



2018

IT | HUE

WEB ACCESSIBILITY

Deep Dive Training

Honeywell
THE POWER OF CONNECTED

Agenda



-  What is Digital Accessibility
-  Business Case for Accessibility
-  Accessibility by Design
-  P.O.U.R. out Your Best Design
-  P.O.U.R. out Your Best Design
-  Tools and Resources

Digital Accessibility

What is Web or Digital Accessibility?

```
public class WordCount extends Configured implements Tool {
    public static class Map extends MapReduceBase implements Mapper<LongWritable, Text, Text, IntWritable> {
        static enum Counters { INPUT_WORDS }
        private final static IntWritable one = new IntWritable(1);
        private Text word = new Text();
        private boolean caseSensitive = true;
        private Set<String> patternsToSkip = new HashSet<String>();
        private long numRecords = 0;
        private String inputFile;
```

What is Web Accessibility?

What - An inclusive practice of making websites and content usable and accessible by individuals of all abilities and disabilities, providing equal access to information and functionality.

How - The World Wide Web Consortium (W3C) established the Web Content Accessibility Guidelines (WCAG) 2.0 as standards for making web content more accessible for individuals with disabilities

Why – We are legally mandated to provide accessible content in all markets where Honeywell operates. There are also some possible GDPR concerns to be addressed.



Types of Disabilities

Vision: Blindness, low vision, color blindness, photosensitivity,

Auditory: deafness and hearing loss

Cognitive: learning disabilities, concussions, temporary cognitive limitations

Movement: limited movement, speech disabilities, or...

Range of Abilities



Blind / Visually Impaired



Mobility Impaired



Deaf / Hard of Hearing



Aging Population
(15% of US pop > 65yo)
Failing Vision
Poor hearing
Color Blindness



Language Learners
Language Barriers



Cognitive

Other
Temporary
Restrictions

...a combinations of these.

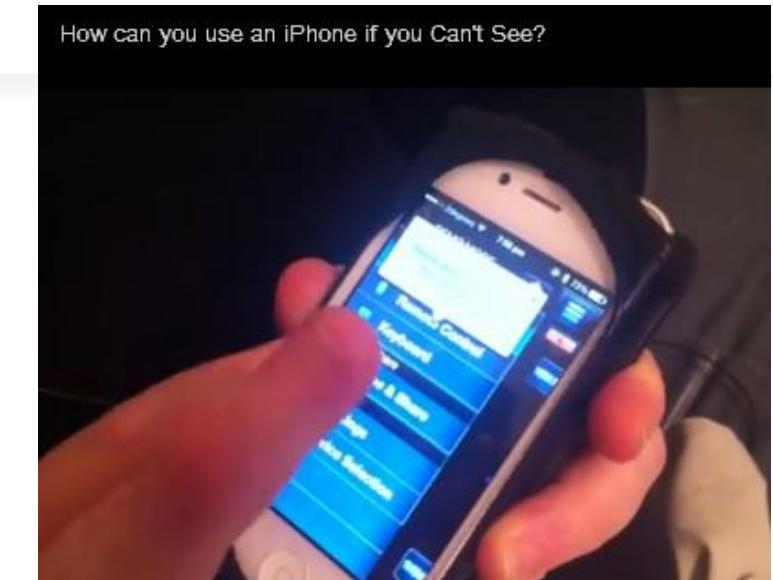
What is Web Accessibility?

Examples of web accessibility issues:

- An individual who cannot see a graphic needs the text alternative so it can be read aloud by a screen-reader.
- An individual who cannot hear an audio or video file needs the text alternative displayed so that s/he can read it.



The first captioned TV program (1973):
"Julia Child's French Chef"



But the automated technology
has issues...

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Devices In Use : Refreshable braille display



Devices In Use: Braille Watch



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Applications : Screen Readers



Video: NVDA Overview

https://youtu.be/Ks7AwV_uxO0



JAWS Settings Center - Default (All Applications)

Application: Default (All Applications)

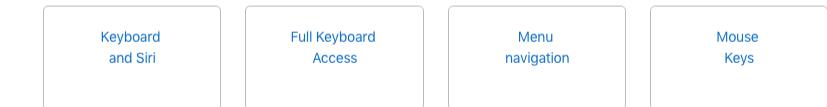
Search for settings

- Images / Graphics
 - Include Images
 - All Images
 - Labeled Images
 - No Images
 - For an Image
 - Speak
 - Order List
 - Unlabeled Image Links
- Links
 - Filter Consecutive Duplicate
 - Say Link Type
 - Identify "Same Page" Links
 - For a Text Link
 - Include Image Links
 - Identify Image Map Links
 - Headings and Frames
 - Lists and Tables
 - Miscellaneous
- Forms Mode
- Text Processing
- Speech Verbosity

Use the options in this group to determine how graphics and images are announced when read

Mac accessibility shortcuts

Accessibility shortcuts help you control your Mac with a keyboard or assistive device. You can also ask Siri to help with some accessibility features.



