Accessibility Crash Course for Web Developers

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What is Web Accessibility?

> *"Web accessibility means that people with disabilities can use the Web."*

W3C Web Accessibility Initiative (WAI)

What is Web Accessibility? (continued)

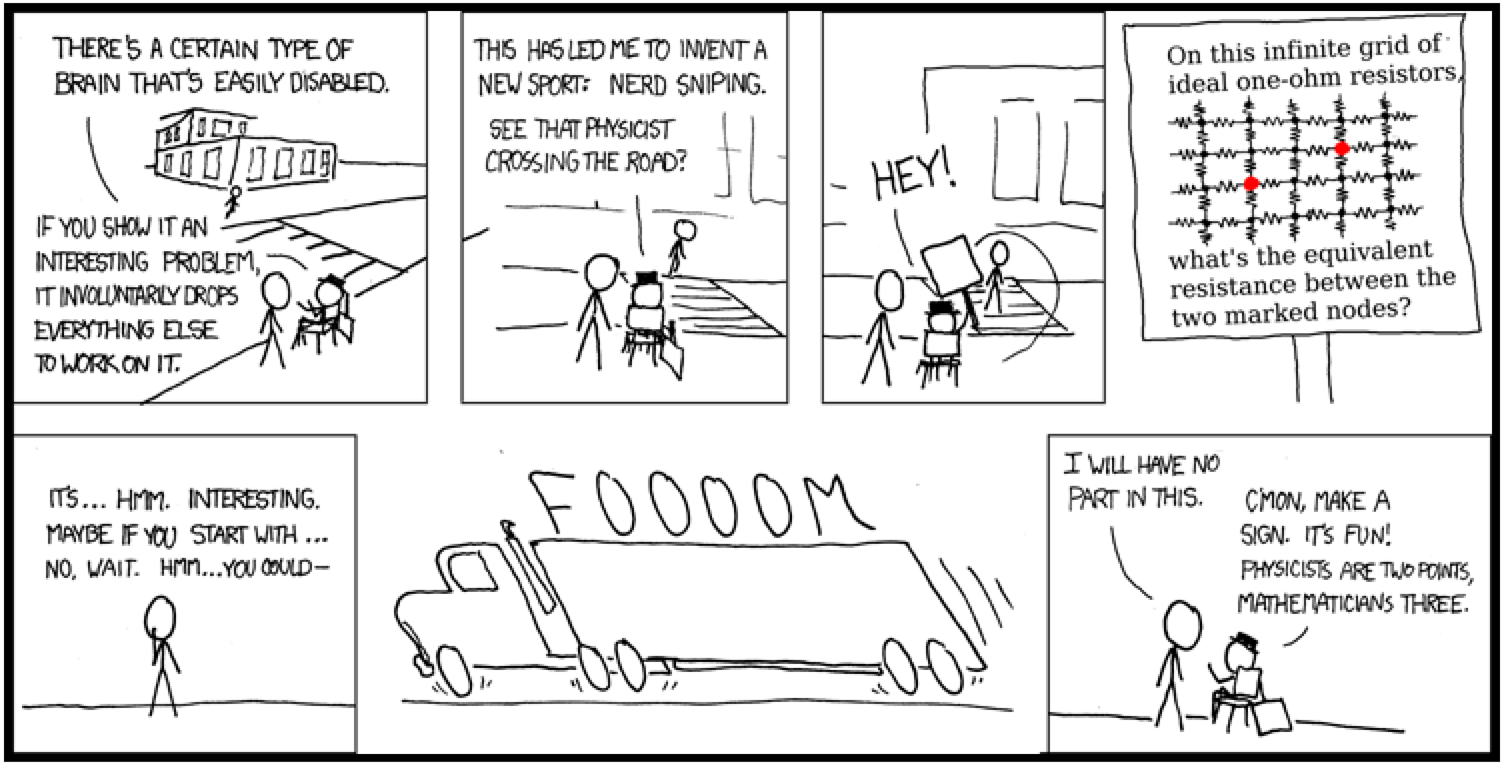
> *"More specifically, Web accessibility means that people with disabilities can perceive, understand, navigate, and interact with the Web, and that they can contribute to the Web."*

W3C Web Accessibility Initiative (WAI)

Why Accessibility?

