



# Accessibility in Front End Environments

Presented by Daniel Ramsayer

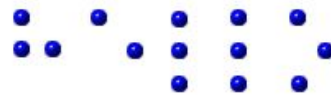


你好

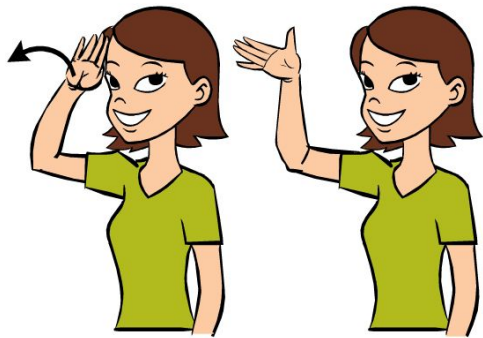
Hello!

iHola!

こんにちは!



سلام



# What is accessibility?

Accessibility refers to the design of products, devices, services, or environments for people with disabilities.

# Who needs accessibility?

**Everyone!** But with particular emphasis on people with:

- Physical Impairments
- Vision Impairment
- Deaf or Hard of Hearing
- Cognitive or Intellectual Impairment

# Whose Responsibility is Accessibility?



Many developers don't have 'Accessibility Expert' in their job descriptions.

Who is responsible for accessibility?

Developing with accessibility in mind as standard.



# Why Develop with Accessibility in Mind?



With as many people as there are with some form of disability, designing to include the greatest overlap for those needs makes sense from both an ethical and financial standpoint.

Accessible interfaces are simple and easy to use, ideal for all users.

# INTERNET USAGE STATISTICS

## The Internet Big Picture

### World Internet Users and 2018 Population Stats

#### WORLD INTERNET USAGE AND POPULATION STATISTICS JUNE 30, 2018 - Update

World Regions	Population ( 2018 Est.)	Population % of World	Internet Users 30 June 2018	Penetration Rate (% Pop.)	Growth 2000-2018	Internet Users %
<a href="#">Africa</a>	1,287,914,329	16.9 %	464,923,169	36.1 %	10,199 %	11.0 %
<a href="#">Asia</a>	4,207,588,157	55.1 %	2,062,197,366	49.0 %	1,704 %	49.0 %
<a href="#">Europe</a>	827,650,849	10.8 %	705,064,923	85.2 %	570 %	16.8 %
<a href="#">Latin America / Caribbean</a>	652,047,996	8.5 %	438,248,446	67.2 %	2,325 %	10.4 %
<a href="#">Middle East</a>	254,438,981	3.3 %	164,037,259	64.5 %	4,894 %	3.9 %
<a href="#">North America</a>	363,844,662	4.8 %	345,660,847	95.0 %	219 %	8.2 %
<a href="#">Oceania / Australia</a>	41,273,454	0.6 %	28,439,277	68.9 %	273 %	0.7 %
<b>WORLD TOTAL</b>	<b>7,634,758,428</b>	<b>100.0 %</b>	<b>4,208,571,287</b>	<b>55.1 %</b>	<b>1,066 %</b>	<b>100.0 %</b>

NOTES: (1) Internet Usage and World Population Statistics estimates in June 30, 2018. (2) CLICK on each world region name for detailed regional usage information. (3) Demographic (Population) numbers are based on data from the [United Nations Population Division](#). (4) Internet usage information comes from data published by [Nielsen Online](#), by the [International Telecommunications Union](#), by [GfK](#), by local ICT Regulators and other reliable sources. (5) For definitions, navigation help and disclaimers, please refer to the [Website Surfing Guide](#). (6) The information from this website may be cited, giving the due credit and placing a link back to [www.internetworldstats.com](http://www.internetworldstats.com). Copyright © 2018, Miniwatts Marketing Group. All rights reserved worldwide.

# Fairly Common

According to the W.H.O.: 15% of the world population experiences some form of disability.

This means almost 1.2 Billion people. (2)



# Permanent or Temporary

Many people experience temporary as well as permanent accessibility issues.

- Broken limbs
- Lost glasses
- Aging





# Overlapping Needs



Many groups have overlapping needs for technology.

These overlaps offer the opportunity to produce beneficial tools for more groups of people than a more specialized tool with lower market share threshold.

These needs are not exclusive to those with disabilities. Many people without a disability benefit from these designs.