Accessibility Options

Zoom
 Enable Zoom

VoiceOver
 Enable VoiceOver

Mouse & Keyboard

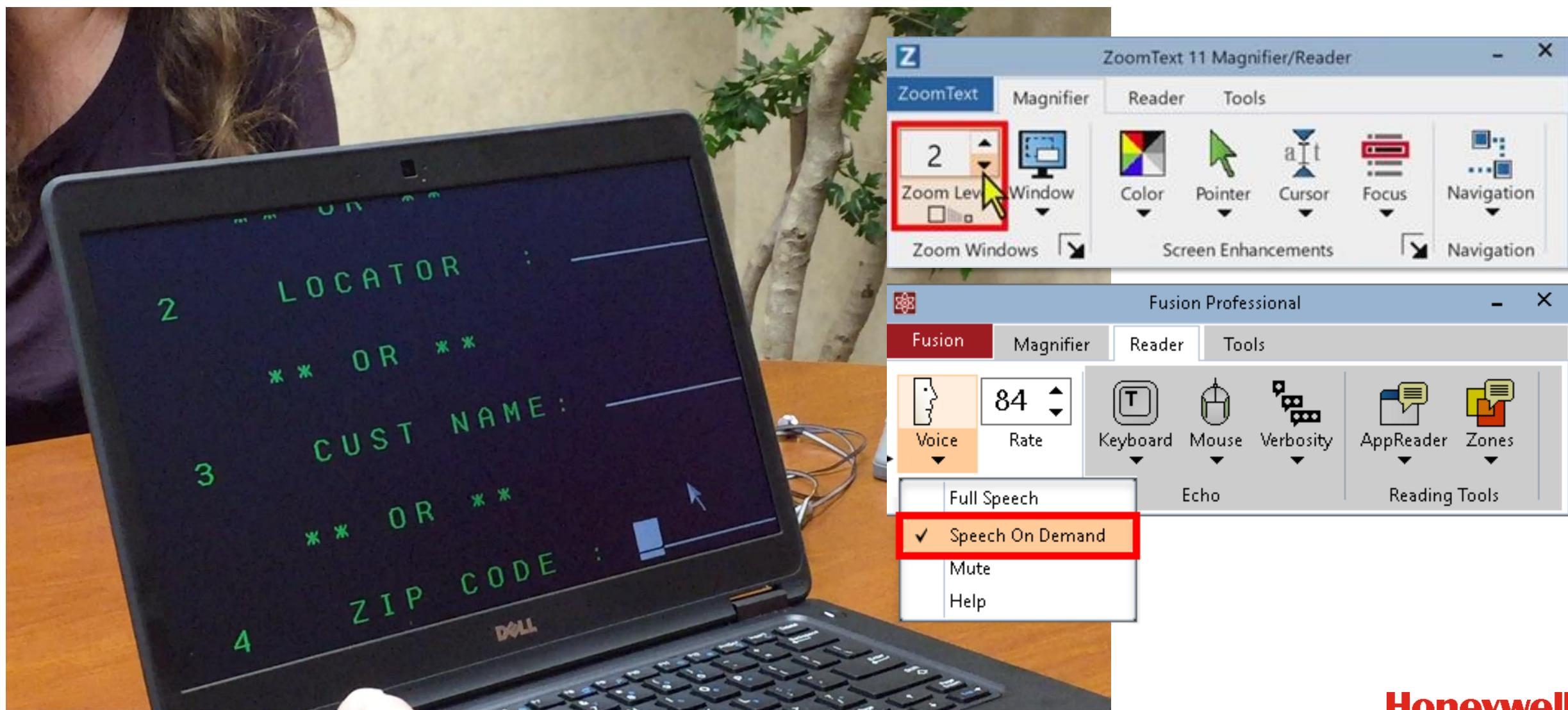
- Enable Sticky Keys
- Enable Slow Keys
- Enable Mouse Keys

