

# Barrierefreiheit kann so einfach sein

**Oder wie ein Internet für alle funktioniert**



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html+css+js  
developer &  
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**LAMBDA SCHMIEDE**



**JUG Mainz**





## GRÜNDE FÜR BARRIEREFREIHEIT

- INKLUSION
- TEILHABE
- EINFACHES DESIGN



**WIN  
OR  
LEARN**

**READABILITY**



**DESIGN  
APPROVED**



**WHERE'S  
THE ROI?**



**SHOW  
TELL**

**KEEP IT SIMPLE**



**CONTENT  
IS QUEEN**



**KNOCK  
IT OUT OF  
THE PARK**

**ADD  
SPACING**



**#HOCKEYS'**

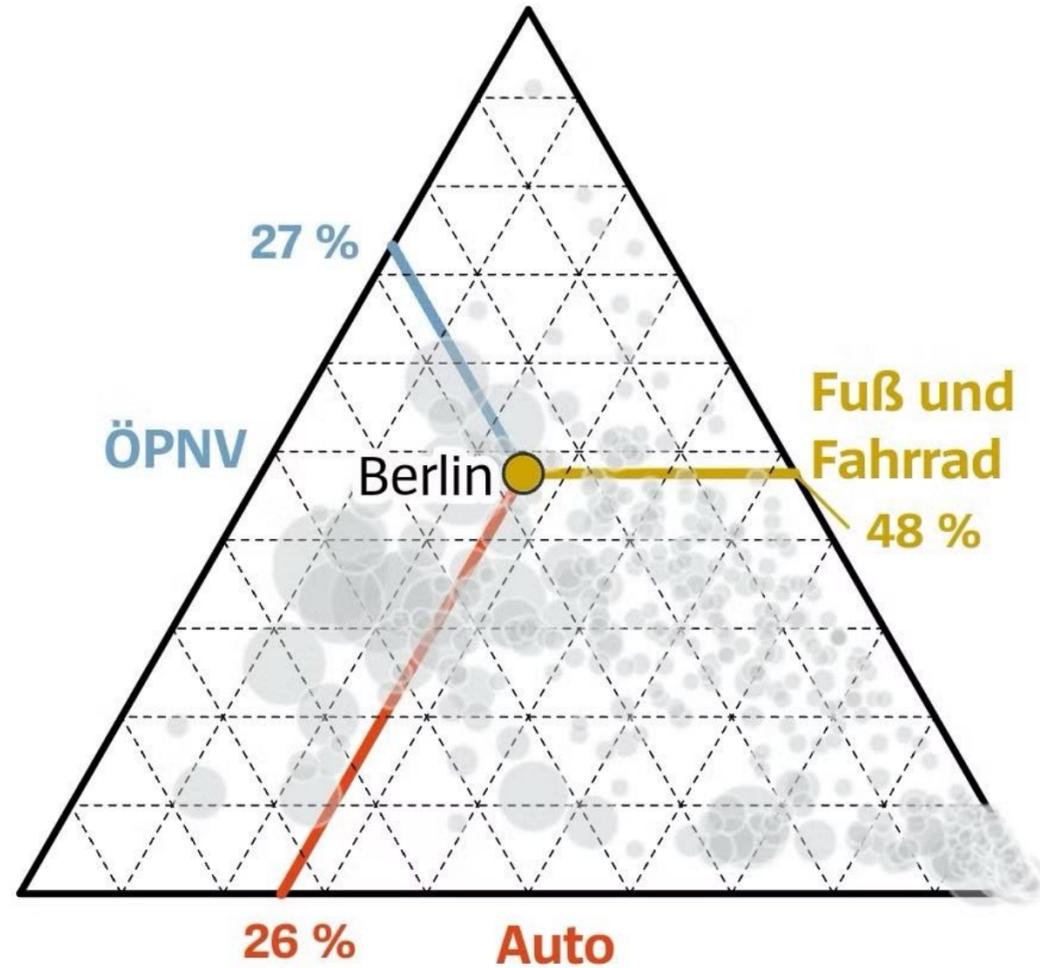
**INFINITE VERTICAL SPACE**



## Mit welchen Verkehrsmitteln die meisten Wege zurückgelegt werden, in Prozent

● Aktiv ● ÖPNV ● Auto ● gleichauf

○ 1 Mio. ○ 10 Mio.



