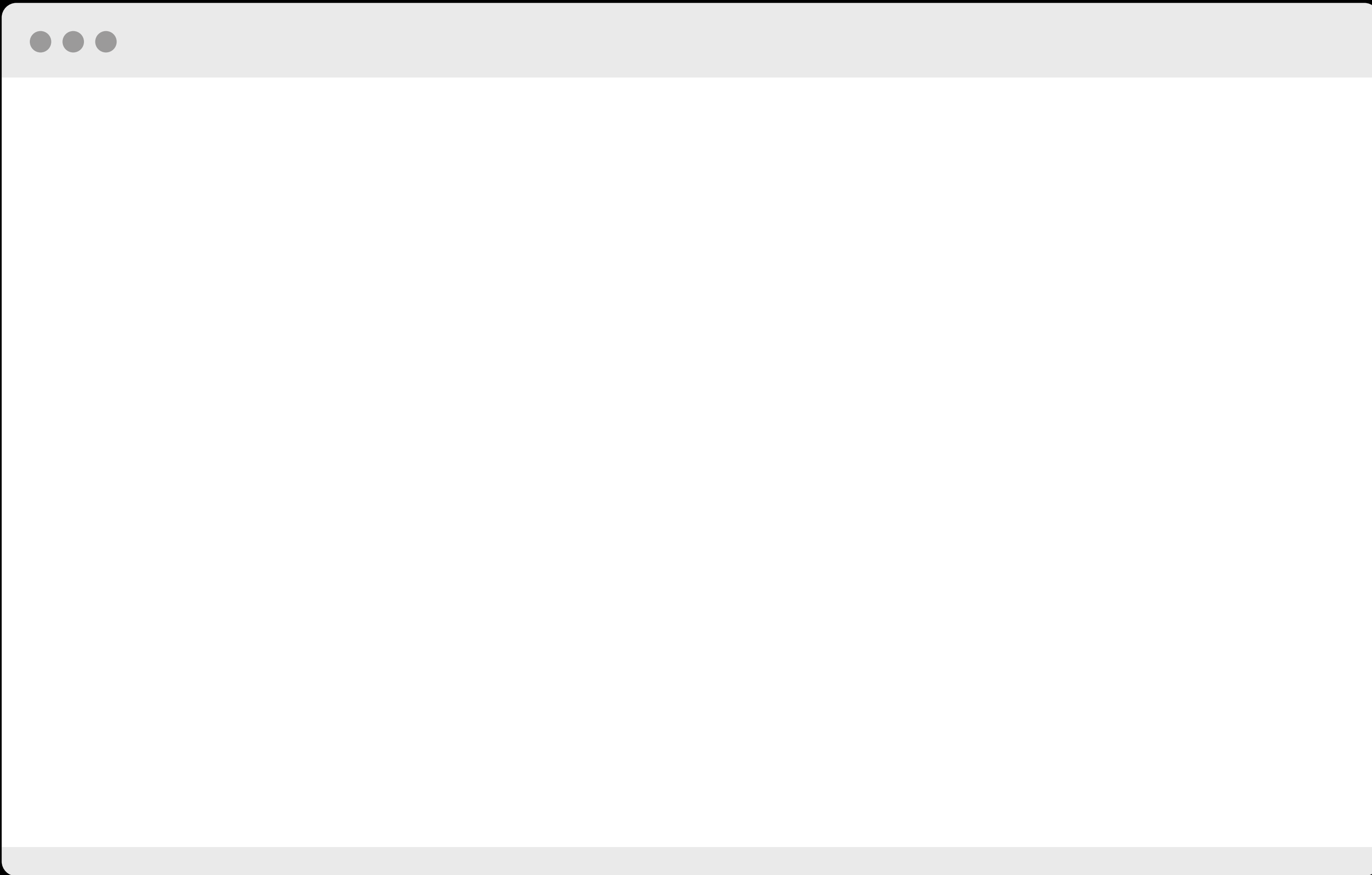
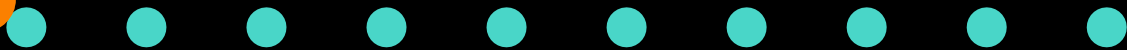
no-preference (false) | reduce (true)

