City University of New York (CUNY)

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Web Accessibility 101 CUNY CS

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How does access to this work benefit you? Let us know!

In today's world accessibility has to be part of the conversation when discussing computer science and technology in general. Understanding how to make work born accessible is vital. This 2 module course covers accessibility basics, WCAG, POUR, why accessibility matters, legal issues and evaluating website accessibility. There are quizzes and assignments to help you learn and think about accessibility in your life.

Select "Modules" from the menu to begin learning about accessibility.

In today's world accessibility has to be part of the conversation when discussing computer science and technology in general. For students who wish to use digital technology in their chosen subject area (be it Art, Digital Humanities, Education, Computer Science etc.) or are planning on becoming front-end or back-end developers, understanding how to make their work accessible is vital.

This brief "Accessibility 101" course will consist of 2 modules. The first module will give students a general understanding of why accessibility matters, general accessibility issues, legal accessibility issues, WCAG (Web Content Accessibility guidelines) and P.O.U.R. The second module will go more into detail on how to create a website with accessibility always considered and how to evaluate a website.

There will be videos, audios, quizzes and assignments to help you put accessibility into practice.

Image attribution: Accessibility Logo created by Christy Blew of The University of Illinois.

"Accessibility matters it will impact you at some point...An accessible world is an inclusive world" - Stephen Cluskey, Dec. 13, 2017
TEDxUCD

Overview

The web's importance in our daily lives continues to grow. The internet is the new public square. It is a place where ideas, information, education, entertainment, commerce and learning are taking place.

The goal of web accessibility is to ensure that all people, including those with disabilities, have equal use and enjoyment of websites and web content.

Creating an accessible internet, so everyone is able to participate in the new public square is the responsibility of all who create digital content. Being able to access the web and participate in information sharing is truly a human right and must be taken into account when creating digital content and websites.

The internet has the opportunity to be one of the most useful tools in providing equity, equality and access to people with disabilities. An accessible internet site allows independence for a person with disabilities. For example, prior to the creation of the internet when a blind person wanted to read a newspaper they needed either audiotapes or braille printouts, which were expensive and sometimes not practical (think about how bulky a Braille version of the Sunday New York Times would be), or at best, a family member or friend could read the newspaper to them. These methods made blind people dependent upon others. Today most newspapers publish online in a format that has the **potential** to be accessible. If a newspaper publishers use accessible code and design then a blind person could use a screen reader to read a paper without anyone's assistance.

Despite the web's great potential for people with disabilities, this potential is still largely unrealized. In 2017 there were [556 open cases](#) against universities for web accessibility issues. In 2018, "there were 2,285 ADA website lawsuits filed in federal courts across the nation, an increase of 181 percent from 2017."

Attribution: [Jared Smith] (2012, Jul. 31) Experiences of Students with Disabilities [Video File]. Retrieved from
https://youtu.be/BEFgnYktC7U

Attribution: [Women Techmakers] (2018, Oct. 31) What is web accessibility in 60 seconds!

Readings:

- Kalbag, Laura (2013, Dec 10) "*Why Bother with Accessibility?*" 24 Ways 24ways.org
- Sket, Christine (2016, Dec. 30) "*Why Accessibility Matters*" Braille Works

According to Census Bureau figures from 2012, 56.7 million Americans (18.7% of the U.S. population) have some type of disability. Accessibility encompasses learning and cognitive disabilities (Links to an external site.), and physical disabilities like deafness, and color blindness. Some people have temporary disabilities, some have age-related impairments, some have disabilities from birth, some develop disabilities from injuries or health conditions, and some have multiple disabilities.

Consider how these impairments impact accessibility of online websites, applications, and documents:

- 19.9 million (8.2%) have difficulty lifting or grasping. This could, for example impact their use of a mouse or keyboard.
- 15.2 million (6.3%) have a cognitive, mental, or emotional impairment. A badly laid out web site could be hard to navigate and understand.
- 8.1 million (3.3%) have a vision impairment. These people might rely on a screen magnifier or a screen reader, or might have a form of color blindness.
- 7.6 million (3.1%) have a hearing impairment. They might rely on transcripts and / or captions for audio and video media.

Attribution: [davidbermancom] (2014, May. 13) Web Accessibility Matters [Video File].

Readings:

- Abou-Zahra, Shadi (2017, May 15) Diverse Abilities and Barriers WC3 Web Accessibility Initiative (WAI)
- Annual Disability Statistics Compendium (Links to an external site.)
  The mission of the Annual Disability Statistics Compendium is to make disability statistics easier to find and use. The Compendium gathers the most recent national statistics on people with disabilities from various federal programs and agencies. The Compendium provides current statistics and time trends related to the prevalence of disabilities as well as key indicators on employment, health, community living, and other outcomes of importance in monitoring the well-being of individuals with disabilities. A series of tables are presented with counts and percentages of people with disabilities in various programs or policy relevant groups. All of the statistics in the Compendium can be found online.
- Brault, M. W (2012, July) Americans with Disabilities: 2010 Households Economic Studies (Links to an external site.) [pdf] US Census Bureau
- Brault, M.W (2012, July) Americans with Disabilities: 2010 CSPAN slides (Links to an external site.) [pdf] US Census Bureau

When designing digital content and a digital site, you cannot assume everyone will access or navigate your site or content in the same way you do. You need to examine your site and content from various users needs and interactions. As creators it is important to recognize users are not all the same.

Consider these user characteristics:

- **Unable to see:**

  Individuals who are blind use *screen readers* that read web content or tactile output (a refreshable Braille device).

- **Has dyslexia:**

  Individuals with learning disabilities such as dyslexia may also use audible output, along with software that highlights words or phrases as they're read aloud using synthesized speech.