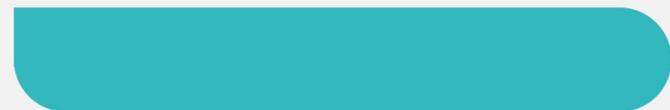
# Hessisches Fragewort mit zwei Buchstaben

# Hä?

# #Kommunikationsbarrieren

*A11y*

Abkürzung für Accessibility



**BARRIEREFREIHEIT**

**BETRIFFT ALLE**

**95.9% DER TOP 1 MIO. SEITEN**

**NICHT BARRIEREFREI**

<https://webaim.org/projects/million/>

**15% ALLER MENSCHEN**

**HABEN EINE BEHINDERUNG**

<https://iris.who.int/handle/10665/44575>

**DESIGN DIENT DEN NUTZER:INNEN**

DESIGN DIENT DEN NUTZER:INNEN

**9% aller Männer, und  
1% aller Frauen  
haben eine Rot-Grün-Schwäche**

# SEITEN BEREICHE

**KONTRAST**

**BILDER**

**SKALIERUNG/ZOOM**

**ANORDNUNG**

**ANORDNUNG**

**FARBEN**

**SPRACHE**

**TAB REIHENFOLGE**



# **Warum ist die Situation so schlecht?**



**SIND WIR**



**NIEN**

**UNFÄHIG?**

**Fehlendes  
Wissen über  
Notwendig-  
keit**



**Fehlendes  
Wissen über  
korrekte  
Umsetzung**



**Fehlende  
Ressourcen  
(Zeit) durch  
Management**





**HTML gibt uns alles was  
wir brauchen**



# QUIZ: WER KENNT <DETAILS>?

HTML Demo: <details> RESET

**HTML** **CSS** **OUTPUT**

```
1 <details>
2   <summary>Details</summary>
3   Something small enough to escape
4   casual notice.
5 </details>
```

▼ **Details**

Something small enough to escape casual notice.

# ÜBERSCHRIFTEN REGELN



1. Genau eine h1
2. Keine Level überspringen

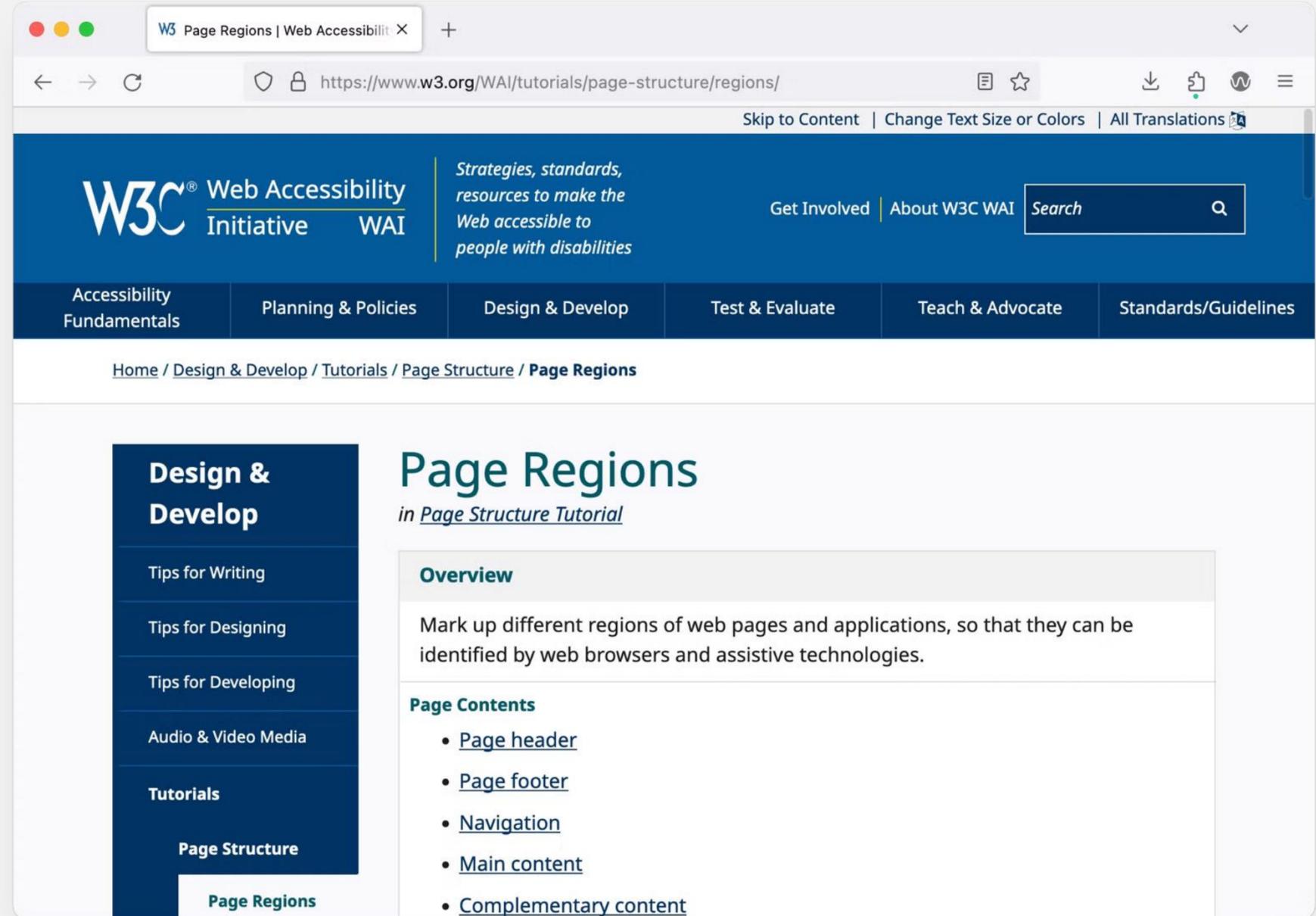
# AUS EINER DIV SUPPE WIRD...

```
<div>  
  <div></div>  
  <div>  
    <div></div>  
    <div></div>  
  </div>  
</div>
```

