



LEVERAGING CHAT GPT FOR ENHANCED WEB ACCESSIBILITY REMEDIATION

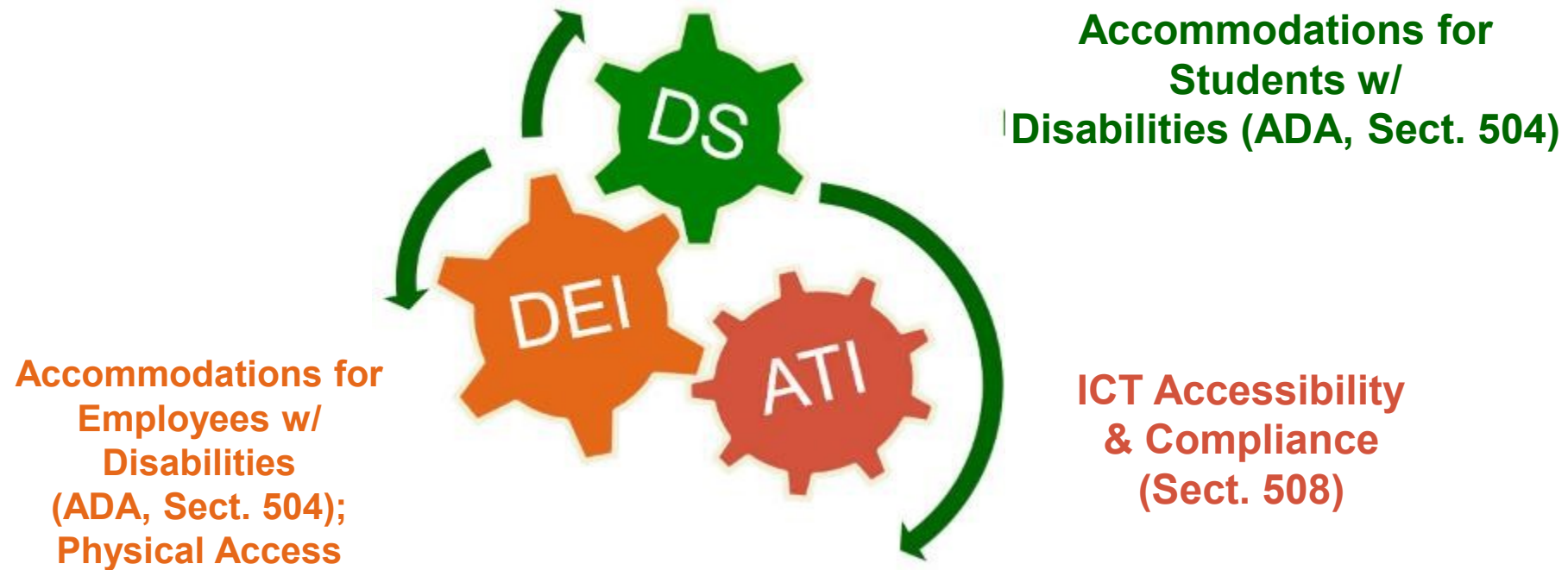
Accessing Higher Ground 2024

November 15, 2024

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Accessibility@Mason: *A Collaborative Partnership*



ATI's Role...

- In addition to the **provision of assistive technology resources**, the ATI works to ensure equivalent access to ICT resources for individuals with different learning styles and abilities in the Mason community through **video captioning, web and document accessibility, alternate formats, and training.**



Web Accessibility Services

Web Accessibility Reviews

- By request through our website
- Automated reviews using DUBBOT

Purchasing & Procurement

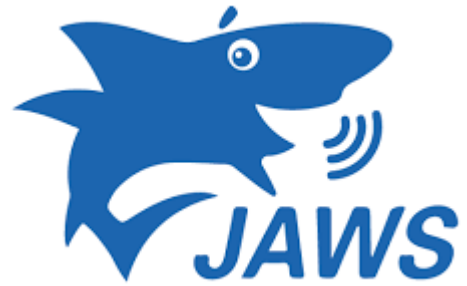
- Web and software applications reviewed as part of the Architectural Standards Review Boards (ASRB) prior to purchasing and implementation

Training

- Periodic training for website and content developers.
- By request through our website.



Request ATI Services

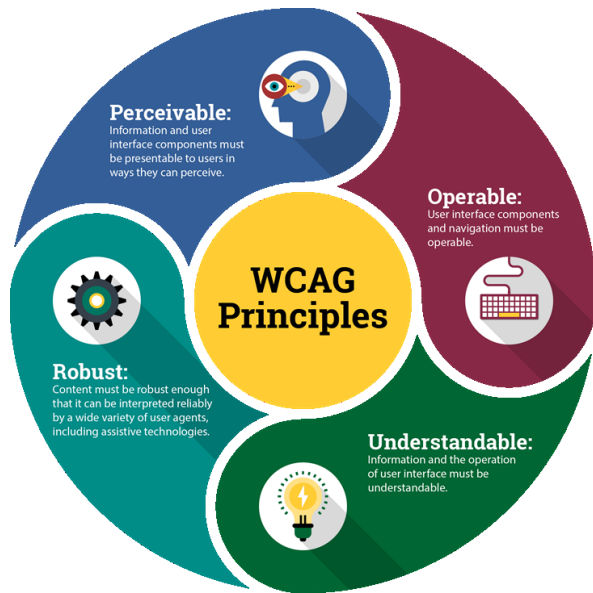


DEMONSTRATION OF SCREEN READING TECHNOLOGY



WEB ACCESSIBILITY STANDARDS

Web Content Accessibility Standards (WCAG) POUR Principles



Perceivable

- Information and user interface must be presented in a way users can perceive.

Operable

- User interface components and navigation must be operable regardless of the technology used.

Understandable

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

Robust

- Content must be robust enough to be interpreted by a wide variety of user agents, including AT.

Web Content Accessibility Guidelines (WCAG)

Level A (25 Criteria)

- Basic requirement for some users with disabilities to be able to access and use web content.