# The 4 Principles of Accessabilities

**Perceivable** - Information and user interface components must be presentable to users in ways they can perceive.

This means that users must be able to perceive the information being presented (it can't be invisible to all of their senses)

**Operable** - User interface components and navigation must be operable.

This means that users must be able to operate the interface (the interface cannot require interaction that a user cannot perform)

**Understandable** - Information and the operation of user interface must be understandable.

This means that users must be able to understand the information as well as the operation of the user interface (the content or operation cannot be beyond their understanding)

**Robust** - Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies.

This means that users must be able to access the content as technologies advance (as technologies and user agents evolve, the content should remain accessible)

# Understanding WCAG 2.0 Conformance

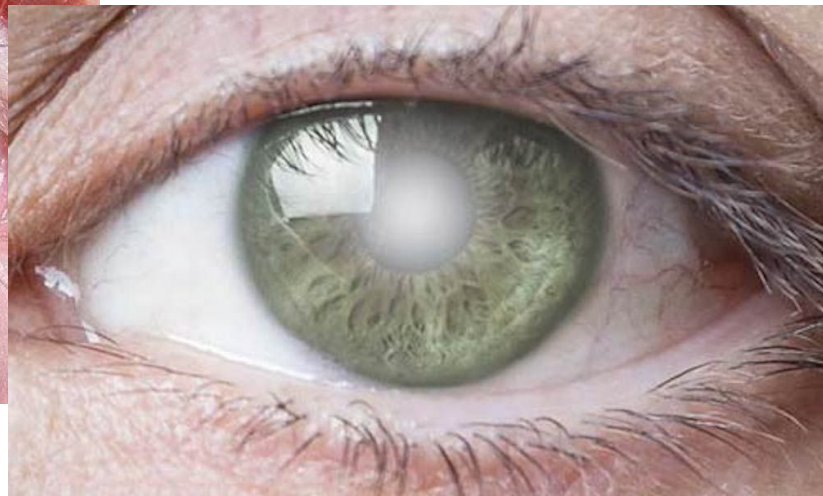
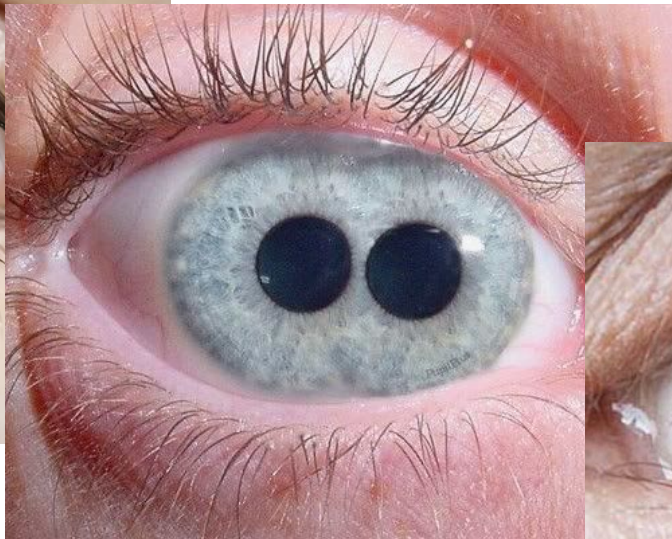
## What is WCAG 2.0?

- **3 Levels: A, AA, AAA.**
  - **A - Bare Minimum, non-text elements have text equivalent id's, all content accessible via the the keyboard. Works with a screen reader.**
  - **AA - A + strong text/background contrast. Well organized, consistent design, live subtitles on videos, text size changeable.**
  - **AAA - is the Gold Standard, though few sites meet this standard.**



# Understanding Disabilities

# VISUAL



# Most Common Vision Impairments



Medium Visual Acuity - Generally requires glasses

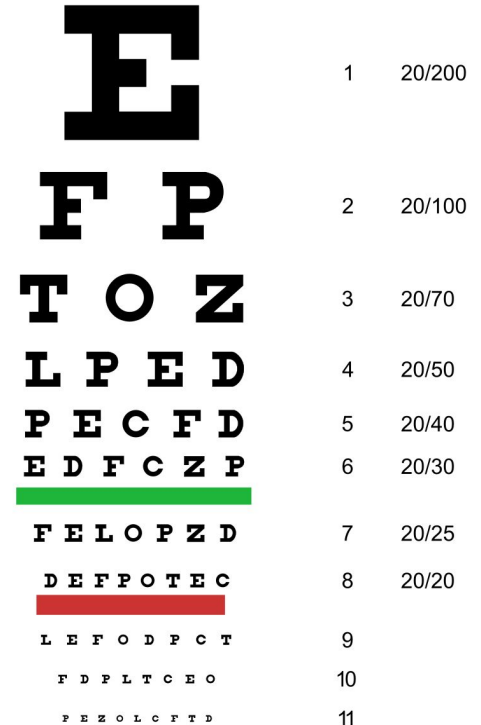
Low Visual Acuity - Blurred vision over 3 meters