# LESBARER & WARTBARER CODE

```
<header>  
  <nav>  
    <menu>  
      <li>...</li>  
    </menu>  
  </nav>  
</header>  
<main>...</main>  
<footer>...</footer>
```

# Page Regions



The screenshot shows a web browser window displaying the W3C Page Regions tutorial. The browser's address bar shows the URL <https://www.w3.org/WAI/tutorials/page-structure/regions/>. The page features a dark blue header with the W3C Web Accessibility Initiative logo and the tagline "Strategies, standards, resources to make the Web accessible to people with disabilities". A navigation menu below the header includes links for "Accessibility Fundamentals", "Planning & Policies", "Design & Develop", "Test & Evaluate", "Teach & Advocate", and "Standards/Guidelines". The breadcrumb trail reads "Home / Design & Develop / Tutorials / Page Structure / Page Regions". The main content area has a left sidebar with "Design & Develop" selected, containing sub-links like "Tips for Writing", "Tips for Designing", "Tips for Developing", "Audio & Video Media", and "Tutorials". The "Page Structure" section is expanded to show "Page Regions". The main heading is "Page Regions" with the subtitle "in Page Structure Tutorial". An "Overview" section states: "Mark up different regions of web pages and applications, so that they can be identified by web browsers and assistive technologies." Below this is a "Page Contents" section with a bulleted list of links: "Page header", "Page footer", "Navigation", "Main content", and "Complementary content".

<https://www.w3.org/WAI/tutorials/page-structure/regions/>

**Barrierefreiheit von Anfang an mitdenken**

**dann bleibt der Aufwand überschaubar**



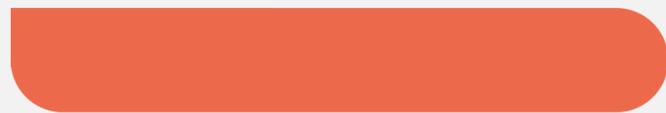
**Barrierefreiheit ist gut fürs Geschäft**

**Sag nicht nur ich...**



" The **global market of people with disabilities** is over 1 billion people with a **spending power of more than \$6 trillion.**

Accessibility often improves the online experience for all users.



<https://www.w3.org/WAI/business-case/>

" **Minimize Legal Risk:** Many countries have laws requiring digital accessibility, and the issue is of increased legal concern.



<https://www.w3.org/WAI/business-case/>

" Ab **Mitte 2025** gilt für **Websites und Apps** eine **gesetzliche Pflicht zur Barrierefreiheit**. Diese regelt das **Barrierefreiheitsstärkungsgesetz (BFSG)**



