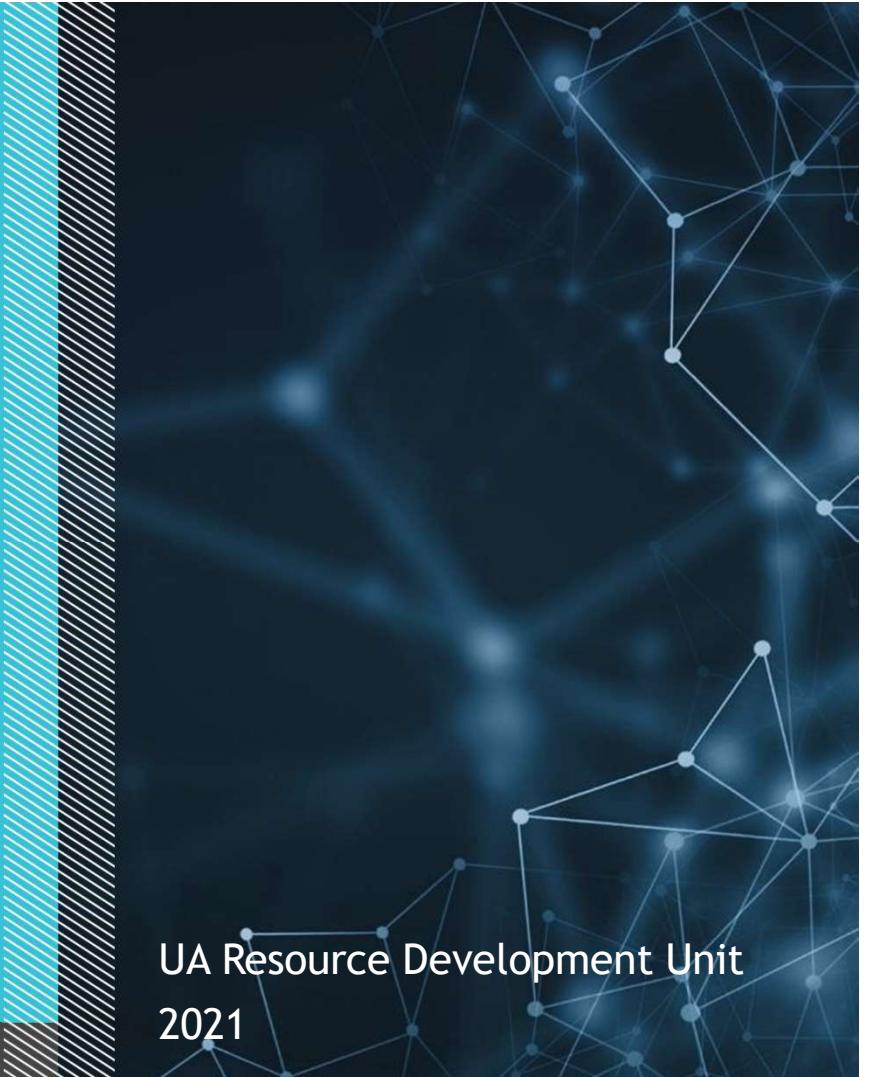




CSS Responsive Design



A dark blue background featuring a complex network of glowing blue dots connected by thin white lines, creating a sense of data flow and connectivity.

UA Resource Development Unit
2021

AGENDA

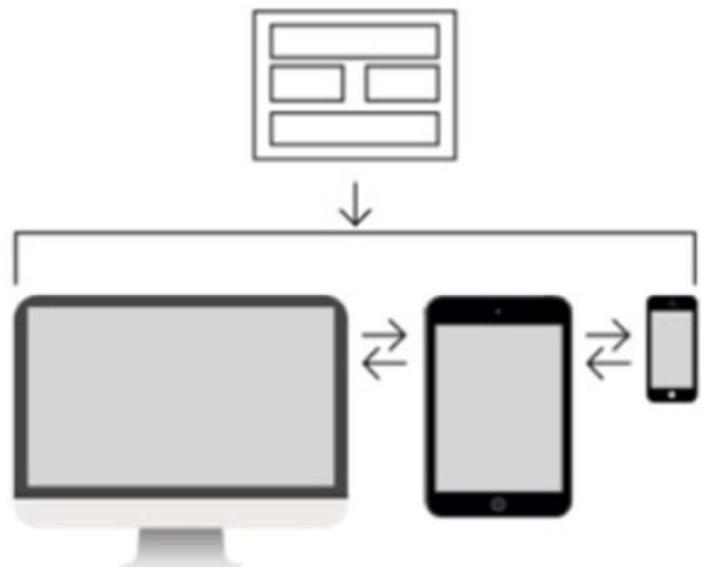
- 1 Responsive Web Design
- 2 Adaptive Web Design
- 3 Media query
- 4 Image art direction
- 5 Retina Displays

Responsive Web Design (RWD)

