

FIT3175 - Usability

Accessibility Principles and Techniques

Week 5 Lecture P1

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Learning objectives

Identifying Accessibility Issues

- Define accessibility
- Understand diversity of access problems
- Legal implications of accessibility

Assistive Technologies

- Assistive hardware
- Assistive software

Content Accessibility Guidelines

- Accessibility standards and WCAG principles
- WCAG techniques

Stage D peer evaluation

Identifying Accessibility Issues

Recap: What is usability?

ISO 9241-11 (Ergonomics of Human-System Interaction) defines "**usability**" as

"extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use"

The ability to specify which users we design for and the context of use means that when we apply this definition alone, we don't immediately consider accessibility.

However, the key measures of **effectiveness, efficiency** and **satisfaction** are still important in evaluating the functionality and acceptability of accessible systems.

What is accessibility?

Consider how the following are different from **usability**:

"It's all about ensuring inclusive participation and access to information for all people, no matter what their abilities or circumstances.... If websites or other digital media are poorly designed and built, they can prevent some people from using them."

- *Vision Australia, Accessibility Toolkit*

"The power of the web is in its universality. Access by everyone regardless of disability is an essential aspect."

- *Tim Berners-Lee, inventor of the World Wide Web*

Yeah, but so few people have a disability...

Not true!

Around 1 in 6 (18%) people in Australia - or about 4.4 million - have disability.

Keep in mind:

- Disabilities can be acquired or temporary (age, illness or accidents).
- Are a spectrum, affecting senses, mobility and cognition.
- Can be imposed by the technologies we use.
- 32% of adults with disability experience high psychological distress.
- 48% of working-age (aged 15–64) people with disability are employed.
- Some disabilities are more visible than others.

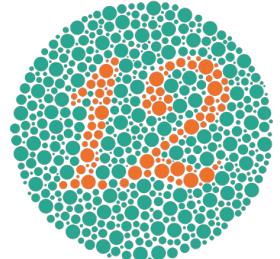
Even from a business perspective, this is a large portion of a potential user base.

Types of disabilities

Different conditions and impairments affect how people interact in different ways. Some disabilities are more visible than others.

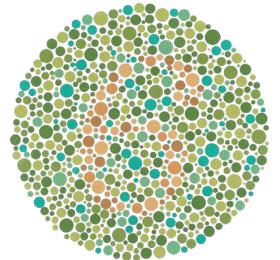
Sensory

Blindness, colour blindness, deafness, hearing loss, low vision, etc.



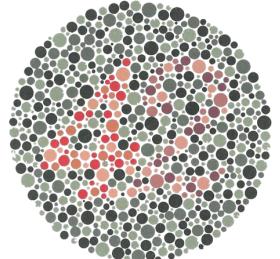
Mobility

Cerebral palsy, epilepsy, muscular dystrophy, spinal cord injury, etc.



Cognitive

Anxiety disorders, autism, brain injury, dyslexia, memory loss, etc.



Right: Ishihara test plates. Numbers are less visible to people with colour blindness.

Inclusive design

An inclusive design philosophy recognises that accessibility problems are not just personal health conditions - **they are mismatches of ability that create exclusion.**

Principles of inclusive design defined in **Microsoft's Inclusive Design Toolkit**:

Recognize exclusion

Designing for inclusivity not only opens up our products and services to more people, it also reflects how people really are. All humans grow and adapt to the world around them and we want our designs to reflect that.



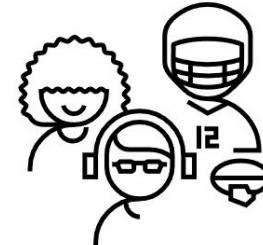
Solve for one, extend to many

Everyone has abilities, and limits to those abilities. Designing for people with permanent disabilities actually results in designs that benefit people universally. Constraints are a beautiful thing.



Learn from diversity

Human beings are the real experts in adapting to diversity. Inclusive design puts people in the center from the very start of the process, and those fresh, diverse perspectives are the key to true insight.



Temporary disabilities and impairments

Sometimes exclusion is temporary

A short-term illness or injury can limit your physical or cognitive abilities, creating temporary difficulty completing tasks.

Describe a situation where an injury...

- Limited your ability to see or hear.
- Limited your ability to perform interactions.
- Limited your ability to think or concentrate.



Situational impairments

Sometimes exclusion is situational

The context and environment can drastically alter the effectiveness of our human abilities.

Have you ever experienced a contextual or environmental situation where...

- Your vision was limited?
- You had difficulty hearing something?
- You had limited use of limbs?



Look more closely: The diversity of users



Accessible design approaches

Design alternatives

Provide multiple representations so that a user can choose the version that works best for them.

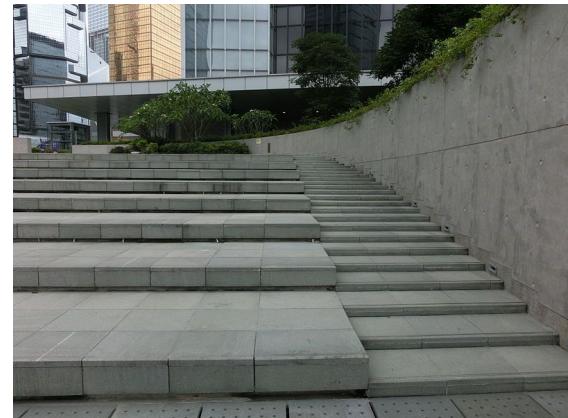
Design for lowest common denominator

Create a single design, that considers accessibility constraints for it to work for as many users as possible.

Design for one, extend to many

A solution that works to solve one issue may in fact help many users experiencing different situations,

Right: Ramps for wheelchair access, can be used by many other people.



Legal requirements

The Australian government has endorsed the Web Content Accessibility Guidelines 2.0 for ALL government websites. Laws apply to the private sector as well.

Australian Disability Discrimination Act 1992

- Information must provided in an accessible manner
- Providers of goods, services, and facilities cannot discriminate due to disability.

Blind woman Gisele Mesnage sues Coles over online shopping website

Coles is facing a landmark claim following an allegation the supermarket giant's website does not provide adequately for visually impaired shoppers. Rachel Browne explains.

Bruce Lindsay Maguire v SOCOG

Australia was the first country to have its discrimination laws tested in this area:
Maguire v SOCOG in 1999.

- Maguire asserted that significant parts of the Sydney Olympic Games website were inaccessible to him. e.g. images without alternative text, badly formatted results tables that couldn't be read by his text reader software

SOCOG's defense was that compliance would be an “unjustifiable hardship”

- This is the only real defense allowed by the DDA
- SOCOG's estimate was that 1 person working 8 hours days would require 368 days to complete the task and the cost would be \$2.2 million
- Expert witnesses estimated that it could be done in around 4 weeks at a cost of around \$30,000

Meet Bruce Maguire...



