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--

I will have no part in this. C'mon, make a sign. It's fun! Physicists are two points, mathematicians three.

XKCD
How can a blind person use 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,

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

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

```javascript
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

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

<title>Descriptive and Unique</title>
Headings

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

<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

<label>Name: <input></label>
ARIA Labels

<button class="icon-search" aria-label="Search">
</button>
Avoid Generic Link Text

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 in the snow"/>
Decorative Images

Clemson Athletics

<img src="paw.png" alt=""/>
Images as Text

Clemson University

<img src="wordmark.png" alt="Clemson University"/>
Tables

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

Academic Calendar
## Example Table

Widgets Sold by Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Units Sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>100</td>
</tr>
<tr>
<td>2000</td>
<td>5,800</td>
</tr>
<tr>
<td>Year</td>
<td>Units Sold</td>
</tr>
<tr>
<td>------</td>
<td>------------</td>
</tr>
<tr>
<td>1990</td>
<td>100</td>
</tr>
<tr>
<td>2000</td>
<td>5,800</td>
</tr>
</tbody>
</table>
Buttons

Example Button 1

Example Button 2

<button>Example Button 1</button>
<a href="#">Example Button 2</a>
HTML5 + ARIA Landmarks

```html
<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

<table>
<thead>
<tr>
<th>Conformance</th>
<th>Normal Text</th>
<th>Large Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>4.5:1</td>
<td>3:1</td>
</tr>
<tr>
<td>AAA</td>
<td>7:1</td>
<td>4.5:1</td>
</tr>
</tbody>
</table>

*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

Bad:

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

```html
maximum-scale=1
```

```html
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
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)

Submit
Hidden Content

Hidden from screen readers:

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

Hidden visually:

```css
.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

0

Increment Count
Start Counting  Stop Counting
Be Assertive  Be Polite
GitHub

[github.com/jdanlewis/a11y-crash-course](https://github.com/jdanlewis/a11y-crash-course)