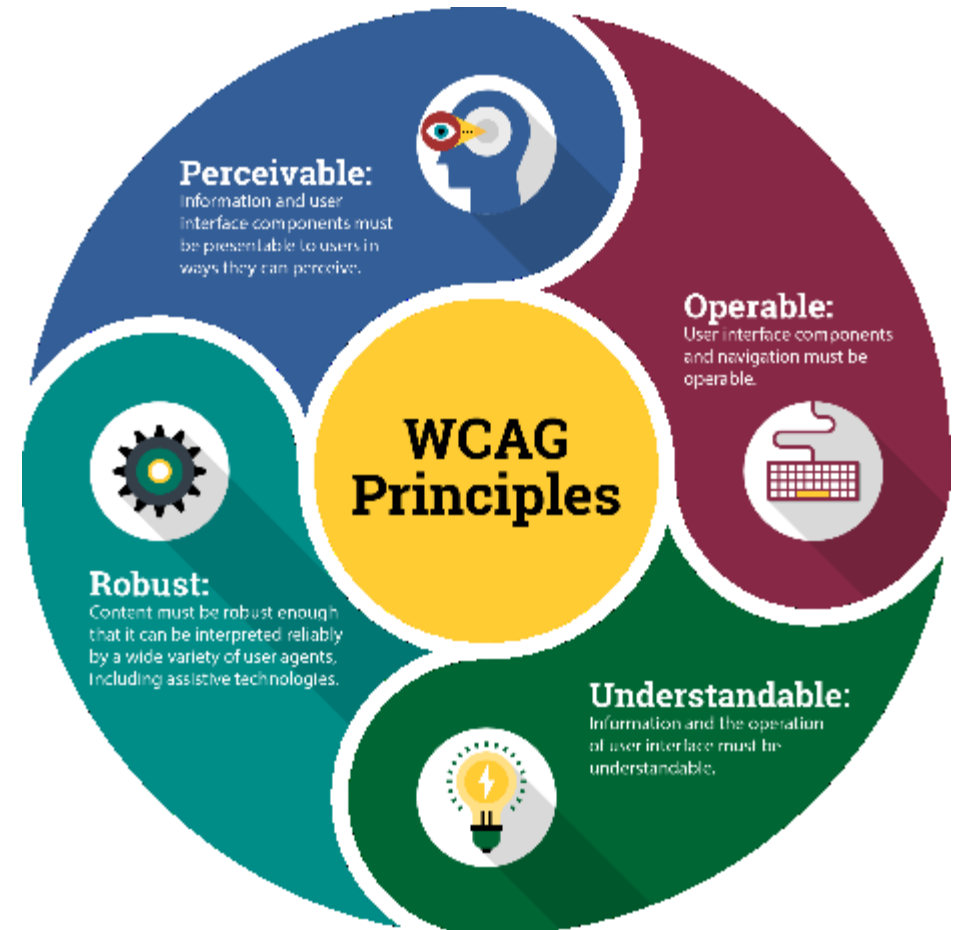
Level AA (Level A + 13 additional criteria)

- Indicates overall accessibility and removal of significant barriers to accessing content. This is what is typically referenced for OCR Reviews

Level AAA (Level A + AA + 23 more criteria)

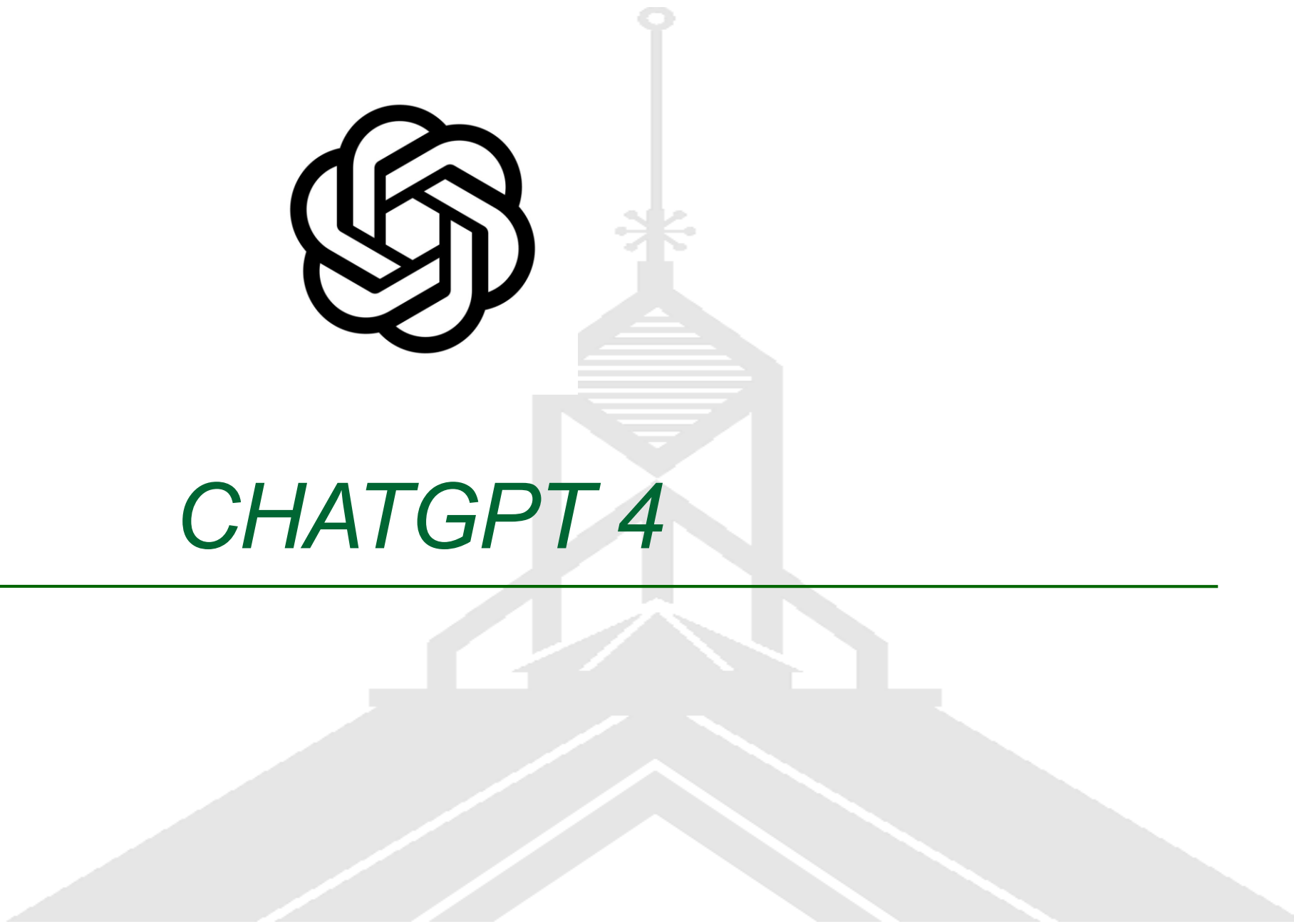
- Provides improvements and enhancements to web accessibility for some users with disabilities.