Bruce Maguire has been blind since birth and currently works as a lead policy advisor for **Vision Australia**.

In this video, Bruce Maguire demonstrates how he is able to interact with websites.

***What lessons can we learn
from this example?***

How to design for accessibility

At a really high level, ignoring all technical details and nuance:

1. Enable multi-modal input and output.

Allow users to access content without having to rely on just one of their senses.

- This is partly handled by our devices and operating systems.
- Our technical implementations must be compatible with standards.

2. Make things as clear and simple as possible.

Don't over-complicate things – make everything easy to follow and understand.

- Unexpected behaviours can trap people with different abilities.
- Our designs must be compatible with human ability.

Accessibility in personas

Discuss:

What accessibility requirements can we consider for this persona?



- Sensory
- Mobility
- Cognition
- Technology
- Temporary
- Situational

Personality

Warm, patient and willing

Favourite activities

Knitting, reading, playing board games with her friends in the retirement home.

Favourite online activities

- Reading knitting blogs.
- Skyping with her grandchildrens.
- Commenting on her grandchildrens' photos on Facebook.

Chen the Loving Grandma

Chen is a former housewife who lost her husband to cancer 30 years ago. She has 2 sons, Chao and Bao. Chao lives in Germany, and Bao lives a few streets away from the retirement house that Chen now lives in. He and his 3 children come to see Chen every now and then. She turned 70 last week, her friends in the retirement home threw her a party which she seemed to enjoy but deep inside all she wanted was to spend the day with her grandchildren who are now busy with school. Her birthday gift from Bao was an iPad mini; she doesn't know much about technology but is hoping to learn how to use it without asking for Bao's help.

Favourite websites:

Facebook and Sixty and Me

Device Use:

- Shared Windows 98 computer
- Nokia N95
- A new iPad Mini4

Motivation

- To teach her friends in the retirement home how to use technology.
- To start a knitting blog. She always gets compliments on her sweaters.

Needs

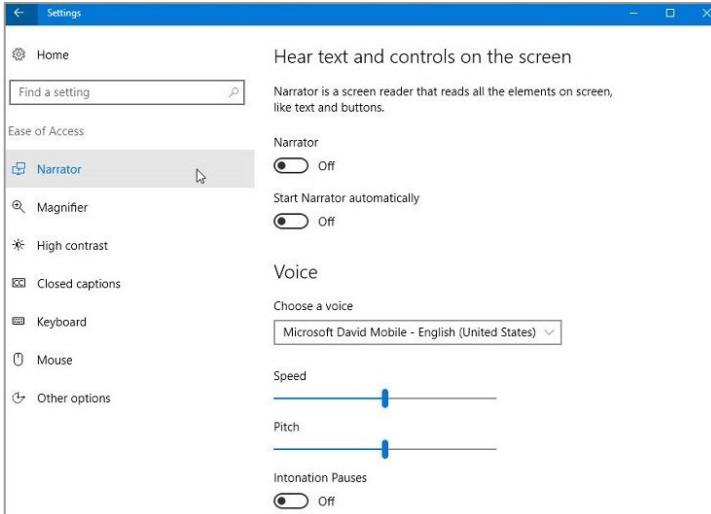
- To be more independant.
- To stay in touch with family and old friends.

Frustrations

- Has a slight hand tremor.
- Is in the early stages of dementia and needs to write things down to remember them.
- Living away from her grandchildren
- Doesn't want to ask for help.

Assistive Technologies

Screen-readers and text-to-speech



Screen readers allow on-screen text and context to be read aloud using a synthesised voice.

- **Desktop operating systems**
 - macOS VoiceOver
 - Windows Narrator
- **Mobile**
 - iOS VoiceOver
 - Android TalkBack
- **Third-party Applications**
 - NV Access NVDA (open-source)
 - Freedom Scientific JAWS (commercial)

Refreshable braille

A refreshable braille display converts onscreen text into electro-mechanical braille that can be read by feeling the braille patterns produced.

- Native support in VoiceOver and Narrator
- Android support via Google BrailleBack

Modern braille displays connect via bluetooth. Users can enter text using a standard keyboard, though some devices do also offer a 8-key braille input feature.



Speech generator



Users have physical or cognitive impairments that make it difficult or impossible to use their own voice for speaking.

Speech generators allow conversations to be constructed from text or pictographic menus.



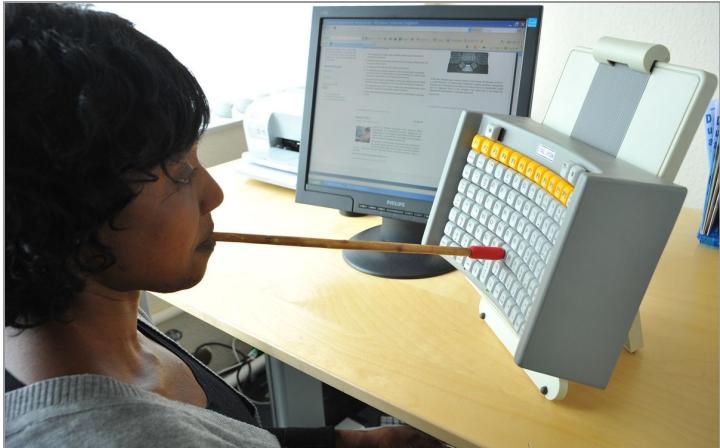
- Previously used to help users communicate with other people.
- The prevalence of modern voice interaction systems gives these tools a new purpose.

Mouth sticks and switches

For users with limited use of limbs, head and mouth devices can be used to operate devices.

- **Pointing sticks** held in the mouth to use of available head movement to interact with keyboards and touchscreens.
- **Sip-and-puff switches** simulate click/touches by blowing into a tube -mounted switch.

Different types of sticks and switches can also be head-mounted depending on users' abilities.



Bluetooth controllers



Bluetooth wireless connectivity and input device provide great flexibility for users to customise how they interact with devices.