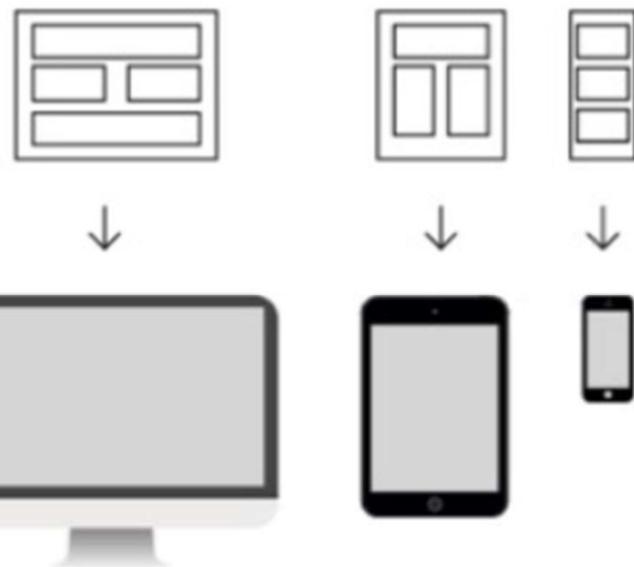
vs

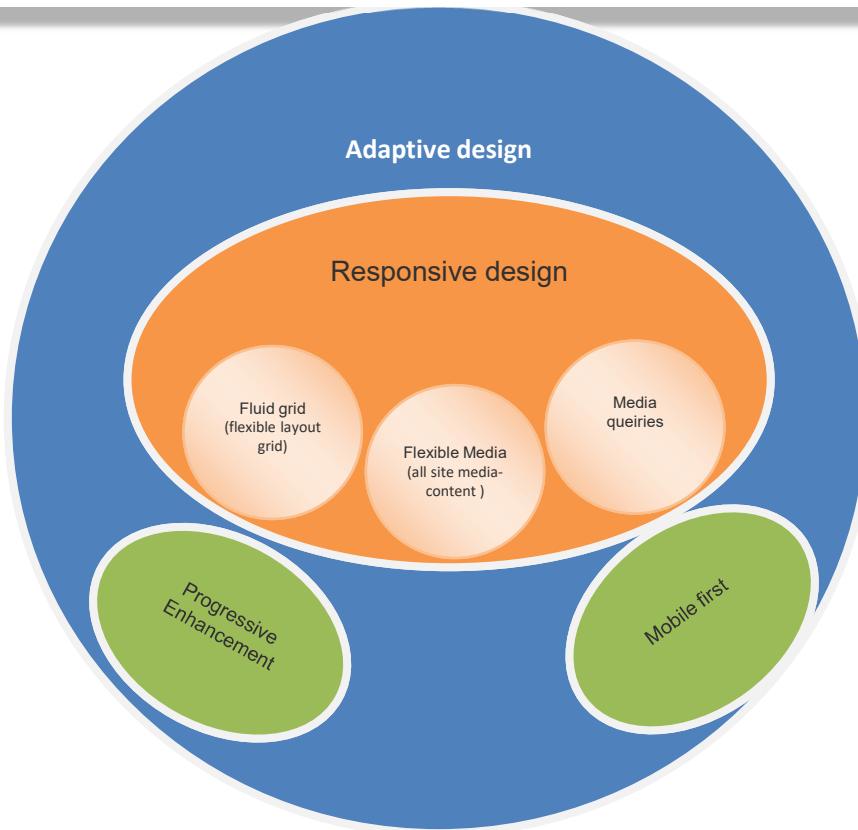
Adaptive Web Design (AWD)

Responsive



Adaptive





RWD & AWD

Both allow websites to be viewed in mobile devices and various screen sizes, ultimately providing visitors with a better mobile user experience



Adaptive Web Design (AWD)

- Uses the server to detect the device the website is being viewed on (desktop, tablet, smartphone)
- Sends specific files for that device
- Distinct templates for each device
- Pages load faster –usually housed on its own domain .domain.com or domain.com/m
- The condensed definition of an adaptive design is that it will change to fit a predetermined set of screen and device sizes.

This Is Responsive

Patterns and resources for creating responsive web experiences.

This Is Responsive. Patterns Resources

<http://bradfrost.github.io/this-is-responsive/>

This Is Responsive.

Patterns and resources for creating responsive web experiences.

This Is Responsive.

Patterns

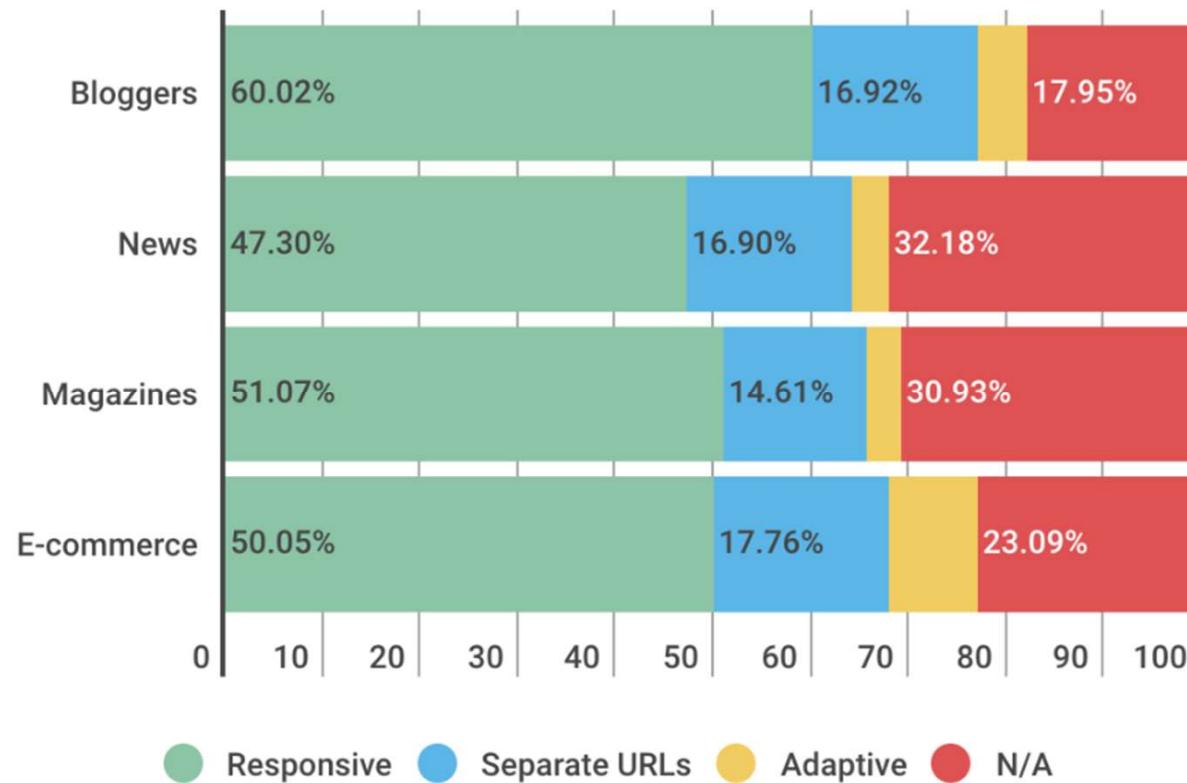
Resources

The concept of responsive web design (RWD)

Responsive Web design is not only about adjustable screen resolutions and automatically resizable images, but rather about a whole new way of thinking about design.

- Uses specific CSS code to modify the presentation of a website based on the size of the device it is being displayed on
- Information for every device is downloaded regardless of whether it is used
- Pages load slower – Same Domain name
- The condensed definition of a responsive web design therefore is that it will fluidly change and respond to fit any screen or device size.





<https://cloud.netlifyusercontent.com/assets/344dbf88-fdf9-42bb-adb4-46f01eedd629/1f768319-abf7-4f9a-9656-811187ce06d7/mobile-configuration-distribution-across-segments-large-opt.png>

Flexible everything

"Responsive Web Design" by Ethan Marcotte May 25, 2010 at

<https://alistapart.com/article/responsive-web-design/>

<https://alistapart.github.io/code-samples/responsive-web-design/ex/ex-site-flexible.html>



Automatic page rescale on mobile devices

On smartphones web designs automatically rescale to fit the tiny screen. A full-sized design, unless specified otherwise, would just shrink proportionally for the tiny browser. Then, the user could easily zoom in and out as necessary.

