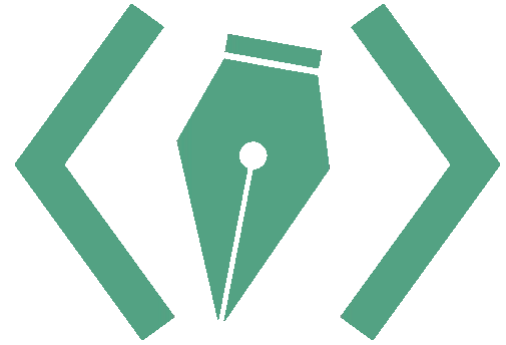


Week 07

# Responsive Design



# Announcements

## Midterm Project

Submit by **tonight @ 11:59pm**: [wdd.io/go/project-submit](https://wdd.io/go/project-submit)

## This week

No HW or lab!

## Thursday Lab [+2 Extra Credit for coming!]

Join main lecture Zoom call! Top project selections will present in lab! Support your classmates!

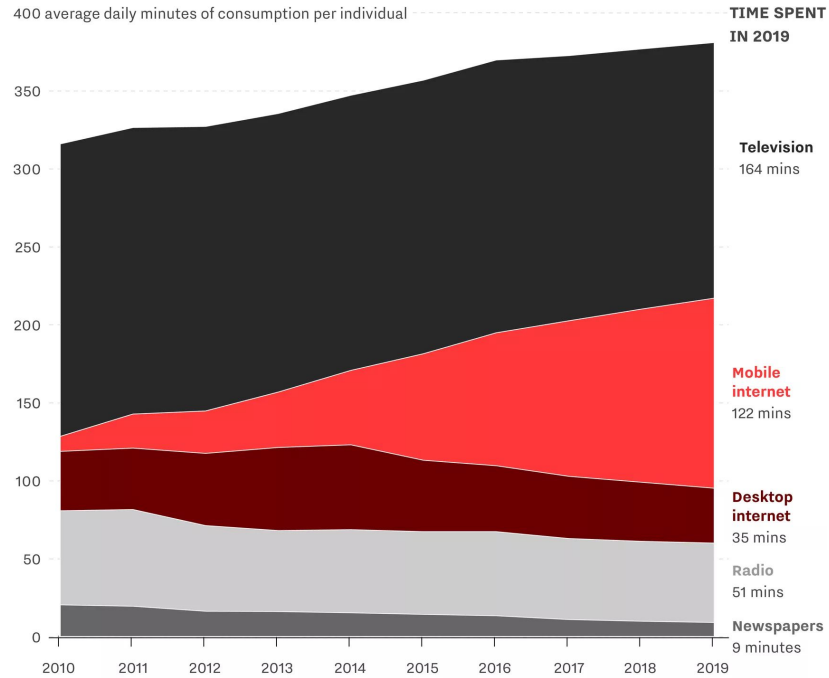
Come to office hours via Piazza or [wdd.io/go/OH](https://wdd.io/go/OH)

Give us anonymous feedback at [wdd.io/go/feedback](https://wdd.io/go/feedback)

# State of the Internet

- Nearly 4.4 billion people have access to the internet today
- Internet is accessible from all kinds of devices including:
  - Laptops and Desktops
  - Tablets
  - Smartphones
  - Game consoles
  - Smartwatches
  - Fridges
  - Microwaves
- We are in the post-PC era!