[WCAG 2.1 Map \(Intopia\)](#)





CHATGPT 4





ChatGPT

- **ChatGPT is a form of Generative AI**

- Generative AI refers to a type of artificial intelligence that can create new content, such as text, images, music, and even videos, that didn't exist before. It works by learning from a vast amount of existing material on a particular subject and then using that knowledge to generate new, original pieces that are similar in style or content.
- Today, I will be demonstrating the paid version – ChatGPT 4
- There is also an iOS and Android version

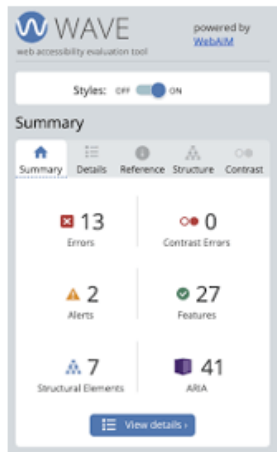
Practical Ways ChatGPT Can Help.

- **Generating Alt-text and descriptions** for images and Infographics.
- Helping readers describe images/components of test.
- **Creating code for:**
 - Accessible links
 - Accessible tables
 - Accessible iFrames/Popups
- **Educating and Advising on Accessibility Practices**



Combining AI Tools for Web Accessibility

Testing Tools & Manual Testing



Identify Issues



Create, Educate,
Remediate



Language Learning Generative AI
Chat GPT

Enhanced
Accessibility





ALTERNATIVE TEXT & DESCRIPTIONS

Non-Text Content WCAG 1.1.1

Basic Guidelines for Accessible Images

- Non-text Content
WCAG 1.1.1

- Alt-Text Should match the purpose or function of the image

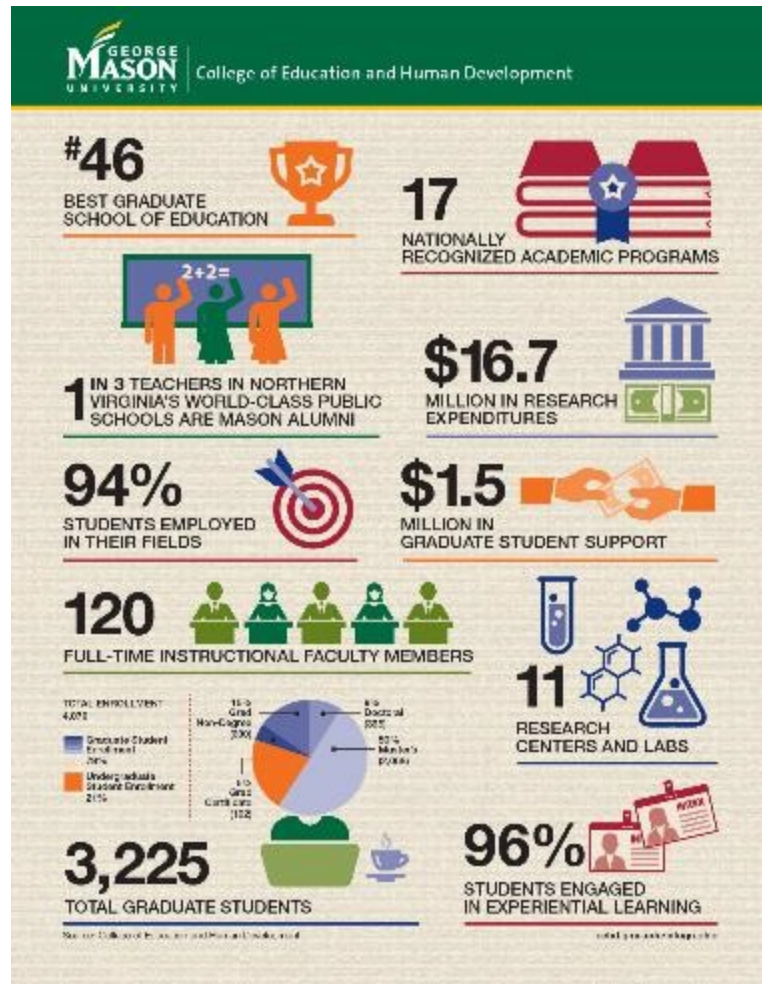


- Be succinct. (a few words a sentence at most)



- Avoid **redundancy** and **extraneous** Information
 - Do not use the word “image” or “graphic”

Info Graphics



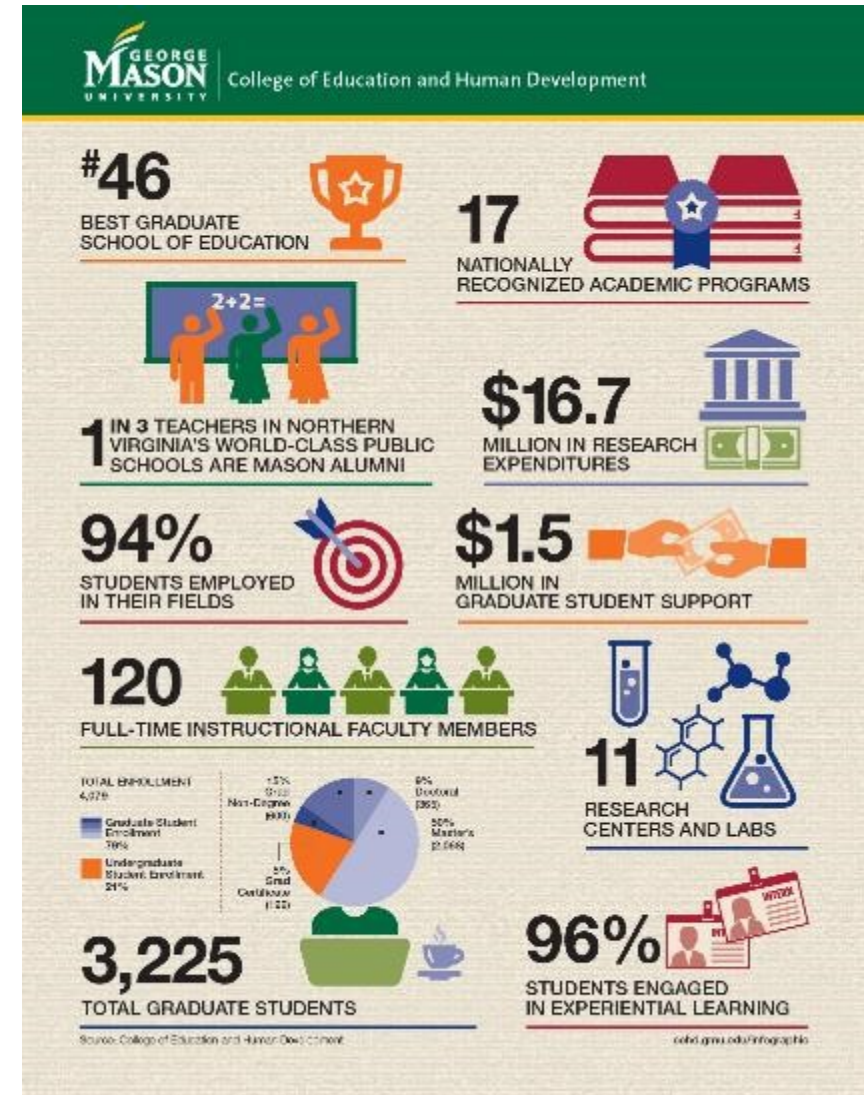
Text as Images/Infographics

- Text in infographics cannot be read using assistive technology.
- **Fonts** and **colors** cannot be easily adjusted by the user.