However, if your page style is optimized for mobile devices we need to tell the mobile device to display the page without any zooming.



```
<meta name="viewport" content="width=device-width,  
initial-scale=1.0">
```

<https://www.mydevice.io>

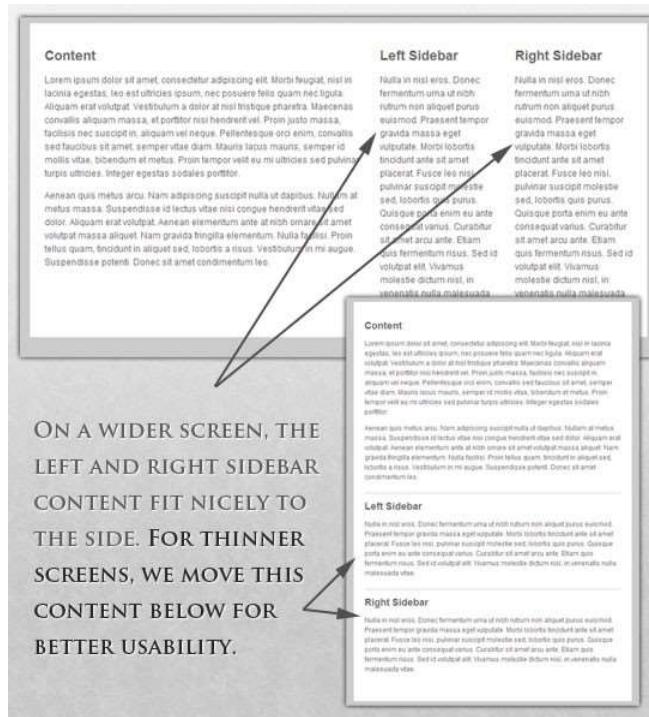
Viewport

```
<meta name="viewport" content="width=device-width, initial-scale=1.0">
```

- Use the meta `viewport` tag to control the width and scaling of the browser's viewport.
- Include `width=device-width` to match the screen's width in device-independent pixels.
- Include `initial-scale=1` to establish a 1:1 relationship between CSS pixels and device-independent pixels.

Custom layout structure

For extreme size changes, we may want to change the layout altogether, either through a separate style sheet or, more efficiently, through a CSS media query.



Showing or hiding content

It is possible to shrink things proportionally and rearrange elements as necessary to make everything fit (reasonably well) as a screen gets smaller.

The diagram illustrates how content is handled on different screen sizes. On a wider screen (left), three columns are visible: 'Main Content' (the main article text), 'A Left Sidebar' (with placeholder text), and 'A Right Sidebar' (with placeholder text). On a smaller screen (right), the sidebars are collapsed into links: 'Left Sidebar Content' and 'Right Sidebar Content'. A large red arrow points from the desktop's right sidebar area to the mobile phone's right sidebar link, indicating that the content from the desktop's right sidebar is being replaced by a link to the mobile version.

Main Content

A Left Sidebar

A Right Sidebar

CONTENT DISPLAYED
ON THE WIDER SCREEN
IS HIDDEN WHEN
MINIMIZED, AND THEN
REPLACED WITH LINKS.

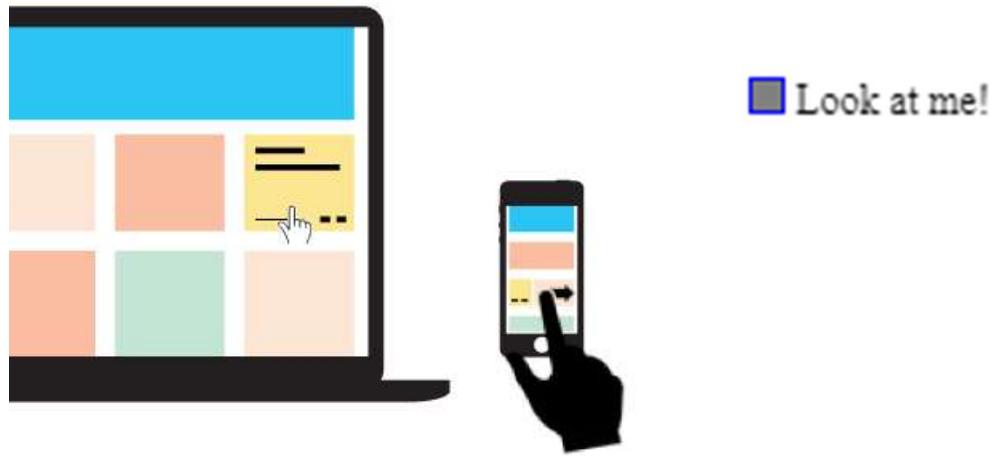
Left Sidebar Content | Right Sidebar Content

Main Content

Touchscreens vs. cursors

Touchscreens obviously come with different design guidelines than purely cursor-based interaction, and the two have different capabilities as well. Touchscreens have no capability to display CSS hovers because there is no cursor; once the user touches the screen, they click.

```
<input id="test" type="checkbox" />
<label for="test">Look at me!</label>
```



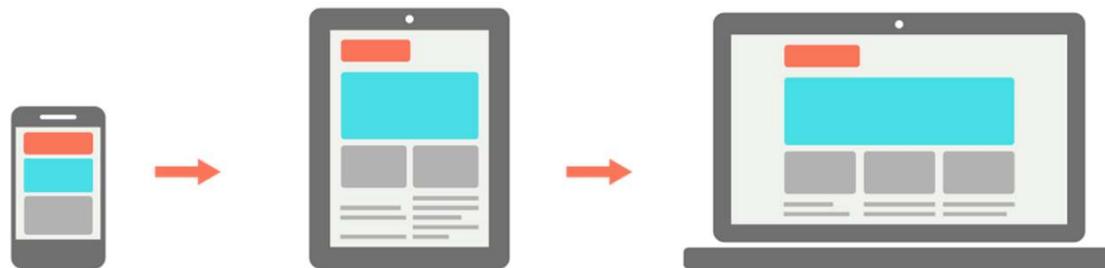
```
input[type="checkbox"] {
-moz-appearance: none;
-webkit-appearance: none;
appearance: none;
border: solid;
margin: 0;
}
input[type="checkbox"]:checked {
background: gray;
}
@media (pointer: fine) {
input[type="checkbox"] {
width: 15px;
height: 15px;
border-width: 1px;
border-color: blue;
} }
@media (pointer: coarse) {
input[type="checkbox"] {
width: 30px;
height: 30px;
border-width: 2px;
border-color: red;
} }
```

