39TH ANNUAL CSUN ASSISTIVE TECHNOLOGY CONFERENCE

Using Generative AI as your Accessibility Testing Assistant

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Agenda

Introductions
Learning Objectives
Lecture
Interactive Activity

Introductions

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Norms

- ✓ Respectful Communication: until we reach the interactive activity, only one person speaking at a time to ensure clarity and facilitate communication
- ✓ Personal Device Usage: the PowerPoint is available if you would prefer to follow along on your own device
- ✓ Respect for Ideas and Questions: foster open-mindedness and active listening when participants are sharing
- ✓ Scheduled Breaks and Self-Care: feel free to take additional breaks as necessary to accommodate individual needs and ensure engagement

We’re Going to be Here Awhile, Let’s Get to Know Each Other!

Get to Know You Activity

Get to Know You Activity Link

Learning Objectives

1. Learn the capabilities of AI for accessibility
2. Understand accessibility bookmarklets and how they work
3. Learn to author AI prompts to create bookmarklets
4. Learn how to test and enhance AI Bookmarklets in your work.

Workshop Resources

1. Github Repository
   Prompts, Source Code, Bookmarklet installer

2. Presentation Materials
   Powerpoint Slides

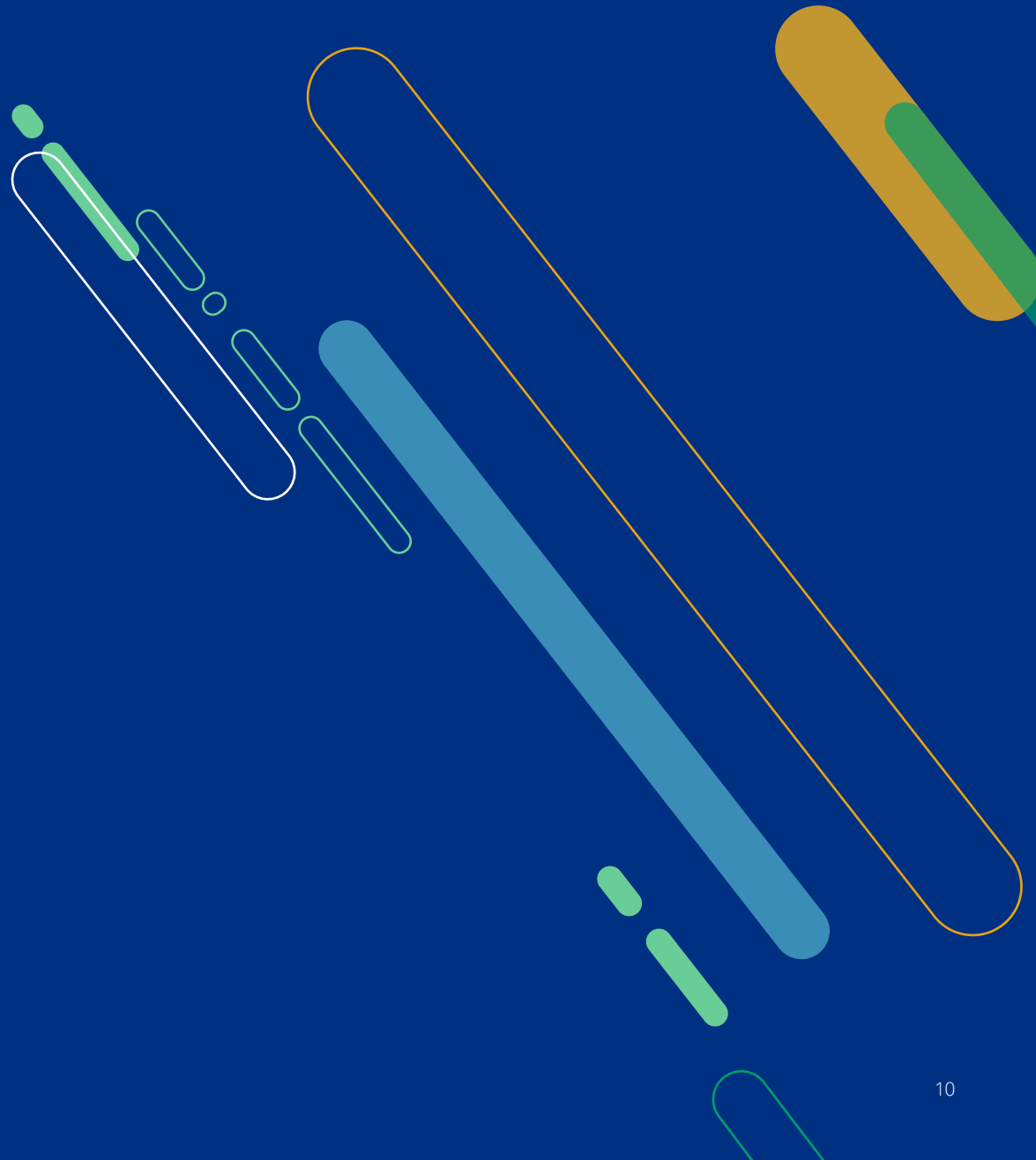
Github

https://github.com/EducationalTestingService/a11yBookMarklets/

Presentation Slides

https://ets-research.org/mhakkinen/CSUNworkshop/

Accessibility Testing



Accessibility Project Life Cycle

- Project Initiation - define scope and goals of the project
  Note: teams need to be inclusive at all stages
- Stakeholder Engagement - collect input on specific accessibility needs and requirements
- Accessibility Assessment - conduct an accessibility audit on existing assets
- Training and Awareness - communicate accessibility standards
- Design Phase- ensure wireframes, mockups, and prototypes are created with accessibility in mind

Accessibility Project Life Cycle (continued)

- Development Phase - conduct regular code reviews checking for semantic HTML
- Testing and QA - involve users with disabilities in usability testing and UAT
- Deployment - deploy to production an accessible product
- Monitoring and Maintenance - establish maintenance plan to address new features or changes

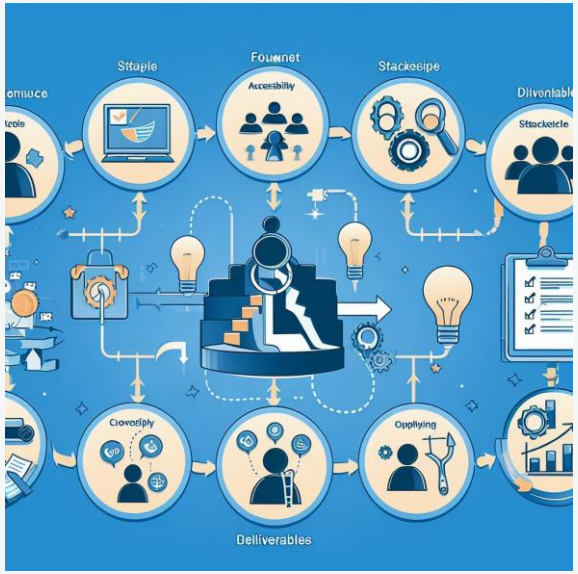
Accessibility Testing (1 of 2)

What does it include?

- Code review
- Screen Reader review
- Visual review: color contrast, reflow, zoom/magnification, keyboard trap

Testing Methods:

- Automated- tools like Axe, ARC, WAVE, and Lighthouse
- Manual Inspection



What is Alt Text?

Home About Services Contact

This is the main content of your accessible page.