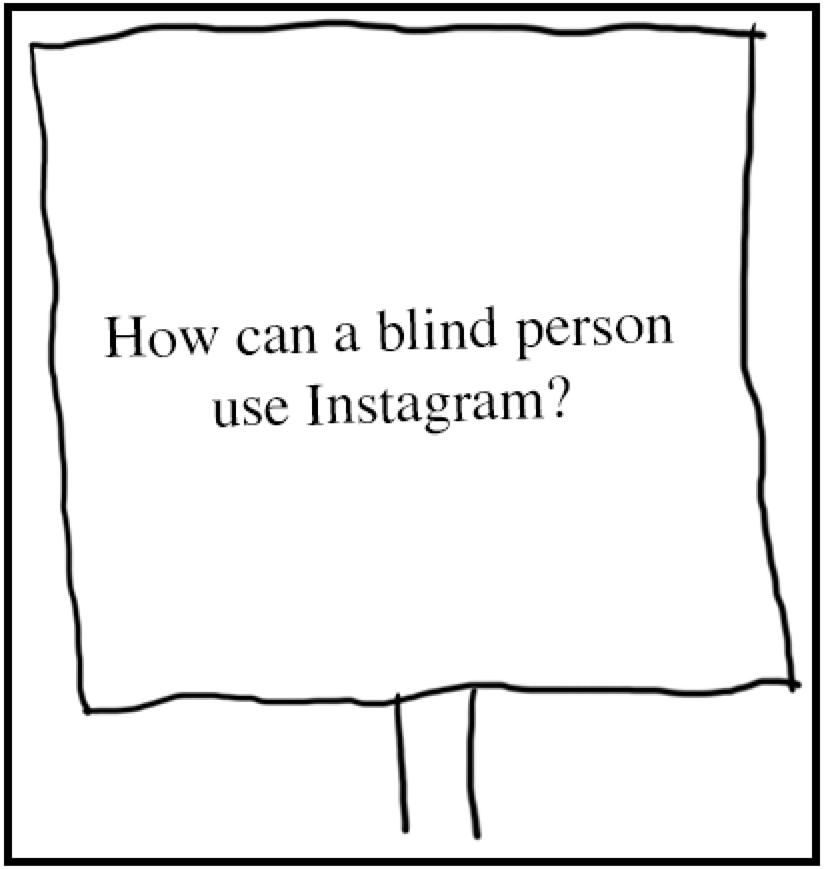
- Empathy
- Law
- Human Rights
- Business
- Standards
- Universal Design
- The Future You
- The Present You