## Worldwide average media consumption by type

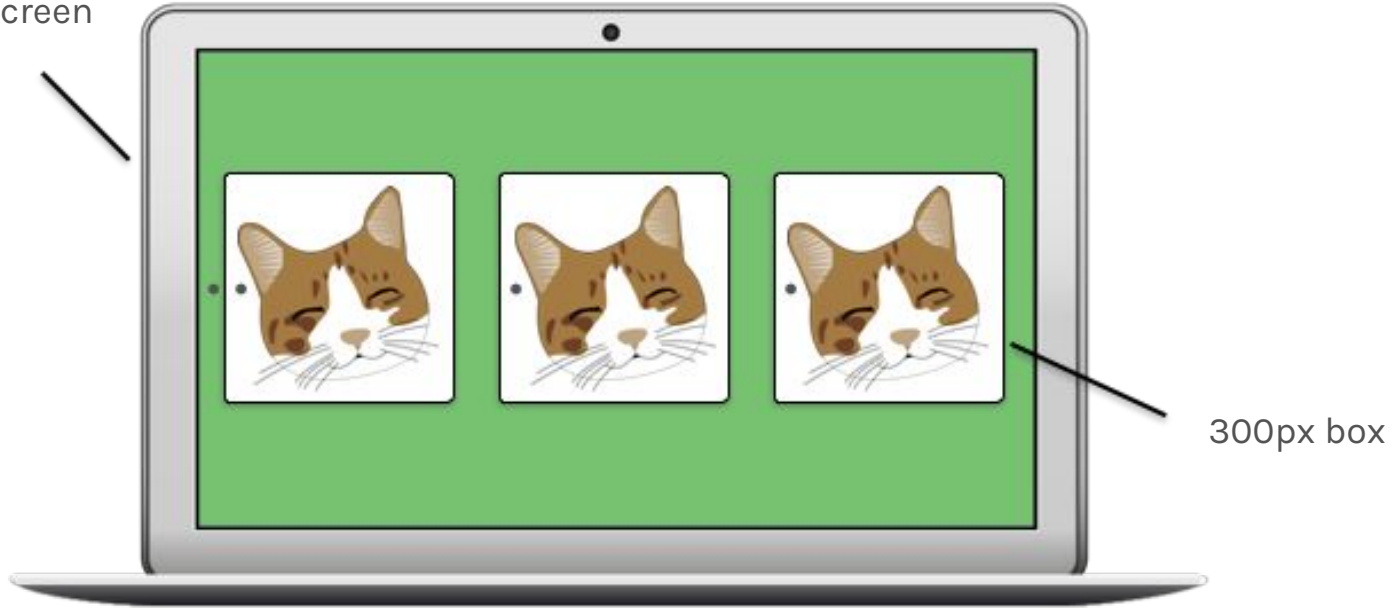


Source: Zenith | Forecasts begin in 2017

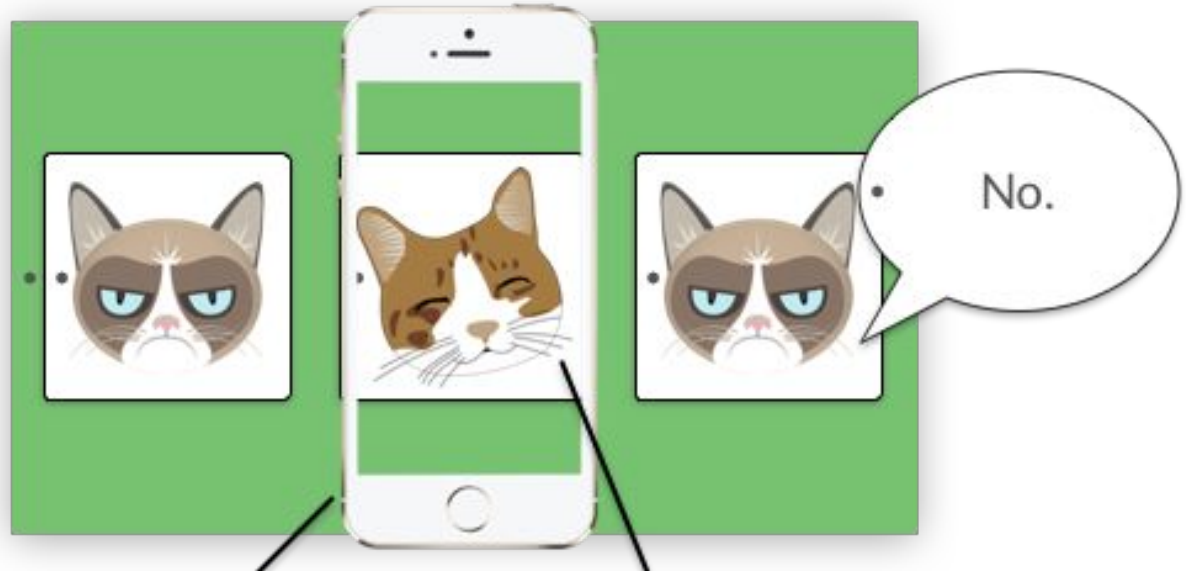
recode

# Why won't my site work on all devices?

1280px screen



# Why won't my site work on all devices?



300px screen

300px box

# **Inspector Demo — What does my site look like on mobile, anyway?**

# Google Mobile Friendly Test

The screenshot shows the Google Mobile-Friendly Test interface. At the top, a dark header bar contains a back arrow, the text "Mobile-Friendly Test", and icons for chat, a grid, and a profile. Below this is a browser address bar showing "http://airbnb.com/" with a refresh icon. The main content area is titled "Test results". On the left, a panel shows a warning icon and the text "Page loading issues VIEW DETAILS". Below this, a box states "Tested on: Oct 22, 2019 at 7:25 PM" and "Page is mobile friendly" in green, with a subtext "This page is easy to use on a mobile device" and a green mobile icon. A "Show apps" button is next to the icon. Below this, a section titled "Additional resources" lists three links: "Open site-wide mobile usability report", "Learn more about mobile-friendly pages", and "Post comments or questions to our discussion group". On the right, a "Rendered page" tab is active, showing a preview of the Airbnb homepage on a mobile device. The preview displays the text "Book unique places to stay and things to do." and a "WHERE" search bar with "Anywhere" entered. A share icon is visible in the bottom right corner of the preview.

← Mobile-Friendly Test

http://airbnb.com/

### Test results

⚠ Page loading issues VIEW DETAILS

Rendered page HTML SCREENSHOT

Tested on: Oct 22, 2019 at 7:25 PM

**Page is mobile friendly**

This page is easy to use on a mobile device

Show apps

Additional resources

- Open site-wide mobile usability report