Accessibility Testing Challenges

- Cost of automation tools – while many “free tools” exist, many commercial accessibility testing tools come with price tags, and training is a need for all.
- Lack of customization - automated tools don’t allow testers to tailor testing criteria to specific requirements or use cases
- HTML knowledge - accessibility testing can require deep understanding of HTML and web development principles
- Subject Matter Experts (SMEs) as authors benefit from simpler tools

Accessibility Testing Challenges (continued)

- Cross-browser and cross-device compatibility - websites and applications may behave differently across various browsers and devices (e.g. desktops vs smartphones)
- Legacy systems and technologies- organizations maintaining outdated systems that require retrofitting

Shifting Accessibility Testing Left

- Content authors may use tools that generate (or support the generation of) accessible code with no underlying view of the code itself .
- Some organizations (e.g., ETS) have best practices and specific structures and labeling that should be present
- Common Accessibility Testing tools can verify WCAG compliance, but don’t know about the specific best practices used in the organization.
- Content may be handed off to accessibility testing teams with the experience to conduct screen reader and manual inspection
- What if we could detect issues at authoring time?

Bookmarklets, What's the Benefit?

Bookmarklet: What is it?

Automated testing and bookmarklets serve different purposes and operate in different contexts:

Automated Testing

- Includes scripts and software tools to test software applications automatically
- Covers functional, regression, and performance testing
- Typically designed to simulate user interactions with the software, executed programmatically without manual intervention

Bookmarklets

- JavaScript stored as bookmarks in web browsers
- Used for modifying the appearance of a webpage, extracting information, executing specific actions
- Require clicking on them in the browser's bookmarks bar, then run on the current web page

Why Bookmarklets?

- Ease of use - require minimal technical expertise to operate
- No installation required- doesn’t require administrative privileges or installation
- Platform independence - this ensures compatibility across testing environments (i.e. Windows or Mac)
- On-the-fly Testing- allows quick and efficient testing
- Customization- offers flexibility and tailoring to specific use cases

Common Bookmarklets

- ANDI - https://www.ssa.gov/accessibility/andi/
- Accessibility Bookmarklets - https://accessibility-bookmarklets.org/
- Paul J Adam's Bookmarklets: https://pauljadam.com/bookmarklets/

- Many more! What are your favorites?

Do It Yourself Bookmarklets?

1. Write the code
2. Add the JavaScript code to a bookmark
   - Open a web browser and create a new bookmark in your bookmark's toolbar
   - Name the bookmark
   - Edit the bookmark URL: right click on new bookmark and select “edit”. Paste the code into the “URL” or “location” field.
3. Test (and debug) your bookmarklet.

But, wait! What if I am not an experienced JavaScript coder?

Bookmarklet: How to build it

Key tips:

- ✓ Add bookmarklets from trusted sources. Malicious code can potentially harm browsing experiences or compromise security
- ✓ Utilize the “console” in the developer tools if the bookmarklet is not functioning correctly. The console will express the error it is encountering when attempting to run the bookmarklet.
  - ✓ Check on multiple websites. It could be the website.
- ✓ Condense the code to a single line instead of pasting the extensive code into the bookmarklet.

Can Generative AI Help?

What is Generative AI?

- Language models- computer programs designed to understand and generate human-like text (i.e., chatbots and virtual assistants)
- Large language models- extensive number of parameters
  - Generative AI is a type of artificial intelligence that creates new, original content.
  - Examples include GPT for text generation, DALL-E for image creation, and AI for music composition.

Common Generative AI Tools

- OpenAI ChatGPT (GPT4, DALL-E)
- Anthropic Claude
- Microsoft Bing/Co-Pilot (GPT4)
- Google Gemini
- GPT4All.io (Open Source- run on your local PC or Mac)
- LM Studio (free for non-commercial, run on your local PC or Mac)

How to Build with AI

- Understanding the bookmarklet's goal
  - Are you creating a bookmarklet to automate tasks, extract information, or simplify workflows? Be specific in your goal
- Writing an efficient prompt - this is the foundation of a successful bookmarklet
- Ask the AI to the create bookmarklet code - ensure it is well-structured, efficient, and compatible with different browsers
- Test it - use different web content types, browser versions, and device configurations
- Fix issues, if necessary - debug the code and troubleshoot using the AI as your programmer

What is a Prompt?

Prompt - user initiated instructions for AI to perform specific tasks.

Key Tips for Effective Prompts:

- ✓Use clear, concise, actionable language
- ✓Clearly define the anticipated outcome
- ✓Provide context by giving background information or setting the scene

Structuring a Prompt

- The Context:
  - Assume you are an expert in Web Accessibility, Javascript, the creation of efficient Javascript bookmarklets, and WCAG.

- The Ask:
  - Please create an efficient bookmarklet to…

Testing a Bookmarklet

- Try out your bookmarklet… what might happen?
  - It produces the expected result!
  - It produces something that isn’t quite right (or accurate)
  - Nothing happens!
- Remember your AI programmer is at the ready to help.

How to Debug a Prompt

- ✓ If it doesn’t work: Find the error message from “console” in the browser dev tools
- ✓ If it works, but not as expected: Describe the difference from what you expected
- ✓ Make it personal and talk to the AI in chat and describe the problem.
- ✓ Ask the AI to correct the problem.

Prompt Etiquette?

- ✓ A natural dialog is not essential, but can be helpful in building your relationship.
- ✓ Treat AI as an assistant or apprentice.
- ✓ Don’t expect perfection.
- ✓ Your role (as a boss with empathy) is to provide guidance.
- ✓ Politeness may actually help.

It can’t hurt to be polite?