- **Has low vision:**

  Individuals with low vision may use screen magnification software that allows them to zoom into all or a portion of the visual screen. Many others with less-than-perfect eyesight may enlarge the font on websites using standard browser functions, such as Ctrl + in Windows browsers or Command + in Mac browsers.

- **Has a physical disability:**

  Individuals with physical disabilities that effect their use of hands may be unable to use a mouse, and instead may rely exclusively on keyboard or use assistive technologies such as speech recognition, head pointers, mouth sticks, or eye-gaze tracking systems.

- **Unable to hear:**
  Individuals who are deaf or hard of hearing are unable to access audio content, so video needs to be captioned and audio needs be transcribed.
- **Using a mobile device:**

  Individuals who are accessing the web using a compact mobile device such as a phone face accessibility barriers, just like individuals with disabilities do. They're using a small screen and may need to zoom in or increase the font size, and they are likely to be using a touch interface rather than a mouse. Also, Apple's iPhone and iPad do not support Adobe Flash.

- **Limited bandwidth:**

  Individuals may be on slow Internet connections if they're located in a rural area or lack the financial resources to access high-speed Internet. These users benefit from pages that load quickly (use graphics sparingly) and transcripts for video.

- **Limited time:**

  Very busy individuals may have too little time to watch an entire video or audio recording, but can quickly access its content if a transcript is available.

Adapted from University of Washington's "Developing Accessible Websites (Links to an external site.)"

QUIZ: Accessibility Challenges

Question 1 1 pts

People with a hearing impairment might rely on _____ and/or _____for audio and videos.

Question 2 1 pts

The only people who benefit from an accessible web site are people with disabilities?

True or False?

Question 3 1 pts

Which of the following are "modes of disability"? (select all that apply)

Permanent Disability
Conditional or Situation Disability
Temporary Disability

WCAG's purpose is "*Proving a single shared standard for web content accessibility that meets the needs of individuals, organizations, and governments internationally.*" - WAI WCAG

Background

The internet and the web are world-wide resources. They are not constrained by borders and countries. Because these are world-wide resources, it was important to create shared standards across the world. In 1994 Tim Berners-Lee founded the World Wide Web Consortium (W3C) at the Massachusetts Institute of Technology. The World Wide Web Consortium (W3C) is an international community where Member organizations, a full-time staff, and the public work together to develop Web standards which can be used by individuals, organizations, and governments internationally.

"Worldwide, there are more than 750 million people with disabilities. As we move towards a highly connected world, it is critical that the Web be usable by anyone, regardless of individual capabilities and disabilities. The W3C is committed to removing accessibility barriers for all people with disabilities - including the deaf, blind, physically challenged, and cognitive or visually impaired. We plan to work aggressively with government, industry, and community leaders to establish and attain Web accessibility goals." - Tim Berners-Lee

WC3 and WAI

The World Wide Web Consortium's (W3C) commitment is "*to lead the Web to its full potential*".

"The social value of the Web is that it enables human communication, commerce, and opportunities to share knowledge. One of W3C's primary goals is to make these benefits available to all people, whatever their hardware, software, network infrastructure, native language, culture, geographical location, or physical or mental ability. To that end they promote ensuring the web has a high degree of usability for people with disabilities." -- W3C Mission

In April 1997 the WC3 created the The Web Accessibility Initiative (WAI) whose mission is to create strategies, standards, and supporting resources to make the Web accessible to people with disabilities.

One of many excellent online resources is the WebAIM website (Web Accessibility in Mind) at "http://webaim.org" . Based at Utah State University, it provides information, training, and practical tools for creating accessible content.

WCAG

- One of the most important documents to come from W3C are the Web Content Accessibility Guidelines (WCAG) . These guidelines were created to help define how to make web content more accessible to people with disabilities, with the goal of providing a single shared standard.
- Since it's release, WCAG 2.0 has become the internationally recognized benchmark for web accessibility.
- The Revised 508 Standards are based on WCAG 2.0.
- WCAG 2.0 is based on four principles: Websites should be (1) perceivable, (2) operable, (3) understandable, and (4) robust.

WCAG 1.0

Focused heavily on the *techniques* for accomplishing accessibility, especially as related to HTML.

WCAG 2.0 and 2.1

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  - Subsequent versions of WCAG (WCAG 2.0 and 2.1) took a different approach: they focused more heavily on the *principles* of accessibility. By focusing more on principles rather than techniques, these future versions of the guidelines are more flexible, and encourage developers to think through the process of accessibility conceptually.
  - WCAG 2.0 is based on four principles: Websites should be (1) perceivable, (2) operable, (3) understandable, and (4) robust.

Remember:

- When WCAG guidelines are followed they improve usability for everyone.
- The Web Content Accessibility Guidelines (WCAG) are the most widely-accepted set of recommendations, and were developed over several years of collaborative involvement by a panel of experts and interested individuals.
- The WCAG guidelines are stable, referenceable technical standards.
- When followed, the guidelines explain how to make web content more accessible to people with disabilities.

The guidelines are an excellent foundation upon which to build accessible web content, but unless the developers understand the reasons behind the guidelines, they might apply the guidelines incorrectly or ineffectively.

Attribution: [W3C Web Accessibility Initiative (WAI)**]** (2017, Dec. 4) *Introduction to Web Accessibility and W3C Standards*

View video with different language subtitles and transcripts and transcripts with visual description.

Readings:

WAI (2018, June 5) WCAG 2.1 at a Glance

Useful website:

One of many excellent online resources is the WebAIM website (Web Accessibility in Mind) . Based at Utah State University, it provides information, training, and practical tools for creating accessible content.

Question 1

The first version of WCAG 1.0 focused heavily on the ***techniques*** for accomplishing accessibility, especially as related to HTML True or False?