- Learn more about mobile-friendly pages
- Post comments or questions to our discussion group

Book unique places to stay and things to do.

WHERE

Anywhere

[Link](#)

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# Why won't my site work on all devices?

- Different devices come with different screen sizes and rendering engines
- Content designed for a laptop with a much bigger screen won't look the same on a tablet/mobile with a much smaller screen

What does this mean for **designers**?

**We need to make sure our websites work on  
all devices & browsers**

# Responsive Web Design

- “Designing websites for multiple screen sizes and devices, so that there is an optimal experience for every user at every possible size.”
- Responsive design deals with:
  - Browser compatibility
  - Screen resolutions
  - Mobile compatibility
- We will be exploring each of these aspects today

# Issue 1: Browser Compatibility

# Browser Compatibility

- The ability of a website to function “as expected” on any web browser
- Browsers have different rendering engines, which is the component that displays the HTML and CSS onto the screen
  - As a result, each browser interprets your code differently

# Dotted Border Differences



IE7



IE8



IE10 PP2



Chrome 15.x



FF 4



FF 6



Safari 5.1



Opera 11.50

# Vendor Prefixes

```
#container-3 {  
  display: none;  
  background-color: white;  
  width: 100%;  
  -webkit-transition: opacity 0.3s;  
  -moz-transition: opacity 0.3s;  
  -o-transition: opacity 0.3s;  
  transition: opacity 0.3s;  
}
```



## Vendor Prefixes — Limitations

- Commonly used vendor prefixes for simple things (linear gradients, transitions, etc.)
- Instead of vendor prefixes, major browsers are moving away from prefixes and toward **@supports** or **feature queries**.
  - Not really in the scope of this class, but feel free to research on your own!