Display
 Invert display colors

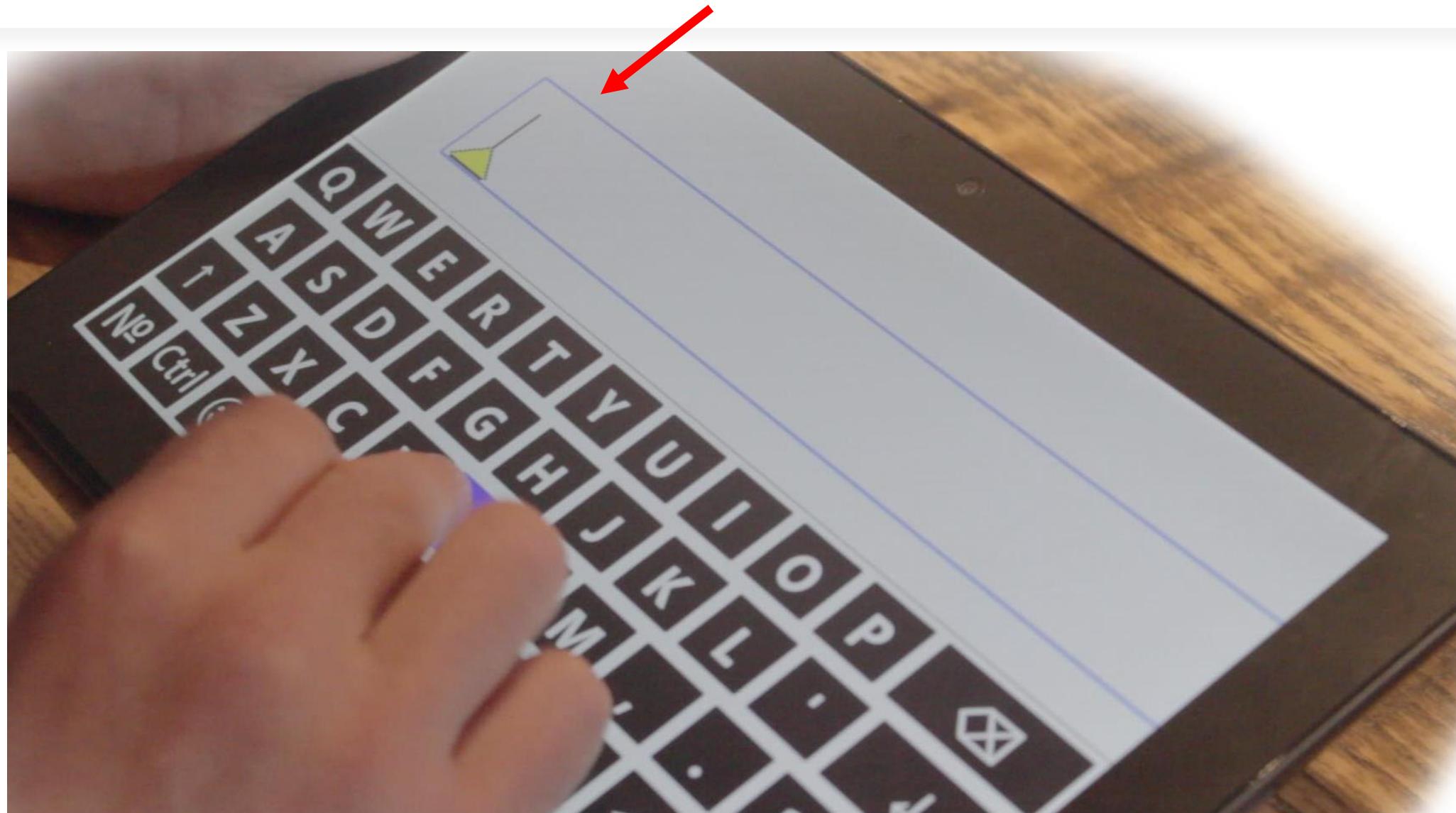
Keyboard Shortcuts... **Preferences...** **Done**