- Buttons that simulate mouse clicks
- Executing gestures and hotkeys
- Interacting with switch scanning systems to facilitate on-screen selections

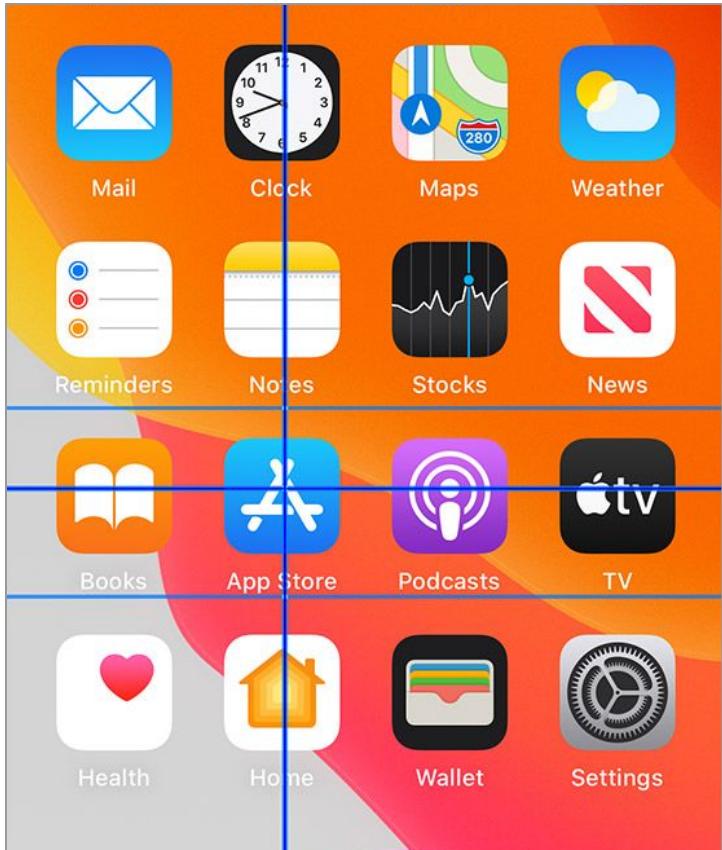
Left-bottom: The controls of this motorised wheelchair are used for driving control, but can also be used as a Bluetooth pointing device for a paired computer, mobile or tablet device.

Switch scanning systems

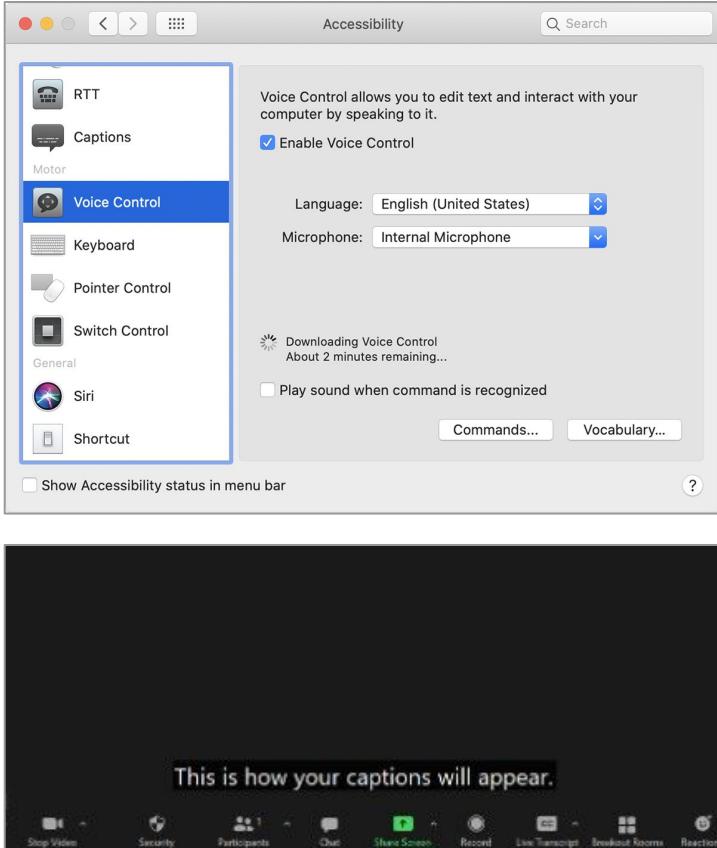
Some users can have difficulty performing selections in a GUI.

A switch scanning system moves a vertical and horizontal line to form a crosshair, pinpointing a desired selection using a single switch.

- A line continuously scans the screen.
- Press a switch to stop the vertical scan.
- Press again to stop the horizontal scan.
- A menu opens with possible actions for the selected item.



Speech recognition



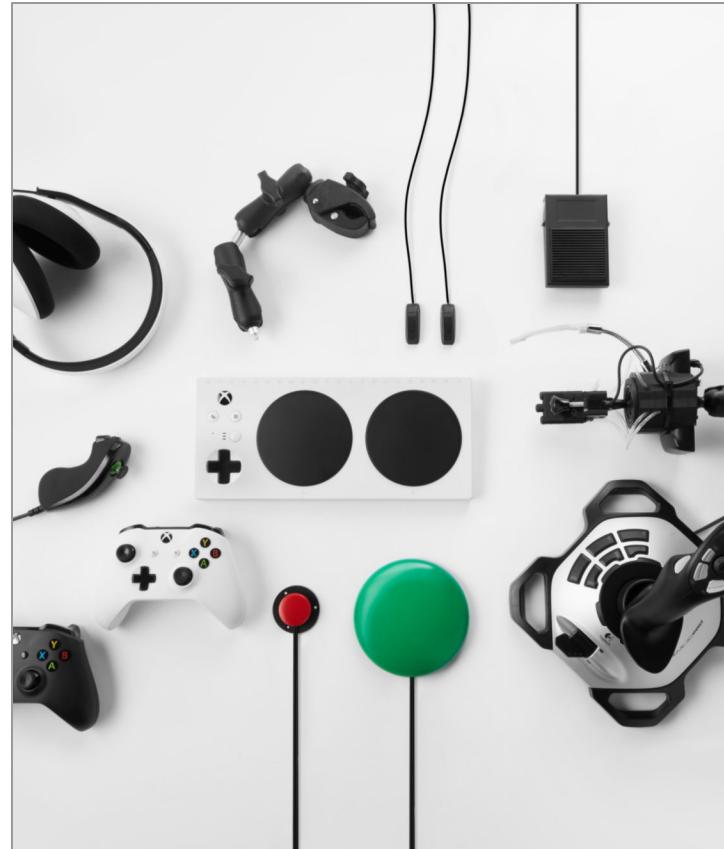
Speech recognition systems have many uses that helps users with a wide range of different tasks.

- Speech as a primary input method.
- Speech as an assistive input method.
- Speech to text for people with hearing difficulties.
- Speech to text for live transcription to improve understanding of content.
- Speech to text for real-time or later translation to other languages.