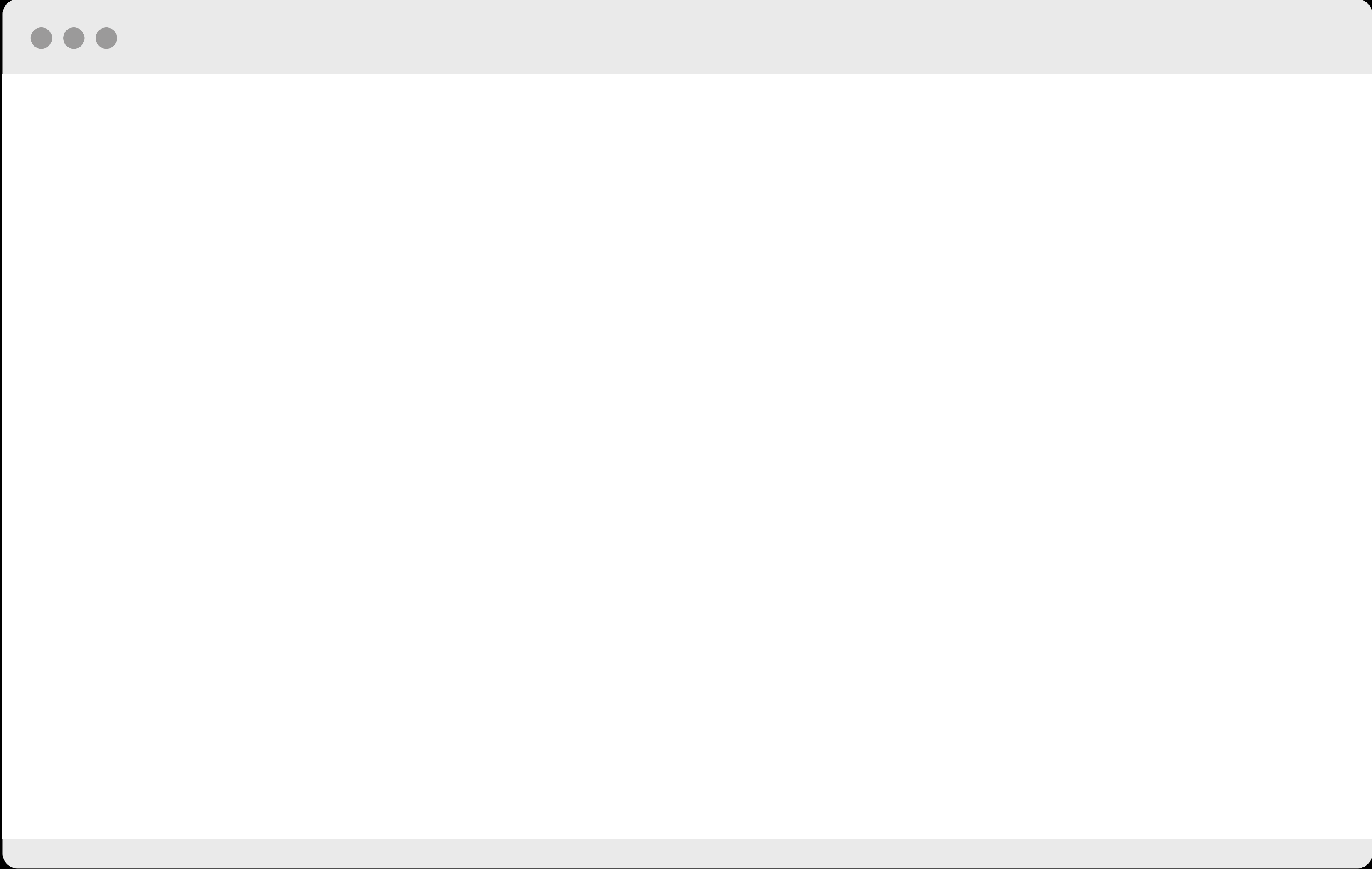
Hey... Browsers?