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Applications : ZoomText



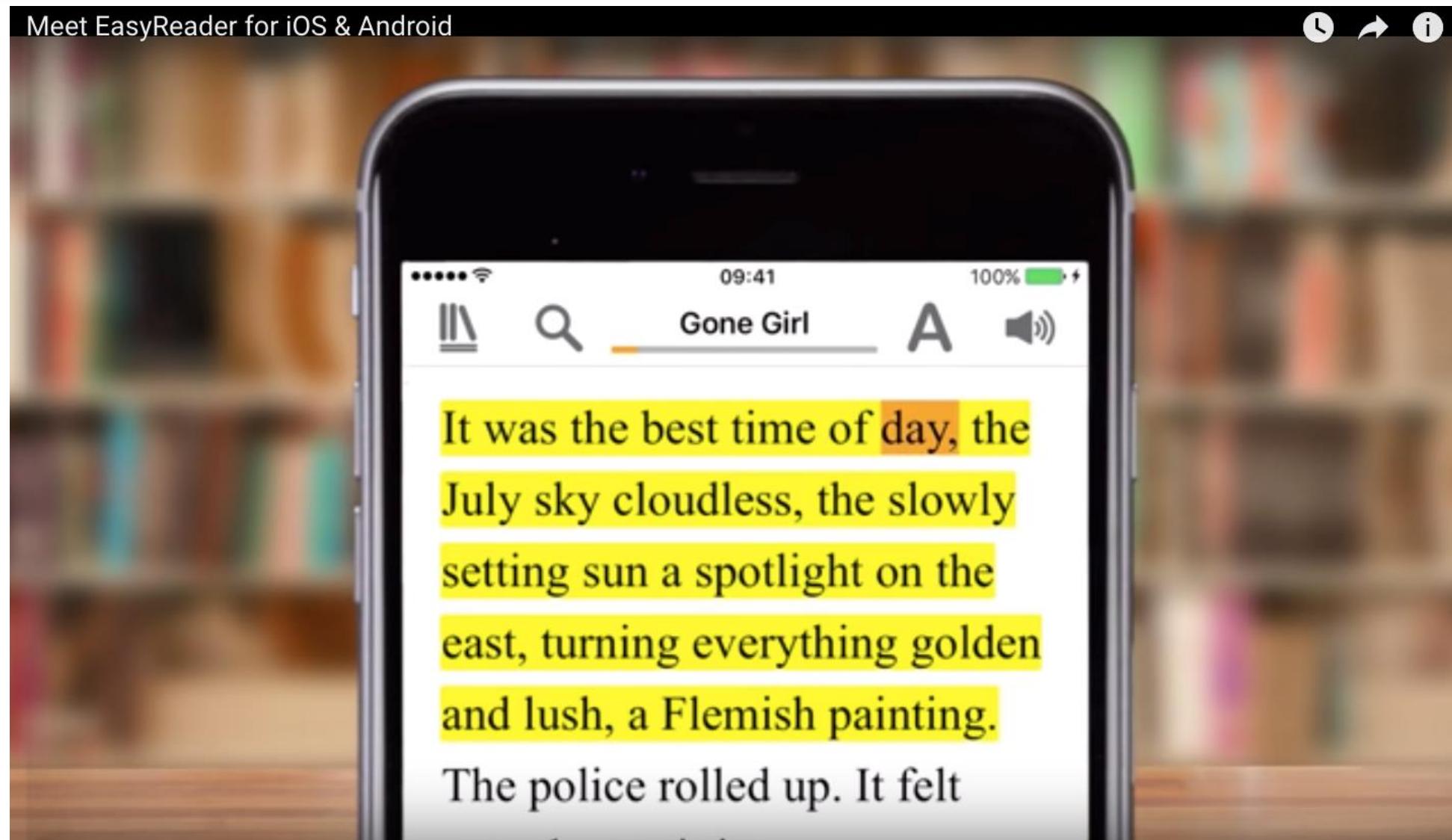
Applications : ZoomText



Applications : EasyReader



Applications : EasyReader



Applications : Color Blind API



Are There Standards?

- U.S. Web Design Standards

standards.usa.gov

The screenshot shows the 'Colors' section of the U.S. Web Design Standards website. The left sidebar lists various UI components: Overview, Typography, Colors (selected), Palette, Text accessibility, Grid, Buttons, Labels, Tables, Alerts, Accordions, Form controls, Form templates, Search bar, Side navigation, Headers, and Footers. The main content area is titled 'Fully accessible combinations'. It is divided into two sections: 'Colors on a white background' and 'Neutrals on a colored background'. The 'Colors on a white background' section contains eight color swatches: primary-darkest on white, primary-darker on white, primary on white, cool-blue-light on white, primary-alt-darkest on white, green on white, visited on white, base on white, gray-dark on white, gray on white, gray-warm-dark on white, secondary-darkest on white, secondary-dark on white, and secondary on white. The 'Neutrals on a colored background' section contains seven color swatches: white on base, white on gray-warm-dark, white on gray-dark, white on gray, white on primary-darkest, white on primary-darker, white on primary, base on gray-light, base on gray-lighter, base on gray-warm-light, base on cool-blue-lighter, base on cool-blue-lightest, base on primary-alt-lightest, and base on green-lighter.

Color Combination	Color Swatch
primary-darkest on white	Primary-Darkest on White
primary-darker on white	Primary-Darker on White
primary on white	Primary on White
cool-blue-light on white	Cool-Blue-Light on White
primary-alt-darkest on white	Primary-Alt-Darkest on White
green on white	Green on White
visited on white	Visited on White
base on white	Base on White
gray-dark on white	Gray-Dark on White
gray on white	Gray on White
gray-warm-dark on white	Gray-Warm-Dark on White
secondary-darkest on white	Secondary-Darkest on White
secondary-dark on white	Secondary-Dark on White
secondary on white	Secondary on White
white on base	White on Base
white on gray-warm-dark	White on Gray-Warm-Dark
white on gray-dark	White on Gray-Dark
white on gray	White on Gray
white on primary-darkest	White on Primary-Darkest
white on primary-darker	White on Primary-Darker
white on primary	White on Primary
base on gray-light	Base on Gray-Light
base on gray-lighter	Base on Gray-Lighter
base on gray-warm-light	Base on Gray-Warm-Light
base on cool-blue-lighter	Base on Cool-Blue-Lighter
base on cool-blue-lightest	Base on Cool-Blue-Lightest
base on primary-alt-lightest	Base on Primary-Alt-Lightest
base on green-lighter	Base on Green-Lighter

Are There Standards? YES - Section 508 vs WCAG 2.0

Section 508 of the Americans with Disabilities Act (ADA)

The legislation referred to as "Section 508" is actually an amendment to the Workforce Rehabilitation Act of 1973. The amendment was signed into law by President Clinton on August 7, 1998.

- Offer Text Equivalents
- Present Synchronized Multimedia
- Remain Independent of Color
- Stay Independent of Style Sheets
- Provide Redundant Links for Server-Side Maps
- Use Client-Side Image Maps
- Label Row and Column Headers
- Use the Headers Attribute in Complex Tables
- Supply Frame Titles (attributes and elements)
- Reduce Flicker
- Offer a Text-only Alternative (LAST RESORT)
- Write Accessible Scripts(m) Specify Accessible Applets and Plug-ins
- Design Accessible Forms
- Offer Skip Navigation
- Alert Users to Timed Responses

Are There Standards? Section 508 vs WCAG 2.0

WCAG 2.0

The Web Content Accessibility Guidelines (WCAG) details can be grouped into 4 main sections (in greater detail from §508), with 3 levels of Conformance.