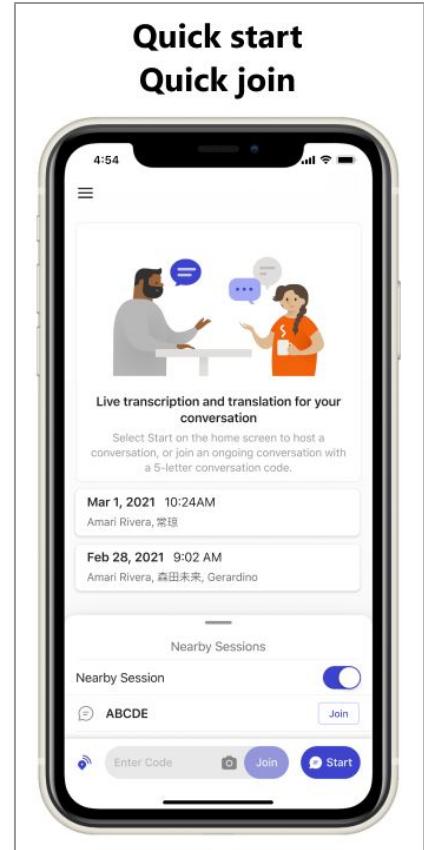
Microsoft's Adaptive Controller

In 2018, Microsoft released **Adaptive Controller** - an accessible controller designed and prototyped with input from gamers with disabilities.

- 2 large remappable face buttons.
- Different sounds played for each press.
- USB connections for pointing devices.
- 3.5mm connections for switch devices.
- Controller can be easily mounted.
- Toggle between saved profiles.
- Bluetooth and USB-C for cross-platform use.



Mobile devices and apps



Accessibility Standards and Guidelines

ISO Accessibility

ISO 9241-112 (Principles for the presentation of information) includes a definition for "accessibility":

"extent to which products, systems, services, environments and facilities can be used by people from a population with the widest range of user needs, characteristics and capabilities to achieve identified goals in identified contexts of use"

Note 1 to entry: Context of use includes direct use or use supported by assistive technologies."

Beyond the standard, platforms will have their own accessibility guidelines.

W3C Web Accessibility Initiative (WAI)

The **World Wide Web Consortium (W3C)** defines and maintains standards that ensure interoperability of the Web, including its **WAI** standards:

- **Web Content Accessibility Guidelines (WCAG)** for the design and development of websites and web content.
- **Accessible Rich Internet Applications (ARIA)** for the design of accessible dynamic websites and web applications.
- **User Agent Accessibility Guidelines (UAAG)** for the design and development of web browsers and assistive technologies.
- **Authoring Tool Accessibility Guidelines (ATAG)** for the design and development of authoring tools that support and promote accessibility.

W3C Web Content Accessibility Guidelines (WCAG)

WCAG defines 4 basic principles that help categorise accessibility issues and the design guidelines and techniques required to solve problems.

- Perceivable
- Operable
- Understandable
- Robust

The advice provided by WCAG is separated into 2 main documents:

- **Web Content Accessibility Guidelines (WCAG) 2.1** (with success criteria)
- **Techniques for WCAG 2.1** (with technical implementations)

WCAG Principle: Perceivable

Perceivable information and user interface

- Text alternatives for non-text content.
- Captions and other alternatives for multimedia.
- Content can be presented in different ways.
- Design content that is easy to see and hear.
- UI controls should have text labels that describe their purpose.



TLDR

Can users use their available senses to detect the content?



WCAG Principle: Operable

Operable user interface and navigation

- Functionality is available from a keyboard.
- Users have enough time to read and use the content.
- Content does not cause seizures and physical reactions.
- Users can easily navigate and determine where they are.
- Users can use different input modalities beyond keyboard.



TLDR

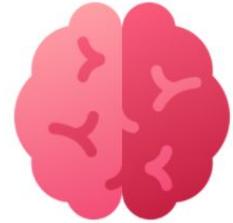
Can users execute the required interactions easily?



WCAG Principle: Understandable

Understandable information and user interface

- Text is readable and understandable.
- Content is presented in predictable ways.
- Navigation and controls work in predictable ways.
- Users are helped to avoid and correct mistakes.



TLDR

Can users mentally process and interpret what they have perceived?



WCAG Principle: Robust

Robust content and reliable interpretation

- Content is compatible with current and future user tools.
- The purpose of each interface element should be programmatically determinable.
- Assistive technologies are made aware of changing status that updates in the page.



TLDR

Can browsers and assistive technologies process the site correctly?



WCAG conformance

Satisfactory implementation of success criteria is required to earn one of 3 conformance levels:

- **A** Basic web accessibility features.
- **AA** Deals with biggest disability barriers.
- **AAA** Highest level of ideal web accessibility.

In most situations **A** or **AA** is a good goal for sites.

Australia.gov.au is currently compliant to Level A of the [Web content accessibility guidelines version 2.0](#) (WCAG 2.0) standard. It is being upgraded to Double A compliance over time. In some cases, content will be accessible to Level Triple A.

Above: Conformance levels in Australian government websites.

Success Criterion 1.2.1 Audio-only and Video-only (Prerecorded)

(Level A)

For prerecorded audio-only and prerecorded video-only media, the following are true, except when the audio or video is a media alternative for text and is clearly labeled as such:

- **Prerecorded Audio-only:** An alternative for time-based media is provided that presents equivalent information for prerecorded audio-only content.
- **Prerecorded Video-only:** Either an alternative for time-based media or an audio track is provided that presents equivalent information for prerecorded video-only content.

Success Criterion 1.2.2 Captions (Prerecorded)

(Level A)

Captions are provided for all prerecorded audio content in synchronized media, except when the media is a media alternative for text and is clearly labeled as such.

Success Criterion 1.2.3 Audio Description or Media Alternative (Prerecorded)

(Level A)

An alternative for time-based media or audio description of the prerecorded video content is provided for synchronized media, except when the media is a media alternative for text and is clearly labeled as such.

Success Criterion 1.2.4 Captions (Live)

(Level AA)

Captions are provided for all live audio content in synchronized media.

Success Criterion 1.2.5 Audio Description (Prerecorded)

(Level AA)

Audio description is provided for all prerecorded video content in synchronized media.

Success Criterion 1.2.6 Sign Language (Prerecorded)

(Level AAA)

Sign language interpretation is provided for all prerecorded audio content in synchronized media.

Can you identify the potential accessibility issues?