Chat GPT Prompts:

Prompt: “What is a good at-text for this image?”

Refined Prompt: “Can you describe this infographic to someone who is blind?”



Chat GPT Prompt for Modal Link

Chat GPT Prompt

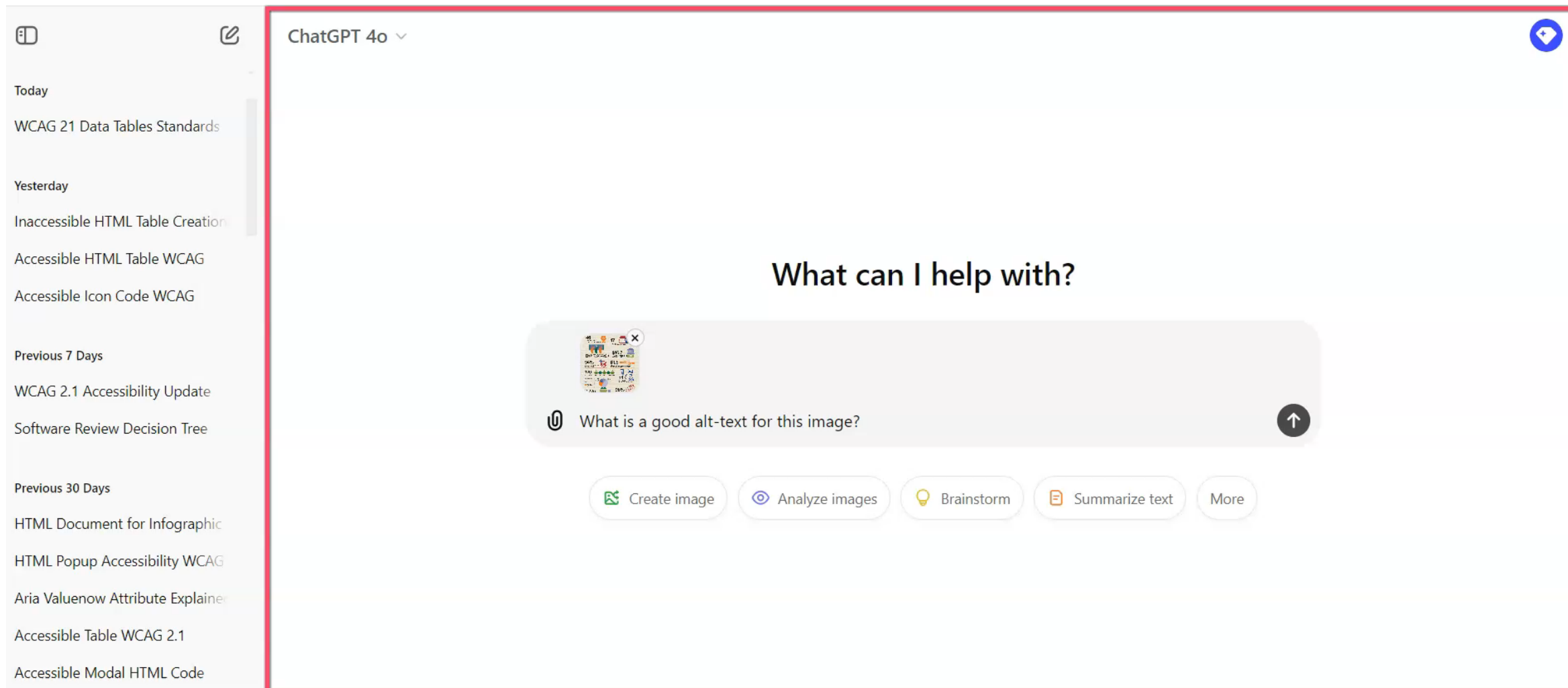
- Please create a modal to provide a detailed description of the infographic that includes a link below the image to open the modal. The modal and its contents should be accessible according to WCAG 2.1AA

Result



[Read Detailed Description](#)

GPT Generated description



The image shows a screenshot of the ChatGPT 4o interface. On the left is a sidebar with a list of chat history items, including "WCAG 21 Data Tables Standards" and "WCAG 2.1 Accessibility Update". The main chat area is titled "ChatGPT 4o" and displays the prompt "What can I help with?". Below the prompt is a text input field containing the question "What is a good alt-text for this image?". To the right of the input field is a circular button with an upward arrow. Below the input field are five suggested actions: "Create image", "Analyze images", "Brainstorm", "Summarize text", and "More".

ChatGPT 4o

Today

- WCAG 21 Data Tables Standards

Yesterday

- Inaccessible HTML Table Creation
- Accessible HTML Table WCAG
- Accessible Icon Code WCAG


Previous 7 Days

- WCAG 2.1 Accessibility Update
- Software Review Decision Tree

Previous 30 Days

- HTML Document for Infographic
- HTML Popup Accessibility WCAG
- Aria Valuenow Attribute Explainer
- Accessible Table WCAG 2.1
- Accessible Modal HTML Code

What can I help with?

 What is a good alt-text for this image?

Create image Analyze images Brainstorm Summarize text More

Help for a reader working with a Student who is Blind.

At the beginning of Year 2, Better Corporation's accounting equation showed the following accounts and balances:

BETTER CORPORATION								
Accounting Equation								
	Assets		=	Liabilities	+	Stockholders' Equity		
Event	Cash	Land		Notes Payable		Common Stock	Retained Earnings	Account Titles for Retained Earnings
Balance								
1/1/Year 2	10,000	20,000		12,000		7,000	11,000	

The image is of a table representing the accounting equation for the Better Corporation. It is organized into three main columns, corresponding to the components of the accounting equation: Assets = Liabilities + Stockholders' Equity. At the top, "BETTER CORPORATION" is centered in bold, and below it, "Accounting Equation" is also centered. The table is structured as follows:

1. "Assets" is subdivided into 3 columns Event, Cash, and Land
2. Under Liabilities Notes Payable
3. Under "Stockholders' Equity" "Common Stock" and "Retained Earnings." Additionally, there's a sub-column under "Account titles for Retained Earnings"
4. Below these headings, there's a row for "Event" with the entry "Balance" and a date "1/1/Year 2."