Sect 1: Perceivable

Web content is made available to the senses - sight, hearing, and/or touch

Sect 2: Operable

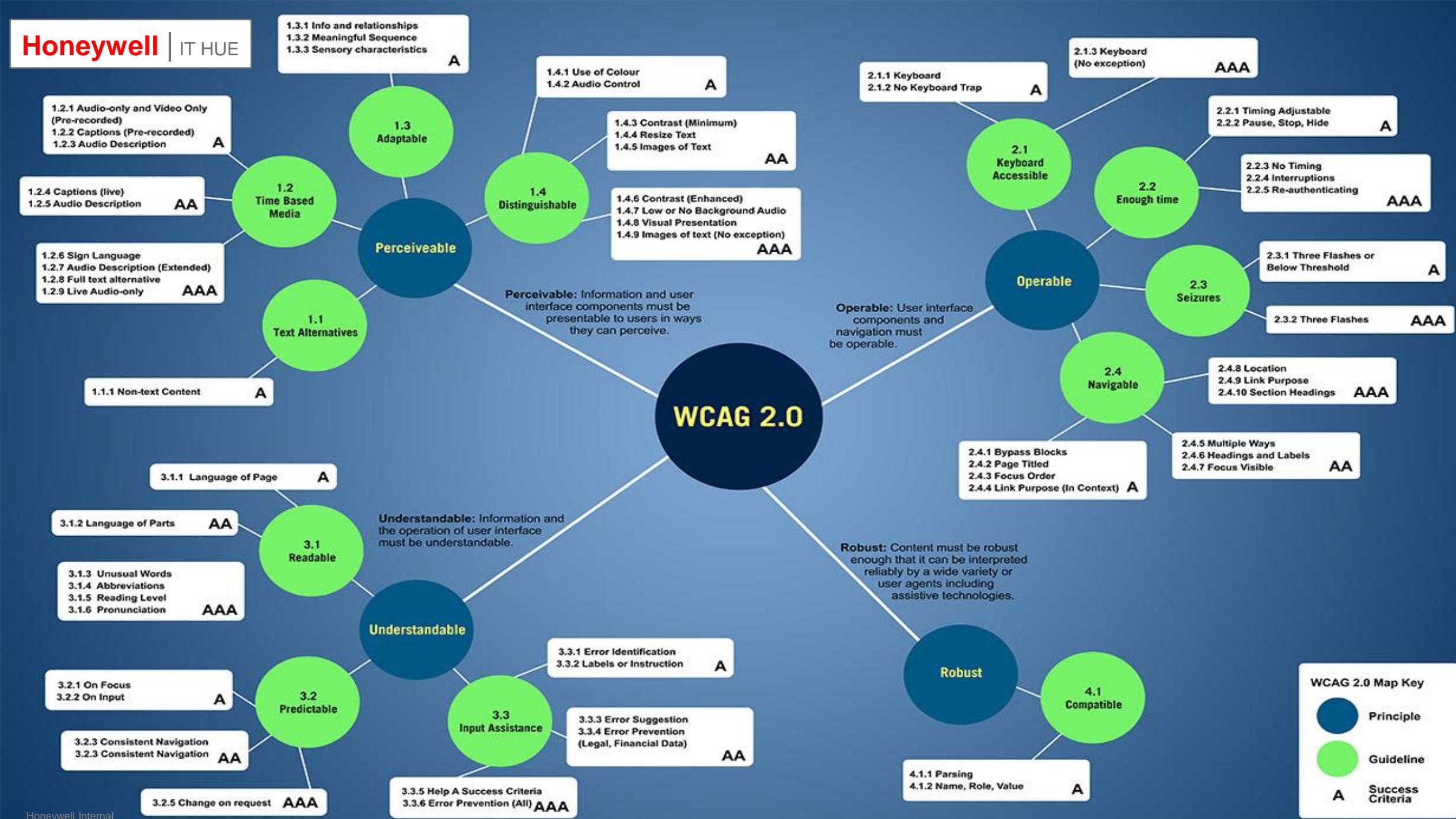
Interface forms, controls, and navigation are operable

Sect 3: Understandable

Content and interface are understandable

Sect 4: Robust

Content can be used reliably by a wide variety of user agents, including assistive technologies



Digital Accessibility

Business Drivers for Accessibility



Why is Web Accessibility Important?

Legal and Business drivers...

The Department of Justice (DOJ) has clarified that the accessibility of goods and services offered via the Internet **is** covered by Title III of the Americans with Disabilities Act (ADA) despite the lack of an explicit statement.

Additionally, accessibility is the “right thing to do” from a branding POV – it’s about showing respect for our customers as individuals.

So in addition to the legal mandate, we can extend our market reach by ensuring all potential customers can research, shop, and purchase our products and services through all digital channels.

United States Population: ~313.8M
United States Disabled: 12%
U.S. disabled consumer population:
• **73% are heads of households; 58% own homes**
• 48% are principal shoppers controlling over \$220B in discretionary income

4 Business Drivers for Accessibility

Driver #1: Reduce Legal Risk

- Comply with multiple laws, both in the US and internationally
- Potential costs from complaints, litigation costs, damages, injunctions
- High transaction volumes and visibility increase legal risk
- Costs to settle class action lawsuits typically top **\$10M**
- Precedents in multiple industries



Driver #2: Avoid Revenue Loss

- Private orgs selling into public sector must provide accessible solutions
 - Section 1557 ACA, Section 508, ADA Title II, State level initiatives in U.S. require a11y.
- Some U.S. regulatory agencies require accessibility as part of market access
 - Communications and Video Products – FCC
 - Healthcare – HHS
 - Air Travel – DOT and FAA



4 Business Drivers for Accessibility

Driver #3: Balance Cost with Efficiency

- Central accessibility programs can be cheaper than chaotic/ad hoc activities
- Share the cost of common infrastructure across teams
 - Examples: tools, recordkeeping, training
- Apply organization wide learning
- More efficient paths to common solutions across product/service lines



Driver #4: Customer Satisfaction / Delight

- Meet or exceed growing customer expectation for accessible products and services
- Grow positive brand image / sentiments
- Capture market share at time when more companies are offering accessible products and services
- Differentiate/innovate with accessibility, show business value





Digital Accessibility

Keys to Designing for Accessibility



User-centered Design Approach



Creating Solutions That Are...

