Introduction to coding for Accessibility

For Software Developer apprentices at The National Archives

What is accessibility?

Accessibility === A11Y

- **The World Wide Web Consortium (W3C)** describe A11Y as ensuring disabled people can **perceive**, **understand**, **navigate**, **interact with** and **contribute to** the Web

- Google describe it in guidance for developers as “the site’s **content is available** and its **functionality can be operated**, by literally anyone”

A11Y and service design

Accessibility is a vital component of good service design. It is related to, but distinct from and often confused with:

- **Usability** (and user experience design)
- **Universal design** (sometimes called inclusive design, design for all or inclusion)
- **Assisted digital** (sometimes called assisted digital support)

A11Y !== Usability

Good services are both. Most of the web is neither.

- ***Usability*** (and user experience design) is the extent to which a product can be used to achieve specified goals effectively, efficiently and with satisfaction.
- ***A11Y*** is ensuring disabled people can perceive, understand, navigate, interact with and contribute to the Web.

A11Y is *part of* universal design

A universal design will be accessible

- ***Universal design*** (aka inclusive design, design for all, or inclusion) addresses issues including access to and quality of hardware; software; network connectivity; computer literacy and skills; economic situation; education; geographic location; and language - **as well as age and disability**
- The relationship between Universal design and A11Y is like aggregation in OOP

A11Y !== Assisted Digital

But they’re often mistakenly thought of as the same thing

Assisted digital is about providing support for people who do not have the skills or access to do so on their own.

For example, if a government department move a digital service online they would need to provide a mechanism for someone without, say, internet access to achieve the service goals. This might be by phone, web chat or face-to-face.

Some myths about A11Y

Myth #1

A11Y worsens the typical user's experience

"...many developers feel that addressing accessibility will force them to choose between creating a delightful and attractive experience, and one that is ugly but accessible. That is, of course, not the case at all" https://developers.google.com/web/fundamentals/accessibility

The truth is that:

- A well executed accessible implementation will result in **a better user experience for everyone**
- **There is no 'typical' user**. We are all unique and our needs change over time. These changes may relate to ageing or illness, or they may be a simple change in our context or the device we're using

Myth #2 - A11Y is about blind people

Making a service usable for people who are blind is vital but inadequate because A11Y encompasses all disabilities that affect access to the Web

This includes:

- Physical, cognitive, visual, auditory, speech and neurological disabilities
- that may be permanent or temporary

More myths about A11Y

And they’re all myths: let’s go through them one-by-one

- *‘We don’t have the time/resource to make this accessible’*
- *‘It’s an internal system, so it doesn’t need to be accessible’*
- *‘The audience is small so no blind user will use it...’*
- *‘We need to use X and that isn’t accessible’*
- *‘Let’s build it and then make it accessible at the end’*

Some accessibility needs

Taken from An Alphabet of Accessibility Issues

C has blood cancer

She’s been on chemo for a few months and, despite being an MD, is finding it harder and harder to remember things, read, or have a conversation. She’s frustrated because she’s becoming more and more reliant on her smartphone for taking notes and keeping track of things

P has Multiple Sclerosis

This affects both her vision and her ability to control a mouse. She often gets tingling in her hands that makes using a standard computer mouse for a long period of time painful and difficult

W had a stroke in his early forties

Now he’s re-learning everything from using his primary arm to reading again

E has Cystic Fibrosis

This causes him to spend two to three hours a day wrapped in respiratory therapy equipment that vibrates his chest and makes him cough. As an extension, it makes his arms and legs shake, so he sometimes prefers to use the keyboard or wait to do tasks that require a steady touch with a mouse. He also prefers his tablet over his laptop because he can take it anywhere more conveniently, and it’s easier to clean germs off of.

Situational, temporary, permanent

Remember that access issues can be:

- ***Situational*** - while this is not always an accessibility issue, a noisy office can present an access to people watching a training video for which there is transcript
- ***Temporary*** - a broken arm or some forms of RSI
- ***Permanent***

How to make a service accessible

Web Content Accessiblity Guidelines 2.0

The definitive guidance for ensuring accessibility

- aka WCAG 2.0
- W3C recommendation
- Organised around the POUR principles:
  - Perceivable
  - Operable
  - Understandable
  - Robust
- For each principle there are guidelines

Perceivable

Can users perceive the content?