Macular Degeneration - Blurred or dark central vision

Tunnel Vision - Blurred or dark peripheral vision

Limited Light Perception - Can only see light and shadows

Total Blindness - No Light Perception



# The Implications



- **1.3 billion people live with some form of vision impairment.**
  - a. 188.5 million people have mild vision impairment**
  - b. 217 million have moderate to severe vision impairment**
  - c. 36 million people are blind.**
  - d. 826 million people live with a near vision impairment.**

**Globally, the leading causes of vision impairment are uncorrected refractive errors and cataracts.**

**Approximately 80% of all vision impairment globally is considered avoidable.**

**The majority of people with vision impairment are over the age of 50 years. (1)**

# Types of Impairment - Colorblindness

1

Considered regular vision, this affects about 94% of sighted people.

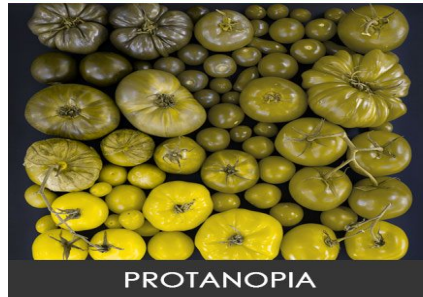


3

Most common colorblind type, affects 4.6% of men, .32% of women. Mostly experience a subdued palette.

2

Affects 1% of men. Red is completely absent and greens are not vibrant.



4

Uncommon, this affects the ability to see yellow. Only about .0001% of people are affected.

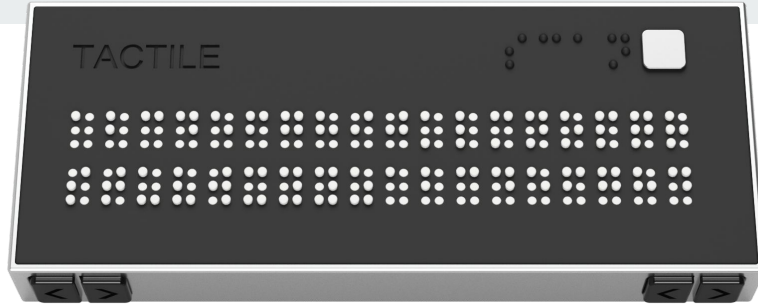
Total color blindness, (Monochromacy), is actually very rare, at only .00003% of the population experiencing it.



# To better understand the implications



- 374 Million people with deuteranomaly
- 76 Million people with Protanopia
- 760,000 people with Tritanopia and
- 260,000 people with Monochromacy