Can I use

transform

? Settings

50 results found

☒ Caniuse (2) ☒ MDN (48)

## # CSS3 2D Transforms - WD

Method of transforming an element including rotating, scaling, etc. Includes support for transform as well as transform-origin properties.

Usage % of all users ?

Global 98.41%

unprefixed: 97.38%

Current aligned Usage relative Date relative Filtered All

IE	Edge	Firefox	Chrome	Safari	Opera	iOS Safari	Opera Mini	Android Browser	Opera Mobile	Chrome for Android	Firefox for Android	UC Browser for Android	Samsung Internet	QQ Browser	Baidu Browser	KalOS Browser
					10.1											
					11.5											
6-8		2-3			12.1											
9	12-16	3.5-15	4-35	3.1-8	15-22	3.2-8.4										
10	17-85	16-80	36-85	9-13.1	23-70	9-13.7		2.1-4.4.4	12-12.1				4-11.2			
11	86	81	86	14	71	14	all	81	59	85	79	12.12	12.0	10.4	7.12	2.5
		82-83	87-89	TP												

Notes Known issues (3) Resources (10) Feedback

The scale transform can be emulated in IE < 9 using Microsoft's "zoom" extension, others are (not easily) possible using the MS Matrix filter

1 Does not support CSS transforms on SVG elements (transform attribute can be used instead)

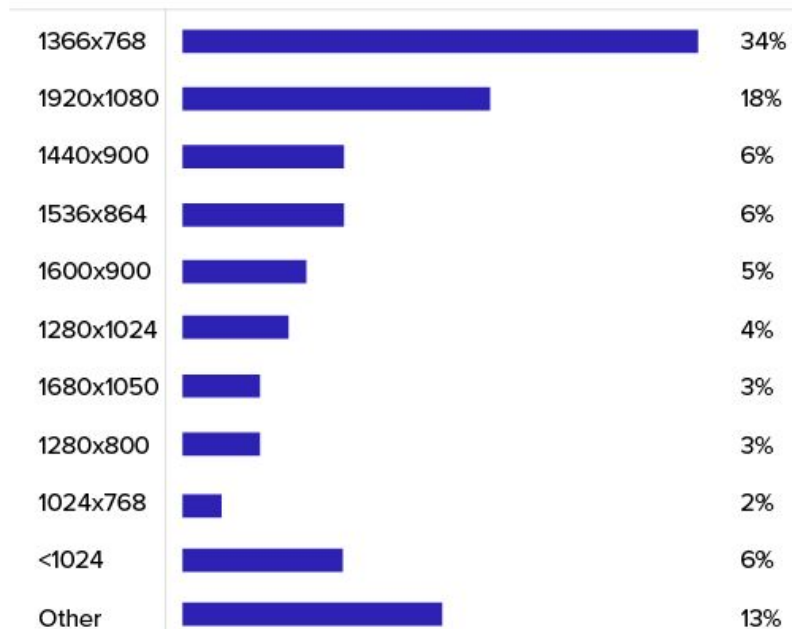
## Issue 2: Screen Resolutions

# Screen Res, y'all

- Resolution: how many pixels your screen can display horizontally and vertically
  - [whatismyscreenresolution.com](https://whatismyscreenresolution.com)
- Not all users will view your website on devices with the same screen resolution
  - 13" Macbook Pro vs 15" Macbook Pro
- Changing the size of your browser window also affects how your website looks