Artist:
https://www.instagram.com/xibang/

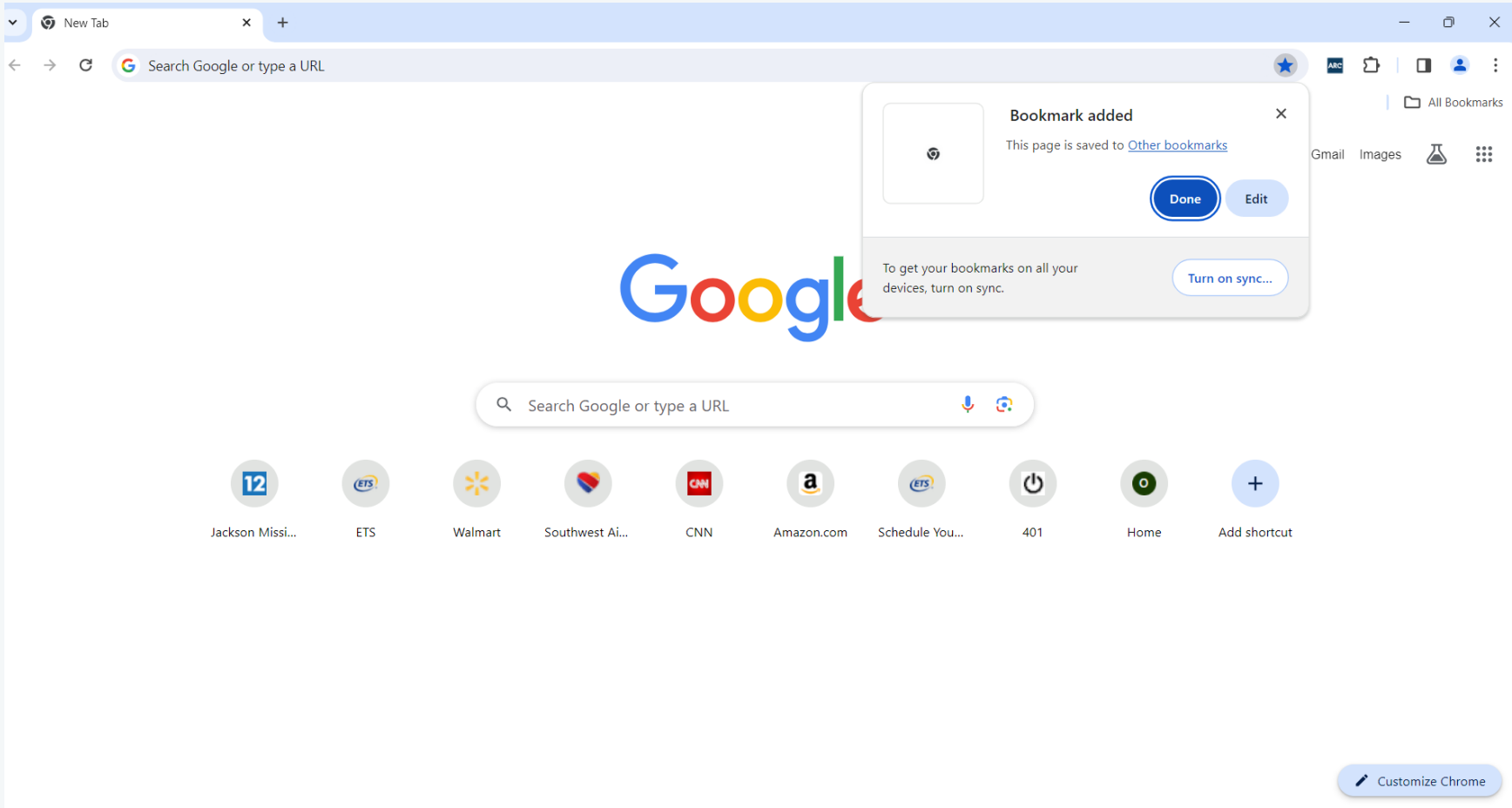
Bookmarklets Demo

Bookmarklets Demonstration

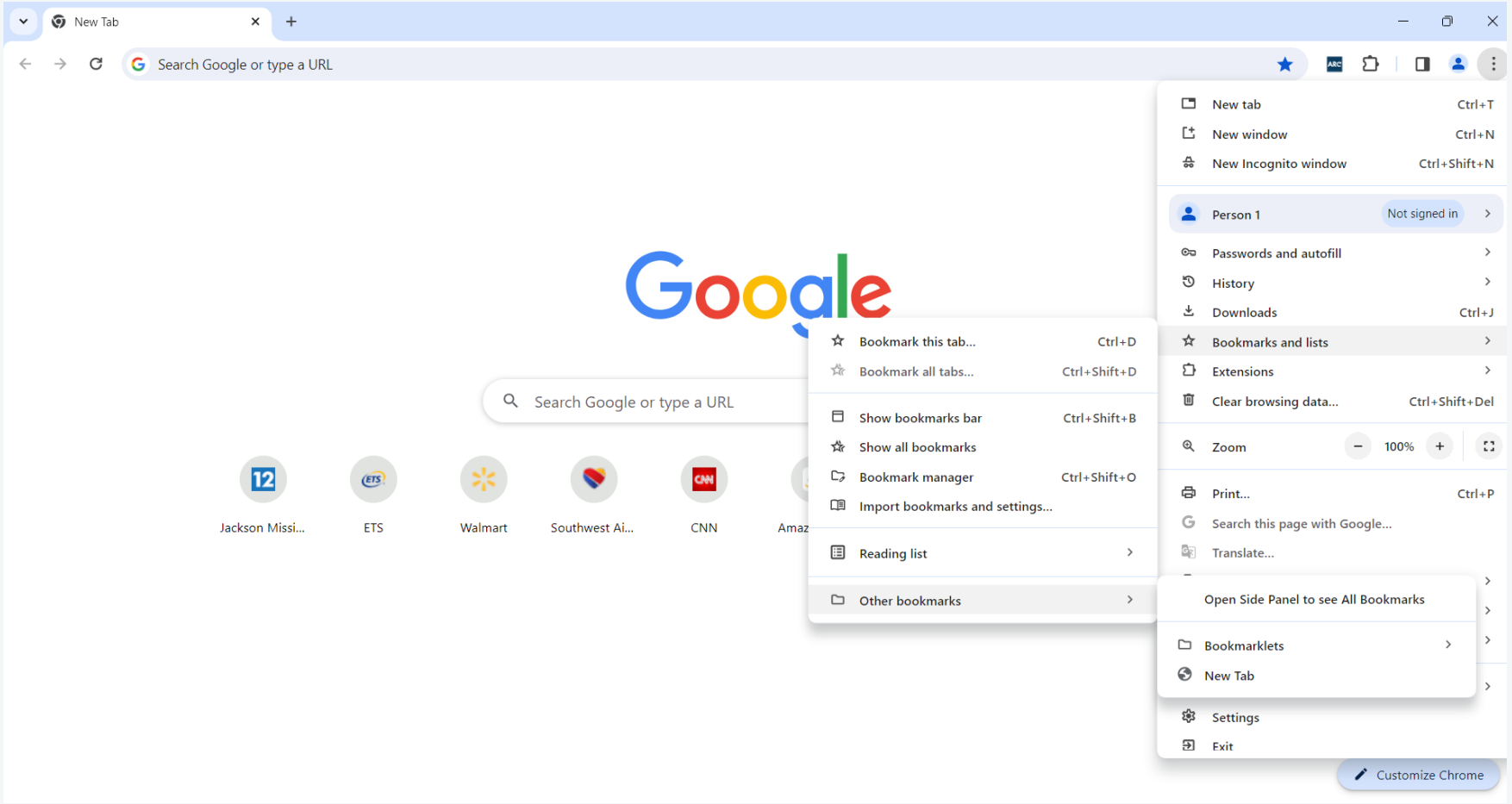
Are there Transcripts? If no, report in a new web page

```
javascript:(function() {    var mediaElements = document.querySelectorAll('video, audio');    var
noTranscriptMedia = [];    mediaElements.forEach(function(media) {        var siblings =
media.parentNode.childNodes;        var hasTranscript = false;
siblings.forEach(function(sibling) {            if (sibling.nodeName === 'TRANSCRIPT' ||
(sibling.nodeName === 'TRACK' && sibling.getAttribute('kind') === 'subtitles')) {
hasTranscript = true;            }        });        if (!hasTranscript) {
noTranscriptMedia.push({ type: media.nodeName.toLowerCase(), src: media.currentSrc });        }
});    var reportHTML = '<html><head><title>audio - no transcript</title></head><body><h1>Media
Elements without Transcripts</h1><ul>';    noTranscriptMedia.forEach(function(media) {
reportHTML += '<li>' + media.type + ' - ' + media.src + '</li>';    });    reportHTML +=
'</ul></body></html>';    var reportWindow = window.open('');
reportWindow.document.write(reportHTML);})();
```