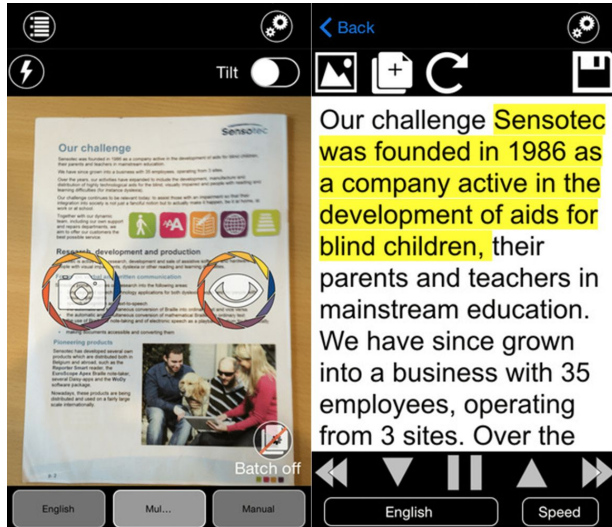


Refreshing Braille Reader

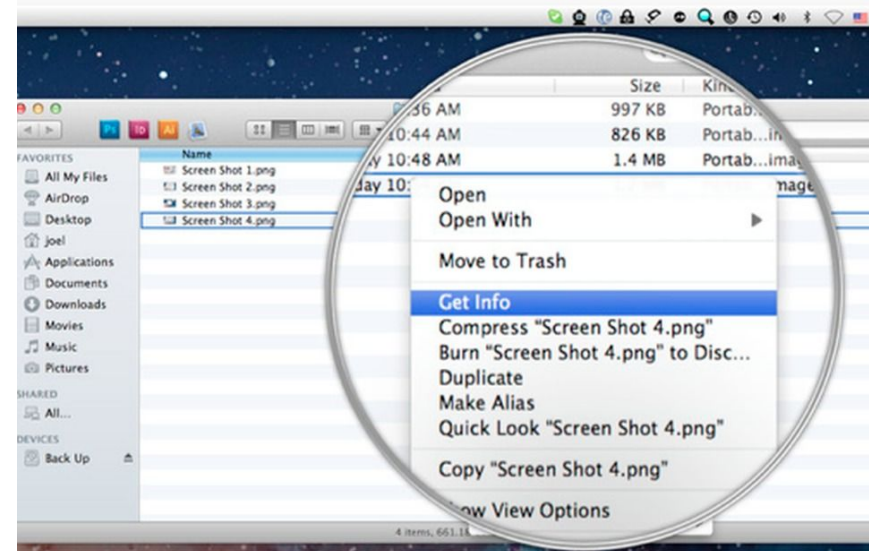


Screen Readers

Image Readers - Not just text



Magnifiers





jo@example.com



Pay with

Select payment method 

Ship to

Choose address 

Remember details?



Subtotal

\$10.00

Shipping

\$0.00

Tax

\$0.90

Total

\$10.90

Place Order

jo@example.com



Subtotal	\$10.00
Shipping	\$0.00
Tax	\$0.90
Total	\$10.90

**Pay with:**

Select payment method ▼

**Ship to:**

Choose address ▼

Remember details?

Place Order

# Common Examples



First Name	Last Name
Email	
Password	

Sign up for free

OR

g+ Sign up with Google

By signing up, you agree to the [Terms of Service](#).

SerGioApps

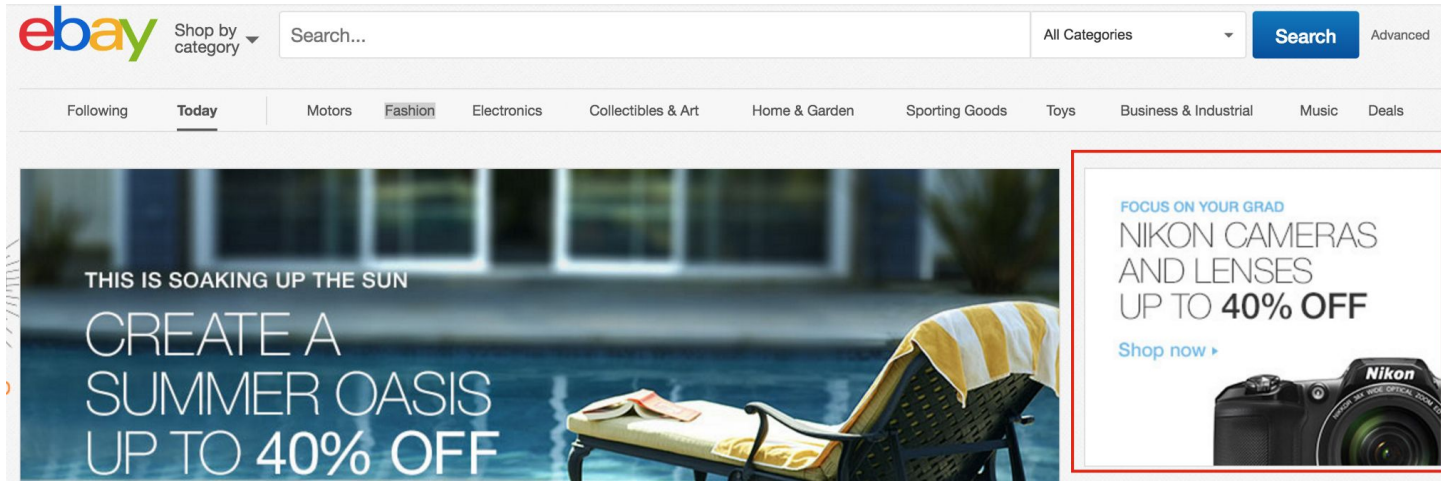
AngularJS Cart by Bill SerGio

### Responsive AngularJS Slick Carousel

<p>Watch Wild Animals Exercise!</p> <p>add to cart \$0.00</p>	<p>Let Your Baby Mop The Floor</p> <p>add to cart \$40.00</p>	<p>Camera DVR</p> <p>Watch Camera with Built-in DVR &amp; Audio</p> <p>add to cart \$118.00</p>
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ebay Shop by category Search... All Categories Search Advanced