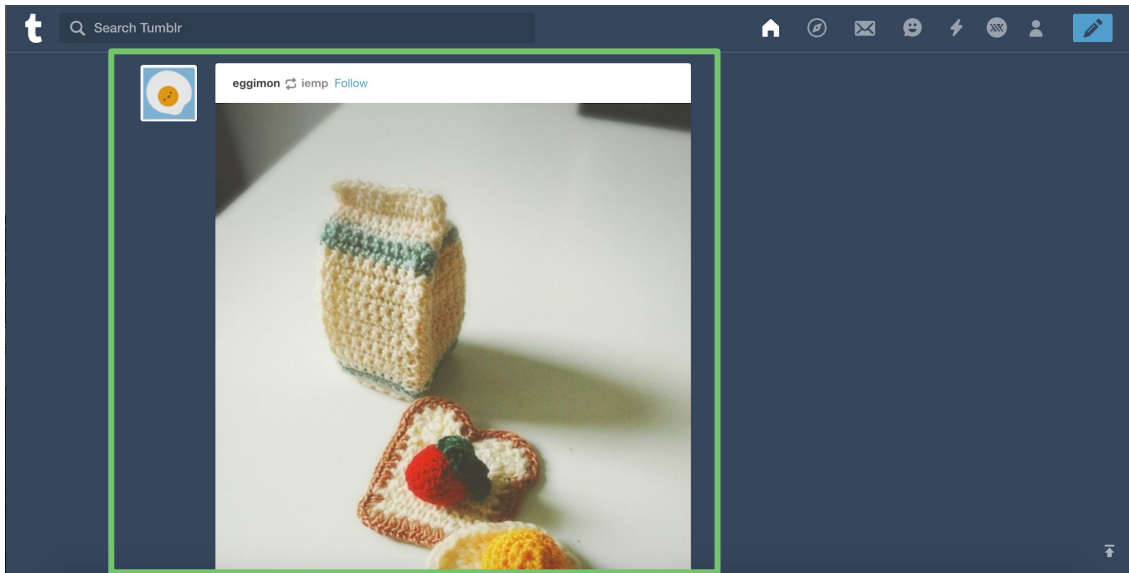
# Screen Res, y'all

Most common browser viewing sizes (January 2018)



# Screen Res, y'all

- Use containers to make your content fit a certain size
  - Using a container size of ~1024x768 is ideal:
  - All screen resolutions greater than or equal the size of the container will have a good viewing experience



Lower Screen Resolutions:  
**Use CSS Media Queries**



## **Issue 3: Mobile Compatibility**

# Designing for Mobile

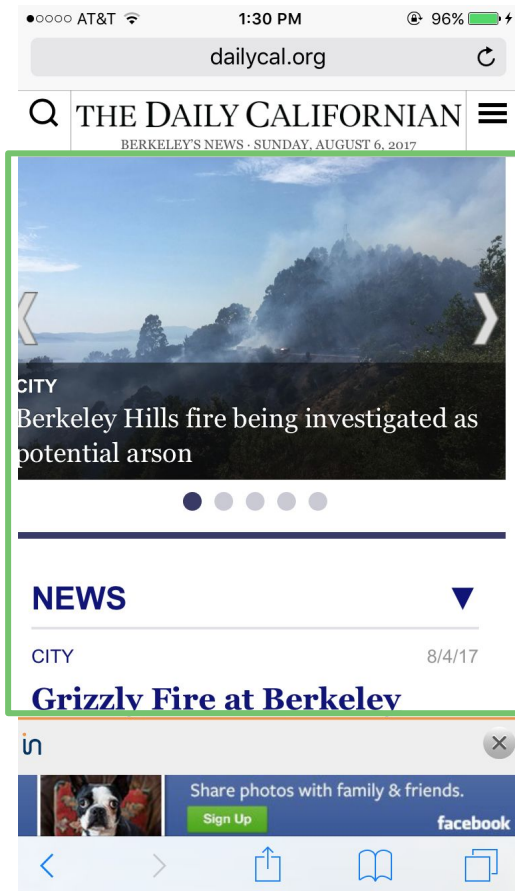
- User interfaces for mobile websites are quite different than those for desktop
- They differ in three main ways:
  - Screen size
  - Touchscreen capabilities
  - Performance