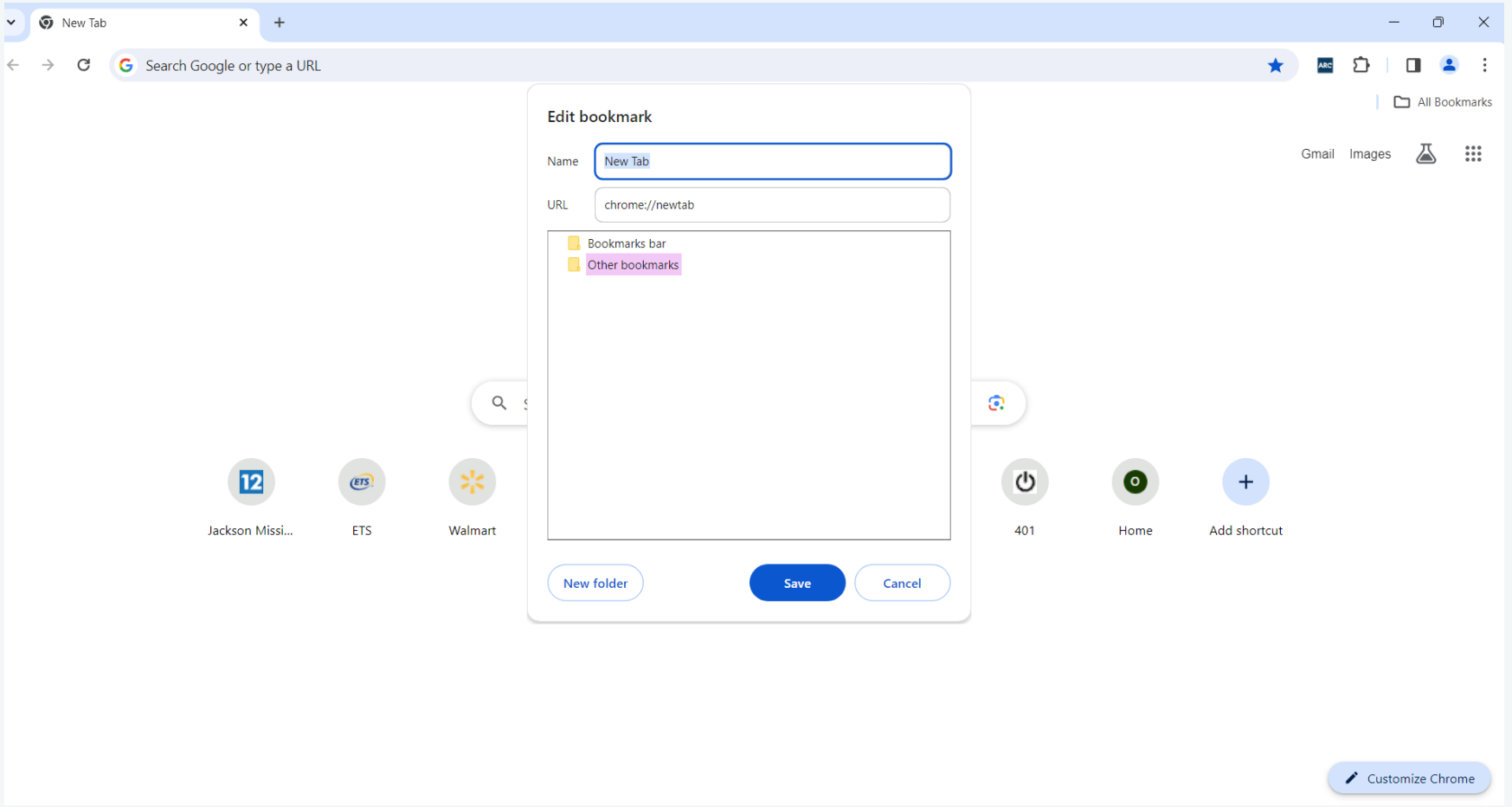
Create a transcripts bookmarklet: Step 1



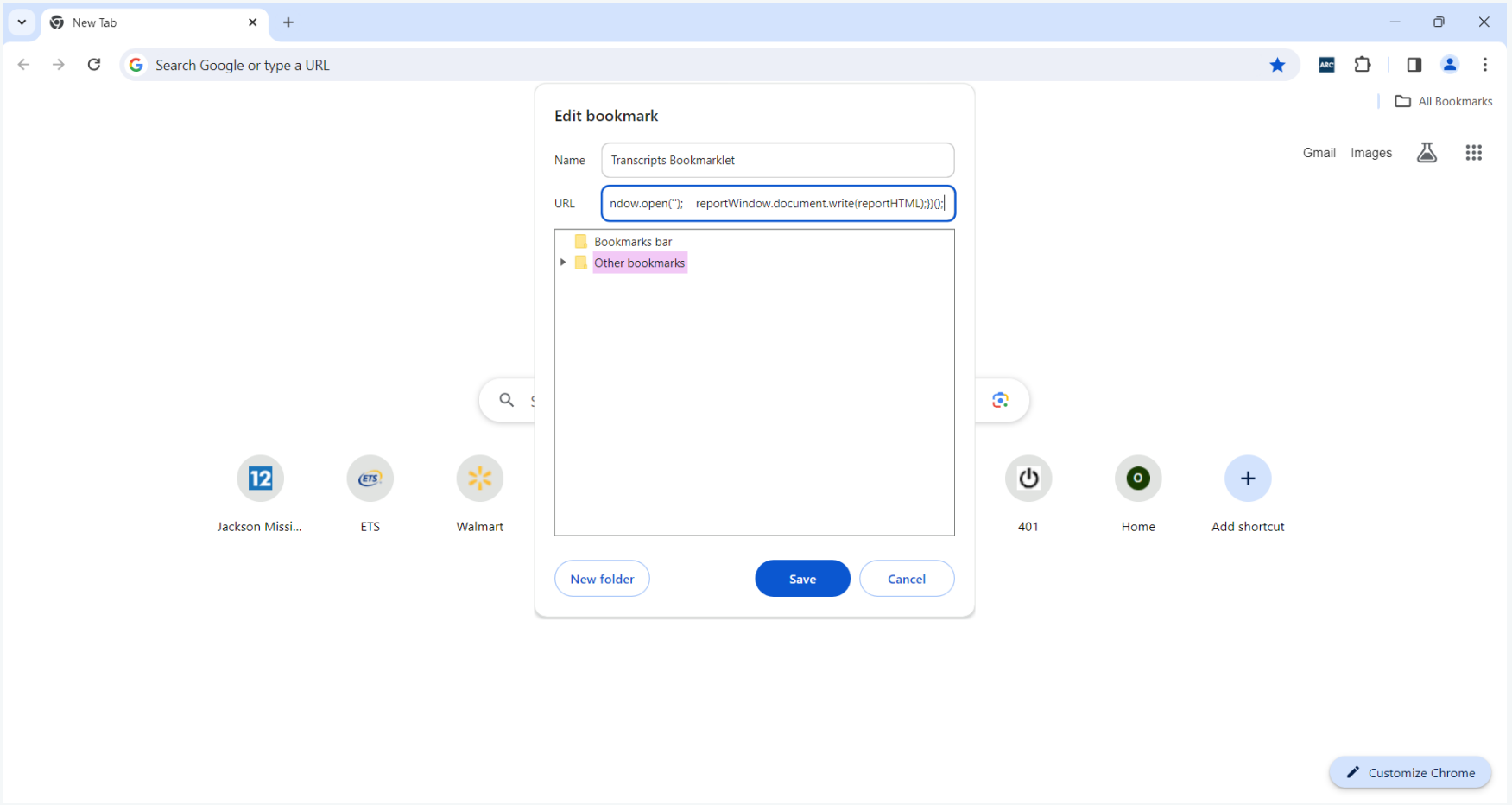
Create a transcripts bookmarklet: Step 2