Following Today Motors Fashion Electronics Collectibles & Art Home & Garden Sporting Goods Toys Business & Industrial Music Deals



```
<a href="http://www.ebay.com/rpp/electronics/nikon-event-041116" alt="Focus on your grad -- Nikon cameras and lenses up to 40% off -- Shop now" target="_top">  
    
</a>  
</body>
```

This is an excellent use of ALT-TEXT.

- Good for visual impairment
- Good for Web Crawlers

# Best Practices



## For Those With Minor Sight Issues

- Higher Contrast Background and Text
- Punctuation for abbreviations
- Design Fluid Websites, using % or ems (Works well for mobile website dev)
- Streamline and simplify user interfaces

## For Those with Major Sight Issues

- Clean Design
- Screen Reader Accessible
  - Provide Alt Text for all images, and alternative content for all other media
  - Use external CSS for styling and layout, and HTML for document structure.
- All elements accessible via tab



# Tools for Checking Accessibility

Contrast:

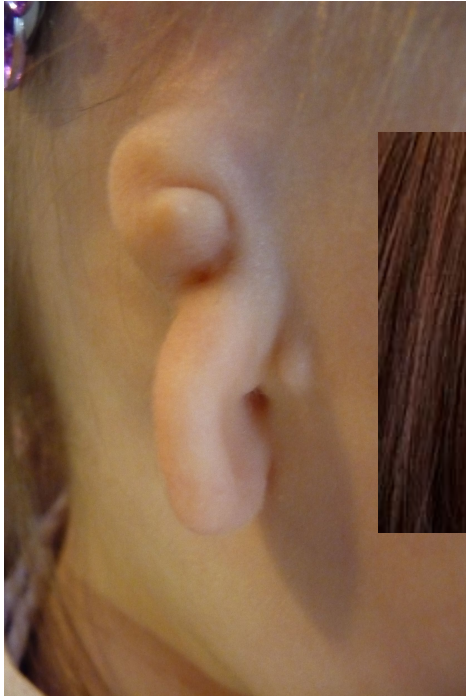
- WebAIM - <https://webaim.org/resources/contrastchecker/>

Tooling:

- <https://www.webaccessibility.com/>



# Hearing



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# Deaf and Hard of Hearing

About 5% of the population

Range of effects from tone/frequency deafness to total range deafness

Can be congenital or acquired

Not all deaf people sign, but many do.  
Providing the option of having interpreter videos for video's is an AAA feature.



# Overlapping Needs



Adding subtitles or transcriptions to your content is practical.

Many people experience content outside of an environment where they can have sound. Providing subtitles improves viewership and sharing for non-deaf users as well.

**85%**

videos on  
Facebook viewed  
without sound

**+16%**

average reach of  
subtitled videos  
vs. non-subtitled

**+26%**

CTA clicks of  
subtitled videos  
vs. non-subtitled

**+17%**

reactions to  
subtitled videos  
vs. non-subtitled

**+15%**

share rate of  
subtitled videos  
vs. non-subtitled



# Best Practices

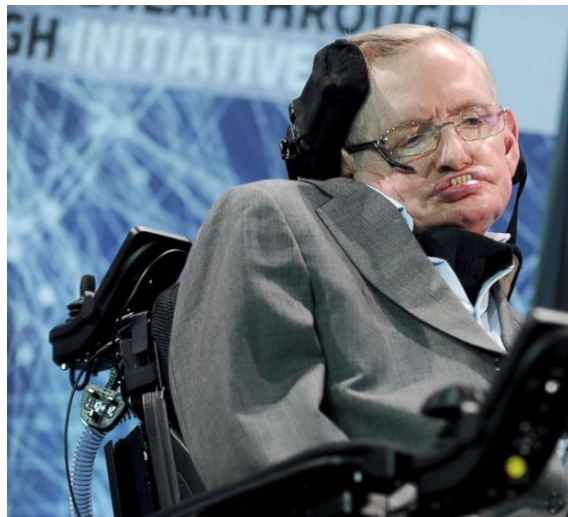


Provide subtitles or text transcripts for videos or music.  
Good for deaf folks, web crawlers, and for people with cognitive disorders.