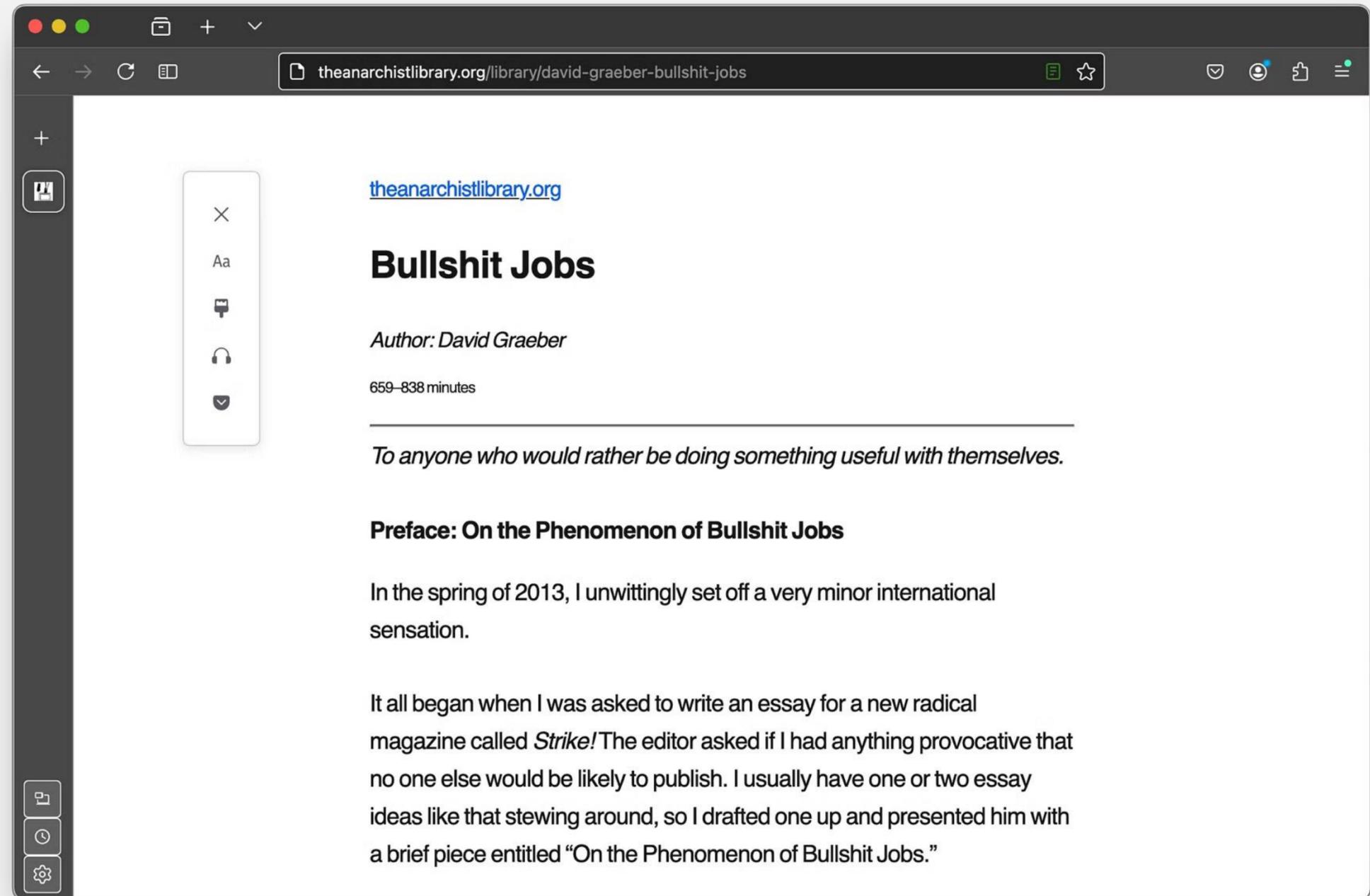
[https://www.aktion-mensch.de/inklusion/barrierefreiheit/  
barrierefreie-website/gesetzliche-pflichten](https://www.aktion-mensch.de/inklusion/barrierefreiheit/barrierefreie-website/gesetzliche-pflichten)



**Barrierefreiheit = Vorteile für alle**



# Reader Modus



# Progressive Enhancement



# Lesbarer Quellcode

```
45 <body>
46 <header class="fixed-top">
47   <div class="px-4 row spread">
48     <a class="skip-to-content-link" href="#main">
49       Springe zum Inhalt
50     </a>
51
52     <a class="logo d-flex align-items-center flex-wrap" href="/">
53       
54
55
56
57     </a>
58
59     <nav>
60       <ul>
61         <li><a class="nav-link" href="/karriere">Karriere</a></li>
62         <li><a class="nav-link" href="/de/blog">Blog</a></li>
63         <li><a class="nav-link" href="/kontakt">Kontakt</a></li>
64       </ul>
65
66       <details>
67         <summary aria-label="mobiles menü öffnen"></summary>
68         <ul>
69           <li><a class="nav-link active" href="/">Startseite</a></li>
70           <li><a class="nav-link" href="/karriere">Karriere</a></li>
71           <li><a class="nav-link" href="/de/blog">Blog</a></li>
72           <li><a class="nav-link" href="/kontakt">Kontakt</a></li>
73         </ul>
74       </details>
75     </nav>
76   </div>
77 </header>
78
79 <div id="main">
80
81 <!-- ===== Hero Section ===== -->
82 <main>
83   <section class="col center-x gap" id="hero">
84     <div class="row gap-s bottom wrap center-x">
85       
86     </div>
87     <h1 class="fade-in">
88       Beratung<br>
89       Entwicklung<br>
90       Schulung
91     </h1>
92   </div>
93 </div>
```



# **Werkzeuge die uns helfen Seiten barrierefrei zu entwickeln**



# Entwicklungsprozess



# LOKAL – BROWSER DEVTOOLS

The screenshot shows the Accessibility panel in a browser's developer tools. The top bar includes navigation icons for Inspector, Console, Debugger, Network, and Accessibility. The 'Accessibility' panel is active, showing a list of elements on the left and a detailed view of the selected element on the right.