Nerd Sniping

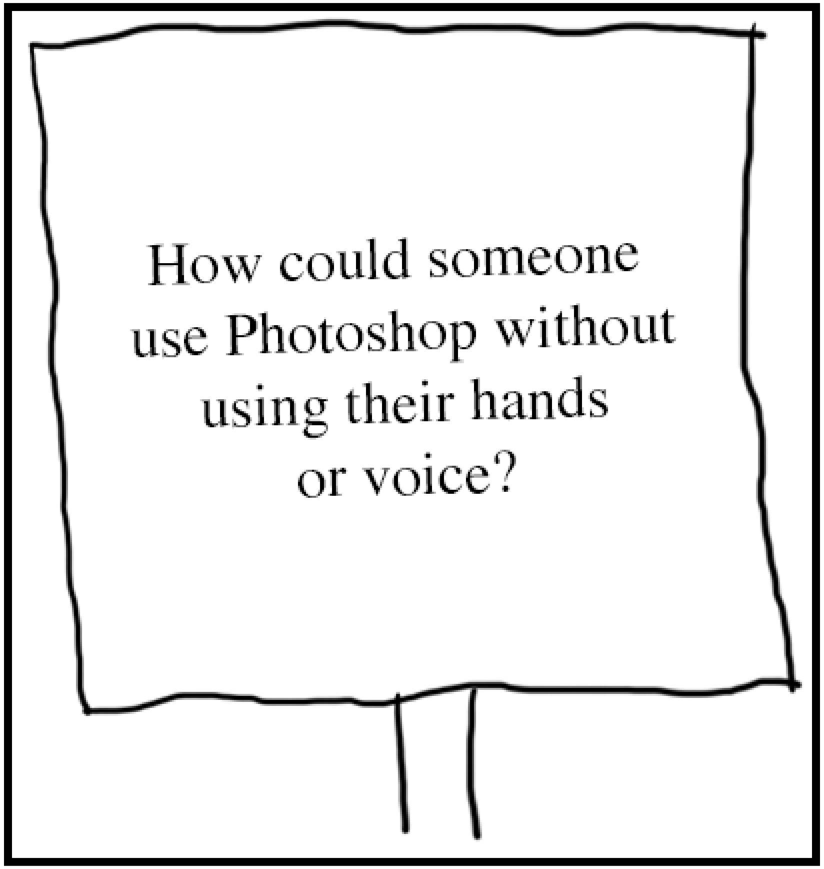

THERE'S A CERTAIN TYPE OF BRAIN THAT'S EASILY DISABLED.
IF YOU SHOW IT AN INTERESTING PROBLEM, IT INVOLUNTARILY DROPS EVERYTHING ELSE TO WORK ON IT.
THIS HAS LED ME TO INVENT A NEW SPORT: NERD SNIPING.
SEE THAT PHYSICIST CROSSING THE ROAD?
HEY!
On this infinite grid of ideal one-ohm resistors, what's the equivalent resistance between the two marked nodes?
IT'S... HMM. INTERESTING. MAYBE IF YOU START WITH ... NO, WAIT. HMM...YOU COULD—
FOOOOM
I WILL HAVE NO PART IN THIS.
C'MON, MAKE A SIGN. IT'S FUN! PHYSICISTS ARE TWO POINTS, MATHEMATICIANS THREE.

XKCD

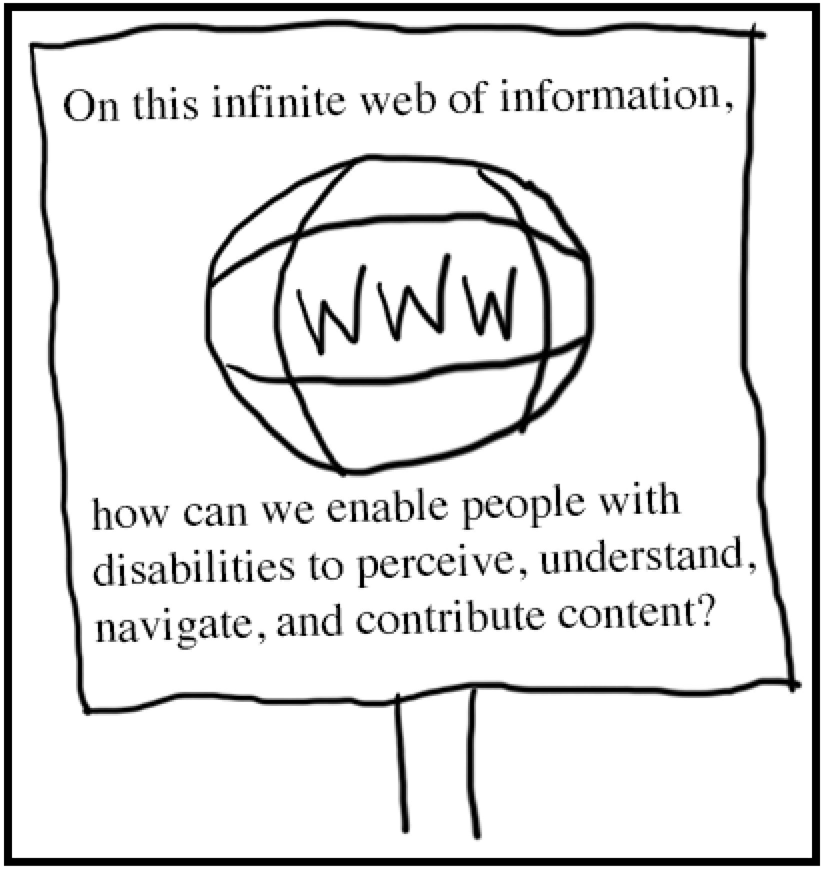
Nerd Sniping Instagram



Nerd Sniping Photoshop


How could someone use Photoshop without using their hands or voice?

Nerd Sniping the Web


On this infinite web of information,
WWW
how can we enable people with disabilities to perceive, understand, navigate, and contribute content?

Accessibility Techniques

- Managing Focus
- Proper Semantics
- Thoughtful Design

Focus

- Visual focus
- Keyboard navigation

Keyboard Navigation

Can you navigate the website using only the keyboard?
Is there anything that *requires* the mouse?

DOM Order

- Document Object Model
- tabindex
- element.focus()

tabindex

```html
<div tabindex="-1"></div>
```

- negative: element is focusable programmatically only
- zero: element is focusable; in DOM order
- positive: element is focusable; relative order (BAD!)

element.focus()

- Focus managed with JavaScript
- Menus, dialogs, complex widgets
- Often paired with negative tabindex

```
<div id="some-div" tabindex="-1"></div>
```

```
var el = document.getElementById('some-div');
el.focus();
```

Focus Outline

Example Link 1

Example Link 2

Example Link 3

```
<a href="//example.com">
  Example Link 1
</a>

<a href="//example.com" style="outline:none">
  Example Link 2
</a>

<a>
  Example Link 3
</a>
```

Outline None

Skip Links

- Allow keyboard users to jump straight to main content
- Often visually hidden until focused
- Browser quirks

```
<a href="#main">Skip navigation</a>
<nav>
...
...
...
</nav>
<main id="main" tabindex="-1">
```

Focus: Putting it all together

- Works with just the keyboard
- Has logical focus order
- Visibly shows current focus
- Does not abuse tabindex
- Uses element.focus() appropriately
- Provides skip link

MDN tabindex documentation

Semantics

"What is this thing and what does it do?"