Have multiple ways to communicate on your site, including social media.

# Physical

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# Physical Disabilities



**Characterized as the lack of functional ability by a body part or system**

Either the loss of the body part, or the loss of the ability to control a body part or system.

**Multiple ways to be impacted**

Some people are only minorly impacted, while others are significantly impacted.

**Tool Users**

Humans are tool users, and necessity is the mother of invention. Motor impaired users may use a keyboard, switch device, voice control, or even an eye-tracking device to interact with their computer.

# The Tools

The most common tool is a keyboard. As motility issues increase, the products to address specific issues diversify.



A Switch



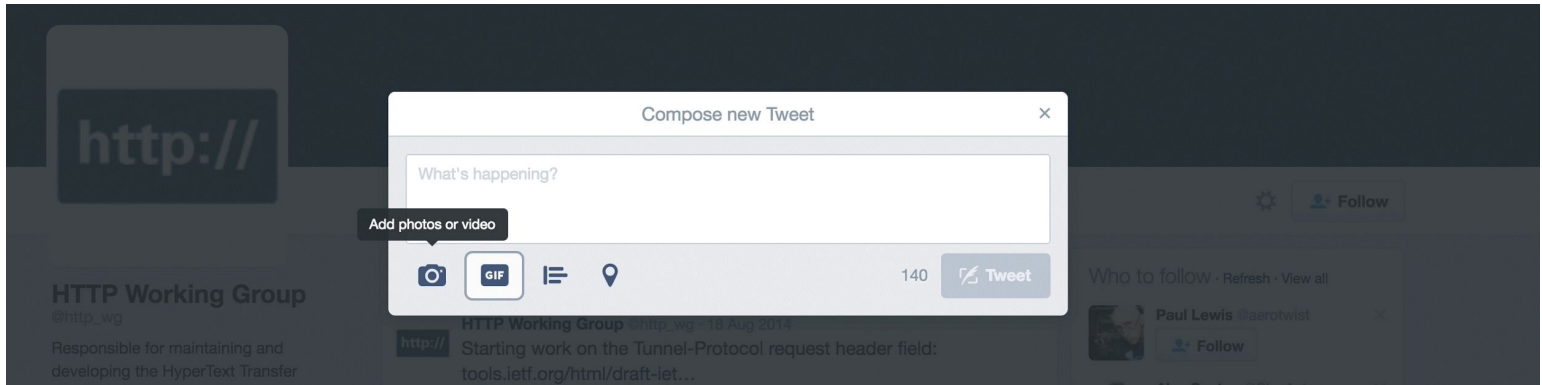
Voice Control



Mobility Stylus



Eye Tracker



### The Good:

- Tabbing navigates through all sections in a comprehensive manner
- Clearly highlights where the selector is
- Exit and Esc close the modal



TRENDING [WHAT! Last-Minute Dad's Day Gift Ideas That Are Basically Free](#)*Today's Must Reads*

- 1 This DIY Tasseled Clutch  
Doubles As a Bridesmaid's

## LATEST STORIES



## BRIDESMAIDS

This DIY Tasseled Clutch Doubles As a  
Bridesmaid's Survival Kit

## The Bad:

- Many Elements aren't accessible by tabs
- There isn't a logical progression between elements
- There is no active highlighting of elements when selected

# Specific Concerns



Larger buttons or link margins for touching

Space between buttons for easy selection

All links or features accessible by using Tab and Shift+Tab key selection on a keyboard