**Check for issues:** All Issues | **Simulate:** Contrast loss |  Show Tabbing Order

Role	Name	Checks
generic:	"" <input type="button" value="keyboard"/>	<b>Keyboard</b> ! Clickable elements must be focusable and should have interactive semantics. <a href="#">Learn more</a>
text leaf:	"Skip to main content"	
text leaf:	"Skip to search" <input type="button" value="contrast"/>	
text leaf:	"References" <input type="button" value="contrast"/>	
text leaf:	"SEARCH" <input type="button" value="contrast"/>	
text leaf:	"Deprecated" <input type="button" value="contrast"/>	
text leaf:	"Deprecated" <input type="button" value="contrast"/>	
text leaf:	"Deprecated" <input type="button" value="contrast"/>	
text leaf:	"Deprecated" <input type="button" value="contrast"/>	
text leaf:	"Experimental" <input type="button" value="contrast"/>	
text leaf:	"Deprecated" <input type="button" value="contrast"/>	
text leaf:	"Deprecated" <input type="button" value="contrast"/>	
text leaf:	"Deprecated" <input type="button" value="contrast"/>	
text leaf:	"Deprecated" <input type="button" value="contrast"/>	
text leaf:	"Non-standard" <input type="button" value="contrast"/>	
text leaf:	"Deprecated" <input type="button" value="contrast"/>	
text leaf:	"Deprecated" <input type="button" value="contrast"/>	
text leaf:	"Deprecated" <input type="button" value="contrast"/>	
text leaf:	"Deprecated" <input type="button" value="contrast"/>	

**Properties**

- name: null
- role: "generic"
- actions: [...]
- value: ""
- DOMNode: div#root
- description: ""
- keyboardShortcut: ""
- childCount: 8
- indexInParent: 0
- states: [...]
- relations: {...}
- attributes: {...}



# LOKAL – WAVE BROWSER ADD-ON

The screenshot displays the WAVE browser add-on interface on the website `mainz.de`. The interface is divided into a left sidebar and a main content area.

**WAVE Interface (Left Sidebar):**

- Logo: WAVE, powered by WebAIM, web accessibility evaluation tool.
- Styles: OFF  ON
- Summary: Home, Details, Reference, Order, Structure, Contrast.
- 0 Errors
- 69 Contrast Errors
- 5 Alerts
- 32 Features
- 44 Structural Elements
- 14 ARIA
- View details >

**Main Content Area (Grid of Categories):**

Category	Count
Verwaltung & Politik	1
Leben & Arbeit	1
Tourismus	1
Freizeit & Sport	1
Kultur & Wissenschaft	1
Wirtschaft	1
Bürgerserviceportal	1
Beruf	1
Sehenswertes	1
Feste und Veranstaltungen	1
Bibliotheken und Archive	1
Services für Unternehmen	1
Oberbürgermeister und Dezernate	1
Bildung und Schule	1
Essen und Erholen	1
Sport	1
Musik	1
Unternehmen	1
Verwaltungsorganisati	1
Alt und Jung	1
Einkaufen, Essen und Erholen	1
Einkauf	1
Bildende Kunst	1
Wirtschaftsstandort	1
Ortsrecht	1
Neu-Mainzer	1
Übernachten und Märkte	1
Essen und Trinken	1
Darstellende Künste	1
Aktuelles	1
Messen und Märkte	1
queere Lebensweisen	1
Stadtführungen	1
Im Grünen	1
Film	1
Stadtratsfraktionen un Ratsinformationssyste	1
Bürger aktiv / Tourist Information	1
Essen und Trinken	1
Gutenberg und Druckkunst	1
Ortsbeiräte	1
Migration und Integration	1
Mainz	1
Spielbank	1
Bürgerbeteiligung in Mainz	1
Bauen und Wohnen	1
Congress	1
Vereine	1
Kulturförderung	1
Beiräte und Beauftragte	1
Mobilität und Verkehr	1
Reiseplanung	1
Vereine	1
Kulturelle Preise	1
Partnerstädte	1
Soziale	1
Ausflüge	1
Weinerlebnis	1
Museen	1

# LOKAL – WAVE SEITE

<https://wave.webaim.org/>

The following apply to the entire page:

## h1 Datenschutzhinweis

Wir verwenden Cookies, um Ihnen die optimale Nutzung von [www.mainz.de](https://www.mainz.de) zu ermöglichen. Für den Betrieb der Seite werden technisch notwendige Cookies gesetzt. Darüber hinaus können Sie Cookies für Statistikzwecke zulassen und uns so dabei unterstützen, die Bedienfreundlichkeit der [mainz.de](https://www.mainz.de) stetig zu verbessern. Sie können die Datenschutzeinstellungen jederzeit anpassen oder allen Cookies direkt zustimmen.