Karl Groves

WAI-ARIA

- The Web Accessibility Initiative Accessible Rich Internet Applications specification
- Roles (menu, checkbox)
- State and Properties (aria-checked, aria-label, aria-hidden)
- Live regions, drag & drop

Don't use ARIA if a native control is sufficient!

Language

```html
<html lang="en">
```

Page Title

```
<title>Descriptive and Unique</title>
```

Headings

- Use them!
- Not for font size
- Create hierarchy

```html
<h1>Level One</h1>
<h2>Level Two</h2>
<h3>Level Three</h3>
```

Labels

- Form controls must have labels
- Labels must be properly associated

```
<label for="name">Name</label>
<input id="name">
```

Wrapped Labels

```html
<label>Name: <input></label>
```

ARIA Labels

```
<button class="icon-search" aria-label="Search">
</button>
```

Avoid Generic Link Text

```
<a href="http://example.com">click here</a>
```

Click here for an example website!

vs.

Visit an example website.

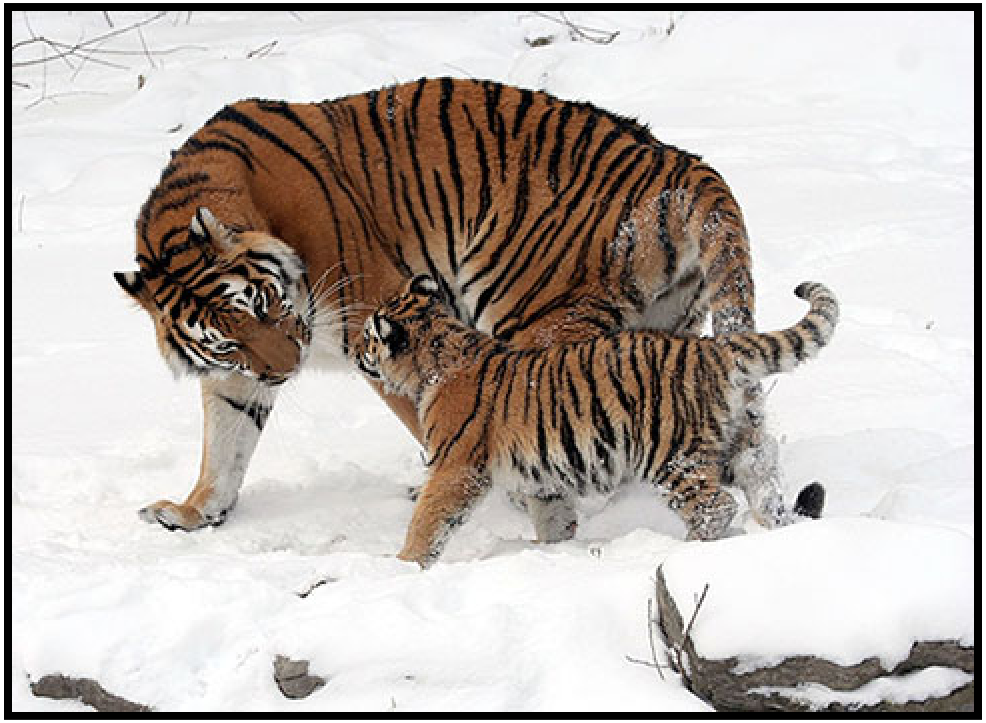
Underline Links

Visit an example website.

vs.

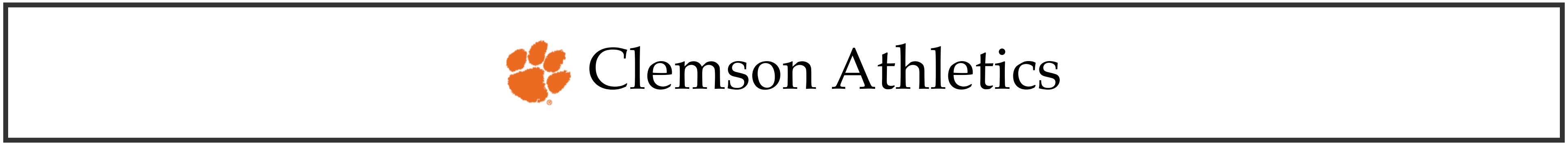
Visit an example website.