Question 2

The WCAG guidelines were created to help define how to make web content more accessible to people with disabilities, with the goal of providing a single shared standard. True or False?

Question 3

The World Wide Web Consortium (W3C) is a for-profit organization, whose sole mission is to make money for their shareholders. True or False?

Summary:

There are four main guiding principles of accessibility upon which WCAG has been built. These four principles are known by the acronym POUR.

POUR is a way of approaching web accessibility by breaking it down into four main aspects:

- *Perceivable*
- *Operable*
- *Understandable*
- *Robust*

Many of the technology challenges faced by people with disabilities can be described using one of the POUR principles.

Attribution: [Government Digital Service] (2017, Oct. 23) *POUR: The 4 principles of accessibility*

POUR in detail

Let's dive in deeper to the specific types of issues and solutions POUR covers. As you read the problems and solutions for each POUR issue, think about the sites you visit and whether they are POUR sites.

PERCEIVABLE issues and solutions

Perceivability means the user can identify content and interface elements by means of the senses. For many users, this means perceiving a system primarily visually, while for others, perceivability may be a matter of sound or touch.

OPERABLE issues and solutions

Operability means that a user can successfully use controls, buttons, navigation, and other necessary interactive elements.

UNDERSTANDABLE issues and solutions

Understandable technology is consistent in its presentation and format, predictable in its design and usage patterns, and appropriate to the audience in its voice and tone.

ROBUST issues and solutions

Content must be robust enough that it can be interpreted reliably by a wide variety of users, allowing them to choose the technology they use to interact with websites, online documents, multimedia, and other information formats.

Readings

- WebAIM (2013, Aug. 28) *Constructing a POUR website*
- Nindie, Nozi (2018, Oct. 1) *Making Accessibility accessible: The POUR Principles*

Question 1

There are four main guiding principles of accessibility known by the acronym POUR. What does POUR stand for?

Public, Open, Understandable, Rigid

Printable, Operable, Uploadable, Rigorous

Perceivable, Operable, Understandable, Robust

Perceivable, Open, Useable, Remixed

Question 2

A website requires users to navigate the site with a mouse. What POUR accessibility principle does this violate?

Understandable

Operable

Perceivable

Robust

Question 3

All disabilities are permanent. True or False?

Making sure a web site and its content are accessible to as many people as possible is not only ethically responsible and good business, it is also legally required. Accessibility has legal implications drawn directly from civil rights law, including **Section 508** and **504** of the **Rehabilitation Act of 1973** and the **American with Disabilities Act**.

As stated on the U.S General Services Administration web site *"Section 508 may not apply to your website, but other laws likely do, so your website should be accessible…Regardless of whether or not federal regulations apply to your website, designing for all users is a best practice, and will help your organization more effectively meet the needs of all your customers."* – [U.S General Services Administration](#)

Under Title II of the ADA, companies cannot discriminate against disabled people "in the full and equal enjoyment of public accommodations." But when the law was passed in 1990, the internet did not have the place in our lives it does now, leaving a vast gray area over what defines an accessible website.

The Department of Justice (DOJ) made the following statement in 2010: "*There is no doubt that the Internet sites of state and local government entities are covered by Title III of the ADA. Similarly, there is no doubt that the websites of recipients of federal financial assistance are covered by Section 504 of the Rehabilitation Act. The DOJ has affirmed the application of these statutes to Internet sites...in numerous agreements with state and local governments and recipients of federal financial assistance.*"

In 2010, the Department of Justice began to develop uniform guidelines but they have not finished. What most organizations and governments are doing is following the WCAG guidelines to meet accessibility.

Americans with Disabilities Act (ADA)

The ADA does not have any specific technical requirements requiring websites to be accessible. However, there are a number of cases where organizations and businesses that are considered to be "places of public accommodation" have been sued due to the inaccessibility of their websites.

In January 2019, a class action lawsuit was filed against Beyoncé , claiming her website violated the ADA because it employed an exclusively visual interface and those with vision issues cannot browse the site and make online purchases without the assistance of a sighted companion. (Cullins, 2019). A rash of art galleries in New York are also being sued for violating the ADA because their websites are allegedly not accessible to visually impaired and blind visitors.

Title II of the ADA requires that communications to people with disabilities be equally as effective as communications with non-disabled people in their timeliness, accuracy, and delivery method. Title II applies to goods, services, and activities provided by state and local governments, including public education institutions.

Title III of the ADA prohibits discrimination on the basis of disability in places of accommodation, the definition of which includes businesses, places of entertainment, the offices of service providers, and some private educational institutions. There is a proposed revision to Title III of the ADA (Federal Register, Volume 75, Issue 142, July 26, 2010) that would, if passed, require WCAG 2.0 Level A and AA conformance to make web content accessible under ADA.

Audio:

George H. W. Bush (1990, July 26) Remarks on the Signing of the Americans with Disabilities Act

Readings:

US DOJ (2014, Jan 31) ADA Requirements: Effective Communication

An extension of the Civil Rights Act of 1964, the Rehabilitation Act of 1973 (Links to an external site.) prohibits discrimination on the basis of disability in federal programs and services, including colleges and universities that use federal funds (e.g., student financial aid).

Section 504 reads:

"No otherwise qualified handicapped individual in the United States should solely by reason of his handicap, be excluded in the participation in, be denied the benefits of, or be subject to discrimination under any program or activity receiving federal financial assistance."

These 41 words, known as Section 504, were included in the language of the Rehabilitation Act of 1973. It took for five years, three presidential administrations, nationwide demonstrations, a take over of a federal building in San Francisco, California, and massive community support to get it passed into law. Section 504 was the first piece of civil rights legislation to promise an end to segregation, an end to employment discrimination, and an end to separate but equal facilities for millions of disabled Americans. The Regulations implementing Section 504 were finally written and passed during the Carter Administration. - Disability Rights Education & Defense Fund

Section 504 prohibits disability-based discrimination by programs that receive federal funds. This means that students, staff, faculty, and visitors with disabilities cannot be denied access to programs and services due to inaccessible technology. As recipients of federal funding, most higher ed institutions are subject to Section 504.