< X

Log in

Phone Log in with email or username

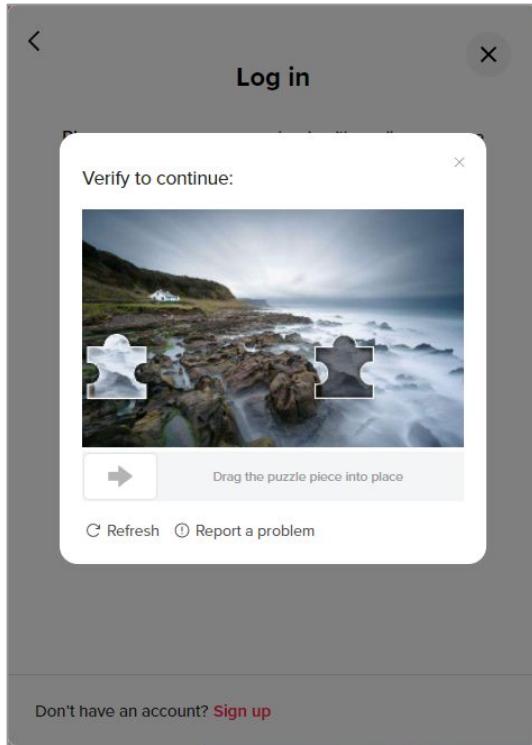
AU +61 ▾ Phone number

Enter 4-digit code Send code

Log in with password

Log in

Don't have an account? [Sign up](#)



< X

Log in

Phone Log in with email or username

AU +61 ▾

Enter 4-digit code Resend code 15s

Log in with password

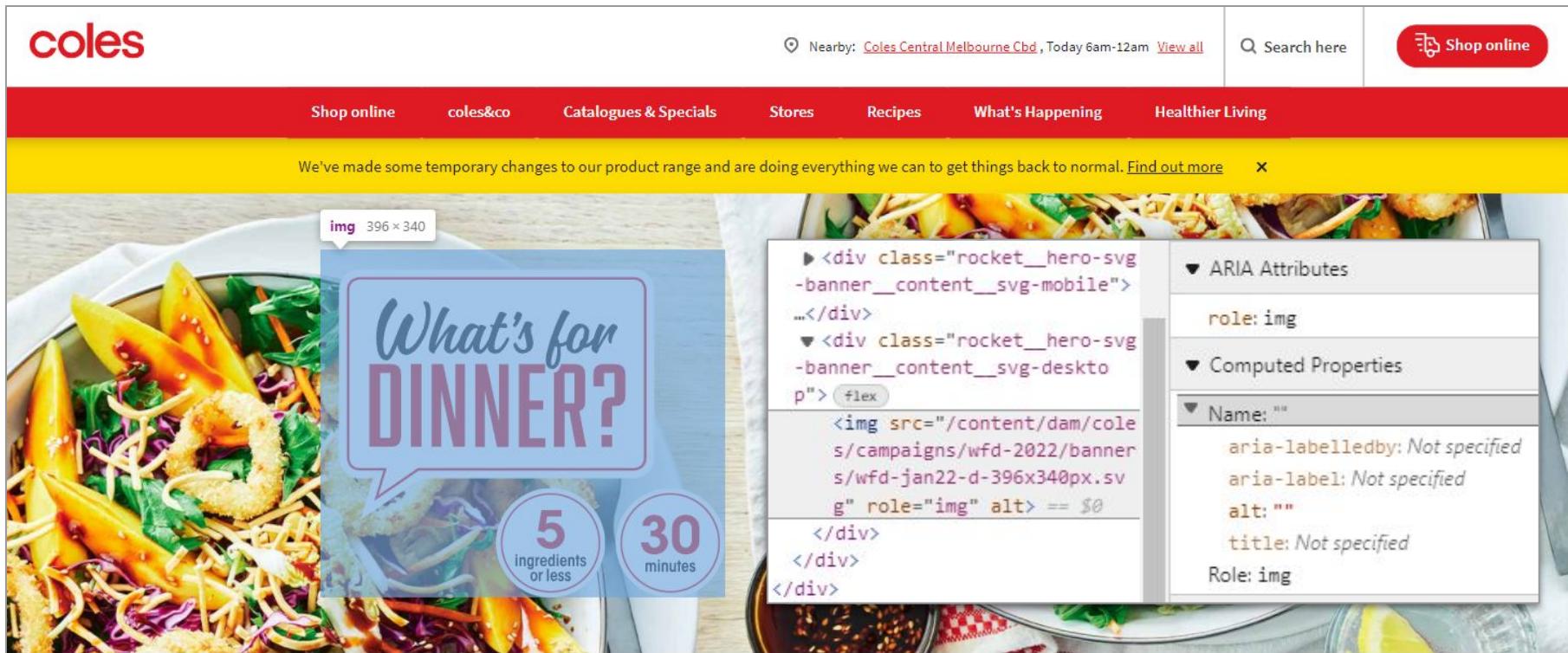
Log in

Don't have an account? [Sign up](#)

Consider the principles: **Perceivable, operable** and **understandable**.

Web Accessibility Techniques

Avoid embedding text within images



The image embeds meaningful text as graphics - **no useful text context is present in the code.**

Text alternatives



- Use **alt** attributes to provide a description for images elements providing the same information if the image cannot be seen.
- Use **title** attributes with other visual elements. This will also display a tooltip when the mouse hovers the element.

Captions and transcripts



Or someone who cannot hear well, and uses captions to watch videos.

Above: Captioned videos provide multiple benefits for different users.

Right: A text transcript for media provides flexibility of **transformation**.

SBS NEWS IN EASY ENGLISH
SBS News in Easy English bulletin 25 January 2022

A screenshot of a video player interface for the "SBS News in Easy English bulletin 25 January 2022". The video player shows the SBS News logo and a play button. Below the video player, there is a timestamp of "00:00" and a duration of "06:02". At the bottom of the page, there is a transcript section with the heading "TRANSCRIPT". The transcript discusses COVID-19 restrictions in New South Wales, mentioning elective surgeries resuming in mid-February and a campaign to assist people at home with mild COVID-19 symptoms.

Controllable duration of timed interactions

Some users may require more time to understand or operate an interface.



For example, a slideshow that automatically advances every 3 seconds.

- Automatically pause when receiving focus or during mouse interaction.
- Include a pause button to extend reading time outside for interaction.

Responsive Design

The GitHub homepage is displayed across three different screen widths, illustrating how the layout adapts to fit the available space while maintaining key elements like the header, main hero image, and call-to-action buttons.

Header: Includes the GitHub logo, navigation links (Why GitHub?, Team, Enterprise, Explore, Marketplace, Pricing), a search bar, and sign-in/sign-up buttons.

Main Hero Section: Features the tagline "Where the world builds software" in large white text. Below it, a large blue globe with a network of pink lines representing global software development is shown. A small 3D-style astronaut figure stands on a white base in the foreground. Text below the tagline states: "Millions of developers and companies build, ship, and maintain their software on GitHub—the largest and most advanced development platform in the world." Below this are two input fields: "Email address" and "Sign up for GitHub".

Statistical Summary: Displays four key statistics: "73+ million Developers", "4+ million Organizations", "200+ million Repositories", and "84% Fortune 100".

Enterprise Callout: A box at the bottom left promotes GitHub Enterprise with the text "Build like the best with GitHub Enterprise" and "Take collaboration to the next level with security and administrative features built for teams." It includes "Start a free trial" and "Contact Sales" buttons, along with logos for Etsy, Stripe, and 3M.

The GitHub homepage is displayed across three different screen widths, illustrating how the layout adapts to fit the available space while maintaining key elements like the header, main hero image, and call-to-action buttons.