“Mobile first” and “desktop first”



Responsive Web Design

Mobile First Web Design



Graceful Degradation



Progressive Enhancement



Mobile website vs desktop

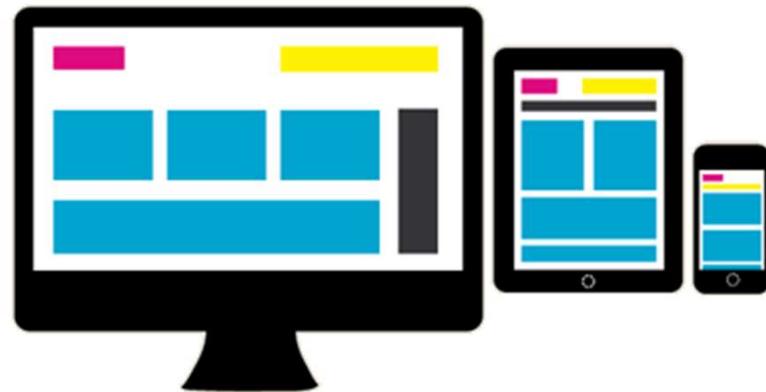
The primary goal of mobile stylesheets is to alter the layout for a smaller display and to reduce bandwidth for slower mobile networks.

```
<link rel="stylesheet" href="site.css" media="screen" />
<link rel="stylesheet" href="mobile.css" media="handheld" />
```



media queries

allow to specify a set of styles that will be applied to the specified types of media and devices.



```
@media condition {  
  /* styles (will be executed if the device meets  
  the specified condition)  
 }
```

@media

Media Type

```
@media screen and (max-width:525px) {  
    img[class="hide"] {  
        display: none !important;  
    }  
}
```

Expression To Test

Conditional CSS To Display

Media Types

Value	Description
all	Used for all media type devices
print	Used for printers
screen	Used for computer screens, tablets, smart-phones etc.

Logical operators

and - all specified conditions should be performed.

, (comma) – at least one of specified conditions should be performed.

not - assigned to negate the specified condition. For operator **and** has a lower priority, i.e. the operator **not** always executes after **and**.

```
@media screen and (min-width: 400px) and (max-width: 700px) { ... }
```

Logical operators

- @media all and (color) { ... }
 - @media all and (not print) { ... }
 - @media only all and (not print) { ... }
- @media all and (orientation: landscape), all and (min-width: 480px) { ... }

MEDIA FUNCTIONS

width - indicates the requirements for the width of the device's viewing area (browser).

min-width - specifies the minimum width of the viewport area in px, em or other units.

max-width - indicates what should be the maximum working area of the device (browser).

height, min-height и max-height - set the requirements similarly to the above functions, but for the **height** of the viewport.

Media functions

orientation - a function that checks what mode (portrait or landscape) the page is displayed in.

aspect-ratio (min-aspect-ratio, max-aspect-ratio) - can specify how the width of the device should be related to the height. Only integer values are allowed.

resolution (min-resolution, max-resolution) - indicates the resolution (pixel density) of the output device. The following values are used for the resolution units: dpi (dots per inch), dpcm (number of dots per centimeter), dppx (number of dots per pixel).

```
@media all and (orientation:portrait) { ... }
```

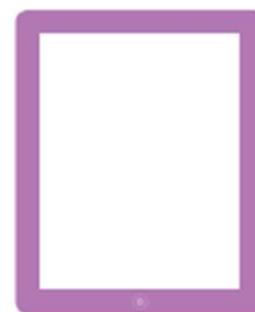
```
@media all and (orientation:landscape) { ... }
```

```
        @media screen and (device-aspect-ratio: 16/9) { ... }
```

```
        @media screen and (device-aspect-ratio: 32/18) { ... }
```



(min-width:800px)
(min-device-aspect-ratio: 1/1)



A
(min-device-width:768px)
(max-device-width:1024px)



B



A



B

(min-device-width:320px)
(max-device-width:480px)

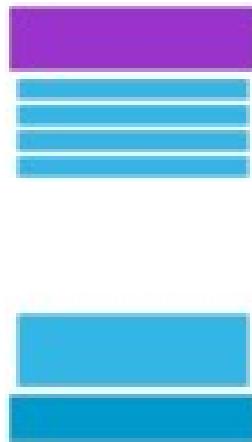
↑ Designing mobile-friendly web mapping applications using CSS3 media queries can provide an improved experience to your end users.
A @media screen and (orientation: portrait) B @media screen and (orientation: landscape)

How to choose breakpoints

- Create breakpoints based on content, never on specific devices, products, or brands.
- Design for the smallest mobile device first; then progressively enhance the experience as more screen real estate becomes available.
- Keep lines of text to a maximum of around 70 or 80 characters.

We can add a breakpoint where certain parts of the design will behave differently on each side of the breakpoint.

```
/* For mobile phones: */ /* For desktop : */
[class*="col-"] {
    width: 100%; }
}
@media only screen and (min-width: 768px) {
    .col-1 {width: 25%;}
    .col-2 {width: 50%;}
    .col-3 {width: 25%;}
}
```



Optimize text for reading

- classic readability theory suggests that an ideal column should contain 70 to 80 characters per line



Bacon Ipsum

Bacon ipsum dolor sit amet pancetta salami beef ribs ribeye ham. Ribeye strip steak boudin t-bone chuck tri-tip kielbasa sirloin frankfurter shankle ball tip ham short loin hamburger pork chop. Doner jowl tail, shoulder chicken beef ribs ribeye leberkas. Tongue corned beef fatback turkey pork chop bacon. Pork meatloaf



Images Art direction

Use relative sizes for images to prevent them from accidentally overflowing the container.

Use the picture element when you want to specify different images depending on device characteristics (a.k.a. art direction).

Use **srcset** and the **x** descriptor in the **img** element to give hints to the browser about the best image to use when choosing from different densities.

Use relative sizes for images

```
img, embed, object, video {  
    max-width: 100%;  
}
```

Flexible images width

The most popular option for working with images in responsive Web design is to use CSS's max-width for an easyfix.

```
img {  
    max-width: 100%;  
    width: auto;  
    height: auto;  
}
```



The path of the righteous man is beset on all sides by the iniquities of the selfish and the tyranny of evil men. Blessed is he who, in the name of charity and good will, shepherds the weak through the valley of darkness, for he is truly his brother's keeper and the finder of lost children. And I will strike down upon Bree with great vengeance and furious anger those who would attempt to poison and destroy My brothers. And you will know My name is the Lord when I lay My vengeance upon thee.