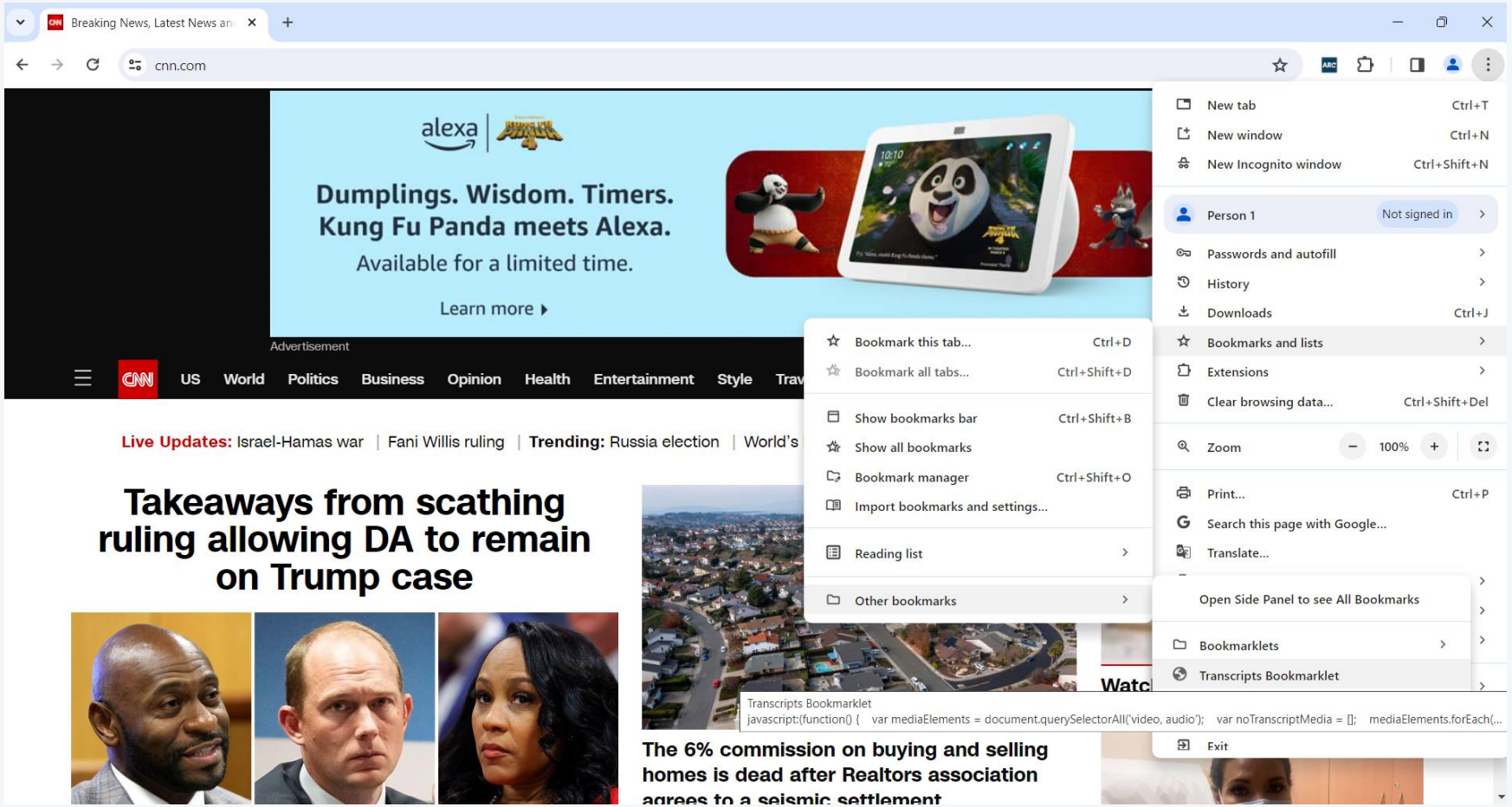
Create a transcripts bookmarklet: Step 3



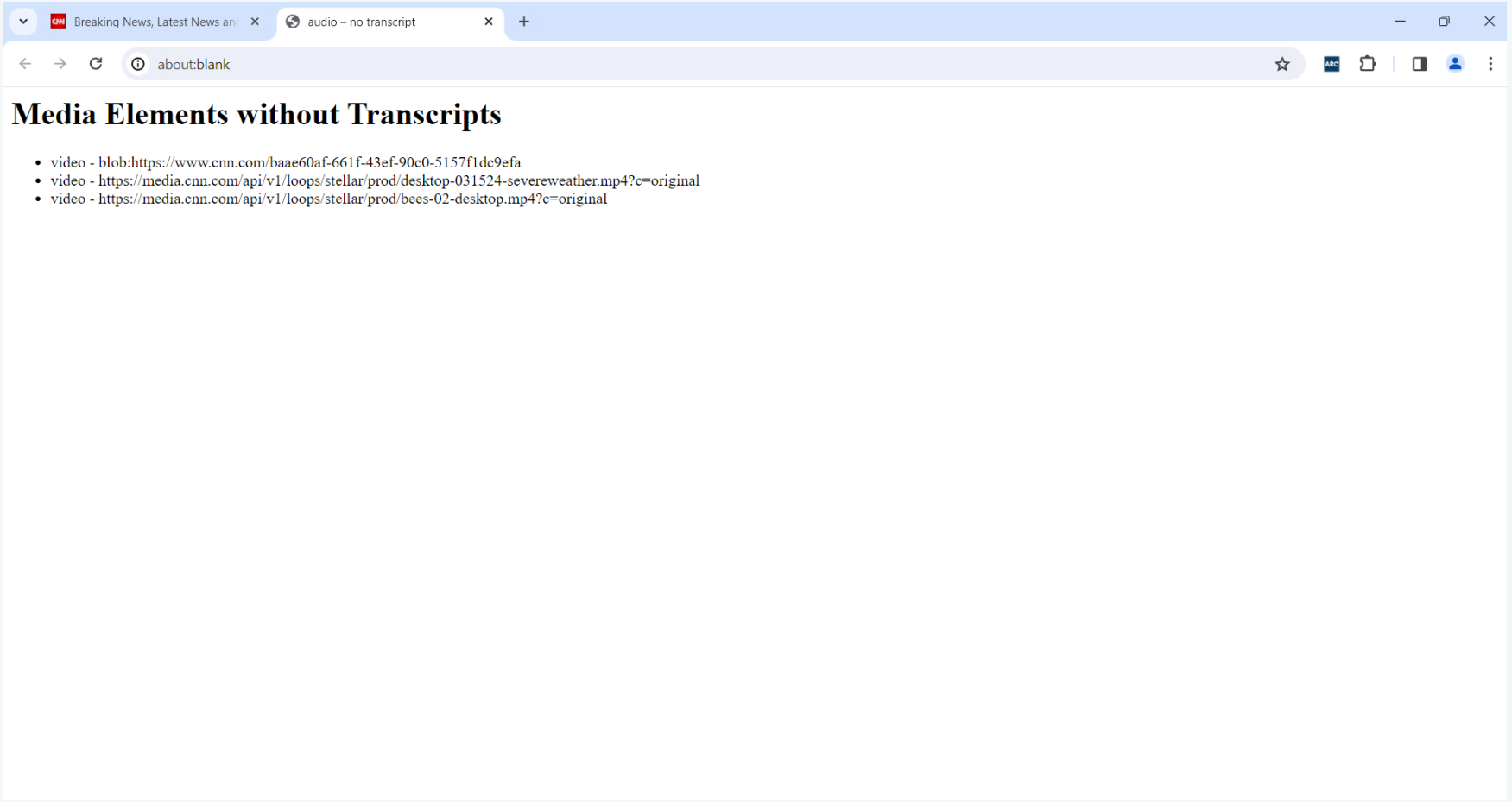
Create a transcripts bookmarklet: Step 4