ACCESSIBLE LINKS

Link Purpose – WCAG 2.4.4 (in context) and WCAG 2.4.9 (Link Only)

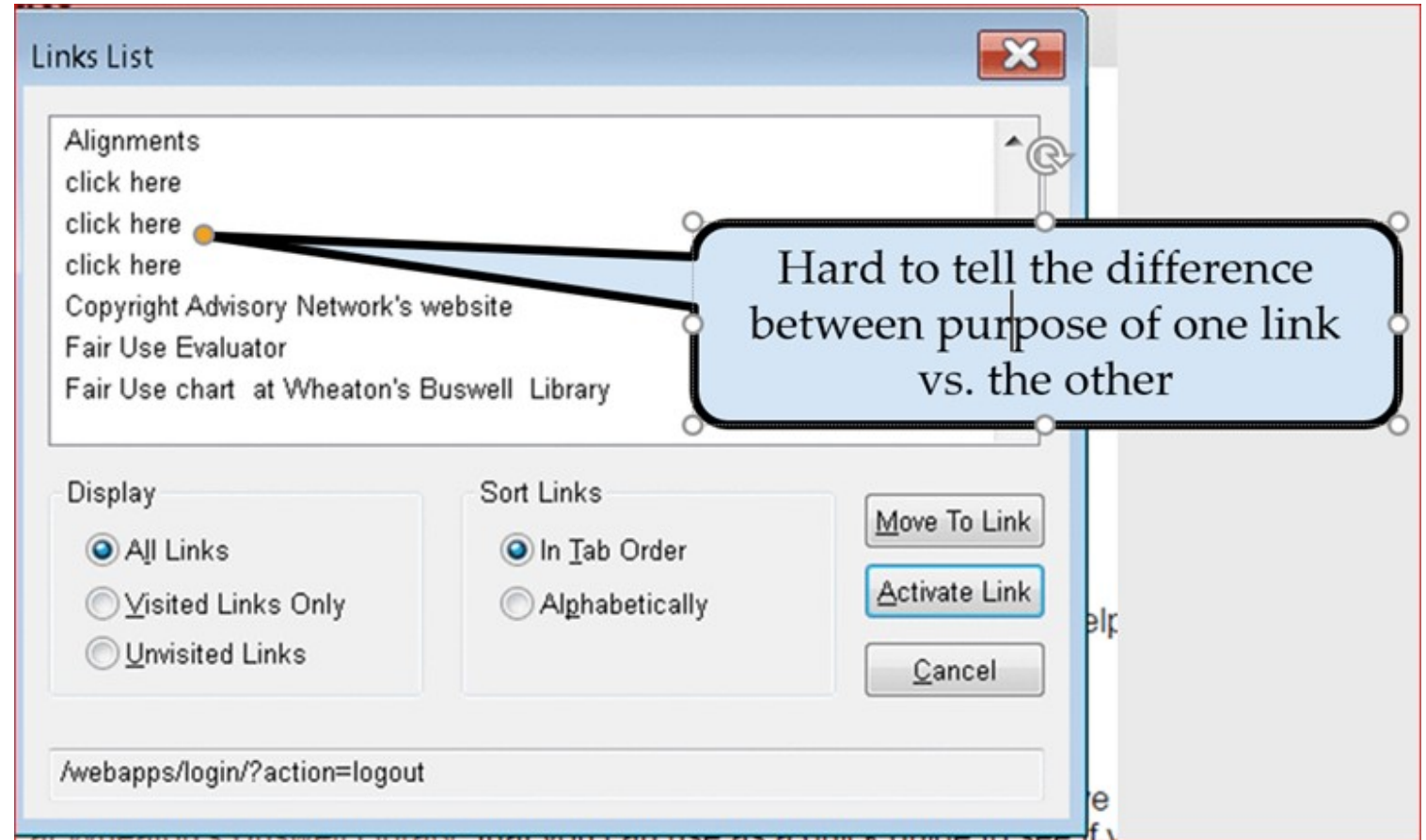
Basic Guidelines for Accessible Links

Links should be identified by more than just color alone.

Use Descriptive Link names.

Avoid URL's and “**Read More**” whenever possible

- Links List (JAWS)



URLs vs Descriptive Link

Poor Design

- Try reading this article about a Mason alum: <https://www2.gmu.edu/focused-your-future/lights-camera-action-mason-alum-creates-own-film-festival>.



Universal Design

- Try reading this article about a Mason alum: [Lights! Camera! Action! Mason Alum Creates Own Film Festival](#).



Creating Descriptive Links



COVID Vaccine Clinic with Giant Pharmacy

Student Health Service and Employee Health and Well-Being are partnering with Giant Pharmacy to hold a

COVID Vaccine Clinic on-campus. Mason students, faculty, and staff [...]

Before

```
<a class="gmuj-read-more-link" title="Read More" href="https://shs.gmu.edu/novasalud/" wiid="N1670">[...]</a>
```

Prompt: Can you tell me how to make the attached code accessible in accordance with WCAG 2.1 AA?

Code after ChatGPT Prompt

```
<a class="gmuj-read-more-link" href="https://shs.gmu.edu/covidclinic-2/" aria-label="Read more about COVID Clinic information" title="Read More">
  Read More
</a>
```

```
<style>
  .gmuj-read-more-link:focus {
    outline: 2px solid #0000ff; /* Visible focus state for
    keyboard users */
  }
</style>
```

ACCESSIBLE TABLES

Info and Relationships - WCAG 1.3.1 (*<table>, <th>, <tr>, and <td> Scope*)

Basic Guidelines for Accessible Tables

Table headers must be identified

Provide a caption

Screen readers use `<th>` tags and `scope` attributes to identify which cells in the table are row or column headers.