Attribution: The Power of 504 (open caption and audio description, English) from DREDF on Vimeo.

Award-winning 18-minute documentary video, which captures the drama and emotions of the historic civil rights demonstration of people with disabilities in 1977, resulting in the signing of the 504 Regulations, the first Federal Civil Rights Law protecting people with disabilities. Includes contemporary news footage and news interviews with participants and demonstration leaders.

Audio:

Listen to the "We Shall Not be Moved" The 504 Sit-In for Disability Civil Rights A June 1997 audio documentary featuring contemporary media coverage of the 504 Sit-Ins and 1997 interviews with some of the Sit-In demonstrators.

Additional Reading:

U.S. Department of Health & Human Services (2015, Aug. 19) What is section 504 and how does it relate to Section 508?

An extension of the Civil Rights Act of 1964, the Rehabilitation Act of 1973 (Links to an external site.) prohibits discrimination on the basis of disability in federal programs and services, including colleges and universities that use federal funds (e.g., student financial aid).

Section 504 reads:

"No otherwise qualified handicapped individual in the United States should solely by reason of his handicap, be excluded in the participation in, be denied the benefits of, or be subject to discrimination under any program or activity receiving federal financial assistance."

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Additional Reading:

U.S. Department of Health & Human Services (2015, Aug. 19) What is section 504 and how does it relate to Section 508?

The purpose of **Section 508**, which is part of the **U.S. Rehabilitation Act**, is to eliminate barriers in information technology. This applies to all Federal Agencies that develop, procure, maintain, or use electronic and information technology.

Section 508 of the Rehabilitation Act (29 U.S.C. § 794d), as amended by the Workforce Investment Act of 1998 (P.L. 105-220) requires federal agencies to develop, procure, maintain and use information and communications technology (ICT) that is accessible to people with disabilities - regardless of whether or not they work for the federal government.

Section 508 requires that when Federal agencies develop, procure, maintain, or use electronic and information technology, Federal employees with disabilities and members of the public seeking information or services from a Federal agency, have access to and use of information and data that is comparable to the access and use by Federal employees and the public, who are not individuals with disabilities, unless an undue burden would be imposed on the agency.

Any company that sells to the U.S. Government must also provide products and services that comply with section 508 (Section 1194.22 of the Rehabilitation Act.)

Originally, these guidelines were based on a subset of the WCAG 1.0 guidelines. Recently, the guidelines were updated to include WCAG 2.0 Level A and AA requirements for those obligated through Section 508. While Section 508 has been in effect since March 20, 2017, those affected by the regulation are required to comply with the updated regulation by January 18, 2018.

Question 1
What is the purpose of Section 508 of the Rehabilitation Act of 1973?
To provide financial assistance to disabled students
To require video captions.
To eliminate barriers to information technology.
Require screen readers for all Federal employees.

Question 2
Section 504 of the Rehabilitation Act of 1973 covers colleges and universities that use federal funds (e.g., student financial aid). True or False?

Question 3
Who was the President who signed the ADA into law?

Writing Assignment

Write a few sentences on each of the following scenarios regarding accessibility, disability and technology. Think about all you've read, the videos you've watched and the audios you've listened to.

1. Describe 3 instances where being able to read video captions would be useful.
2. How are users with cognitive disabilities helped by well formatted and laid out web sites? Who else would benefit from a well formatted and laid out web site? How would they benefit?
3. Alternative text (alt-text for short) makes images and graphics "visible". Alt-text describe the information or function represented by images or graphics. Describe how alt-text and accessible images are useful in various situations.
4. Discuss the possible accessibility issues if a professor required all their students to listen to a podcast for a class. Discuss ways the professor could make sure the podcast was accessible.
5. Under what circumstances might a user prefer to read a webpage in high contrast?
6. How has your thinking on accessibility changed since finishing this first Accessibility 101 module?

Points 10

Submitting a text entry box, a website url, a media recording, or a file upload

Whose job is accessibility anyway?

For accessibility to become embedded in our everyday thinking and world, we all need to realize the role we all can play in accessibility. No matter our jobs or lives we should each think about accessibility and incorporate accessibility into our considerations. Try to step back and think "is X accessible? is there a way I can make Y accessible?"

Ensuring accessibility does not need to be part of a person's job description or a person's personal experience and life to become something all people can participate in.

- o The next time you post a picture to social media for your job (and your personal accounts while you are at it) you can add "alt-text" so that users with screen readers will be able to access the image.
- o The next time you type up a word document you can make sure to use *styles* and *headings* to format and also use alt-text if you include images, so keyboard only user will be able to navigate your site.
- o If you are scanning documents and posting them online or emailing them, you can ensure the scanner is set to scan OCR (optical character recognition), so the document is scanned for individual characters and not as an image since individual characters are searchable, unlike images of text.
- o If your job is purchasing a new computer program or database you can ask the vendor if it is accessible.
- o When you create a chart make sure that your designs and content do not rely solely on color to convey their meaning, this way it will be accessible to a colleague who is color blind.

These are just a few examples of the things we can all do in our lives to increase accessibility.

The next section of this course will cover some core technical ways to increase and ensure accessibility, how to improve the experience of adaptive technology users, people with non-apparent disabilities and the general population.

General Information:

When you create a web page, a word document, a PowerPoint, a spreadsheet make sure you create a meaningful title for your item.

Why are page titles important?