Alternative Text



```
<img src="tiger.jpg" alt="A tiger with her cub i
```

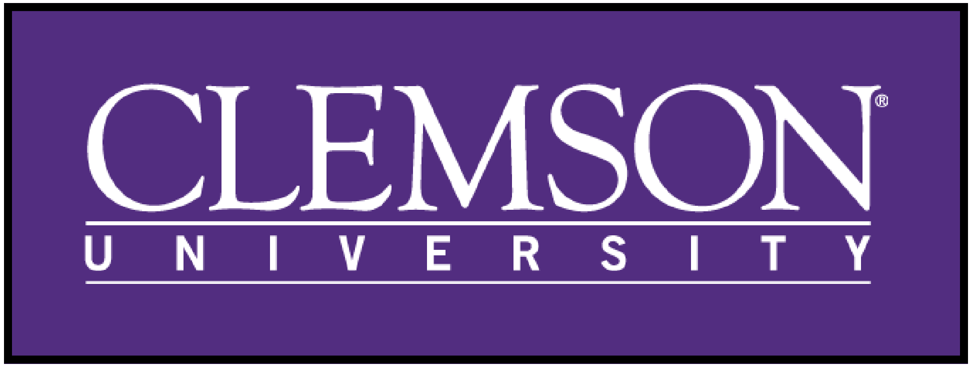
Decorative Images



Clemson Athletics

```
<img src="paw.png" alt="">
```

Images as Text



```
<img src="wordmark.png" alt="Clemson University"
```

Captions

Fooled by Nature - Squirrel Navigators

Synchronized, Equivalent, Accessible

Tables

- Not used for layout
- Used for data
- Include table caption and headers

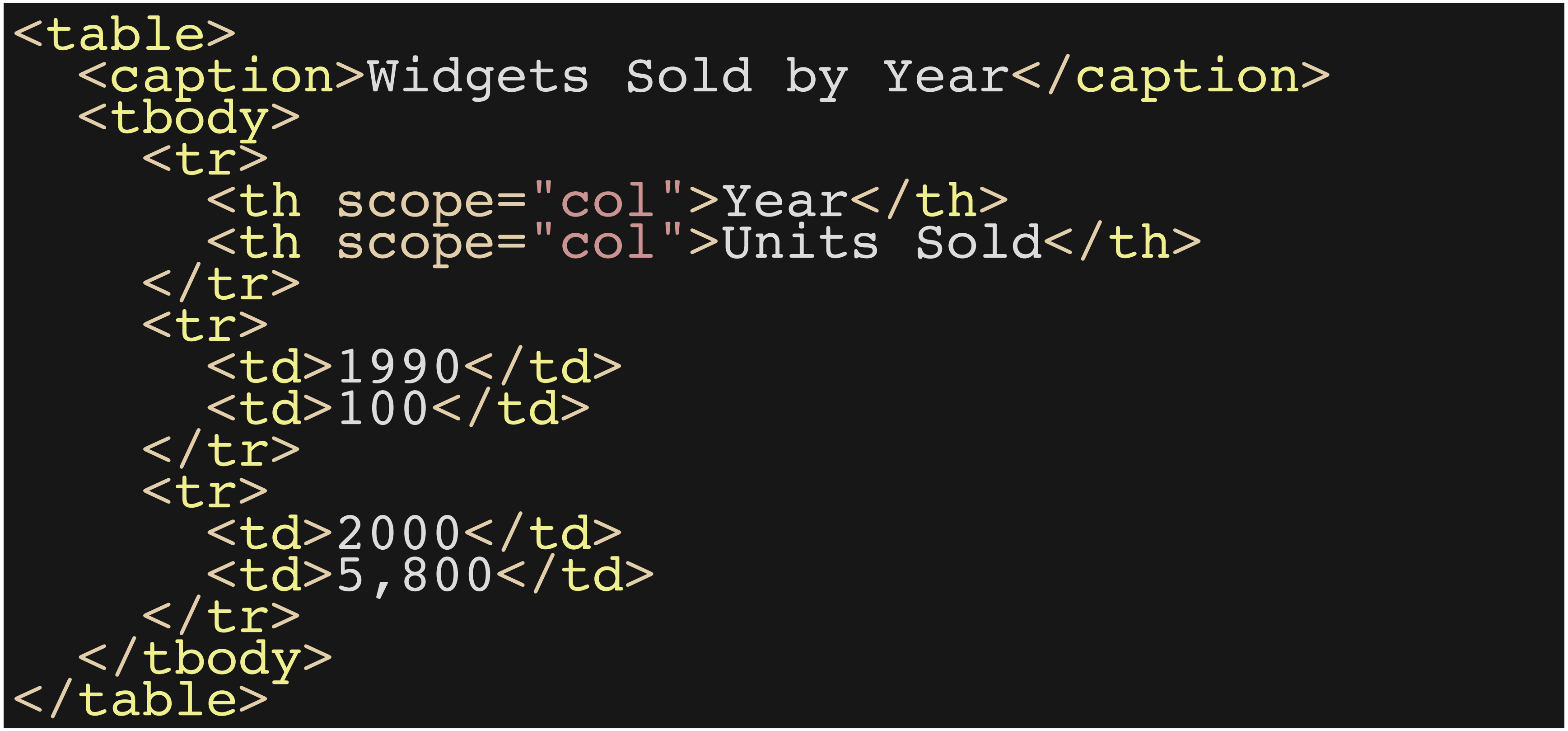
Academic Calendar

Example Table

Widgets Sold by Year

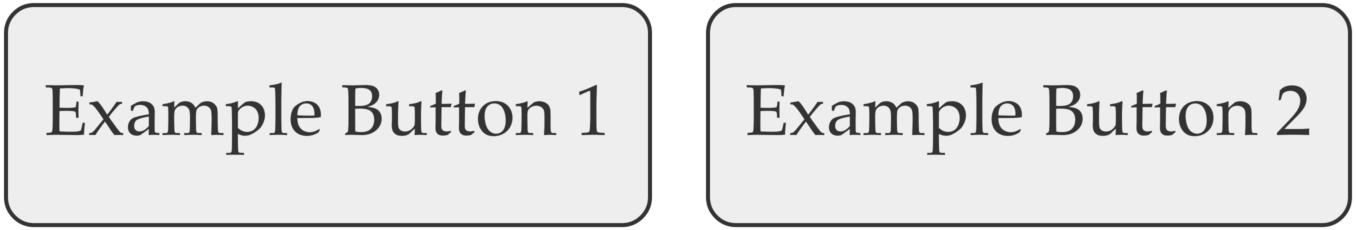
Year	**Units Sold**
1990	100
2000	5,800

Example Table Code



```
<table>
  <caption>Widgets Sold by Year</caption>
  <tbody>
    <tr>
      <th scope="col">Year</th>
      <th scope="col">Units Sold</th>
    </tr>
    <tr>
      <td>1990</td>
      <td>100</td>
    </tr>
    <tr>
      <td>2000</td>
      <td>5,800</td>
    </tr>
  </tbody>
</table>
```

Buttons



```
<button>Example Button 1</button>
<a href="#">Example Button 2</a>
```

HTML5 + ARIA Landmarks

```
<header role="banner">
<nav role="navigation">
<main role="main">
<aside role="complementary">
<footer role="contentinfo">
```

Design

- Sensory characteristics
- Use of color
- Strobing content
- Multiple devices

Sensory Characteristics

Don't rely solely on sensory characteristics to express meaning.

- Color
- Shape
- Location
- Sound

Vision Statistics

- More than 280 million people are visually impaired
- 1 in 26 people see your site differently

ChromeLens

Color Contrast

Contrast Ratios

Conformance	**Normal Text**	**Large Text**
AA	4.5:1	3:1
AAA	7:1	4.5:1