When possible, **avoid using split or merged cells**

	Monday	Tuesday	Wednesday	Thursday	Friday
8:00 AM	✓				
9:00 AM		✓			✓
10:00 AM					
11:00 AM					
12:00 PM					

State	Discovered	Became State	Order of State
Virginia	1607	1788	10
Massachusetts	1620	1788	6
New Hampshire	1623	1788	9

Level	Monthly		Annual	
	Subscription	Maintenance	Subscription	Maintenance
Beginner	\$1,000	\$0	\$10,000	\$1,000
Intermediate	\$3,000	\$0	\$30,000	\$2,500
Advanced	\$5,000	\$0	\$50,000	\$3,000

Example:

Screen readers and tables (without markup)

Dept. Code	Course #	Section	Max. Enrollment	Current Enrollment	Room Number	Days
BIO	100	1	15	13	5	Mon, Wed, Fri
ENGL	200	2	15	7	8	Tues, Thurs
PSYCH	100	1	15	15	13	Wed

Table Without Markup (Read Left-to-Right, Top-to-Bottom)

Department Code, Class Number, Section, Max Enrollment, Current Enrollment, Room Number, Days, BIO, 100, 1, 15, 13, 5, Mon, Wed, Fri, ENGL, 200, 2, 15, 7, 8, Tues, Thurs, PSYCH, 100, 1, 15, 15, 13, Wed

Example:

Screen readers and tables (without markup)



Table Without Markup (Read Left-to-Right, Top-to-Bottom)

Department Code, Class Number, Section, Max Enrollment, Current Enrollment,
Room Number, Days, BIO, 100, 1, 15, 13, 5, Mon, Wed, Fri, ENGL, 200, 2, 15, 7, 8,
Tues, Thurs, PSYCH, 100, 1, 15, 15, 13, Wed

Example:

Screen readers and tables

(with <th> tags and scope attribute for column and rows)

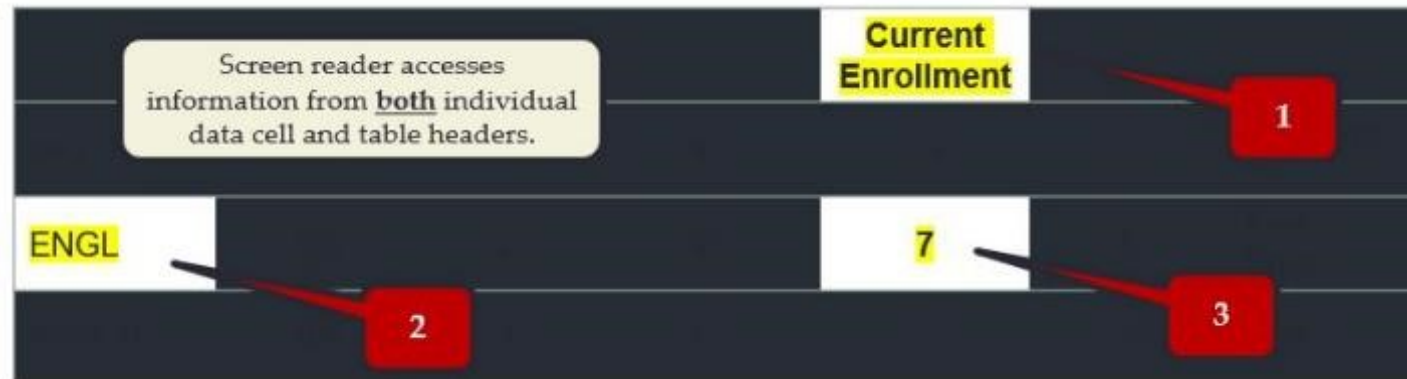


Table With <th> tags and scope attributes

Department Code, Class Number, Section, Max Enrollment, **Current Enrollment**,
Room Number, Days, BIO, 100, 1, 15, 13, 5, Mon, Wed, Fri, **ENGL**, 200, 2, 15, **7**, 8,
Tues, Thurs, PSYCH, 100, 1, 15, 15, 13, Wed

Example (Tables): Accessible tables vs. Inaccessible tables (*video example*)

VIDEO: Accessible U Video

Demonstration of a table using
JAWS – Screen Reading
Technology (3:25)

Can you spot the barriers?

There are at least 22 accessibility issues on this page. To see a list of all known issues, [click here](#). To see a more accessible version of this same page, [click here](#). For a cheat sheet of accessibility issues, [click here](#).

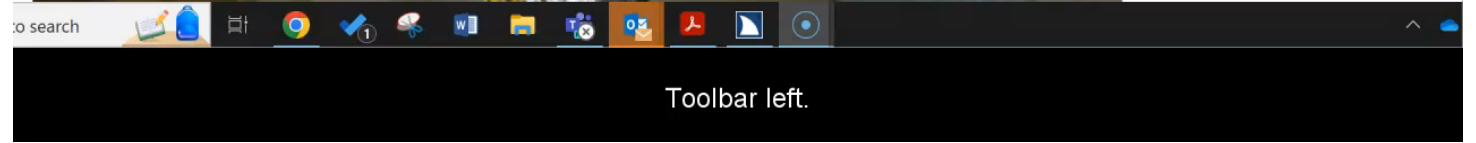
AU Enrollment Trends

	Last Year					This Year				
	CS	Eng	Eco	Phy	Psy	CS	Eng	Eco	Phy	Psy
Undergraduate	1481	400	727	747	1006	1500	340	777	787	1112
Graduate	310	84	273	69	312	350	64	341	72	325

AU Video



to search



Toolbar left.

Chat GPT Prompt: Tables

First Prompt:

- Please act as a web developer and add accessible code to make the following HTML table accessible in accordance with WCAG 2.1 AA.
(Paste Code)

Result

Business Hours	
Day	Hours
Monday - Thursday	8:45 AM - 12 PM 1 PM - 4:30 PM
Friday	12:30 PM - 4:30 PM
Saturday - Sunday	Closed

Refining Results:

Second Prompt:

Thank you. Now, can you incorporate CSS to show lines and make the table more visually attractive? Please include a caption and focus indicator.

Business Hours

Day	Hours
Monday - Thursday	8:45 AM - 12 PM 1 PM - 4:30 PM
Friday	12:30 PM - 4:30 PM
Saturday - Sunday	Closed



ACCESSIBLE IFRAME

Basic Guidelines for Accessible iFrames/Popups

iFrames should include a title to allow the screen reader user to understand what content is in the frame.

The content within the frame must be keyboard accessible (i.e. ability to close the pop up or start, stop and pause video content within the frame.)