[Zur Datenschutzerklärung \(inkl. Erläuterung Technisch notwendige Cookies und Statistik\)](#)

Alle Cookies akzeptieren | Datenschutzeinstellungen anpassen | Nur notwendige Cookies

Summary: 0 Errors, 5 Contrast Errors, 5 Alerts, 32 Features, 44 Structural Elements, 14 ARIA

Lässt sich gut  
mit anderen als  
Link teilen

# LOKAL – PA11Y

<https://pa11y.org/>

```
Hello, there.
/Users/paule λ pa11y-ci https://www.javaland.eu/de/home/
(node:20361) [DEP0040] DeprecationWarning: The `punycode` module is deprecated. Please use a
userland alternative instead.
(Use `node --trace-deprecation ...` to show where the warning was created)
Running Pa11y on 1 URLs:
> https://www.javaland.eu/de/home/ - 169 errors

Errors in https://www.javaland.eu/de/home/:

• Anchor element found with a valid href attribute, but no link content has been supplied.

(#page > a:nth-child(1))

<a class="visually-hidden visually-hidden-focusable" href="#nav-primary"> </a>

• Anchor element found with a valid href attribute, but no link content has been supplied.

(#page > a:nth-child(2))

<a class="visually-hidden visually-hidden-focusable" href="#content"> </a>

• This element has insufficient contrast at this conformance level. Expected a contrast
ratio of at least 4.5:1, but text in this element has a contrast ratio of 2.88:1.
```

*Es gibt auch eine  
Web-Oberfläche*

# CI PIPELINE – PA11Y-CI

GitHub - pa11y/pa11y-ci: Pa11y CI

https://github.com/pa11y/pa11y-ci

Product Solutions Open Source Pricing Search or jump to... Sign in Sign up

pa11y / pa11y-ci Public Notifications Fork 61 Star 493

Code Issues 37 Pull requests 6 Actions Projects Security Insights

main 4 Branches 27 Tags Go to file Code

**dependabot[bot]** Bump ip from 1.1.8 to 1.1.9 33ffa42 · last month 106 Commits

.github/workflows	Update to Pa11y v7 and other dependency updat...	last month
bin	Update to Pa11y v7 and other dependency updat...	last month
lib	Update to Pa11y v7 and other dependency updat...	last month
test	Update to Pa11y v7 and other dependency updat...	last month
.editorconfig	Upgrade to pa11y@6.2.3, add publishing workflow...	5 months ago
.eslintignore	Use ESLint with the pa11y lint config (#20)	7 years ago
.eslintrc.js	Update to use pa11y 5 beta and async/await (#33)	6 years ago
.gitignore	Use nyc over istanbul (#22)	7 years ago
.npmrc	Upgrade to pa11y@6.2.3, add publishing workflow...	5 months ago

**About**

Pa11y CI is a CI-centric accessibility test runner, built using Pa11y

[pa11y.org](https://pa11y.org)

testing sitemap ci accessibility a11y automated-testing pa11y

Readme  
LGPL-3.0 license  
Activity  
Custom properties  
493 stars  
12 watching  
61 forks  
Report repository



Beispiel

**Barrierefreiheit**

**kann so einfach sein**



# "Missing alternative text"



The screenshot shows the WAVE web accessibility evaluation tool interface. The browser address bar displays 'www.heise.de'. The tool's header includes the WAVE logo and 'powered by WebAIM'. A 'Styles' toggle is set to 'ON'. The 'Details' panel on the left shows a summary of 88 errors, with a magnifying glass highlighting the 'Missing alternative text' category, which has 62 instances. Other error categories include '4 X Linked image missing text' and '1 X Missing form label'. The main content area shows a grid of error icons (red squares with a white 'x') overlaid on a webpage layout. A large blue arrow points from the magnified error list towards the explanatory text on the right.

## Errors Missing alternative text

### What It Means

Image alternative text is not present.

### Why It Matters

Each image must have an alt attribute. Without alternative text, the content of an image will not be available to screen reader users or when the image is unavailable.