- Screen readers announce the page and slide titles when they load web pages, documents and presentations.
- A good page title helps orient users to the content of the page or document.
- A good title helps users **understand**, a POUR principle.

How to Create good page titles:

- Page titles should be brief, clear, informative, and unique.

Quiz:

Go to your 10 favorite or most visited web sites. Hover your mouse over the page tab and see what the titles are for the 10 pages. Do they correspond to the content on the page? How would you improve the accessibility of the titles?

General Information:

When you create a web page or document which has well organized content it helps users to orient themselves and to navigate effectively.

Why is layout important?

- A site or document which is well-structured is easier to understand and navigate.
- Everyone can benefit from a site which is well-structured.
- A well laid out page helps people with visual impairments, including low vision, orient themselves on the page and understand content.
- Keyboard users can browse pages and their sections more efficiently.
- People with cognitive and learning disabilities can more easily find and prioritize content on a well laid out page.
- A well laid out page helps users **perceive, operate and understand**, POUR principles.

How to create good layout?

- Use headings to separate sections.
- Use lists.
- Don't use tables for layout.
- Don't only use visual cues (such as color) to show the layout.

Citation: [W3C Web Accessibility Initiative (WAI)Links to an external site.] (2016, May 17) Web Accessibility Perspectives: Clear Layout and DesignLinks to an external site. (1:05min)

Audio Description version:
[W3C Web Accessibility Initiative (WAI)Links to an external site.] (2016, May 17) Web Accessibility Perspectives: Clear Layout and Design - Audio Described VersionLinks to an external site. (1:53min)

General Information:

Organizing a web page, word document or pdf with headings helps users get an idea of the page's structure and organization.

Why headings are important?

- Headings provide structure to your documents by describing topic and subtopic areas in an outline fashion.
- When people can follow a site or document's organization and structure, it is easier for them to comprehend the content.
- Headings become a navigation tool for both those who can see visually and those who use screen readers.
- Assistive technology allows users to pull up a list of headings.
- **For those who use screen readers**, the use of headings allows them to listen to a list of all the headings and skip to the desired area on the page or document.
- **For those who can see**, the use of visually apparent headings allows them to quickly visually scan the document or site to get an overall idea of meaning of the site or document.
- Headings also help those with cognitive disabilities understand and navigate.
- Headings helps users **perceive and understand**, POUR principles.

How to create headings?

- Make heading text brief, clear, informative, and unique.
- There should only be one Heading 1 <h1> per page, however there can be more than one <h2> to <h6> per page.
- Each level of heading, indicates the relationship from one part of the content to the other parts.
- The sub-sections under a heading relates logically to a heading above it.
- Duplicate headings can exist on separate pages, but each heading should be unique within the same page, if at all possible.

Quiz: Headings

Question 1

Screen readers will read aloud headings on a word document or web page if created correctly? True or False?

Question 2

It is okay to have multiple <h1> headings on your page? Yes or No?

Question 3

Which POUR principles do headings cover? Robust, Perceive, Understand or Operable?

General Information:

Semantic Lists (ordered and unordered) provide orientation for users by organizing information in meaningful ways.

Why lists are important?

- Use different types of lists to group information according to its nature to provide orientation for users.
- When list are used correctly, assistive technologies are able to convey information to their users as they navigate to and within lists, such as the total number of items and the relative position of each item in the list.
- Lists are recommended as potential replacements for simple tables, as tables can be more difficult to navigate and sometimes we provide info in tables that really would be better suited to lists.
- Semantic lists helps users **perceive, operate, understand**, and be able to interact in a **robust** manner, POUR principles.

How to create accessible semantic lists?

- Use the built in "lists" option in WYSIWYG editors (what you see is what you get) to create lists.
- Don't create lists by manually typing in numbers or indenting, these are not accessible.
- Create **Ordered** Lists <ol> for when there is a defined sequence or order intended for the items in the list.
- Create **Unordered** Lists <ul> for when there is no specific order intended for the list you are creating.
- Create **Description** Lists <dl> for when a specific structure is needed to provide definitions for terms.

Meaningful Link Text

General Information:

Assistive technology allows users to pull up a list of links and because of that the text of links needs to be meaningful by itself.

Why is meaningful link text important?

- Screen readers pull up lists of links and reads them out so they need to be written in meaningful text to provide users with meaning.
- Links such as "Click Here" or "More" don't provide any information to screen readers and are meaningless out of context.
- Meaningful link text allows users to **perceive, operate and understand**, POUR principles.

How to create meaningful link text:

- Make link text informative and provide context.

Before and After Meaningful Link Text Demo

Accessibility Barriers:

- Check out the bad link text accessibility errors on these pages: home page error #5 and #7Links to an external site. and news page error #5Links to an external site.

No Accessibility Barriers:

- Now see link versions of these pages: Accessible home page section #5Links to an external site. and #7 (links) and accessible news page section #5Links to an external site..

Question 1

Assistive technology allows users to call up lists of headings but not links. True or False?

Question 2

Explain why using the link text "Click Here" is not an accessible.

Question 3

Which link text is **not** accessible? More, Click, Additional Information

Alternative Text for Images and Graphics

General Information:

Making images and graphics "visible" to all users is one of the first principles of accessibility. Adding alternative text (alt text) to an image or graphic allows it to be discoverable and understood by users in a variety of ways. Text alternatives convey the purpose of an image or function to provide an equivalent user experience. For instance, an appropriate text alternative for a search button would be "*search*" rather than "*magnifying lens*".