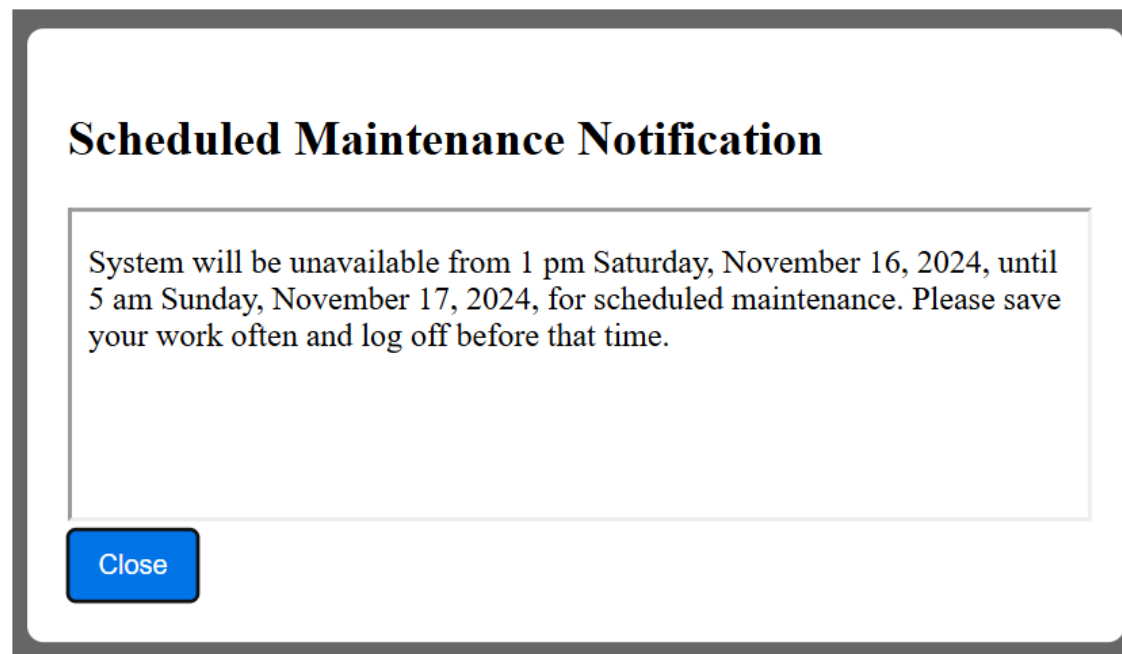
The screenshot shows a web application interface titled "My Inbox". It features a search bar, a filter dropdown set to "ID", and a table with columns "ID" and "Name". A single row is visible with ID "DP00002332" and a name starting with "Maintenance". A modal window is open over the table, titled "Maintenance" with a "close window" button. The modal content reads: "Maintenance: [redacted] will be offline Saturday, 6/15/2024, from 2AM until 5AM Sunday, 6/16/2024. Please save your work often and log off before that time." Two callout boxes point to specific elements: one points to the "close window" button, and another points to the modal's title bar.

The close button is only accessible using the mouse. - Someone who cannot use the mouse cannot close this iFrame

This iFrame is not provided with an accessible name. Someone using a screen reader will not know it is here.

iFrames and Popups

- **Prompts:**
- P1: Good morning; how do you make an HTML iFrame popup accessible in accordance with WCAG 2.1 AA Guidelines?
- P2: Please write accessible code for an HTML popup with the following text inside. The system will be unavailable from 1 pm Saturday, November 16, 2024, until 5 am Sunday, November 17, 2024, for scheduled maintenance. Please save your work often and log off before that time” Thank you!



Chat GPT Prompt: iFrame:

Prompt: Can you please create HTML code to embed the following video.

Copy and Paste embed code

- `<iframe width="706" height="397" src="https://www.youtube.com/embed/ITUDiTgAZY0" title="Introduction to WAVE" frameborder="0" allow="accelerometer; autoplay; clipboard-write; encrypted-media; gyroscope; picture-in-picture; web-share" allowfullscreen></iframe>`

Refining Results

Prompt:

- Thank you. Can you also add a title to the iframe and anything else that will make it accessible to people who use screen-reading technology or cannot use the mouse?

```
html Copy code
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Accessible Video Embed Example</title>
</head>
<body>
  <h1>Accessible Embedded Video Example</h1>
  <p>Below is an example of how to embed a video into an HTML page in an accessible
  <iframe width="706" height="397"
    src="https://www.youtube.com/embed/ITUDiTgAZY0"
    title="Introduction to WAVE - Web Accessibility Evaluation Tool"
    frameborder="0"
    allow="accelerometer; autoplay; clipboard-write; encrypted-media; gyroscope;
    allowfullscreen
    aria-label="Introduction to WAVE Web Accessibility Evaluation Tool"></iframe>
</body>
</html>
```



USING CHATGPT FOR DEVELOPING RESOURCES

Create Resources for Training



- **Prompt:** What components are needed to create accessible (Images, Links, Forms, Tables, Video)
- **Prompt:** Thank you, can you now create an accessible HTML page with the checklist? Be sure to use CSS to make it visually attractive

Accessible Data Table Checklist - WCAG 2.1 AA

Make sure to follow these accessibility guidelines to ensure your data tables are usable by all users, including those with disabilities.

Checklist for Creating Accessible Data Tables

- ✓ Use the `<table>` element for tabular data (avoid using tables for layout).
- ✓ Use `<th>` elements for headers, not `<td>`, and add the `scope` attribute to define header type (column/row).
- ✓ Use `headers` and `id` attributes to associate headers with data cells in complex tables.
- ✓ Provide a descriptive `<caption>` for the table that summarizes its purpose.
- ✓ Avoid nested tables; use lists or split tables if necessary.
- ✓ Ensure the table is fully navigable by keyboard, with clear focus indicators.
- ✓ Check color contrast for table text against the background using a contrast ratio checker (minimum 4.5:1).
- ✓ Make tables responsive for smaller devices (mobile-friendly design).
- ✓ Use ARIA roles and properties like `aria-sort` for interactive tables (e.g., sortable columns).
- ✓ Avoid leaving cells empty; use placeholders like "N/A" or `aria-hidden="true"`.
- ✓ Test tables with screen readers (e.g., NVDA, VoiceOver) to ensure proper reading order and associations.
- ✓ Ensure consistent layout for repeated tables to make navigation easier for users.

For more details on making accessible tables, visit the [WCAG 2.1 Quick Reference Guide](#).

Create Inaccessible and Accessible Examples

Complex Table Example

- **Prompt:** Please create an example of an inaccessible complex table with two heading levels using html. Do not include any accessible code.
- **Prompt:** Now can you add cell padding to make it easier to read?
- **Prompt:** This is great; now, can you make the table accessible in accordance with WCAG 2.1 Level AA standards?