**More Intuitive
Easier To Use
More Productive**

**More Desirable
More Efficient**



Improving...

**User Experience
Customer Experience
Brand Experience**

Customer Loyalty



Tangible Business Outcomes...

**Differentiated Offerings
Faster Growth
Higher Margins**

**Expanded Market Share
Premium Pricing
Value Creation**

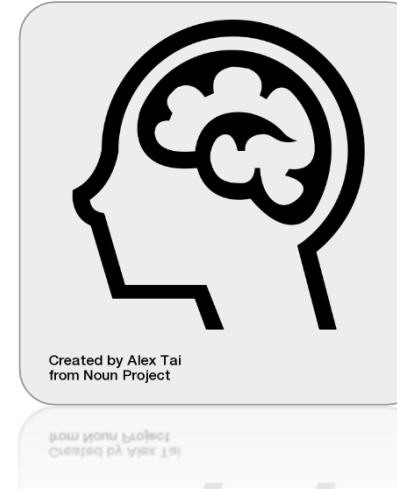
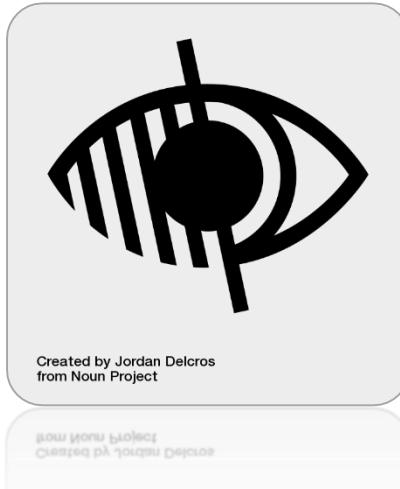
KEY #1: Understand Usability

NIELSEN'S 10 HEURISTICS

1. Visibility of system status
2. Match between system and real world
3. User control and freedom
4. Error prevention
5. Help users recognize, diagnose, and recover from errors
6. Consistency and standards
7. Recognition over recall
8. Flexibility and efficiency of use
9. Aesthetic and minimalist design
10. Help and documentation

KEY #2: Understand Your Users

- 15-20% of people have a disability
- Everyone is disabled at some point in their lives.



Accessibility / UX Personas

Anja : Web developer / software engineer

- 33 years old
- Anja progressively lost her sight after a car accident where she suffered a severe head trauma. As a blind user, she no longer uses a mouse and has no need for a monitor. She now relies exclusively on a keyboard and screen reader software to work, and browse the web.
- As a software engineer, she lives and breathes web technologies. But there's only so much she can do when information is provided through undescribed graphics, web interfaces lack semantic code, or content is not conveyed to her screen reader.



KEY #3: Work With Your Team

Product Manager

Researcher

Designer

Content Creator

Developer

QA

KEY #4: Understand the Tricky Parts

- Forms
- Tables
- Custom Controls
- Dynamic Content

- TEST, TEST, TEST!!!!

Tricky Parts : Custom Controls: What Are They?

First name

```
1 <label>First name</label>
2 <input type="text" name="fname" class=
 "av-text" id="fname"> |
```

First name

```
1 <p>First name</p>
2 <div id="input" contenteditable></div>
```

Anything that doesn't use standard
HTML control elements.

Tricky Parts : Testing Keyboard Accessibility

Facets of Keyboard Accessibility

- Tab Order
- Focus management for in-page updates
- Visual focus indication
- Keystrokes to select or activate

Testing for Keyboard Access

- Tab and Shift+Tab
- Arrow or Space to select
- Enter or Space to activate
- Visual focus indication on all tabbable elements
- Logical focus location at all times

KEY #5: Use the HUE DLS Pattern Library

- Colors
- Typography
- Forms
- Tables
- Notifications
- Icons
- Content guidelines

Honeywell | Desktop UI Controls

The screenshot displays a comprehensive pattern library for Honeywell's desktop user interface controls. It is organized into several sections:

- BUTTONS:** Includes Primary Call-to-Action Button, Standard Buttons, and various states (Active, Hover, Pressed, Inactive).
- ENTRY FIELDS:** Features Text Fields, Dropdowns, and Text Boxes, each with multiple state variations (Active, Focused, Filled, Error, Validation, Inactive).
- SLIDERS:** Shows a horizontal slider with different tick marks and a vertical slider.
- TOGGLES:** Displays various toggle switch states (Active, Selected, Error, Inactive, Three).
- TOOLTIPS:** Provides examples of tooltip placement and content.
- DATE PICKER:** Shows a date selection calendar for November 2015.
- DIVIDERS:** Illustrates horizontal and vertical list item separators.
- TABLES:** Shows standard tables with columns and download links.
- DIALOG BOXES:** Displays a confirmation dialog asking if the user wants to delete an item.
- IMAGE SLIDERS:** Shows light and dark versions of a circular image slider with navigation arrows.
- CHECKBOXES:** Shows checked and unchecked checkbox states.
- RADIO BUTTONS:** Shows selected and unselected radio button states.