Why using alternative text (alt-text) is important

- Adding alternative text (**"alt text")** will make images and graphics "visible".
- Text alternatives serve as labels for controls and functionality to aid keyboard navigation and navigation by voice recognition (speech input).
- For people using **screen readers** or **browsing speech-enabled websites** alt-text can be read aloud or rendered as Braille.
- Alt-text gives the **speech input software users** the ability to put focus onto a button or linked image with a single voice command.
- Alt-text allows **mobile users** to turn images off to help with download speeds or limit data-roaming charges.
- Alternative text (alt-text) covers POUR principles **perceive, operate understand**, **robust**.

How to create good alt-text?

- Remember that context matters when creating alt-text.
- Always ask yourself "*What is the context and purpose of this image/graphic?*"
- Create alt-text which provides a textual alternative to non-text content.
- Describe the content and function represented by the image/graphic.
- **PRO TIP:**
  - Place a "." period at the end of your alt-text, this notifies screen readers the alt-text is done.
  - Don't use the words "image of, picture of, photo of etc." it is redundant. Assistive technology already announces the item is an image.
  - Add alt-text to images in documents, web sites and social media posts.

The World Wide Web Consortium (W3C) has created a very useful guide on how to create useful alt-text.

Informative images (Links to an external site.):

> Images that graphically represent concepts and information, typically pictures, photos, and illustrations. The text alternative should be at least a short description conveying the essential information presented by the image.

Decorative images (Links to an external site.):

> Provide a null text alternative (alt="") when the only purpose of an image is to add visual decoration to the page, rather than to convey information that is important to understanding the page.

Functional images (Links to an external site.):

> The text alternative of an image used as a link or as a button should describe the functionality of the link or button rather than the visual image. Examples of such images are a printer icon to represent the print function or a button to submit a form.

Images of text: (Links to an external site.)

> Readable text is sometimes presented within an image. If the image is not a logo, avoid text in images. However, if images of text are used, the text alternative should contain the same words as in the image.

Complex images such as graphs and diagrams (Links to an external site.):

> To convey data or detailed information, provide a full-text equivalent of the data or information provided in the image as the text alternative.

[Groups of images (Links to an external site.)](#):

> If multiple images convey a single piece of information, the text alternative for one image should convey the information for the entire group.

[Image maps (Links to an external site.)](#):

> The text alternative for an image that contains multiple clickable areas should provide an overall context for the set of links. Also, each individually clickable area should have alternative text that describes the purpose or destination of the link.

Before and After Alternative text (Alt-text) Demo

Accessibility Barriers:

Check out the alternative text (alt-text) accessibility errors on this [home demo non-accessible page (Links to an external site.)](#). The alternative text errors are [home page error #1 (Links to an external site.)](#), [home page error #2 (Links to an external site.)](#), [home page error #4 (Links to an external site.)](#), [home page error #7 (Links to an external site.)](#), [home page error #8 (Links to an external site.)](#) and [home page error #10 (Links to an external site.)](#).

No Accessibility Barriers:

Now see an [accessible version of the home demo page (Links to an external site.)](#). Look at the accessible alternative text (alt-text) on this home demo accessible page. The alternative text for [accessible home page section #1 (Links to an external site.)](#), [accessible home page section #2 (Links to an external site.)](#), [accessible home page section #4 (Links to an external site.)](#), [accessible home page section #7 (Links to an external site.)](#), [accessible home page section #8 (Links to an external site.)](#) and [accessible home page section #10 (Links to an external site.)](#).

Question 1

Alternative text (alt-text) benefits mobile users. True or False?

Question 2

Images of text is always accessible. True or False?

Question 3

What punctuation should you place at the end of your alt-text? Comma, Semicolon, Period, Hyphen?

QUIZ: Alt-text

Alternative text (alt-text) benefits mobile users. True or False?

Videos: Captions, Audio Descriptions and Transcripts

General Information:

Videos are great and they should be produced and delivered in ways that ensure that all members of your audience can access their content.

Why making videos accessible is important?

- Video captions not only benefit those who are deaf or hard of hearing, but people who are learning disabled, ESL learners, those who are in a quiet public environment and don't have access to headphones (such as a library).
- Video captioning improves comprehension and retention of information.

How to create accessible videos:

- Having accessible videos includes captions, a transcript, and audio description and is delivered in an accessible media player.

Captions

Captions are text versions of the audio content, synchronized with the video.

- **Open captions** are part of the video and cannot be turned off.
- **Closed captions** are not part of the video and can be turned off and on.
- YouTube's automatically generated captions are a good STARTING point but they need to be manually checked to fix errors.
- Jessica Kellgren-Fozard (Links to an external site.) is a great teacher and champion of captioning. These 4 videos cover the importance of captions, how to caption, and captioning best practices.
    - How to get 80% more views! – Captions and why they are useful. (Links to an external site.) (11 min)
    - How To Caption Your Videos On YouTube (Links to an external site.)(6 min)
    - Don't Do This! – How to do captions right! (Links to an external site.)(15 min)
    - The Secret Language of Captions DECODED (Links to an external site.) (8 min)

Audio Descriptions

Audio Descriptions are commentary and narration which guides the listener through the movie, tv show, theater or other art form with concise, objective descriptions of new scenes, settings, costumes, body language, and "sight gags," all slipped in between portions of dialogue or songs.

- Audio Descriptions help with accessibility for people who are blind, have low vision, or who are otherwise visually impaired.
- Audio description supplements the regular audio track of a program.
- Audio description is usually added during existing pauses in dialogue.
- Audio description is also called "video description" and "descriptive narration"

Still not totally sure what audio descriptions are and how they are different from captions? Play these 2 videos of the same trailer for movie Frozen to see the difference.

Open Captions version:

Citation: [IMSTVUK (Links to an external site.)] (2013, Nov. 12) Frozen – Trailer with Subtitles (Links to an external site.) [Video File].

Audio Descriptions version:

Citation: [IMSTVUK (Links to an external site.)] (Links to an external site.) (2013, Nov. 12) Frozen – Trailer with Audio Description (Links to an external site.) [Video File].