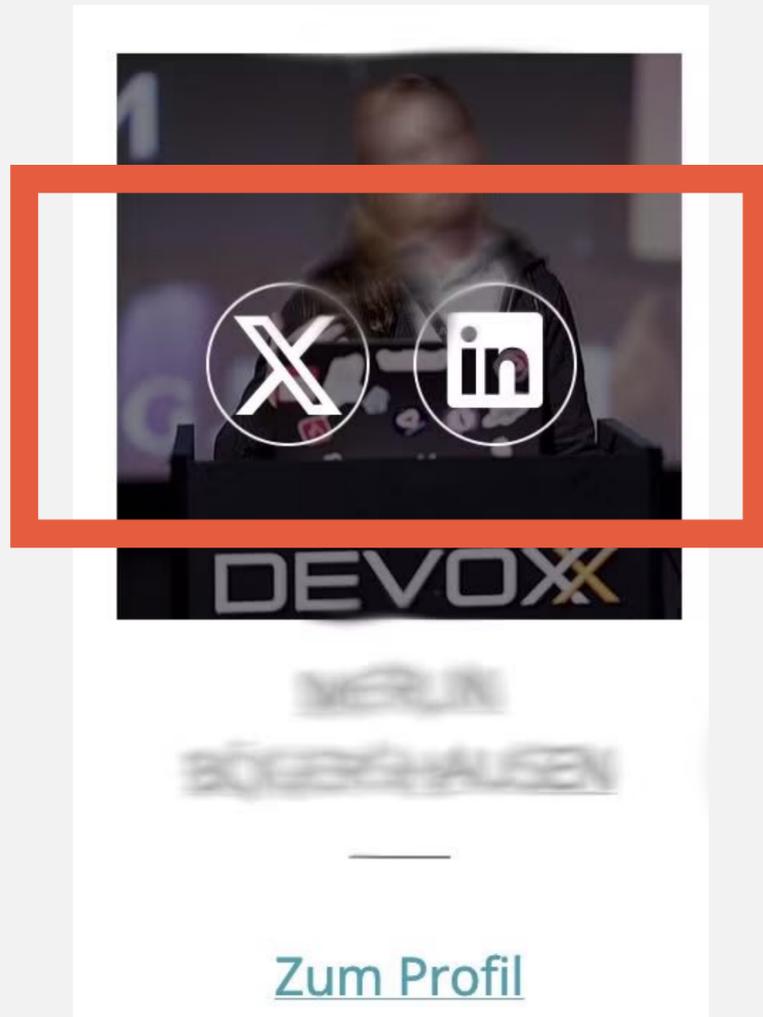
### How to Fix It

Add an alt attribute to the image. The attribute value should accurately and succinctly present the content and function of the image. If the content of the image is conveyed in the context or surroundings of the image, or if the image does not convey content or have a function, it should be given empty/null alternative text (`alt=""`).

# "Missing alternative text"

```
1 
```

# "Empty link"



## Errors

Empty link

### What It Means

A link contains no text.

### Why It Matters

If a link contains no text, the function or purpose of the link will not be presented to the user. This can introduce confusion for keyboard and screen reader users.

### How to Fix It

Remove the empty link or provide text within the link that describes the functionality and/or target of that link.

### The Algorithm... in English

An anchor element has an href attribute, but contains no text (or only spaces) and no images with alternative text.

# "Empty link"

```
1 <a href="https://mastodon.social">  
2 <i class="doag-icon-x"></i>  
3 </a>
```



```
1 <a href="https://mastodon.social">  
2 <i class="doag-icon-x"  
3 alt="Mastodon Profil von Person XY"></i>  
4 </a>
```

**Wenn wir alt-Texte auf einer dynamisch generierten Webseite wollen**

**muss das CMS nicht nur das Bild selbst ausliefern können**



# "Very low contrast"

Zur Agenda

Zum Ticketshop

Informationen zur Anreise



## Contrast Errors

Very low contrast

### What It Means

Very low contrast between text and background colors.

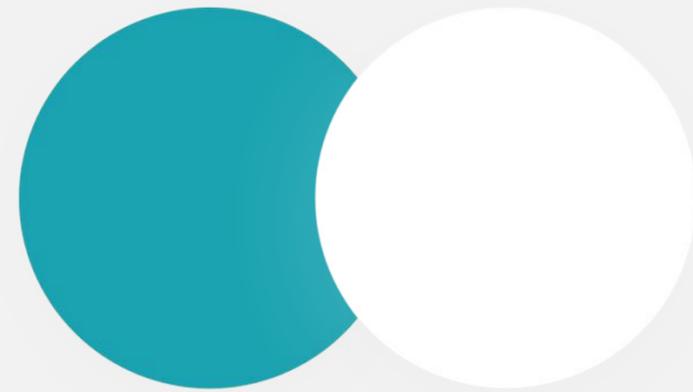
### Why It Matters

Adequate contrast of text is necessary for all users, especially users with low vision.

### How to Fix It

Increase the contrast between the foreground (text) color and the background color. Large text (larger than 18 point or 14 point bold) does not require as much contrast as smaller text.