Forms

Labels or instructions should be included whenever user input is required, and should be positioned near the elements they reference... Does it even look like a form?

First name

Password

Confirm Password

Email *

Your answer

First name

First name is a required field.

.....

Too Short

Confirm Password

✗ Passwords must match.

- ⓘ Use 8-16 characters.
- ⓘ Use at least one number and one alphabetic character.
- ✓ Don't use any special characters.
- ⓘ Don't use a password similar to your account name.

Feedback

Your answer

A photograph of a person wearing glasses and a blue shirt, sitting at a wooden desk and working on a laptop. A red arrow points from the left edge of the frame towards the laptop screen. The laptop screen displays the text "Digital Accessibility".

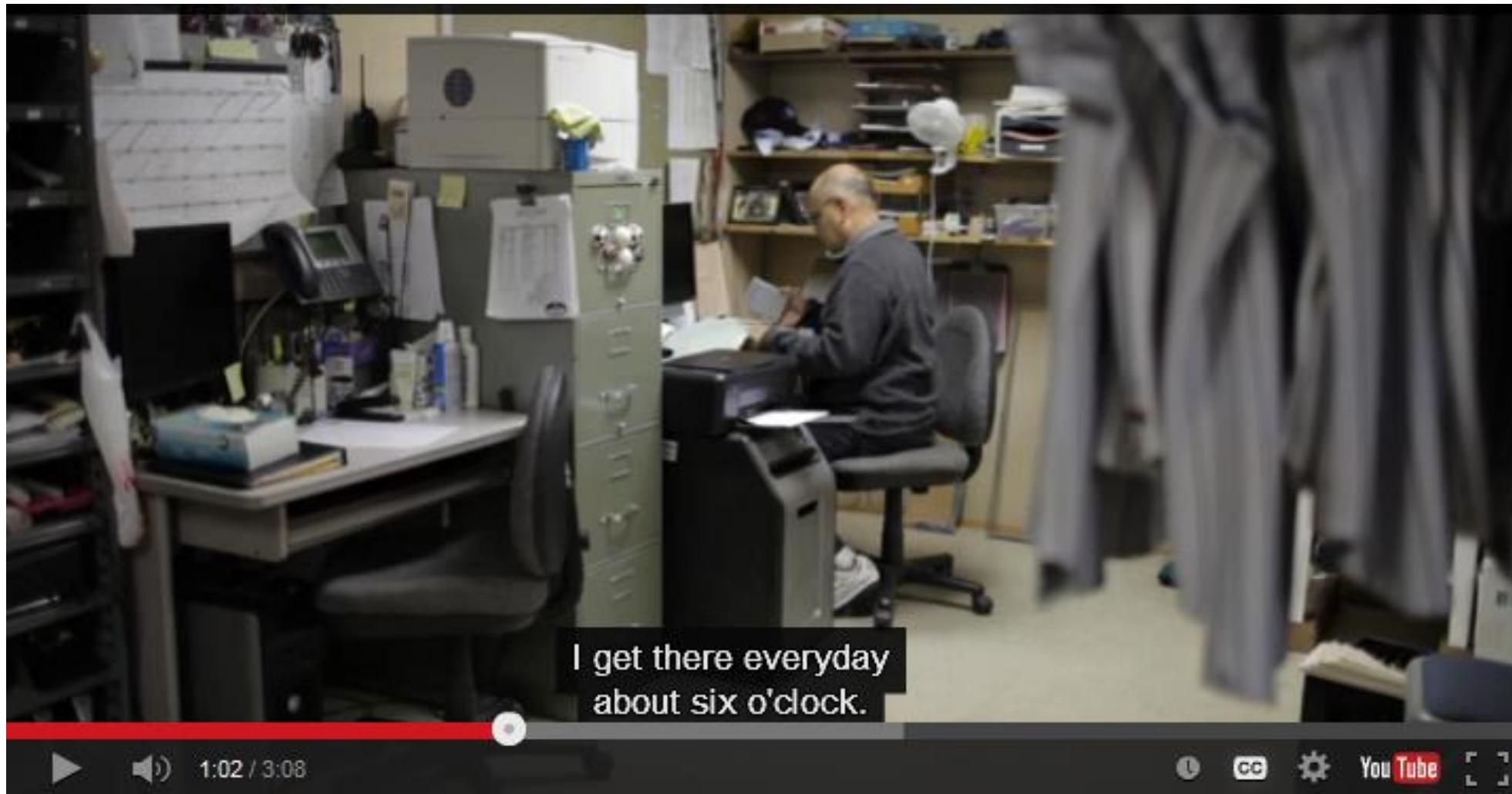
Digital Accessibility

P.O.U.R. Out Your Best Design

P.O.U.R. out Your Best Design

- **Perceivable:** Web content is made available to the senses - sight, hearing, and/or touch
 - Provide alternatives for time-based media
- **Operable:** Interface forms, controls, and navigation are operable with keyboard or mouse
 - Keyboard accessible
- **Understandable:** User-friendly, easy to comprehend.
 - Input Assistance
- **Robust:** Content works across browsers, assistive technologies, mobile devices, old devices/browsers, etc. Follows standards.
 - Name, Role, Value
 - a visual example of ARIA code currently in use on a Pru page

Perceivable: Web Video & Closed Captioning



Operable: On Focus/Input

Guideline 2.4.7 Level AA

- Users with motor impairments who rely on the keyboard to navigate need a clear visual focus indicator.