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Statistical Summary: Displays three key statistics: "73+ million Developers", "4+ million Organizations", and "84% Fortune 100".

Colour contrast

Contrast Checker

Home > Resources > Contrast Checker

Foreground Color

#4242FF 

Lightness



Background Color

#C2C2C2 

Lightness



Contrast Ratio

3.41:1

[permalink](#)

Normal Text

WCAG AA: Fail



Large Text

WCAG AA: Pass



Graphical Objects and User Interface Components

WCAG AA: Pass



The screenshot shows the Coolors Contrast Checker interface. It displays two color swatches: a dark purple (#506E93) for text and a light yellow (#FFEE7D) for background. Below the swatches is a 'Contrast' section with a large '4.45' rating, a 'Poor' rating indicator with one star, and three buttons: 'Adjust text color' (purple), 'Adjust background color' (yellow), and 'Adjust both colors'. A note below says 'Poor contrast for small text (below 18pt) and good contrast for large text (above 18pt or bold above 14pt). Click to fix'. To the right is a yellow box containing a quote by Lao-Tze: 'Watch your thoughts; they become words. Watch your words; they become actions. Watch your actions; they become habits. Watch your habits; they become character. Watch your character; it becomes your destiny.' and the attribution 'Lao-Tze'.

Contrast ratios can be used to determine general readability of text.

Above: The Coolors tool provides simple auto-adjustment options to optimise contrast for readability.

Left: The WebAIM tool also considers color in UI elements.

<https://coolors.co/contrast-checker/>, <https://webaim.org/resources/contrastchecker/>

Don't rely on colour alone

Your Information

Full Name

Email Address

katy@tealmedia

Password

Phone Number

Phone Number

CONTINUE

By registering you agree to Box's [Trial Terms of Service](#) and [Privacy Policy](#).

Your Information

Full Name

Email Address

katy@tealmedia

Password

Phone Number

Phone Number

CONTINUE

By registering you agree to Box's [Trial Terms of Service](#) and [Privacy Policy](#).

Email address or username

katy@tealmedia.com

Password

Incorrect username and/or password. You modified your password 196 days ago.

Remember me for 30 days

Sign in

Forgot password?

Red highlighting of invalid fields.

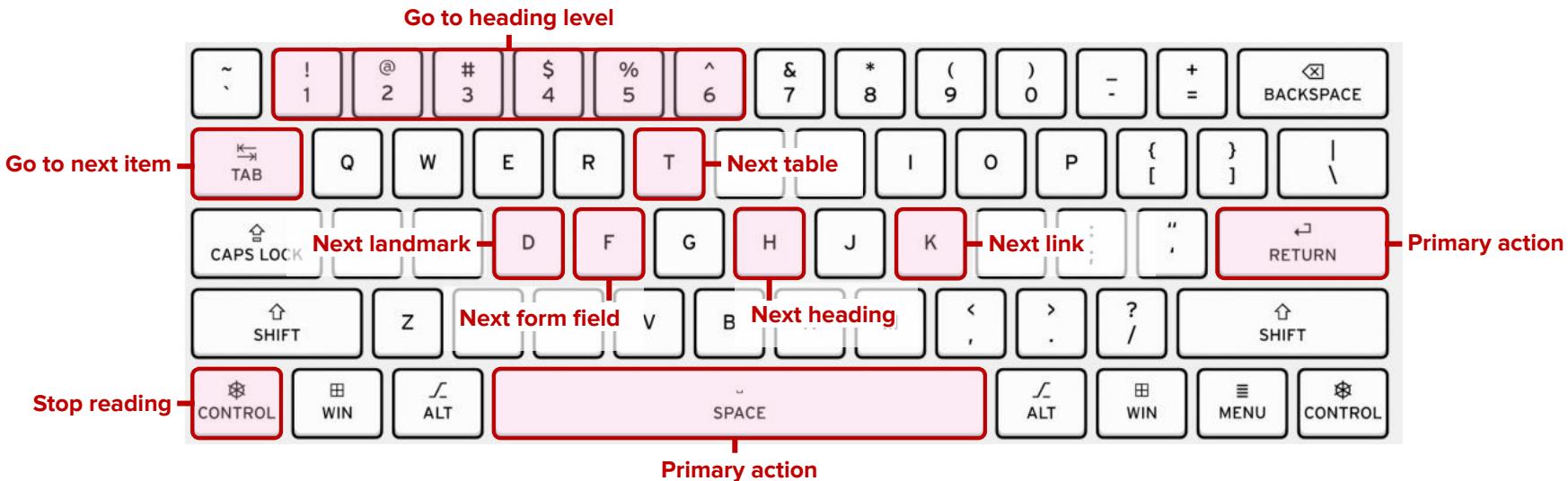
Seen by a user with protanopia.

A more accessible solution for all.

Users may have different perception or understanding of colour used as information.

Design for keyboard accessibility

Avoid overriding default keyboard shortcuts - especially shortcuts required for assistive devices.



Above: Single-key shortcuts required for operation of Microsoft Narrator.

Three flashes or below

The Banned Pokémon Episode That Gave Children Seizures



So the animators used a rapidly-strobing technique that flashed red and blue lights on the screen (pictured above), to make the explosion look “virtual”. Like something you’d see in Tron, or the Lawnmower Man.

And then all hell broke loose.

Straight away, children across Japan were struck down with various ailments. Some kids passed out, or experienced blurred vision. Others felt dizzy, or nauseous. In extreme cases, some even experienced seizures and cases of temporary blindness.

Above: *Pokémon episode "Electric Soldier Porygon"*

RATED TV-14

Some scenes have a strobing effect that may affect photosensitive viewers.

Above: Netflix warns viewers of strobing lights.

For web content, the W3C adopts guidelines from television broadcast rules in the UK.

1. No more than 3 general flashes and / or red flashes within 1 second
2. The area of flashes occupies no more than 25% of any 10 degree visual field on the screen.

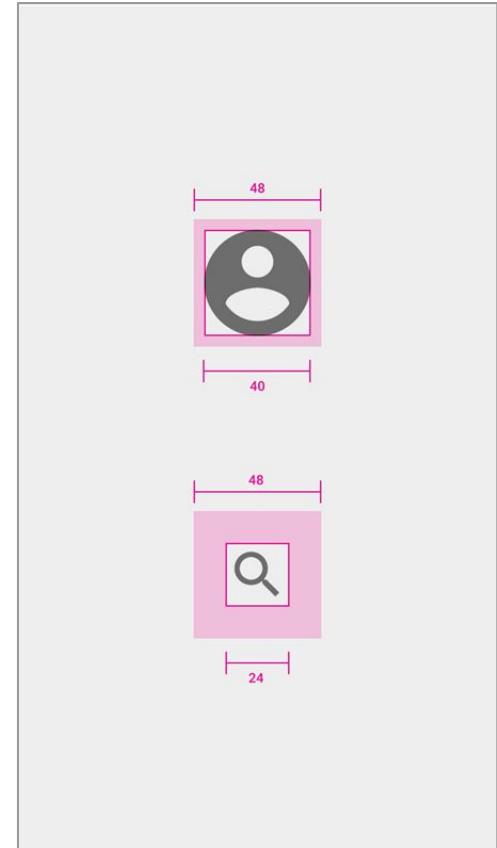
Interaction target size

Input devices and user ability affect accuracy of pointer-based interactions.