Inaccessible Table

Sales Data			Expenses Data		
Product	Q1	Q2	Marketing	Operations	Development
Product A	\$5,000	\$6,000	\$2,000	\$3,000	\$4,000
Product B	\$8,000	\$7,500	\$2,500	\$3,500	\$4,500
Product C	\$9,000	\$10,000	\$3,000	\$4,000	\$5,000

Accessible Table

Quarterly Sales and Expenses Data for Products

Sales Data			Expenses Data		
Product	Q1	Q2	Marketing	Operations	Development
Product A	\$5,000	\$6,000	\$2,000	\$3,000	\$4,000
Product B	\$8,000	\$7,500	\$2,500	\$3,500	\$4,500
Product C	\$9,000	\$10,000	\$3,000	\$4,000	\$5,000

Create Inaccessible and Accessible Code Examples

Form Example

- **Prompt:** Please create an dropdown box with the following options: Yes, No, N/A. Make it inaccessible for screen reader users.
- **Prompt:** Now can you add accessible code that will meet WCAG 2.1 AA standards?

Please select an option:
Choose Yes, No, or N/A

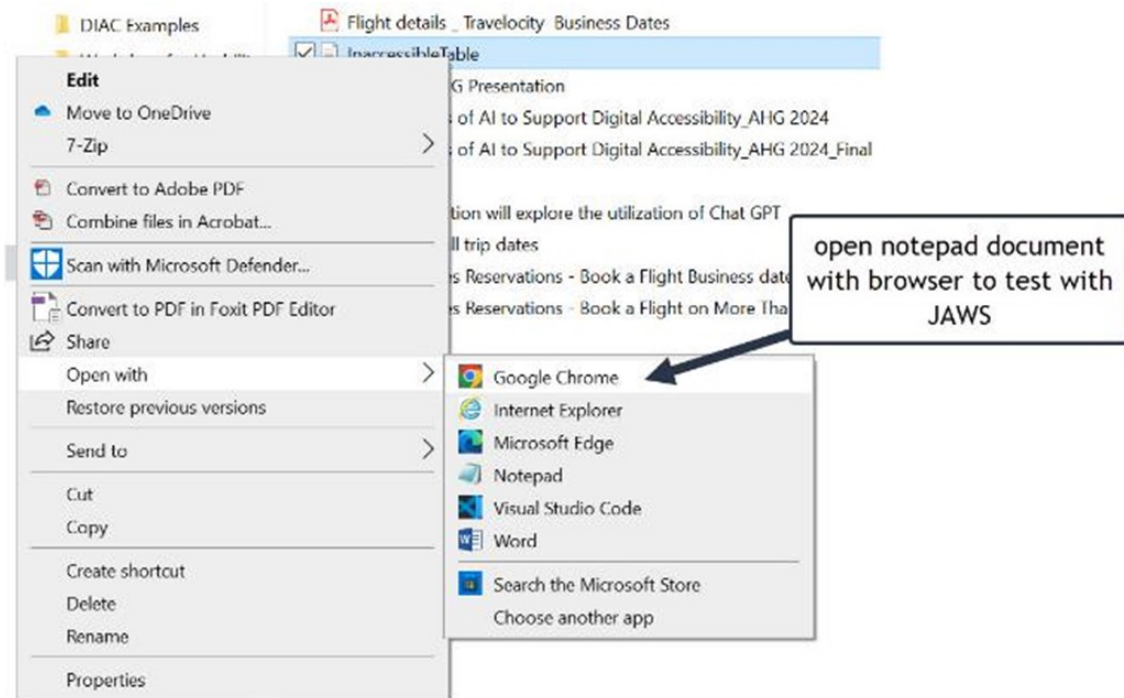
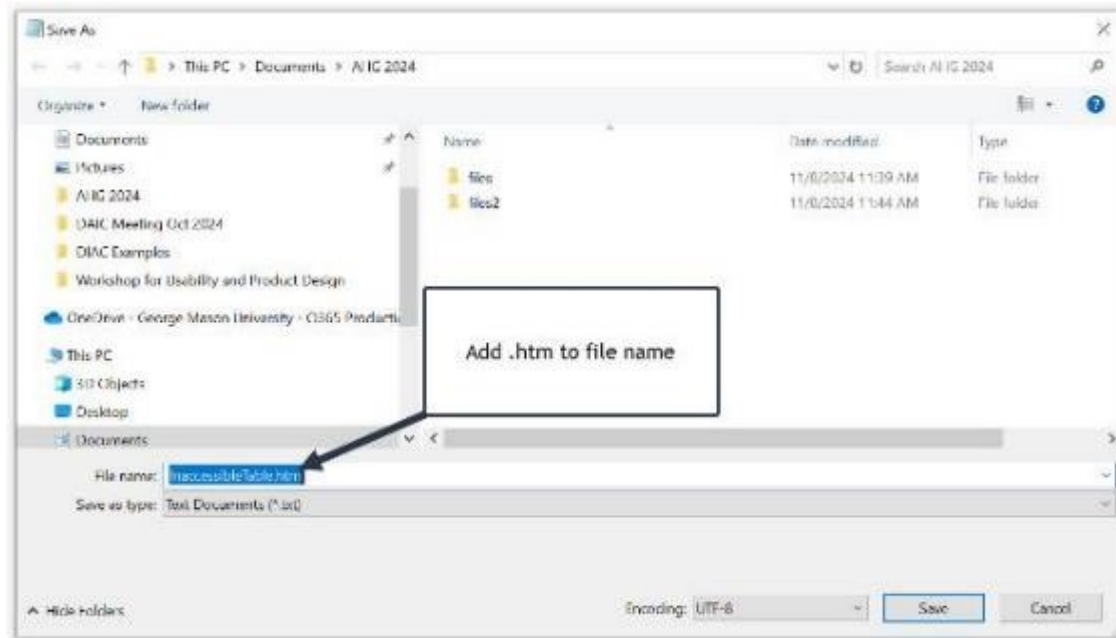
▼

Select an option response.

- Yes
- No
- N/A**

Checking the code created by ChatGPT

1. Copy and paste the code into Notepad
2. Save the Notepad document by adding .htm after the file name
3. Open NotePad document in your browser of choice



AI & Chat GPT Considerations

Advantages for Web Accessibility

- Web site remediation
 - Use ChatGPT in conjunction with automated testing tools (WAVE, ANDI, DUBBOT etc.) to provide guidance for remediation.
- Image descriptions – web sites and documents.
- Creating Content
 - Ask ChatGPT what is needed prior to adding the content.

Knowledge IS Required

- You must know enough about the topic to get the most accurate answer.
- Give Chat GPT details about what you want “in accordance with WCAG 2.1 AA Guidelines
- Chat GPT is not always correct.
 - Re-test remediated code using automated testing tools and or manual testing procedures.
- Note when content is created using ChatGPT



Questions?

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