# Mobile vs Desktop

	Mobile	Desktop
Screen Size	4" - 6.1"	11" - 30"
Input Method	Touchscreen	Mouse/trackpad
Performance	Relatively slow	Relatively fast

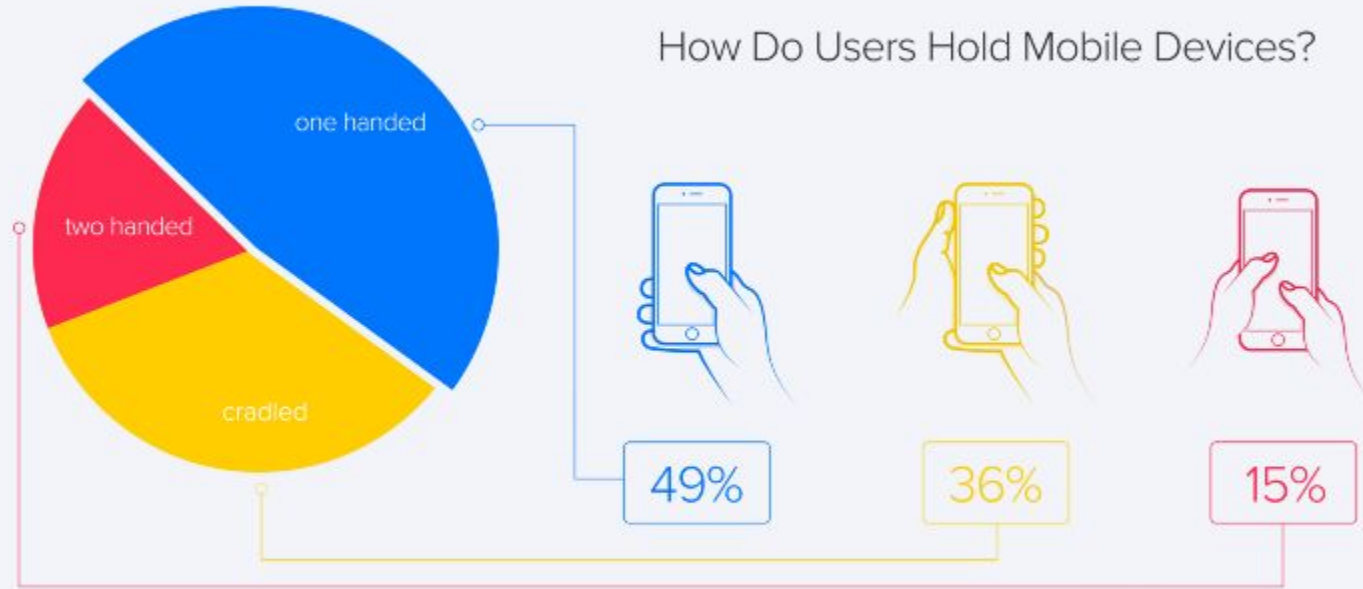
# Screen Size

- Screen size is much, much smaller than on desktop:
  - Focus on the content and tuck everything else away
- Due to the restricted space, most UIs should stack elements vertically
  - Helps maximize the width and emphasis on each element



- Restrict your use of position: fixed elements
  - They reduce space for content
- Top bar and ad at the bottom are fixed, leaving less space for content