Touch input is increasingly common and less accurate than mouse input.

Apple, Google and Microsoft recommend a minimum interaction target sizes of 40-50px

- The **px** unit refers to device-independent pixels.
- Approximately **7-10mm** in physical dimension
- Where content is smaller, add padding to increase size.



Language and reading level

1 000 000+ articles														
Polski العربية	Deutsch English	Español Français	Italiano يَهُوْمَهُ	Nederlands 日本語	Português Русский	Sinugboanong Binisaya	Svenska Українська	Tiếng Việt Winaray	中文					
Afrikaans	Български	Беларуская	Dansk	Εύσκαρα	Հայերեն	תַּרְבָּעָה	Lietuvių	Bahaso	Нохчийн	Қазақша /	Slovenščina	Suomi	Тоҷикӣ	Volapük
Slovenčina	Bán-lám-gú / Hō-	Català	Eesti	فارسی	हिन्दी	ଜୀର୍ଣ୍ଣାମ୍ବୁଦ୍ଧି	Magyar	Minangkabau	Ӧ'zbekcha /	Qazaqsha / شەقەرلەر	Српски / Srpski	தமிழ்	Հայոց	寒語
Asturianu	Ió-oé	Čeština	Ελληνικά	Galego	Hrvatski	Latina	Македонски	Norsk (bokmål ·	Ўзбекча	Română	Srpskohrvatski /	Татарча / Tatarça	Türkçe	ଓଡ଼ିଆ
Azərbaycanca	وازقا	Cymraeg	Esperanto	한국어	Bahasa Indonesia	Bahasa Melayu	nynorsk)	Simple English			Српскохрватски	ລາວພາໄທ		
100 000+ articles														
Bahsa Aceh	Беларуская	Brezhoneg	Frysk	Ido	ಕನ್ನಡ	Lëtzebuergesch	ଓଡ଼ିଆ	Ming-dêng-ngû /	Nordfrisk	پښتو	Caxa Тыла	Ślůnski	ଶୋଖାଳ / Basa	Yorùbá
Alemannisch (Тарашкевица)	Чӑвашла	Gaeilge	Ilokano	Kreyòl Ayisyen	Limburgs	文言	閩東語	Occitan	Piemontéis	Scots	Basa Sunda	Ugi	Zazaki	
አማርኛ	Bikol Central	Diné Bizaad	Gáidhlig	Interlingua	Kurdî / کوردى	Lombard	ମରାଠୀ	Монгол	Марий	Plattdüütsch	Shqip	Kiswahili	Véneto	Žemaitėška
Aragonés	বিঝুলিয়া মণিপুরী	Emigliān-	ગુજરાતી	Ирон аæзар	کوردبىن نادى	Ligure	ମରୁଗାଲ୍ଗୁରି	ନେପାଳ ମାତ୍ରା	ଓଡ଼ିଆ	Qırımtatarca	Sicilianu	Tagalog	Walón	isiZulu
Basa Banyumasan	Boarisch	Rumagnól	Hausa	Íslenska	କୃତ୍ୟବ୍ୟା	ମୈଥିରୀ	ନେପାଳୀ	ପଞ୍ଜାਬୀ (ହୁରମୁଖୀ)	Runa Simi	ଶିଂତ୍ରୀ	ତଲାଙ୍କ	吳語		
Башкортса	Bosanski	Føroyskt	Hornjoserbsce	Jawa	କ୍ୟାରିକ ମର୍ଯ୍ୟାଦା	କ୍ରାମାକାରୀ	Nnapulitano	(ପଞ୍ଜାବୀ (ହୁରମୁଖୀ)	ସଂକ୍ଷିତମ୍	ନେନ୍ଦ୍ରୀ			ଶିତ୍ରୀ	
1 000+ articles														
Адыгэбзэ	ମୁହାଫାର	Bislama	Davvisámegiella	Furlan	Hak-kâ-ngi / 喜家	Kapampangan	କୌଣସି / Konknri	ଲେଙ୍ଗି	Mirandés	Nouormand /	Papiamentu	Ripoarisch	ChiShona	faka Tonga
Ænglisc	Avafe'ẽ	ଓଡ଼ିଆ	Deitsch	Gaél	語	Kaszébszci	Kriyòl Gwiyannen	Lingála	Мокшень	Normaund	Перем Коми	Rumantsch	Soomaaliga	Türkmençe
Akan	ଆକାର	ବୁର୍ଯ୍ୟାଦ	Gagauz	Хальмг	Kernewek	ମାତ୍ରାକାରୀ	ଭାଷାକାରୀ	ଲୋବାନ୍	ଗୋପ	Novial	Pfälzisch	Русинъкий язык	Sranantongo	ତ୍ୟା ଦ୍ୟାଲ
ଅଞ୍ଚିତାନୁଷ୍ଠାନୀୟ ବାସା ବାଲି	Aymar	Chavacano de Doloresbski	Giküü	‘Ólelo Hawai’i	Igbo	କିନ୍ୟାରିଂଦା	ମାତ୍ରାକାରୀ	Luganda	ନୋଵା ବାକା-ବିତି	Afaan Oromoo	Picard	Gagana Sāmoa	Taqbaylit	isiXhosa
Armáneashce	ବାହା ବାନଜା	Corso	Estremēñu	ମୁହାଫାର	Interlingue	କମ୍ଭି	ଲାକ୍ଷ୍ୟ	Reo Māohi	ନାହୁତାହିଲୀ	ଅଜାମ୍ବାଣୀ	କ୍ଷୋରାଚାଇଁ	Sardu	Taranđine	କୋରାକ୍ୟାନ୍ତି
Arpitan	ମୋଜପୁରୀ	Vahcuengh / 話𠙹	Fiji Hindi	Kabyle	Kongo	କବି	ଲାତଗ୍ଜୁ	Māori	ମାତ୍ରାହିଲୀ	ପାତି	ମଙ୍କାର	Seeltersk	Tetun	Vepsän
100+ articles														
Bamanankan	Euegbe	ଡାମ୍ପିର୍	Kalaallisut	Néhiyawéwin /	Ποντιකά	Kirundi	Setswana	SiSwati	Tséhesenéstotse chi'umbuka	ଲୋକା ଛାନ୍ଦୀ				
Chamoru	Fulfulde	Inuktitut	ମୁହାଫାର	ଚାମ୍ପିର୍	ମୁହାଫାର	Sängö	Словѣньскъ /	Thunɔŋjæ	Tshivenda	Twi				
Chicewha	ଟିଟିଶିର	Iñupiaq	Li Niha	Norfuk / Pitkern	Romani	Sesotho	ମହାରାଷ୍ଟ୍ରାଦିର୍ଘାତ୍ମକ	CWY	Xitsonga	ନେନ୍ଦ୍ରୀ				

Providing an option for every language isn't always feasible. Instead, provide content as text so that users have maximum flexibility to transform the content themselves.