Readings:

Dello Stritto, Mary Ellen and Linder, Kathryn. (2017, Aug. 28) A Rising Tide: How Closed Captions Can Benefit All Students (Links to an external site.)

Question 1

Open captions [_____] be turned off, unlike closed captions.

Question 2

Audio descriptions have been called "descriptive narration". True or False?

Question 3

Video captions can benefit many users. Select all those who can benefit from video captions.

Someone in a noisy environment, Someone learning disabled, Someone who is deaf or hard of hearing, Someone in a quiet environment or ESL and Multiple Language Learners (of any language).

General Information:

Creating a properly structured table helps a blind, low-vision and/or screen reader user make sense of a table by reading out the heading titles and then cell content.

Why is making tables accessible important?

- Tables without structural markup to differentiate and properly link between header and data cells, create accessibility barriers.
- Tables used for layout are frowned upon because unless they are designed correctly they are not considered accessible; many accessibility advocates consider using tables for layout bad practice.
- Accessible tables allows users to **perceive, operate understand**, access in a **robust** manner, POUR principles.

How to create accessible tables:

- Make sure your tables have **header** rows and/or **header** columns.
- Avoid spanned rows and columns in data tables, especially as headers. Many screen readers cannot properly read these correctly.
- Make sure your header row or header column cells are NOT blank.
- It is okay to have blank data cells, just not a blank header cell.
- Tables without table headings are not accessible.
- Always use the simplest table configuration possible.
- After you've created headers, you need to associate the data cells with the appropriate headers .The scope attribute identifies whether a table header is a column header or a row header. <th scope="col">Name</th> or <th scope="row">Max</th>
- Data tables very often have brief descriptive text before or after the table that indicates the content of that table. This text should be associated to its respective table using the <caption> element. The <caption> element must be the first thing after the opening <table> tag.

Before and After Tables Demo

Accessibility Barriers:

Check out the accessibility table errors on this ticket demo non-accessible pageLinks to an external site.. The table errors are table error #2Links to an external site. and table error #5Links to an external site..

No Accessibility Barriers:

Now see what an accessible version of the ticket demo pageLinks to an external site. looks like. Accessible ticket section #2Links to an external site. and accessible ticket section #5Links to an external site..

Readings:

WebAIM (n.d) Creating Accessible TablesLinks to an external site.

Question 1

Table header rows and header columns do not assist in accessibility? True or False?

Question 2

Is it okay to have blank cells in a table? No, Yes, any cell can be blank or Yes as long as it is not a header cell.

Question 3

Is it okay to merge several cells together, spanning across rows or columns? True or False?

QUIZ: Tables

Question 1

Table header rows and header columns do not assist in accessibility? True or False?

General Information

Don't shy away from using colors but use color intelligently. Having a general understanding of color and color contrast is important to help communicate in an accessible manner.

"Color is an important asset in design of Web content, enhancing its aesthetic appeal, its usability, and its accessibility. However, some users have difficulty perceiving color. People with partial sight often experience limited color vision, and many older users do not see color well. In addition, people using text-only, limited-color or monochrome displays and browsers will be unable to access information that is presented only in color." - W3C Working Group NotesLinks to an external site.

Why using colors accessibly is important

- Colors affect the readability of your document and site for all users, not just those with vision impairments.
- Some people cannot read text if there is not sufficient contrast between the text and background.
- High contrast is required by some people with visual impairments, including many older people who lose contrast sensitivity from ageing.
- While some people need high contrast, for others — including some people with reading disabilities such as dyslexia — bright colors are not readable. They need low luminance.
- The WCAG 2.0 require that color combinations meet clearly defined contrast ratios. In order to meet the guidelines at Level AA, text or images of text must have a contrast ratio of at least 4.5:1 (or 3:1 for large text).

How to use color accessibly

- Don't use color as the **only** way of communicating information, always make sure meaning is conveyed in multiple ways.
- Choose colors with sufficient contrast.
- Check the color contrast of your items to make sure they are accessible.
  - **WCAG Contrast CheckerLinks to an external site.** is a Firefox browser plug-in.
    This plug-in checks the compliance of contrast levels of foreground and background color combinations based on the requirements of WCAG 2.1.
  - **Color Contrast AnalyzerLinks to an external site.** is a Chrome browser plug-in.
    This extension allows you to analyze text color contrast problems on a webpage according to the WCAG 2 text color contrast requirements. It evaluates the page as it appears in the browser, so it is able to handle text over gradients and advanced CSS attributes. You can choose to analyze a portion of a web page, the entire visible contents of a tab, or an entire web page.
- To meet basic guidelines (Level AA) text must have a contrast ratio of at least 4.5:1 (or 3:1 for large text).

Citation: [W3C Web Accessibility Initiative (WAI) (2016, May 17) Web Accessibility Perspectives: Colors with Good Contrast (1:03min)

Audio Description version:
[W3C Web Accessibility Initiative (WAI) (2016, May 17) Web Accessibility Perspectives: Colors with Good Contrast - Audio Described VersionLinks to an external site. (1:38min)

Additional Readings:Links to an external site.

- Boudreau, DenisLinks to an external site. (2014, Apr. 14) Make links easier to distinguish when color alone identifies themLinks to an external site.
- Boudreau, Denis (2014, Feb. 4) Provide sufficient contrasts for large sized textLinks to an external site.
- Boudreau, Denis (2014, Feb. 1) Provide sufficient contrasts for regular sized textLinks to an external site.
- W3C (2017, Dec. 22) Easy Checks - A First Review of Web Accessibility Links to an external site.
- WebAIM (n.d.) Contrast and Color Accessibility: Understanding WCAG 2 Contrast and Color RequirementsLinks to an external site.
- WebAIM (n.d.) Visual Disabilities - IntroductionLinks to an external site.
- WebAIM (n.d) Visual Disabilities - Color BlindnessLinks to an external site.