Create a transcripts bookmarklet: Step 5



Create a transcripts bookmarklet: Step 6

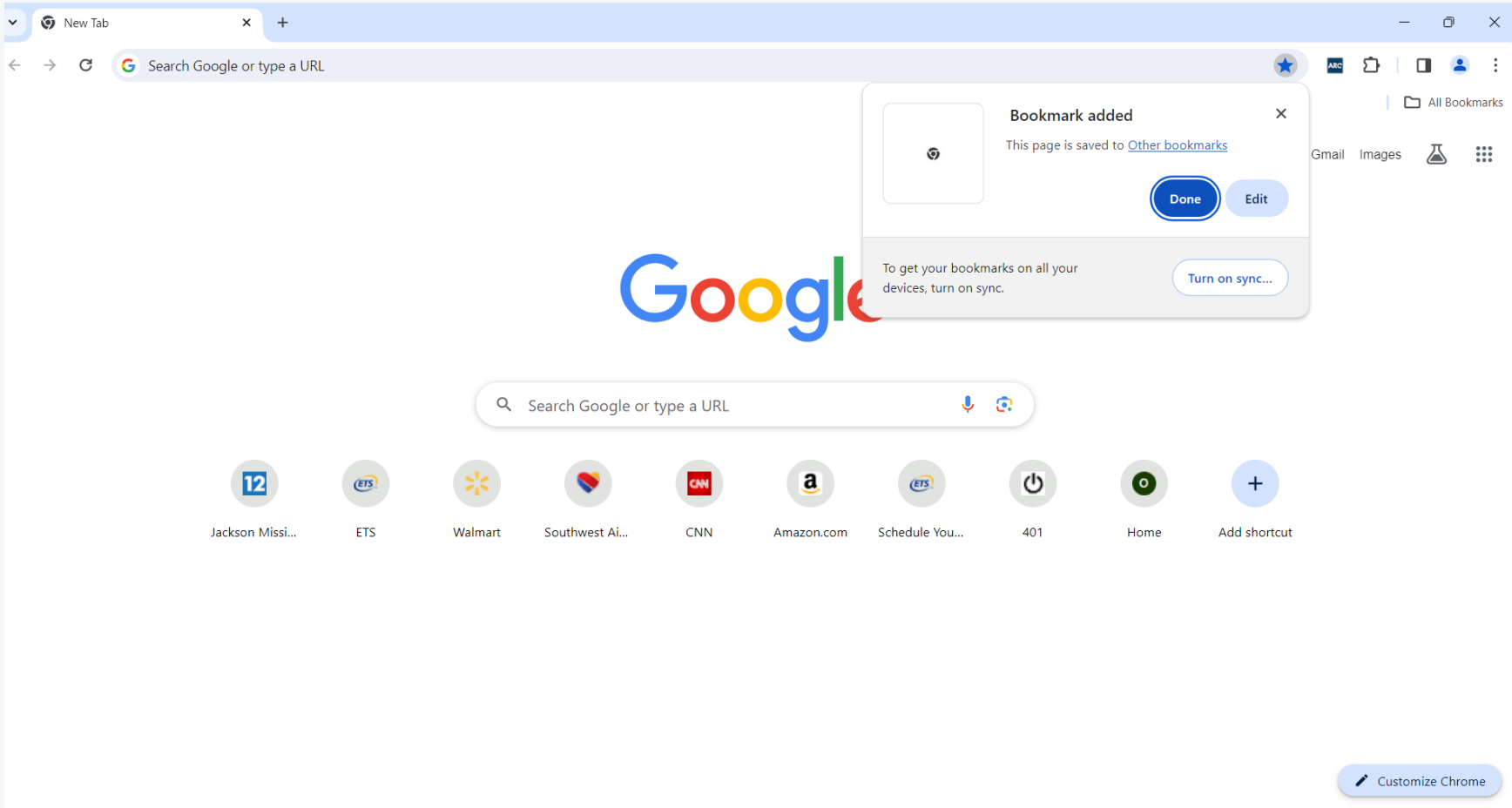


Bookmarklets Demonstration

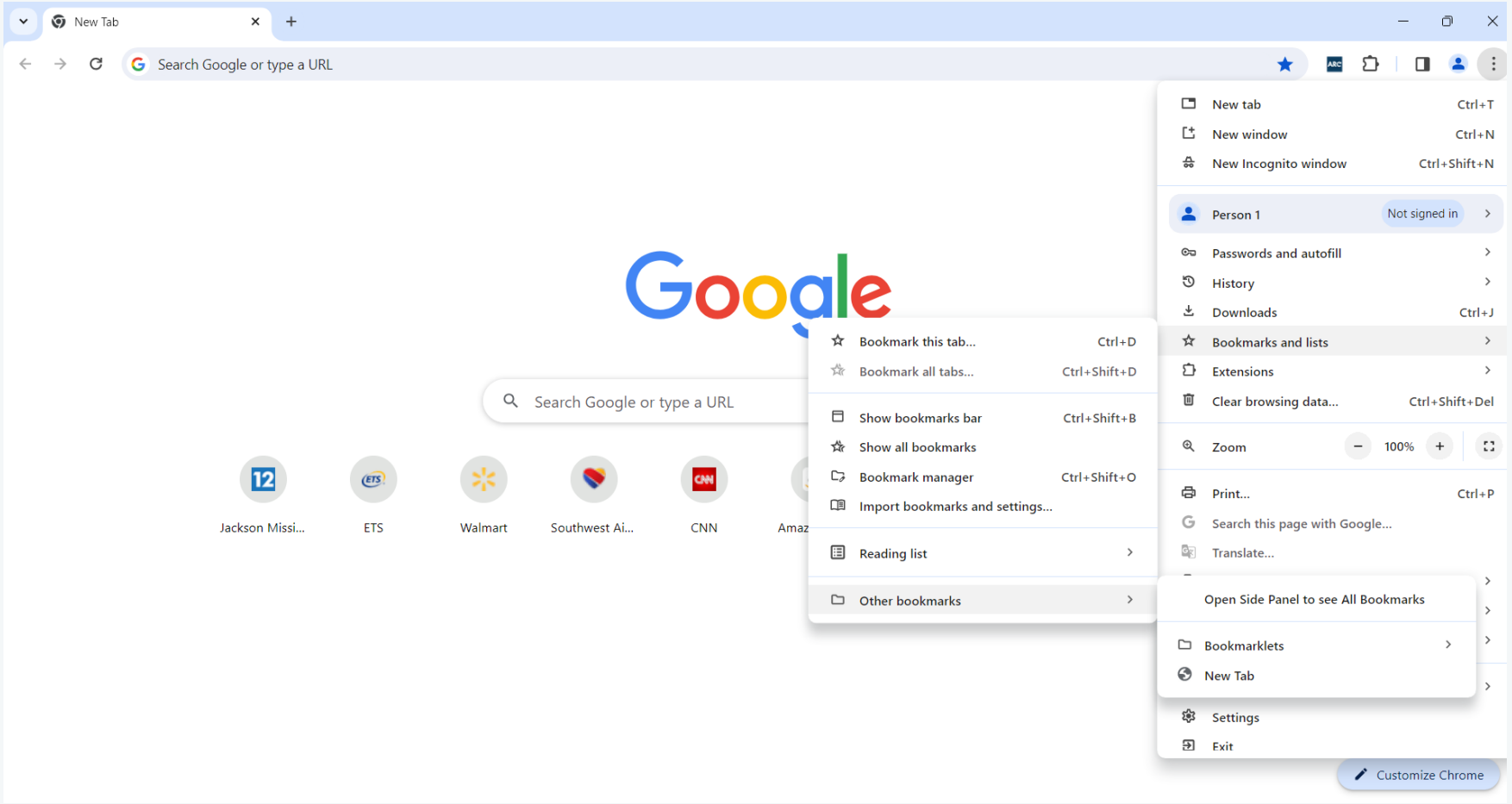
Aria labels – display a red border around all aria labels

```
javascript:(function() {  var formFields = document.querySelectorAll('input, select, textarea');  formFields.forEach(function(field) {  var label = '';
var ariaLabel = field.getAttribute('aria-label');  var id = field.id;  if (id) {  label = document.querySelector('label[for="' + id + '"]');  label =
label ? label.textContent.trim() : %27%27;  }  var fieldInfo = document.createElement(%27div%27);  fieldInfo.style = %27border: 3px dotted red;
padding: 5px; margin-bottom: 5px; color: red%27;  fieldInfo.innerHTML = %27<strong>Field:</strong> %27 + field.nodeName.toLowerCase() +
%27<br>%27 +  %27<strong>Label:</strong> %27 + (label || %27No label found%27) + %27<br>%27 +  %27<strong>Aria-
label:</strong> %27 + (ariaLabel || %27No aria-label found%27);  field.parentNode.insertBefore(fieldInfo, field.nextSibling);  });})();
```