Large text is at least 18 point or 14 point bold.

Strobing Content

Flashes faster than 3 times per second can cause seizures for people with photosensitivity.

Responsive Design

- Grid system
- Media queries
- Flexible images

Read the seminal paper on A List Apart.

Zoom

```
<meta name="viewport"
 content="width=device-width, initial-scale=1">
```

Bad:

```
maximum-scale=1
```

```
user-scalable=no
```

Testing for Accessibility

- Automated Testing
- Manual Testing

Automated Testing: Pros

- Quick: can scan a lot of code at once
- Provides a good baseline
- May catch errors that were otherwise overlooked
- Can report some errors with certainty (i.e. missing alternative text)

Automated Testing: Cons

- False positives; false negatives
- Many errors require human analysis
- Not as thorough as manual testing
- Alternative text: accurate? decorative?
- Difficulty determining color contrast
- Difficulty with complex widgets & rich content
- Nuances between screen readers and browsers

WAVE Toolbar

- Identifies common errors and warnings
- Summarizes accessibility features
- Provides structural information, ability to toggle CSS, and contrast checks

WAVE Chrome Extension

Tenon.io

- Automatically scans websites for accessibility errors
- Provides an API to integrate accessibility testing into existing toolchain
- Web interface to manage projects and settings

Tenon.io

Google Accessibility Developer Tools

- Adds accessibility audit to dev tools
- Adds accessibility properties to elements tab
- Can audit dynamically generated content
- Provides links to detailed error descriptions