- WebAIM (n.d.) Visual Disabilities - Low VisionLinks to an external site.

Before and After Color and Color Contrast Demo

Accessibility Barriers:

Check out the color and color-contrast accessibility errors on these pages:

home page error #3, news page error #6Links to an external site. and tickets page error #6Links to an external site.

No Accessibility Barriers:

Now see a accessible color and color-contrast versions of these pages:

Accessible home page section #3Links to an external site., accessible news page section #6Links to an external site. and accessible tickets page section #7Links to an external site..

There are numerous free resources to help you check the accessibility of websites. There are also built in accessibility checkers in word. Explore these tools and see how you can use them to check the accessibility principles discussed in this course.

Browser Plug-Ins

WAVE tool

WebAIM is a non-profit organization based at the Center for Persons with DisabilitiesLinks to an external site. at Utah State UniversityLinks to an external site.. They created the WAVE tool in 2001 to locate and identify accessibility problems directly within Chrome and Firefox browsers.

The WAVE browser plug-in is easy to use and allows you to see issues on your pages, such as contrast errors or structural issues, all at once automatically. The tool also provides information and links to further information regarding WCAG so it helps you learn about accessibility as you use it. WAVE for FirefoxLinks to an external site., WAVE for ChromeLinks to an external site..

aXe: the Accessibility Engine

Created by the Deque SystemsLinks to an external site., the aXe browser extension will run a quick in-browser test. The extension returns detailed information on accessibility violations and how to fix them with a link to more in-depth information. You use the aXe extension in conjunction with opening and viewing "Inspect Element" or "Inspect" in your browser. They have axe for ChromeLinks to an external site., axe for Firefox 54+Links to an external site., axe-core on GitHub,Links to an external site. and axe-core on npmLinks to an external site..

Web Developer

This web developer extension adds a toolbar button with various web developer tools to the browser. These tools can be used to check accessibility. Web Developer for ChromeLinks to an external site., Web Developer for FirefoxLinks to an external site. and Word Developer for OperaLinks to an external site., and will run on any platform that these browsers support including Windows, macOS and Linux.

tota11y add-on

The Tota11y: Accessibility visualization toolkit will help you visualize how your site performs with assistive technologies by allowing you to look at issues such as Headings, Color contrast, Link text, labels or Image alt tags. Tota11y is available as a browser plug-in and bookmarklet. Created by Khan Academy. tota11y for FirefoxLinks to an external site., tota11y for ChromeLinks to an external site.

A11Y – Color blindness empathy test

Empathy test for color blindness and visual impairment. This add-on emulates 8 types of color blindness, plus grayscale to check the contrast of your website. A11y for FirefoxLinks to an external site., A11y for ChromeLinks to an external site.

headingsMap

The extension generates a document map or index of any web document structured with headings (you can access directly to the content by clicking on any of its items), and now, it shows the HTML 5 outline. headingsMap for FirefoxLinks to an external site., headingsMap for Chrome.Links to an external site.

Bookmarklets

Accessibility of web pages can be hard to observe. Bookmarklets are lightweight interactive bookmarks that contain JavaScript code which can help you visualize web accessibility.

To install a bookmarklet, the most common way is to drag and drop the bookmarklet link into your browser's bookmarks or favorites bar.

JavaScript Bookmarklets for Accessibility Testing

These [16 bookmarklets were created by Paul AdamLinks to an external site.](#), a Web & Mobile Accessibility Consultant in Austin, TX. I find the "Image", "Force Focus" and "Headings" really useful.

Accessibility Bookmarklets

These [5 bookmarklets were originally created by Pixo and Disability Resources and Educational Services (DRES)Links to an external site.](#) at the University of Illinois at Urbana-Champaign. They are based on WCAG 2.0, ARIA 1.0, and HTML5 requirements. and designed for use on modern desktop browsers (Chrome, Firefox, Safari, Opera, and IE 9 or above). Click on the bookmarklet images below to be taken to the instillation page. Once on the page, to install a bookmarklet, the most common way is to drag and drop a bookmarklet link into your browser's bookmarks or favorites bar.

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  - **Landmarks:** Highlights all ARIA landmarks, including HTML5 tags that are interpreted as landmarks.
  - **Headings:** Highlights all H1 through H6 elements on a page.
  - **Lists:** Highlights every ordered list, unordered list, and definition list on a given page, along with how many list items exist for each list.
  - **Forms**: Highlights form-related elements and provides information on their associated labeling techniques, grouping labels and ARIA roles.
  - **Images**: Highlights the types of images on a page, along with their alt text.

Your final assignment has 4 parts.

Final Part 1:

1. Select 5 websites (1 business, 1 school, 1 art institution and 2 of your choice).
2. Run each site's homepage (at minimum) through these [accessibility evaluation tools](#).
3. Write down what sites you visited, the accessibility evaluation tools you used and what errors you found for each page/site.

Final Part 2:

Thinking about the 5 websites write and discuss about the following issues:

1. How the accessibility issues you found would cause barriers to users with disabilities.
2. Solutions you would suggest or use to fix the accessibility issues you found.
3. How your solutions would assist not just users with disabilities but other users as well (list them).

Final Part 3:

Find contact information for each of the sites you visited and which had accessibility issues and write them a message telling them about any accessibility issues you found and solutions. Provide a copy of this email to your professor.

IMPORTANT: If you don't wish to actually send an email that is okay, still go through the process of finding the contact information and writing the email. Send this information to the professor.

Final Part 4:

Tell us the most important thing about accessibility you feel you've learned and how you plan on incorporating accessibility into your everyday life.