Language and reading level

Definitions can be provided to help users with unfamiliar technical terms, jargon and abbreviations.

For highest levels of compliance, target a lower secondary education level (children around 11-14 years old).

Right: Wikipedia provides pop-up definitions of new terminology that links to another article.

This not only helps understand the use of language, but also provides hints at the link's destination.

The screenshot shows the Wikipedia article page for "Accessibility". The main content area includes a summary, a section on disabilities, and a sidebar with accessibility icons. A blue pop-up box is overlaid on the page, containing a definition of "disability" and linking to the "disabilities" section of the article. The URL in the address bar is <https://en.wikipedia.org/w/index.php?title=Accessibility&oldid=98300000>.

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Article Talk Read Edit View history Search Wikipedia

Accessibility

From Wikipedia, the free encyclopedia

For design of products or environments for access by all users, see [Universal design](#). For design of websites etc. for access by all users, see [Web accessibility](#). For measures of spatial accessibility, see [Accessibility \(transport\)](#). For the logical notion, see [Accessibility relation](#). For the process in agenda-setting theory, see [Agenda-setting theory § Accessibility](#).

For

A **disability** is any condition that makes it more difficult for a person to do certain activities or effectively interact with the world around them. These conditions, or impairments, may be cognitive, developmental, intellectual, mental, physical, sensory, or a combination of these factors.

Access [show]

design [show]

environ [show]

disabilities [1] [2] The concept of accessible design and practice of accessible development ensures both "direct access" (i.e. unassisted) and "indirect access" meaning compatibility with a person's assistive technology [2] (for example, computer screen readers).

Accessibility can be viewed as the "ability to access" and benefit from some system or entity. The concept focuses on enabling access for people with disabilities, or enabling access through the use of assistive technology; however, research and development in accessibility brings benefits to everyone. [3][4][5][6][7]

Education [show]

Therapy [show]

Societal implications [show]

Personal assistance [show]

Socioeconomic assistance [show]

Groups · Organizations [show]

Parasports [show]

Culture [show]

Disability · Lists [show]

V · T · E

Accessibility is not to be confused with [usability](#), which is

Design navigation for understanding

The screenshot shows a navigation bar with tabs: All, **Images**, Videos, Shopping, Maps, More, Settings, and Tools. Below the bar, the page title is "Amazon Fashion". A breadcrumb trail indicates the path: Clothing, Shoes & Jewelry > Women > Accessories > Sunglasses & Eyewear Accessories > Sunglasses. The main content area displays a grid of links categorized by gender: WOMEN, MEN, GIRLS, and BOYS. The grid includes sections like "Shop and Learn", "Apple Store", "For Education", "Account", and "About Apple".

Category	Link	Link	Link	Link	
Shop and Learn	Apple Store	For Education	Account	About Apple	
	Mac	Find a Store	Apple and Education	Manage Your Apple ID	Apple Info
	iPad	Genius Bar	Shop for College	Apple Store Account	Newsroom
	iPhone	Today at Apple		iCloud.com	Job Opportunities
	Watch	Apple Camp	For Business		Press Info
	TV	Field Trip	Apple and Business	Apple Values	Investors
	Music	Apple Store App	Shop for Business	Accessibility	Events
	iTunes	Refurbished and Clearance		Education	Contact Apple
	iPod	Financing		Environment	
	Accessories	Reuse and Recycling		Inclusion and Diversity	
Gift Cards	Order Status		Privacy		
	Shopping Help		Supplier Responsibility		

Navigation should use familiar techniques to increase users' understanding.

ARIA for dynamic elements

Dynamic scripted interactions require more work to ensure that changes occurring within a web page can be reported back to user-agents.

The **Accessible Rich Internet Applications (ARIA)** standard uses attributes set using HTML and JS to report the current and changed states of elements to the browser.

```
<div id="menubtn" aria-haspopup="true" aria-controls="navmenu"
aria-expanded="true">
    Menu
</div>

<nav id="navmenu" role="menu" aria-labelledby="menubtn">
    <a href="page1.html" role="menuitem">Page 1</a>
    <a href="page2.html" role="menuitem">Page 2</a>
</nav>
```

Use standards and validate your code

Web standards will continue to evolve and change. Designers, developers of web content and web browsers must implement compatible standards.

- Old versions of HTML, CSS and JS continue to work in new browsers
- HTML5 and CSS3 has fallback features for compatibility in old browsers
- Some features of new JS may fail and break scripts in old browsers

Validation tools help ensure that code can be parsed reliably:

- **HTML** <https://validator.w3.org/>
- **CSS** <https://jigsaw.w3.org/css-validator/>
- **JS** <https://babeljs.io/> (transpile modern ES6 into legacy ES5)

Group Assessment Peer Evaluation

Peer evaluation is now open

Now that you have spent time working in groups, please complete peer-evaluation to provide feedback about group members' contributions.

- Teamwork and collaborative skills
- Punctuality and meeting group deadlines
- Extent of contribution
- Quality of contribution
- Extra comments here (up to 500 characters)

Look for the **Stage D - Peer Evaluation** link in the Moodle Assessments page.

FIT3175 Stage D - Peer Review Form

Complete the form based on the number of group members.

Please rate yourself and your group member using the following scale:

Bad	Poor	Fair	Good	Excellent					
1	2	3	4	5	6	7	8	9	10

william.lay@monash.edu [Switch account](#) 

Your email will be recorded when you submit this form

* Required

Enter your group name: *

Your answer

Rate yourself (group member 1) below:

Your Student ID: *

Your answer

Your full name: *

Your answer

Effective teamwork and collaborative skills
Rate yourself

Next session

- Input devices and input styles
- Comparing input methods and designing voice interactions

Reminders

- **Peer Evaluation for Stage D is open**
 - Rate your group members and provide feedback to staff.
- **Discussion Forum 2 is due on Friday at 11:55PM.**
- **Stage E + F are submissions next week.**
 - Stage E: Group high fidelity prototype (due Friday week 6, 11:55PM)
 - Stage F: Individual presentation (in-class, Week 6 Tutorial P2)