Look, just because I don't be givin' no man a foot massage
don't make it right for Mansellus to throw Antwone into a glass
motherfuckin' house, fuckin' up the way the nigger talks.
Mother-fucker do that shit to me, he better paralyze my ass.



The path of the righteous man is beset on all sides by the iniquities of the selfish and the tyranny of evil men. Blessed is he who, in the name of charity and good will, shepherds the weak through the valley of darkness, for he is truly his brother's keeper and the finder of lost children. And I will strike down upon thee with great

Group of images in different resolutions

This technique requires a few image files in different resolutions loaded for different screen size. Image switching may be implemented with help of some javascript plugin or by back-end based solution.

```
  

```



Large image large.jpg



Medium image med.jpg



Small cropped image small.jpg

Srcset Example

```

```

```

```



HTML5 picture element

<picture> element is a solution that is both complete and in need of no additional scripts or third- party services to do the job.

```
<picture>
  <source srcset="high-res.jpg" media="(min-width: 64em)">
  <source srcset="med-res.jpg" media="(min-width: 37.5em)">
  <source srcset="logo.svg" type="image/svg+xml">
  
</picture>
```

Picture Example

```
<picture>
  <source media="(min-width: 800px)" srcset="head.jpg, head-2x.jpg 2x">
  <source media="(min-width: 450px)" srcset="head-small.jpg, head-small-2x.jpg 2x">
  
</picture>
```

Relative sized images

```

```

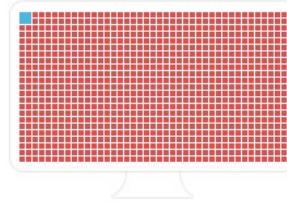
Retina displays

Smartphone device manufacturers introduced double density pixel screens for creating sharper images on smaller screens. However, this some issues for designers and developers as images that are not optimized for high-resolution screen will look less than stellar.

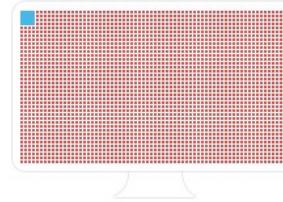


Retina displays

LESS PIXELS



MORE PIXELS (retina)



CSS pixels



uses..

physical pixels



`width: 2px;
height: 2px;`



CSS pixels

uses..



physical pixels

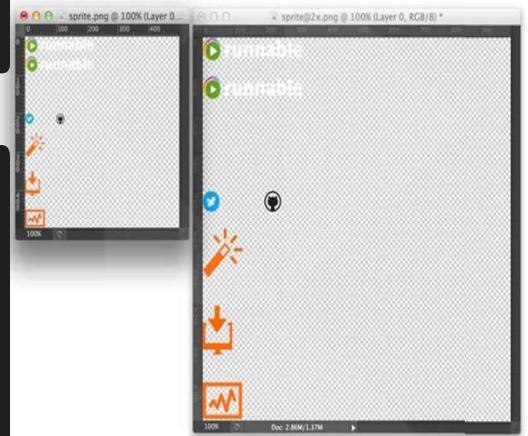
Few coding techniques for retina displays

Use media queries for high-res CSS styles

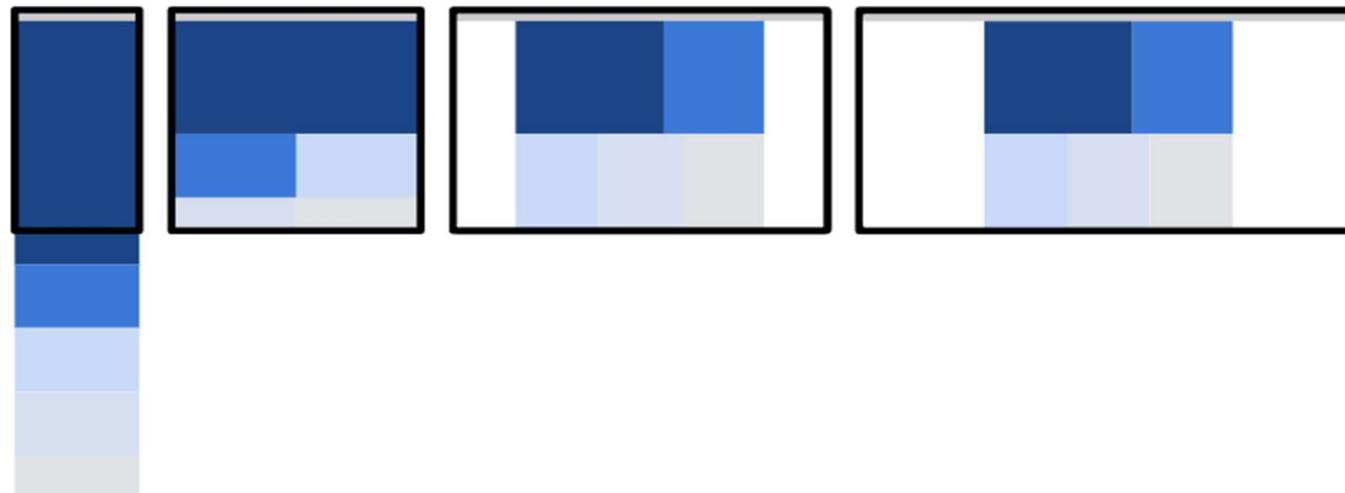
```
@media screen and (-webkit-min-device-pixel-ratio: 2), (min-resolution: 192dpi)
{
    /* High-res styles go here */
}
```

Have two versions of your CSS sprites: standard dimensions and @2x

```
@media screen and (-webkit-min-device-pixel-ratio: 2), (min-resolution: 192dpi)
{
    .logo{
        background-image: rl(assets/sprite@2x.png);
        background-size: 500px 500px;
    }
}
```