Respecting Reduced Motion



reduce != remove






```
@media (prefers-reduced-motion: reduce) {  
  * {  
    animation: 0s !important;  
    transition: 0s !important;  
  }  
}
```



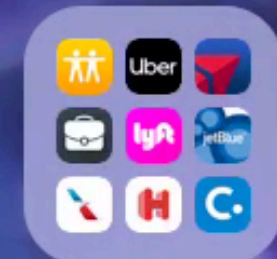
Reduce where needed

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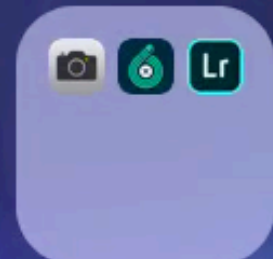
Hello, Universe.

Viljami S. Design is a digital product design studio based in Helsinki, Finland. We help our clients succeed through innovative thinking and craftsmanship.

TELL US ABOUT YOUR PROJECT



Travel



Photoifying



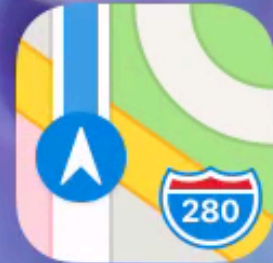
Instagram



Photos



Safari



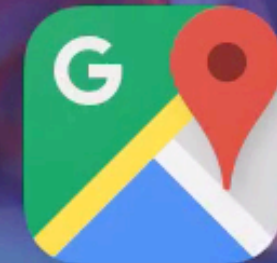
Maps



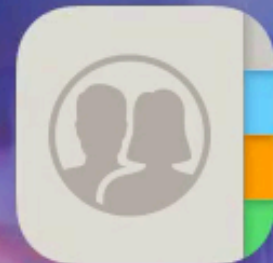
Clock



Calculator



Google Maps



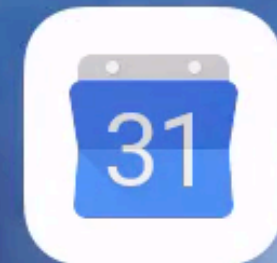
Contacts



Settings



Sleep Cycle



GoogleCalen...



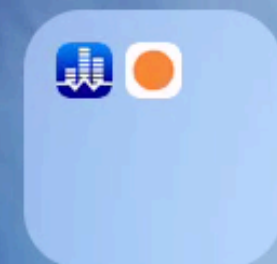
Swarm



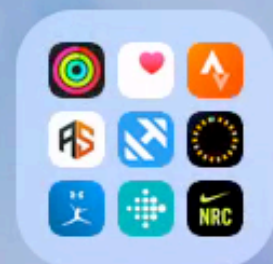
Weather



Slack



Calm



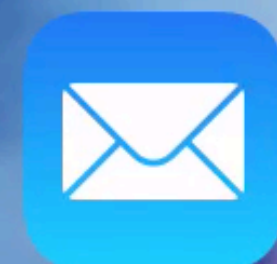
So Fit!!