Guidelines 3.2.1, 3.2.2 Level A

- Because it can be disorienting, changes of context should not occur when shifting focus or choosing from a selection, but rather when the user takes a specific action to do so.

Where Do You Fit In?



Understandable: Errors

Guideline 3.3.1 Level A

- If an input error is detected, the error should be identified and described to the user in a text form.

 **SHARE DAY ONE** Close X

All Fields are Required
Error: Please fix the issues in the following fields

Your Name <small>Please enter a valid name</small>	Your Email <small>Please enter a valid email address</small>
Friend's Name <small>Please enter a valid name</small>	Friend's Email <small>Please enter a valid email address</small>
Day One Stories presented by Prudential	

Submit

Bad Example:

Fill Out the form below to register now

All field in red are required information

Contact Information

First Name:

Last Name:

City:

Submit

Good Example:

Fill Out the form below to register now

* required information

Contact Information

* First Name:

* Last Name:

* City:

Submit

Robust: Compatible - Name, Role, Value

Guideline 4.1.2 Level A

- Maximize compatibility with current and future user agents, including assistive technologies.

Name, Role, Value: example of ARIA code
currently in use on a Prudential page

```
100      . . . (10-12-3) a (.mobileinactive)
101          <span data-src="/img/logo-prudential.png" data-alt="Prudential: Bring Your
102          <![endif]-->
103          <!-- Fallback content for non-JS browsers. -->
104          <noscript>
105              
107      </span>
108      </a>
109  </div> <!-- /branding -->
110  <!-- Disclaimer -->
111  <div class="masthead-disclaimer">
112      <p>Prudential Day One Funds are offered as insurance company separate accounts available
113      </p>
114  <!-- Main navigation -->
115  <nav class="mainnav" role="navigation" aria-label="primary">
116      <ul class="cf">
117          <li><a href="/about/index.html" target="_self"><span class="center">About the <span
118              class="mobile-dropdown inactive">
119                  <li><a href="/about/planning-for-retirement.html" target="_self">Planning f
120                      <ul class="mobile-dropdown-second-level inactive">
121                          <li><span class="visuallyhidden">Selected</span></li>
122                      </ul>
123                  </li>
124                  <li><a href="/about/day-one-funds.html" target="_self">Day One Funds<span c
125                      <ul class="mobile-dropdown-second-level inactive">
126                          <li><a href="/about/day-one-funds-glidepath.html" target="_self">Day
127                              <li><a href="/about/fund-details.html" target="_self">Fund Details</
128
129
130
131
132
133
134
135
```

Thank You!

A photograph showing a person's hands. One hand holds a white smartphone, and the other hand holds a yellow pencil, writing on a small piece of paper attached to the phone. In the background, another person wearing a blue patterned shirt is visible, along with some books or papers on a surface.

Digital Accessibility

Appendix : Tools and Resources

Free Accessibility Tools

- Screen Reader
 - NVDA (NVDAaccess.com)
- Simulation Tools
 - No Coffee visual simulator: <https://chrome.google.com/webstore/detail/nocoffee/>
- Scanning tools are free:
 - WAVE (<http://wave.webaim.org/extension/>)
 - FAE (<https://fae.disability.illinois.edu/>)
 - CynthiaSays (<http://www.cynthiasays.com>)
 - Vamola (http://www.validatore.it/vamola_validator/checker/index.php)
 - Its an Italian website but the results are in english
- Color contrast checkers:
 - <http://contrast-finder.tanaguru.com>
 - <http://gmazzocato.altervista.org/colorwheel/wheel.php>

NoCoffee

Plugin for Chrome

www.audible.com/wl/ref=a_expresssa_mst_tnaft_3?ie=UTF8&pf_rd_r=8NMMQMN904MA6KEE8RHP&pf_rd_m=A2ZO8J; 26

to OneNote LinkedIn Gmail Microsoft Word USA T P C G S 9 0 Staff

Hi, Bill

audible Home Library WishList Books Available Listen Page

Library WishList Books Available Listen Page

You have 19 items in your WishList.

See Details Edit Details Add to Cart Remove from WishList

Selected items

Detail	Title	Author	Price
	10-19-2015	WishList Books Available	Audiobook
	10-19-2015	Interesting Stories	Audiobook
	10-19-2015	Smart Girls	Audiobook
	10-19-2015	Hogwarts	Audiobook

NoCoffee Vision Simulator

Pervasive issues

- Blur (low acuity):
- Contrast loss:
- Glare:
- Ghosting:
- Snow:
- Cloudiness (cataracts):
- Flutter (nystagmus):

Color deficiency:

Blocked visual field

- Normal
- Central (macular degeneration)
- Peripheral (glaucoma, retinitis pigmentosa)
- Corner (retinal detachment)
- Side (hemianopia)
- Large spots (diabetic retinopathy)
- Floaters

Strength and size:

[More info](#) [Feedback](#)