Google Accessibility Developer Tools

High Contrast Mode

- Shows websites in high contrast mode
- Affects users with low vision
- Colorblind people may benefit
- Helpful for people sensitive to light

Google High Contrast Extension

Color Contrast Checkers

- Ensures color contrast is sufficient for low vision users

WebAIM Color Contrast Checker

Colour Contrast Analyser

Chrome Lens

- Simulates visual deficiencies
- Track path of a screen reader user

Chrome Lens

Manual Testing

- Manual testing can be tedious
- Requires strong understanding of accessibility best practices
- There's no substitute for a human

Screen Readers

- JAWS
- NVDA
- VoiceOver
- Window-Eyes
- ZoomText

Screen Reader / Browser Combos

- JAWS with IE
- NVDA with Firefox
- VoiceOver with Safari
- Window-Eyes with IE
- ZoomText with IE

WebAIM Screen Reader Survey, July 2015

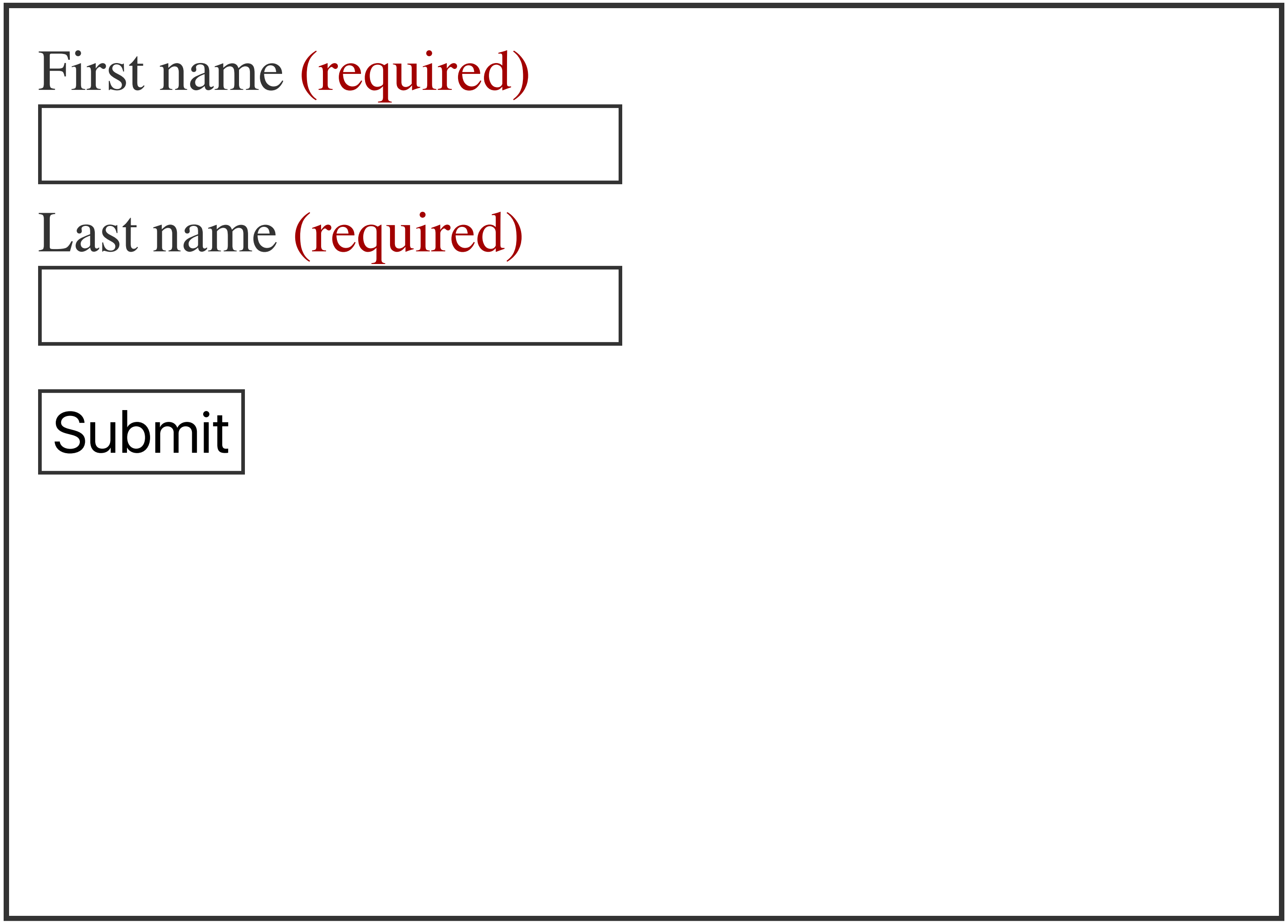
Bonus

Widgets

- Modal dialogs, date pickers, combo boxes, etc.
- Keyboard interaction
- ARIA attributes
- Examples