Notes



Sonos



Mail



Dark Sky



Todoist



Forest




```
.thing {  
  ...  
  transform: translateX(-100%);  
  transition: transform 500ms cubic-bezier(0.645, 0.045, 0.355, 1);  
}
```

```
@media (prefers-reduced-motion) {
```

```
  .thing {  
    opacity: 0;  
    transition: opacity 500ms cubic-bezier(0.645, 0.045, 0.355, 1);  
  }  
}
```


Starting state

```
.plant1 {  
  transform: translateY(-100%);  
  transition: $dur $ease-both;  
}
```

```
.plant2 {  
  transform: translateY(120%);  
  transition: $dur $dur/6 $ease-both;  
}
```

```
.plant3 {  
  transform: translateY(-100%);  
  transition: $dur $dur/3 $ease-both;  
}
```


Starting state

```
.plant1 {  
  transform: translateY(-100%);  
  transition: $dur $ease-both;  
}  
  
.plant2 {  
  transform: translateY(120%);  
  transition: $dur $dur/6 $ease-both;  
}  
  
.plant3 {  
  transform: translateY(-100%);  
  transition: $dur $dur/3 $ease-both;  
}
```

Ending state

```
All the plants {  
  transform: translateY(0);  
  opacity: 1;  
}
```

Reduced motion

```
@media (prefers-reduced-motion: reduce) {  
  
  .title span:nth-of-type(1), .title span:nth-of-type(1) {  
    transform: translateX(0);  
    opacity:0;  
  }  
  
  .plant1, .plant2, .plant3 {  
    transform: translateY(0);  
    opacity:0;  
  }  
  
}
```


Writing like a cat for fun and profit

Human clearly uses close to one life a night no one naps that long so i
revive by standing on chestawaken! walk on car leaving trail of paw
prints on hood and windshield Gimme attention gimme attention
gimme attention gimme attention gimme attention gimme attention
just kidding i don't want it anymore meow bye knock over christmas
tree meow all night stare at the wall, play with food and get confused
by dust scratch at the door then walk away, friends are not food or if it
fits i sits. Has closed eyes but still sees you who's the baby. Meow gnaw
the corn cob for attack like a vicious monster adventure always yet
scream at teh bath. Head nudges rub against owner because nose is
wet bring your owner a dead bird or purr. Ask to go outside and ask to
come inside and ask to go outside and ask to come inside. Mouse kitty
scratches couch bad kitty, yet have my breakfast spaghetti yarn, for
woons noon hanging from butt must get rid run run around house drag

JavaScript

```
let scroll = new SmoothScroll('a[href*="#"]'),
    motionQuery = matchMedia('(prefers-reduced-motion)');

const handleReduceMotionChanged = () => {
  if (motionQuery.matches) scroll.destroy();
}

motionQuery.addListener(handleReduceMotionChanged);

handleReduceMotionChanged();
```


Writing like a cat for fun and profit

Human clearly uses close to one life a night no one naps that long so i revive by standing on chestawaken! walk on car leaving trail of paw prints on hood and windshield Gimme attention gimme attention gimme attention gimme attention gimme attention just kidding i don't want it anymore meow bye knock over christmas tree meow all night stare at the wall, play with food and get confused by dust scratch at the door then walk away, friends are not food or if it fits i sits. Has closed eyes but still sees you who's the baby. Meow gnaw the corn cob for attack like a vicious monster adventure always yet scream at teh bath. Head nudges rub against owner because nose is wet bring your owner a dead bird or purr. Ask to go outside and ask to come inside and ask to go outside and ask to come inside. Mouse kitty scratches couch bad kitty, yet have my breakfast spaghetti yarn, for

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**Projects with more
extensive motion**



GlobeKit

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This is —GlobeKit

GlobeKit is a visualization platform that can turn geographic data into stunning interactive experiences.