## How Do Users Hold Mobile Devices?



Statistics from uxmasters.com

@dward 

**We mostly use our mobile phones one-handed**

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# Reachability

Left-Handed & Right- Handed Example

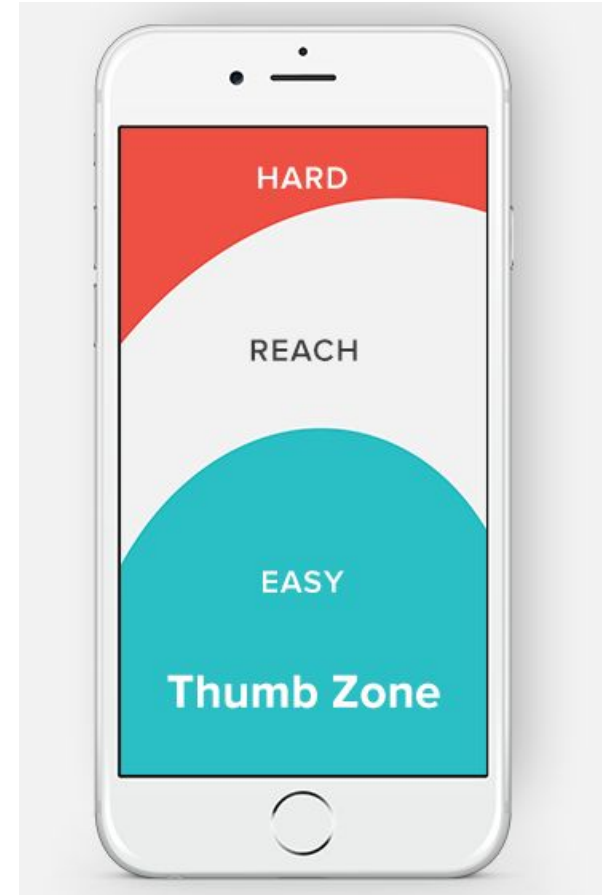
- — Good
- — Medium
- — Out of Reach (OW)

Reachability has physical limits

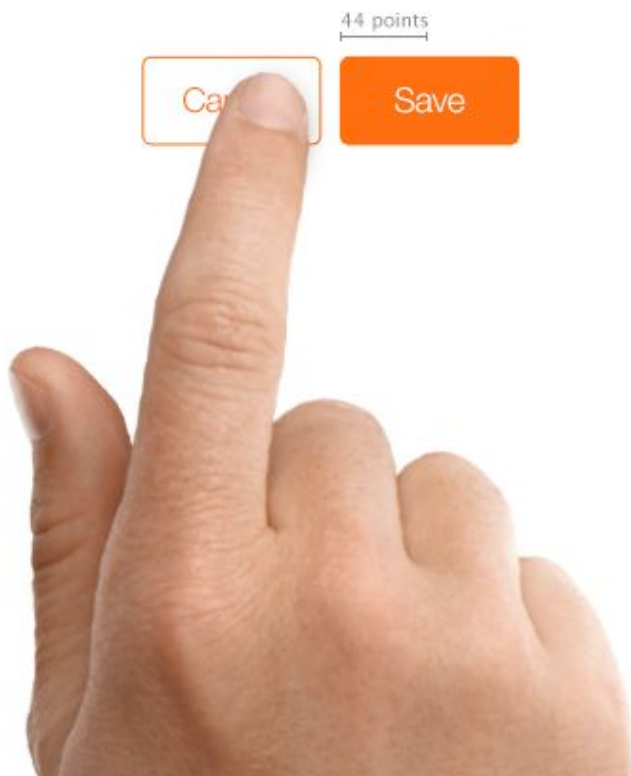
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# Touch Screen

- Thumbs are less precise than cursors
  - Add padding to accommodate for the size of people's thumbs
- Commonly used buttons should be placed at the bottom of the screen:  
Improves reachability