WAI-ARIA Authoring Practices

Form Errors



First name (required)

Last name (required)

Hidden Content

Hidden from screen readers:

```
<div aria-hidden="true">...</div>
```

Hidden visually:

```
.visually-hidden {
  position: absolute;
  left: -10000px;
  top: auto;
  width: 1px;
  height: 1px;
  overflow: hidden;
}
```

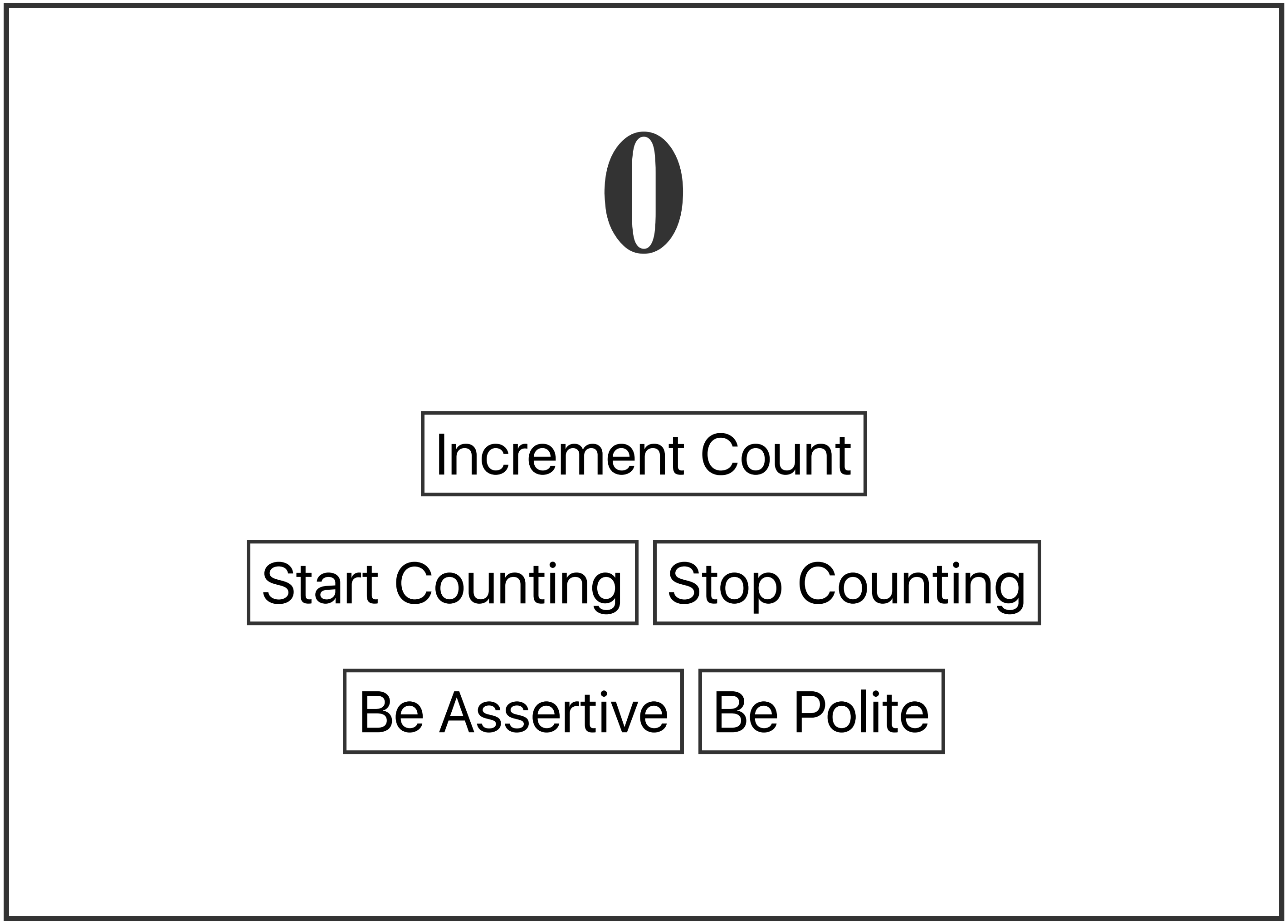
Single Page Apps

- Focus should be evident at all times, especially after dynamic updates
- When navigating, update title and set focus to main container or h1
- Use aria-live to express UI changes

aria-live

```
<div aria-live="polite"></div>
```

Live Regions



GitHub

github.com/jdanlewis/a11y-crash-course