Mostly Fluid

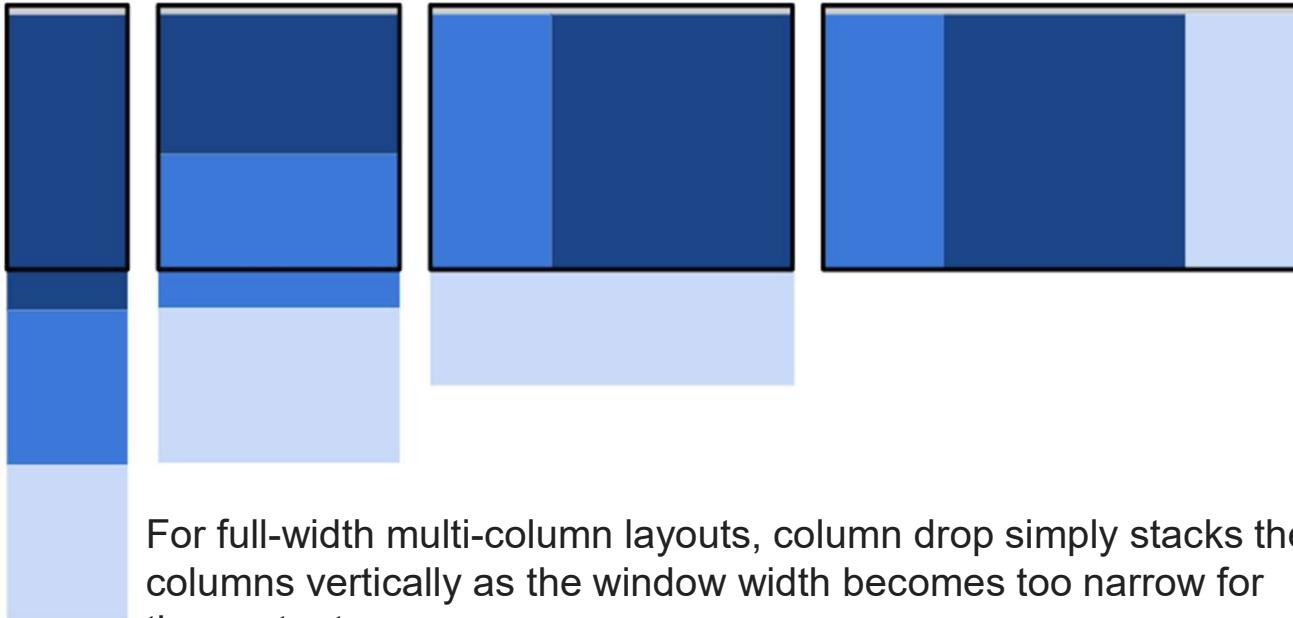


The mostly fluid pattern consists primarily of a fluid grid. On large or medium screens, it usually remains the same size, simply adjusting the margins on wider screens.

On smaller screens, the fluid grid causes the main content to reflow, while columns are stacked vertically. One major advantage of this pattern is that it usually only requires one breakpoint between small screens and large screens.

```
.c1, .c2, .c3, .c4, .c5 {  
    width: 100%;  
}  
  
@media (min-width: 600px) {  
    .c2, .c3, .c4, .c5 {  
        width: 50%;  
    }  
}  
  
@media (min-width: 800px) {  
    .c1 {  
        width: 60%;  
    }  
    .c2 {  
        width: 40%;  
    }  
    .c3, .c4, .c5 {  
        width: 33.33%;  
    }  
}  
  
@media (min-width: 800px) {  
    .container {  
        width: 800px;  
        margin-left: auto;  
        margin-right: auto;  
    }  
}
```

Column drop



For full-width multi-column layouts, column drop simply stacks the columns vertically as the window width becomes too narrow for the content.

Eventually this results in all of the columns being stacked vertically. Choosing breakpoints for this layout pattern is dependent on the content and changes for each design.

```
.c1, .c2, .c3 {  
    width: 100%;  
}  
  
@media (min-width: 600px) {  
    .c1 {  
        width: 60%;  
        -webkit-order: 2;  
        order: 2;  
    }  
  
    .c2 {  
        width: 40%;  
        -webkit-order: 1;  
        order: 1;  
    }  
  
    .c3 {  
        width: 100%;  
        -webkit-order: 3;  
        order: 3;  
    }  
}  
  
@media (min-width: 800px) {  
    .c2 {  
        width: 20%;  
    }  
  
    .c3 {  
        width: 20%;  
    }  
}
```



<https://modernizr.com/>

Respond to your user's browser features.

Modernizr tells you what HTML, CSS and JavaScript features the user's browser has to offer.

[Add your detects](#)

[Development build](#)



DOWNLOAD

DOCUMENTATION

NEWS

RESOURCES

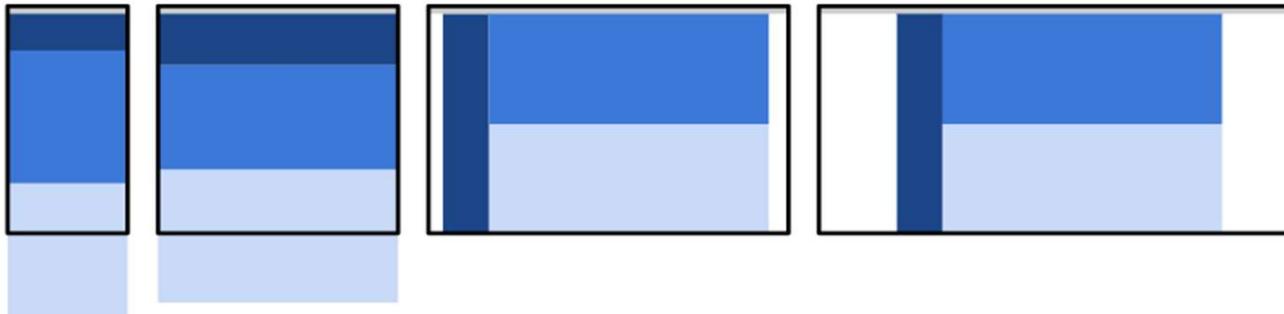
Respond to your user's browser features.

Modernizr tells you what HTML, CSS and JavaScript features the user's browser has to offer.

[Add your detects](#)

[Development build](#)

Layout shifter



The layout shifter pattern is the most responsive pattern, with multiple breakpoints across several screen widths.

Key to this layout is the way content moves about, instead of reflowing and dropping below other columns. Due to the significant differences between each major breakpoint, it is more complex to maintain and likely involves changes within elements, not just overall content layout.

```
.c1, .c2, .c3 {  
    width: 100%;  
}  
  
@media (min-width: 600px) {  
    .c1 {  
        width: 25%;  
    }  
  
    .c4 {  
        width: 75%;  
    }  
}  
  
@media (min-width: 800px) {  
    .container {  
        width: 800px;  
        margin-left: auto;  
        margin-right: auto;  
    }  
}
```

Tastemakers Blog The A-List Contribute About



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Get daily how-tos, stories & updates with the latest news.

* photo by Clare Barboza



Sign up for our newsletter to receive a handpicked selection of the best stories, recipes, and news, delivered weekly to your inbox.