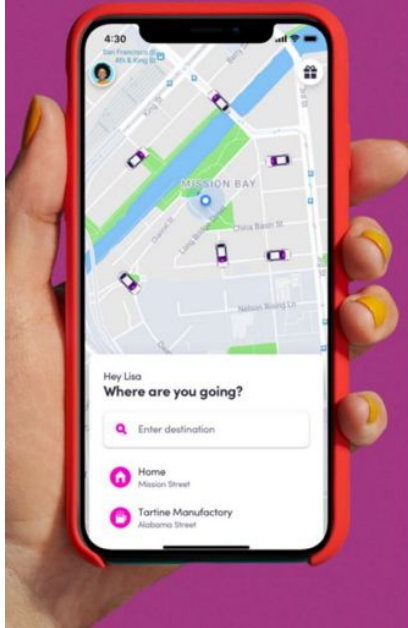




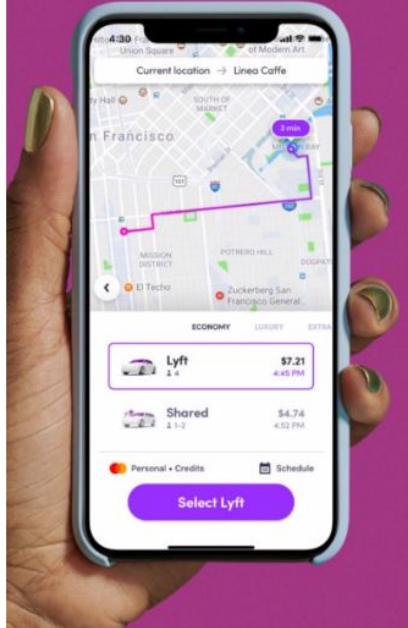
**Mobile UI elements should have accessible dimensions**

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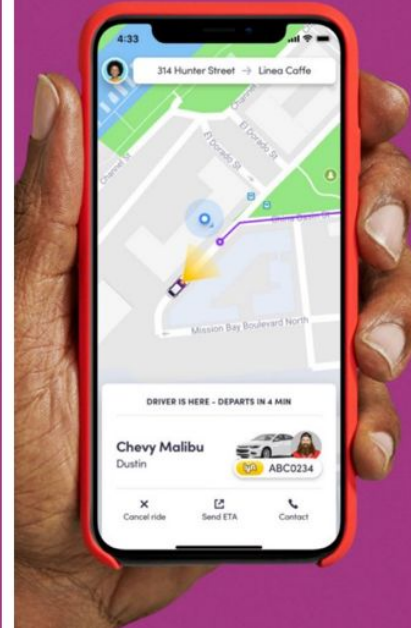
Choose your  
destination



See your cost  
up front



Get a ride  
in minutes

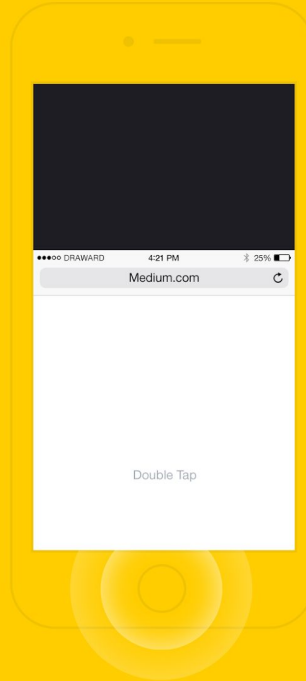


Lyft — Effective mobile reachability

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EXAMPLE

## iOS Reachability Solution



477px  
Of Useful Space

@draward 

# Performance

- Rendering performance on mobile is roughly half that of desktop
  - This causes mobile websites to be slow
- Minimize heavy JavaScript front-end manipulation
- Minimize use of transitions, animations, hover effects, etc.
- Mobile UIs should be as simple as “click and scroll”

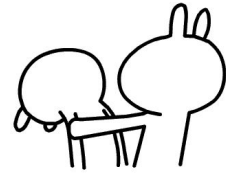
## **Solution: Mobile-First Design**

# Performance

- It's harder to squash things down to fit more things in smaller space than opening things up and adding more things to fill a larger space
- Design for mobile first, then design for larger screens
  - forces you think about what is important (visual hierarchy!)
  - take accessibility to the next level

# Review

- Designing for variation is important
- Make sure your websites work on all browsers
  - Add prefixes if necessary
- Make sure your websites work WELL on all devices
  - Mobile-first design



**Questions?**