- Keep in mind that just because something is perceivable via one sense it does not mean all users can perceive it

Operable

Can users use interface components and navigate the content?

- For example, if a feature is reliant upon a ‘hover’ then it will not be usable by someone who is not using a mouse and those who are using touch screens

Understandable

Information and UI operations must be understandable

Covers such things as:

- Clarity of language used on the page
- Programmatically describing the language of the page and its parts
- Pages should operate in *normal* ways (for example, don't open new windows in response to a hover event)

Robust

Will it work across user agents (browsers)?

- Can the content be consumed by a wide range of (current and future) browsers?
- Will it work with assistive technology?

Coding rich accessible applications

WAI ARIA

Making complex applications accessible

The Accessible Rich Internet Application (ARIA) Suite provides tools to make dynamic content and advanced user interface controls more accessible

ARIA concepts

Roles, *States* and *Properties*

ARIA is structured around an ontology of:

- Roles
- States
- Properties

That are used in combination to improve accessibility

Tools ARIA provides: ***roles***

Example roles include:

- ***Roles*** to describe the type of widget presented, such as "menu", "treeitem", "slider", and "progressmeter"
- ***Roles*** to describe the structure of the Web page, such as headings, regions, and tables (grids)

Tools ARIA provides: **properties and states**

Example states and properties include:

- ***Properties*** to describe the ***state*** widgets are in, such as "checked" for a check box, or "haspopup" for a menu.
- ***Properties*** to define ***live regions*** of a page that are likely to get updates (such as stock quotes), as well as an interruption policy for those updates—for example, critical updates may be presented in an alert dialog box, and incidental updates occur within the page
- ***Properties*** for drag-and-drop that describe drag sources and drop targets
- Mechanisms to provide keyboard navigation for the Web objects and events, such as those mentioned above

Beyond code

What’s on your site?

Coding can only take you so far: the design and content of a website plays a role in accessibility too.

We have to think about what we are saying and how we are saying it; we have to think about the way we present this information.

Thinking in wider terms can be more useful than focusing on specific conditions (unless that’s appropriate for the project) - for example, considering ‘cognitive skills’ rather than listing dyslexia, autism, MS.

Cognition

An umbrella term for your learning skills—your ability to process information, reason, remember, and relate.

There are too many types of cognitive disabilities to list, so I'm going to focus on areas that can be affected:

- memory
- problem-solving
- attention
- reading, linguistic, and verbal comprehension
- visual comprehension

Content needs to be clear and accurate, and sometimes in more than one format, in order for individuals to fully understand content.

Memory

Ability to recall information

A common model for understanding memory includes 3 elements: working (immediate), short-term and long-term memory.

Think about length of information you're giving, and the complexity of a task: are you relying on a user being able to remember previous screens or even the top of the page?

Problem-solving

Ability to find solutions for problems or tasks

This isn’t just about solving a puzzle; it’s about ability to work out the steps you need to take in order to do something, or correct an error.

Making calls to action clear and consistent can help, as can explanation about what steps people need to take to complete a task.

Attention

Ability to focus on the task at hand

Taking in and concentrating on the right information can be more difficult for some people.

Think about what could distract someone: how much competing information is there on the page; are there background images or sounds, or colour clashes?

Can you use visual cues or highlights to focus someone's attention?

Reading & verbal comprehension

Ability to understand text

Write as simply and clearly as you can - use common words, minimise use of contractions, consider font.

Non-literal text (like sarcasm and metaphor) can be an issue - some readers won’t pick up on it!

Explore other ways to convey information alongside written.

Visual comprehension

Ability to understand visual information

Some people have trouble understanding what images and icons imply, or what visual cues are asking of them.

Try not to rely entirely on visual communication methods (like colour, spatial relationships, styles, design elements, photos, images).

Are we leaving anyone out?

When creating content, it’s useful to pause and ask who might be unable to access what you are making.

For example, if you are creating a video will D/deaf people be able to access the information?

If you don’t know the answer - research!