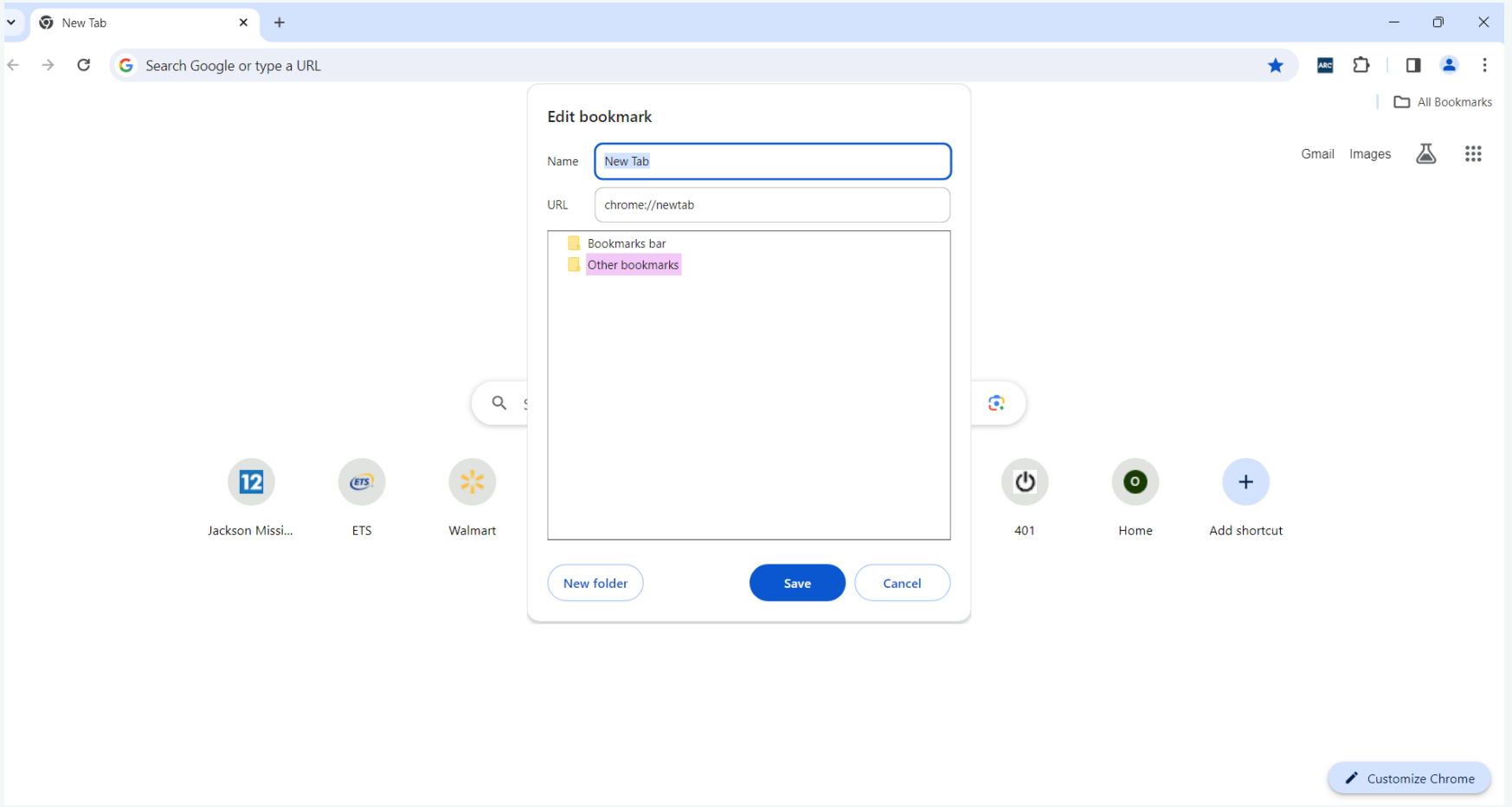
Create an aria-label bookmarklet: Step 1



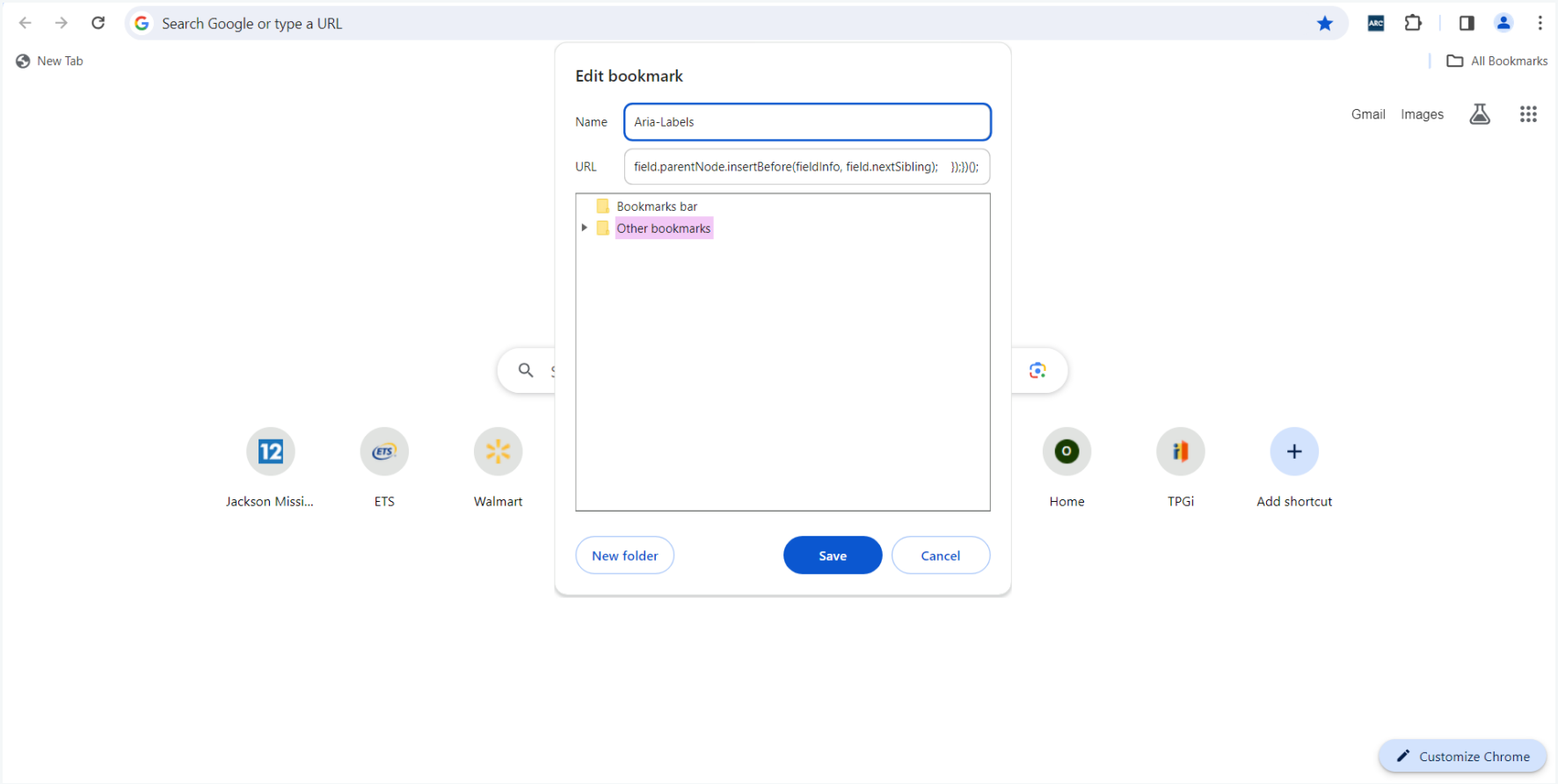
Create an aria-label bookmarklet: Step 2