Tastemakers

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About

LATEST TWEET

Join the Conversation

<http://foodsense.is/>



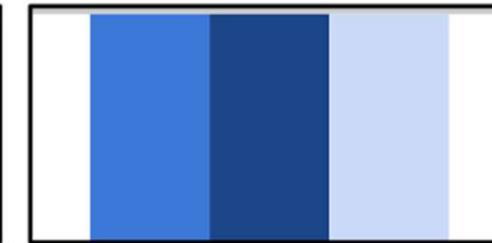
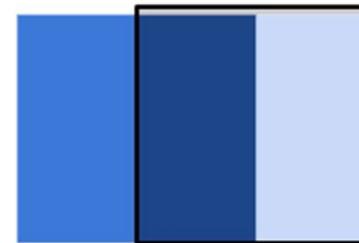
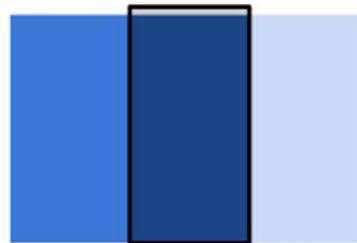
Tastemakers

Blog

The A-List

Contribute

Off canvas

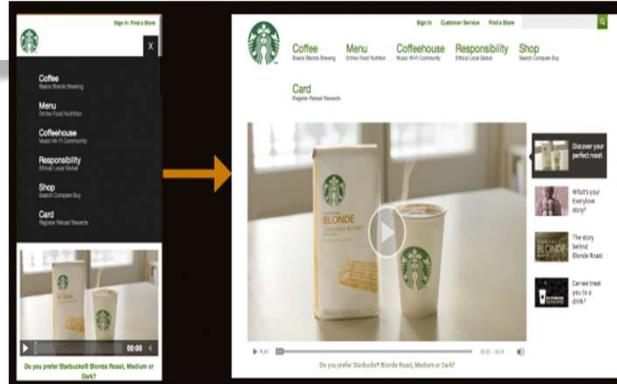


<https://developers.google.com/web/fundamentals/design-and-ux/responsive/patterns>

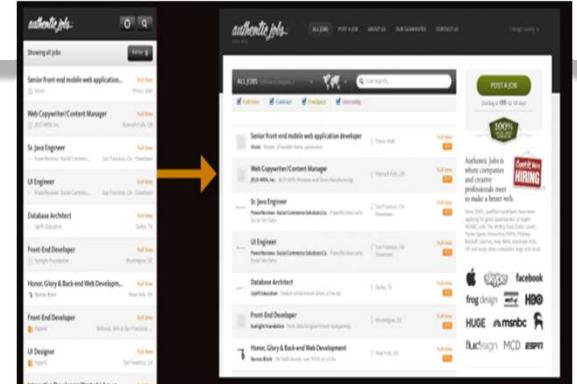
Responsive Navigation Patterns



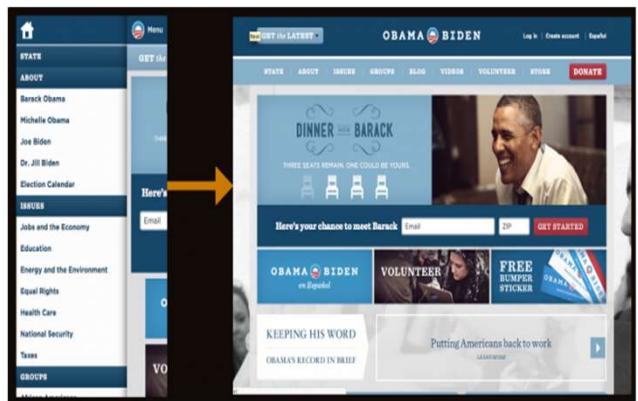
the select menu



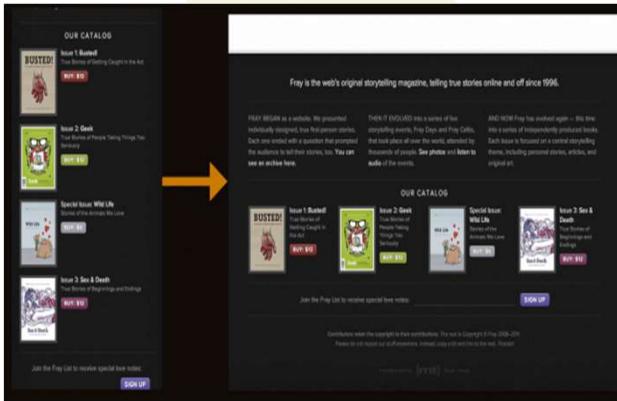
the toggle



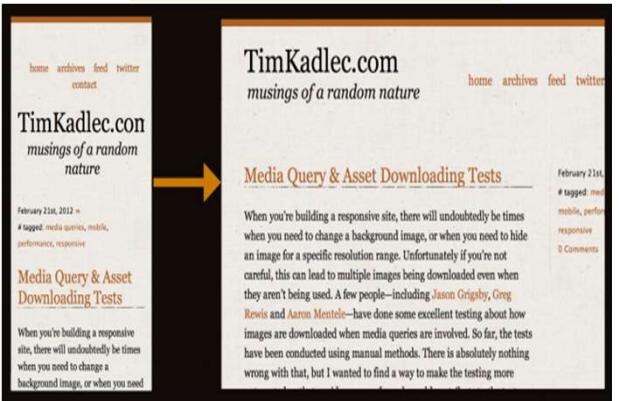
the “hide n’ cry”



the left nav layout



the footer-only



top nav or “do nothing” approach

Top toggle menu

Pros:

- **one button in header** maximizes space for content on a small screen
- **important items stay visible** in most screen sizes and you decide the item priorities
- **legibility of navigation items is maintained** with adequate spacing, by automatically hiding items that don't fit

Cons:

- **navigation items might be less discoverable** because some items are hidden in the drop-down or toggle menu
- **users may not notice the button** contains a navigation menu in the smallest screen size
- **one more step** is needed to access the hidden navigation items

Top toggle menu

The diagram illustrates a top toggle menu design across three different screen sizes: desktop/wide tablet, tablet, and mobile.

desktop/ wide tablet layout: The top navigation bar includes links for Breakfast, Lunch, Dinner, About Us, Blog, and Contact. Below the navigation, there are six cards arranged in two rows of three. The top row contains "Sweet corn soup", "Cilantro chicken", and "Homemade buttermilk". The bottom row contains "Grilled salmon", "Frozen yogurt", and "Greek salad". Each card has a light gray background with a dark gray cross pattern and a small blue text label at the bottom.

tablet layout: The top navigation bar includes links for Breakfast, Lunch, Dinner, About Us, Blog, and Contact. Below the navigation, there are four cards arranged in two rows of two. The top row contains "Sweet corn soup" and "Cilantro chicken". The bottom row contains "Grilled salmon" and "Frozen yogurt". Each card has a light gray background with a dark gray cross pattern and a small blue text label at the bottom.

wide mobile layout: The top navigation bar includes links for Breakfast, Lunch, Dinner, and a "More" button with a dropdown arrow. Below the navigation, there are two cards arranged in one row of two. The first card contains "Sweet corn soup" and the second card contains "Cilantro chicken". Each card has a light gray background with a dark gray cross pattern and a small blue text label at the bottom.

mobile layout: A hand icon is shown clicking on the "More" button in the wide mobile layout. This triggers a transition indicated by a dashed arrow to the right, leading to the final mobile layout. In the mobile layout, the top navigation bar includes links for Breakfast, About Us, Lunch, Blog, Dinner, and Contact. Below the navigation, there are three cards arranged vertically. The first card contains "sweet corn soup", the second card contains "Cilantro chicken", and the third card contains "Salad". Each card has a light gray background with a dark gray cross pattern and a small blue text label at the bottom.