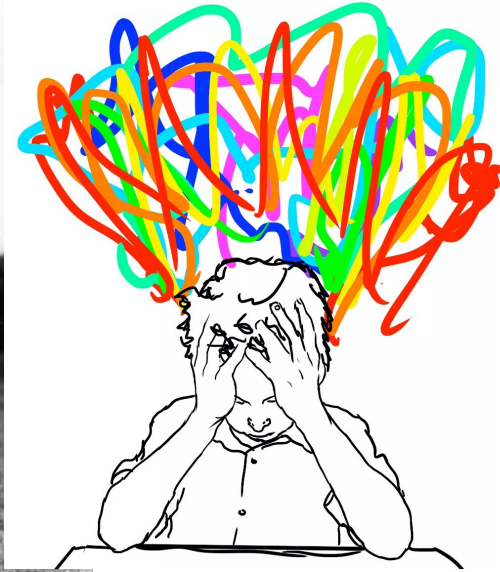
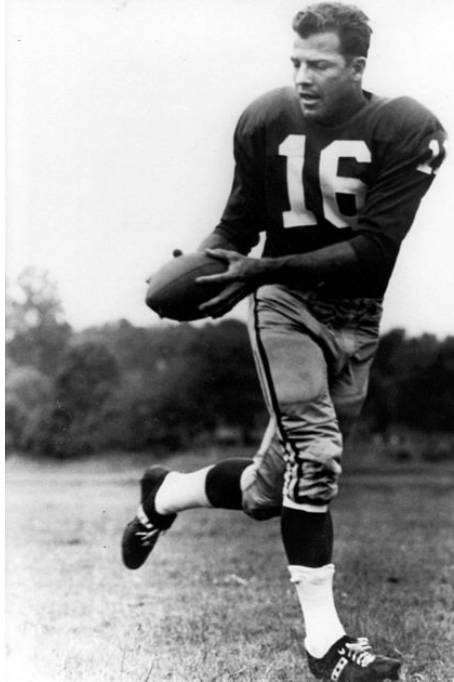
```
TabIndex <div tabindex = 0 />
```

Native elements like buttons

Many devices that improve usability for everyone are beneficial to those with disabilities

# Cognitive

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# Not Static



Many people range in their cognitive abilities during their lifetime.

Cognitive issues can be temporary (concussion) or permanent (traumatic brain injury)

Some are born with cognitive disabilities, others gain them from injury or disease.

Issues faced by this group are deep and wide, with some overlap.

# Bare Basics



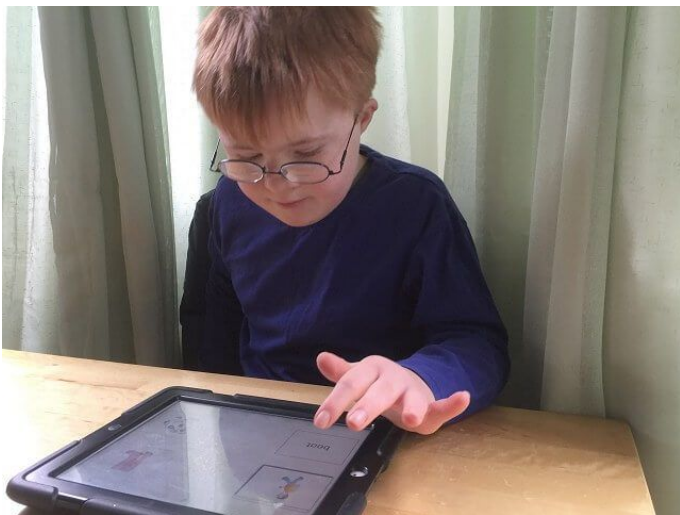
Functional disability or by clinical disability?

1. Memory
2. Problem-solving
3. Attention
4. Reading, linguistic, and verbal comprehension
5. Math comprehension
6. Visual comprehension

# Cerebral or Mental Disabilities

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Generally defined as those with cognitive, communication, problem solving, or information retention issues, these effect between 2-5% of the global population.



Variable intelligence, but often have difficulty following tasks.

Capable of learning, but either at a reduced speed or using different methodologies.

Active tool or methodology use is common in this group, with many options developed to help.



## Best Practices

Clear, concise text

Smaller paragraphs

Consistent Page Design

Clear Functionality

Low learning threshold

Good Website Examples:

YouTube

Bad Website Examples:

Facebook



## The Take Aways

- People with disabilities make up millions of users.
- When using the web, many find barriers and will often click away from sites that they have difficulty with. This is bad development.
- Users remember poorly running sites and avoid them in the future.
- Making websites accessible is good development because it makes it easier to all clients.



# Open Source Projects For Accessibility

## Screen Readers:

- NVDA (Python/Windows)
- ORCA (LINUX)

## Magnifiers

- Virtual Magnifying Glass 3.7

## Subtitle or Voice to Text

- Kaldi
- Simon

## Gaze tracking

- PyGaze
- MIT Pupil





# Thank you!





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