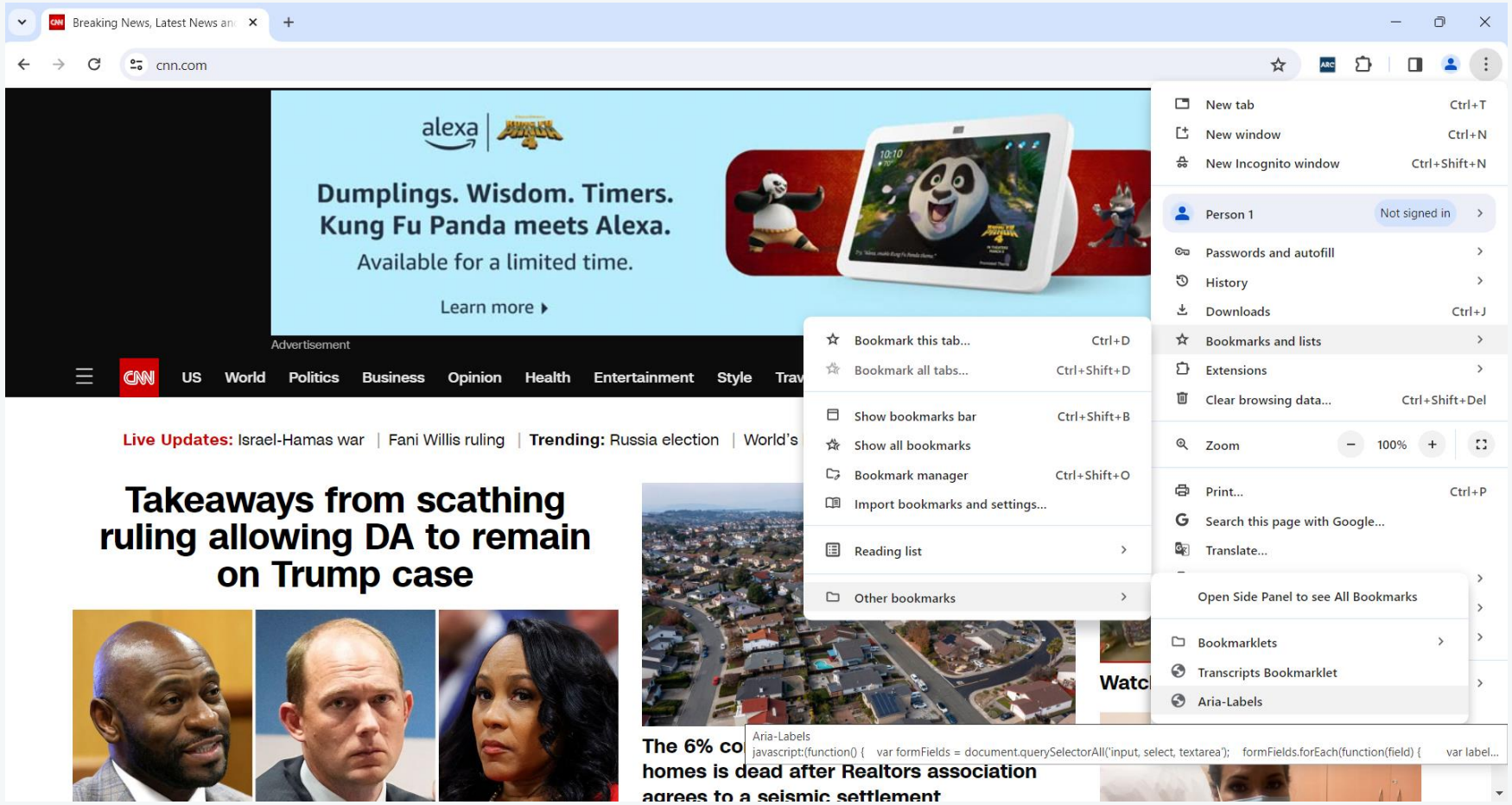
Create an aria-label bookmarklet: Step 3



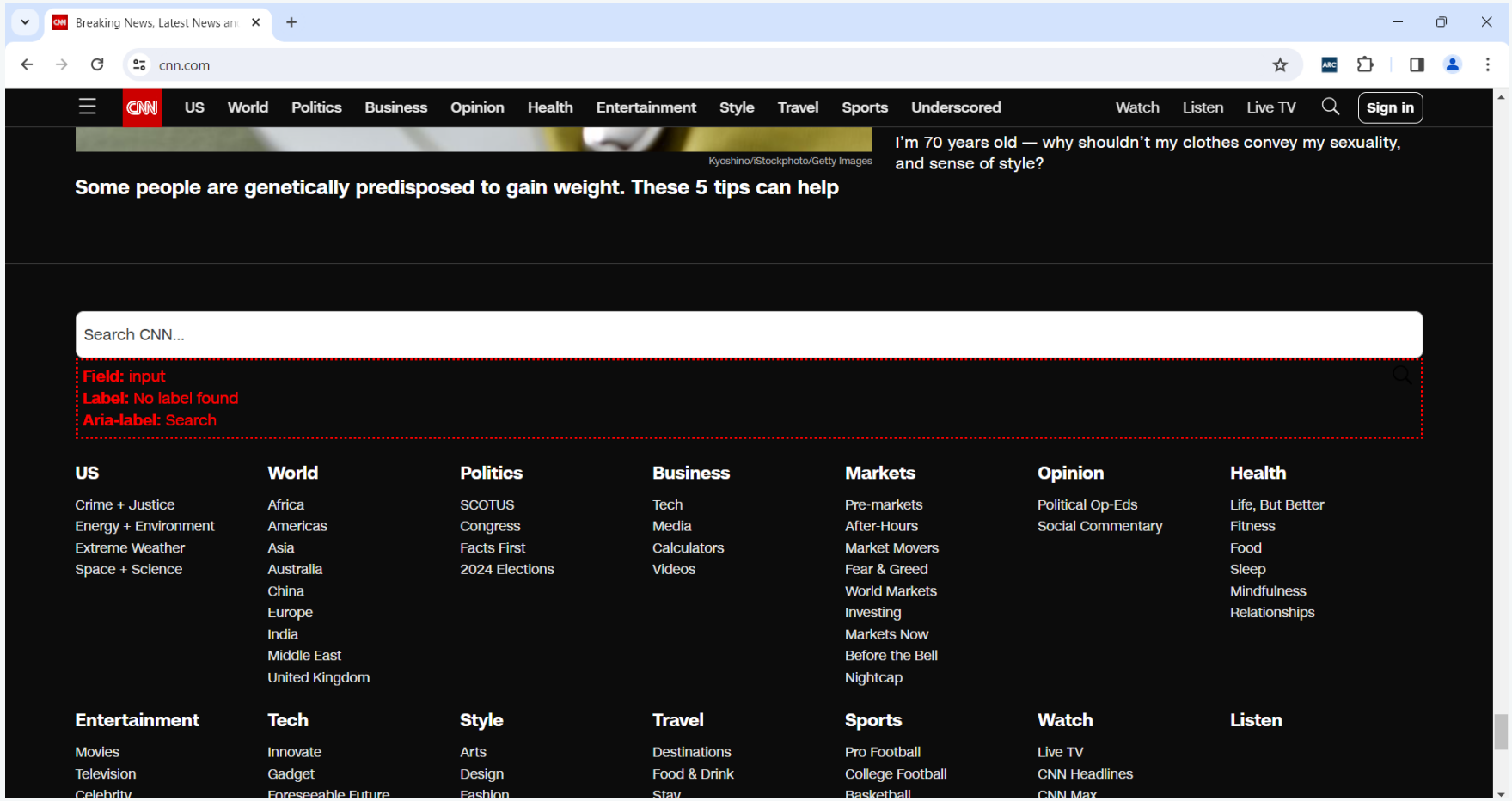
Create an aria-label bookmarklet: Step 4



Create an aria-label bookmarklet: Step 5



Create an aria-label bookmarklet: Step 6



Some words of caution!

- How long can bookmarklet code be?
  - 2000-8000 characters
  - It can vary so don’t try to “boil the ocean”!
- Due to the concise, efficient, “one line of code” approach, leave the debugging to your AI assistant.
  - You can ask the ai to reformat the code for review if you want to examine it more closely.

Interactive Activity

Collaborative Practice

- We will create a bookmarklet as a workshop

Independent Application

- Work in groups or independently to create your own bookmarklet.

Sharing and Reflection

- Highlight successful bookmarklets created
- Discuss roses and thorns of the process
- Key takeaways

Your turn!

Take-away:
Use this spreadsheet to demonstrate when AI can apply to specific criteria.

Questions?

accessibility@ets.org