Expandable bottom menu

Pros:

expandable menu is easy to discover

important items are always visible and you decide the item priorities

legibility of navigation items is maintained with adequate spacing, by automatically hiding items that don't fit

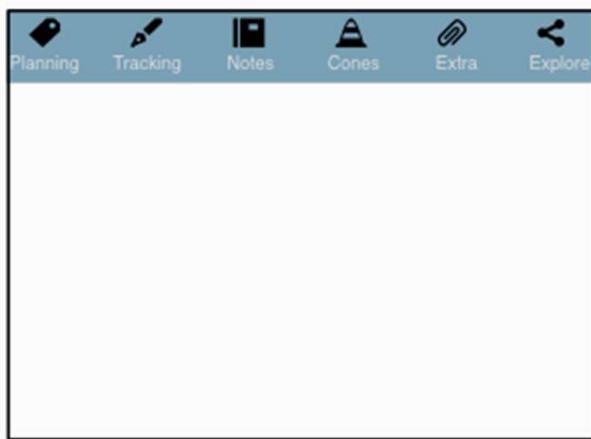
Cons:

one more step is needed to access the navigation items that are hidden

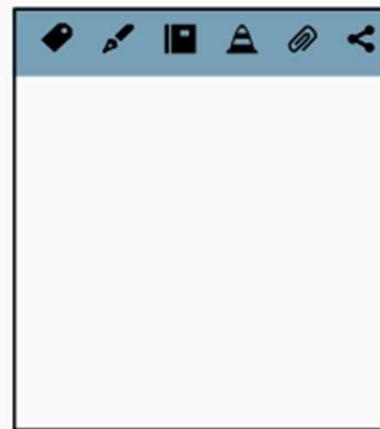
navigation items might be less discoverable because some items are hidden

less space for content in the smallest screen size

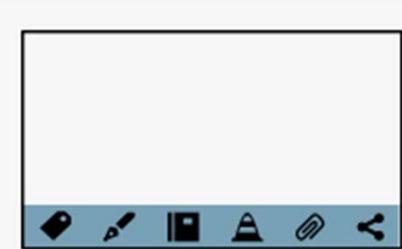
Expandable bottom menu



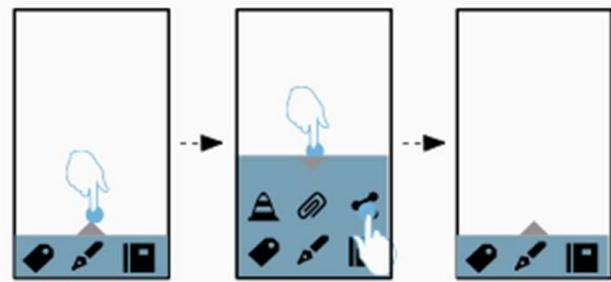
desktop/ wide tablet layout



tablet layout



wide mobile layout



mobile layout

Left hidden menu

Pros:

- potentially displays more navigation items** in a left navigation compared to a top navigation
- most items are always visible** except in the smallest screen size
- one button in header** maximizes space for content on a small screen

Cons:

- navigation items might be less discoverable** because some items are hidden in the drop-down or toggle menu
- users may not notice the button** contains a navigation menu in the smallest screen size
- one more step** is needed to access the navigation items that are hidden

Left hidden menu

Account

Notebooks

- food
- news
- gossip
- planet

Tags

- food
- news
- gossip
- planet

Blog post from yesterday
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Praesent vehicula, velit fermentum eleifend sodales, urna libero porta magna, nec sagittis felis tortor sed neque. Sed euismod blandit augue at finis.

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Sharpies don't work anymore
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desktop/ wide tablet layout

Account

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Blog post from yesterday
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Random snippet
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Sharpies don't work...
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Banana film
Lorem ipsum dolor sit amet, consectetur adipiscing elit.

tablet layout

Account

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Random snippet
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wide mobile layout

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mobile layout

Accessibility

prefers-reduced-motion detects if the user has the reduced motion preference activated to minimize the amount of movements and animations.

It takes two values: *no-preference, reduce*.

prefers-contrast informs whether the user has chosen to increase or reduce contrast in their system preferences or the browser settings.

It takes three values: *no-preference, high, low*.

inverted-colors informs whether the user has chosen to invert the colors on their system preferences or the browser settings. Sometimes this option is used as an alternative to high contrast.

It takes values: *none, inverted*.

prefers-color-scheme - we can tap into a user's system or browser preferences to determine whether we serve a "dark" or a "light" theme based on their preferences.

It takes two values: *light, dark*

```
.button {  
background-color: #0958d8;  
color: #fff; }  
@media (prefers-contrast: high) {  
.button {  
background-color: #0a0db7;  
} }  
  
@media (inverted-colors) {  
img, video {  
filter: invert(100%);  
} }  
  
body {  
--bg-color: white;  
--text-color: black;  
background-color: var(--bg-color);  
color: var(--text-color);  
}  
@media screen and (prefers-color-scheme:  
light) {  
body {  
--bg-color: black;  
--text-color:white;  
} }
```

Related resources

- [Tutorials at smashingmagazine.com](#)
- [Presentation about work with retina displays pepelsbey.net](#)
- [The first famous article about responsive web design alistapart.com](#)
- [Responsive design inspiration at mediaqueri.es](#)
- [Image scaling trick with aspect ratio](#)

FE Online UA Training Course Feedback

I hope that you will find this material useful.

If you find errors or inaccuracies in this material or know how to improve it, please report on to the electronic address:

serhii_shcherbak@epam.com

With the note [FE Online UA Training Course Feedback]

Thank you.

Q&A

<epam>



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CANDID



CREATIVE



ORIGINAL



INTELLIGENT



EXPERT

UA Frontend Online LAB