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• M 4.5+ Earthquakes, Past Month

Source: [USGS.gov](#) →



Animation with reduced-motion

A PEN BY Marcy Sutton PRO

♥


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⚙️ Settings

📺 Change View

📌

⌵



⚙️ HTML

⌵

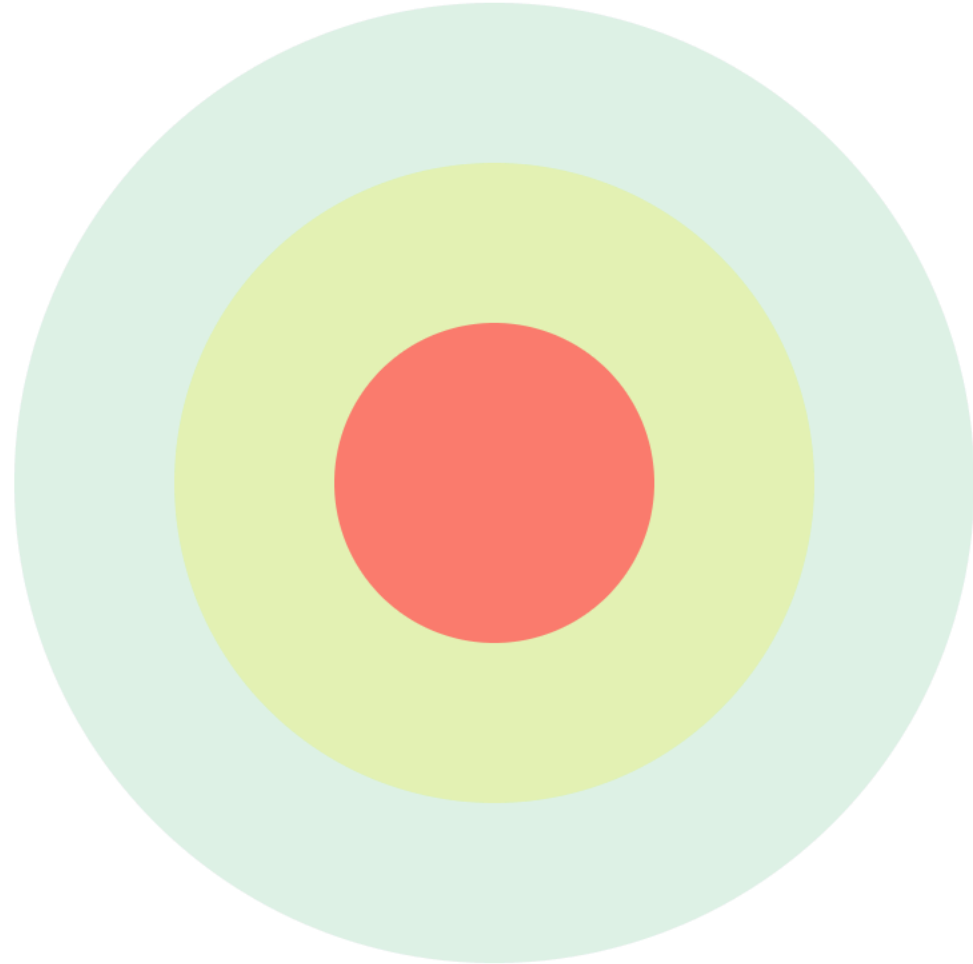
⚙️ CSS (SCSS)

⌵

⚙️ JS

⌵

```
1 var animating = true;
2 var animationTarget = document.getElementById('animation-target');
3 var toggleBtn = document.getElementById('animation-toggle');
4 var toggleBtnText = toggleBtn.querySelector('span');
5 toggleBtn.addEventListener('click', toggleBtnHandler);
6
7 function toggleBtnHandler(event) {
8   if (animating) {
9     disableAnimation();
10  } else {
11    enableAnimation();
12  }
13 }
14 function disableAnimation() {
15   toggleBtnText.textContent = 'on';
16   animationTarget.classList.add('no-animate');
17   animating = false;
18   localStorage.setItem('animating', 'false');
19 }
20 function enableAnimation() {
21   toggleBtnText.textContent = 'off';
22   animationTarget.classList.remove('no-animate');
```



Turn on animation

Animation source: <https://codepen.io/matchboxhero/pen/pWLOQb>

Console Assets Comments ⌵

☆ x

Collections ⌵

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codepen.io/marcysutton/pen/yqVVeY?editors=0010



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