**"Very low contrast"**



#1aa3b1

#ffffff

**3.04**

**Kontrastverhältnis**

# Hilfsmittel

## Contrast Checker

[Home](#) > [Resources](#) > Contrast Checker

### Foreground

Hex Value

#FFFFFF

Color Picker

Alpha

1

Luminance



### Background

Hex Value

#15828E

Color Picker



Luminance



Contrast Ratio

**4.54:1**

<https://webaim.org/resources/contrastchecker/>



# Wie CSS helfen kann



# OS A11y API

→ **Browser**

→ **Webseite/CSS**

## Accessibility Shortcuts

---

### Vision



Zoom



Colour Filters



Increase Contrast



Reduce Transparency

---

### Motor



Full Keyboard Access



Accessibility Keyboard

---

Keyboard Shortcuts...

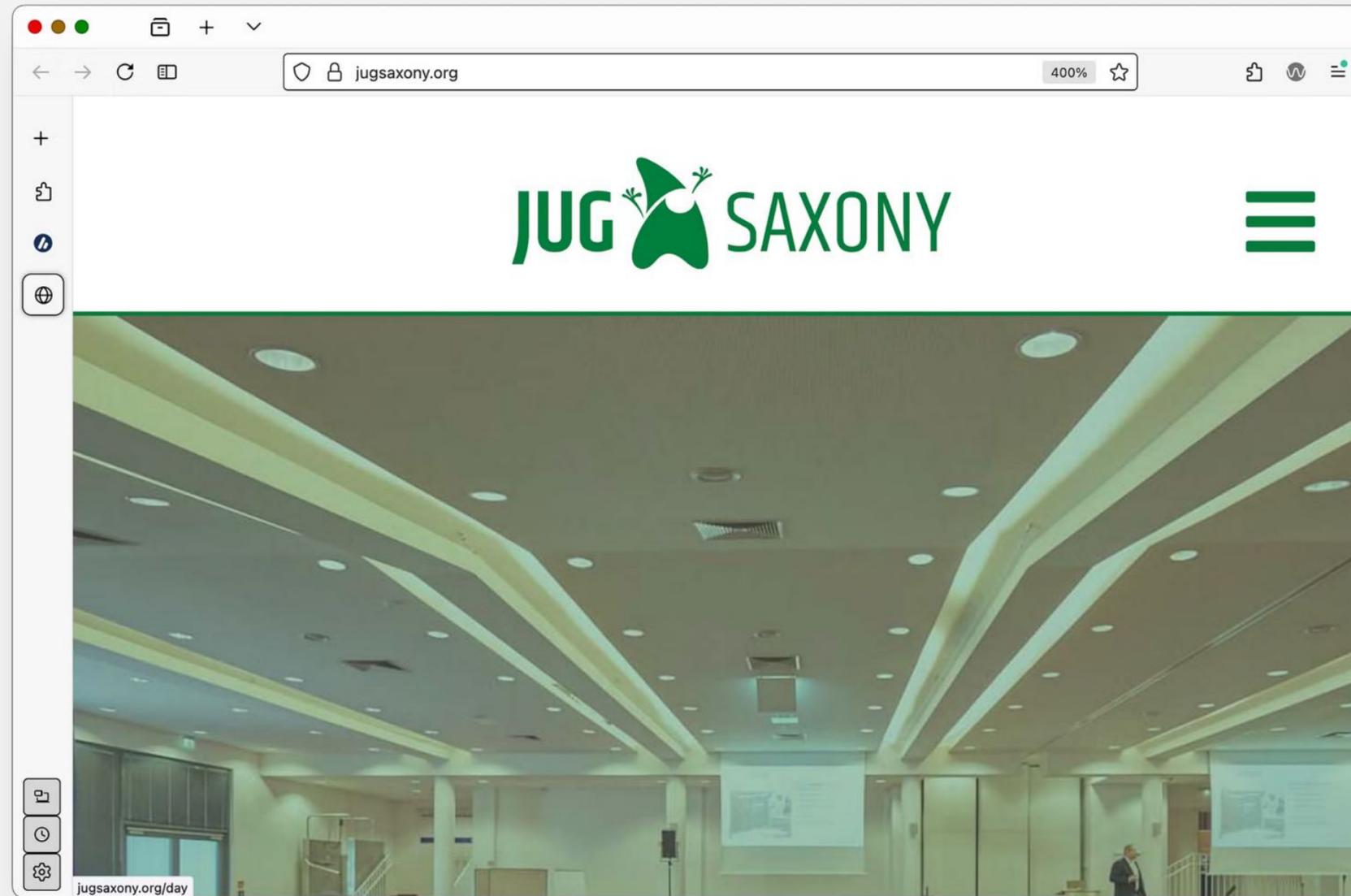
Accessibility Settings...

# prefers-contrast: more

```
1  @media (prefers-contrast: more) {  
2      body {  
3          color: black;  
4      }  
5  }
```

<https://developer.mozilla.org/en-US/docs/Web/CSS/@media/prefers-contrast>

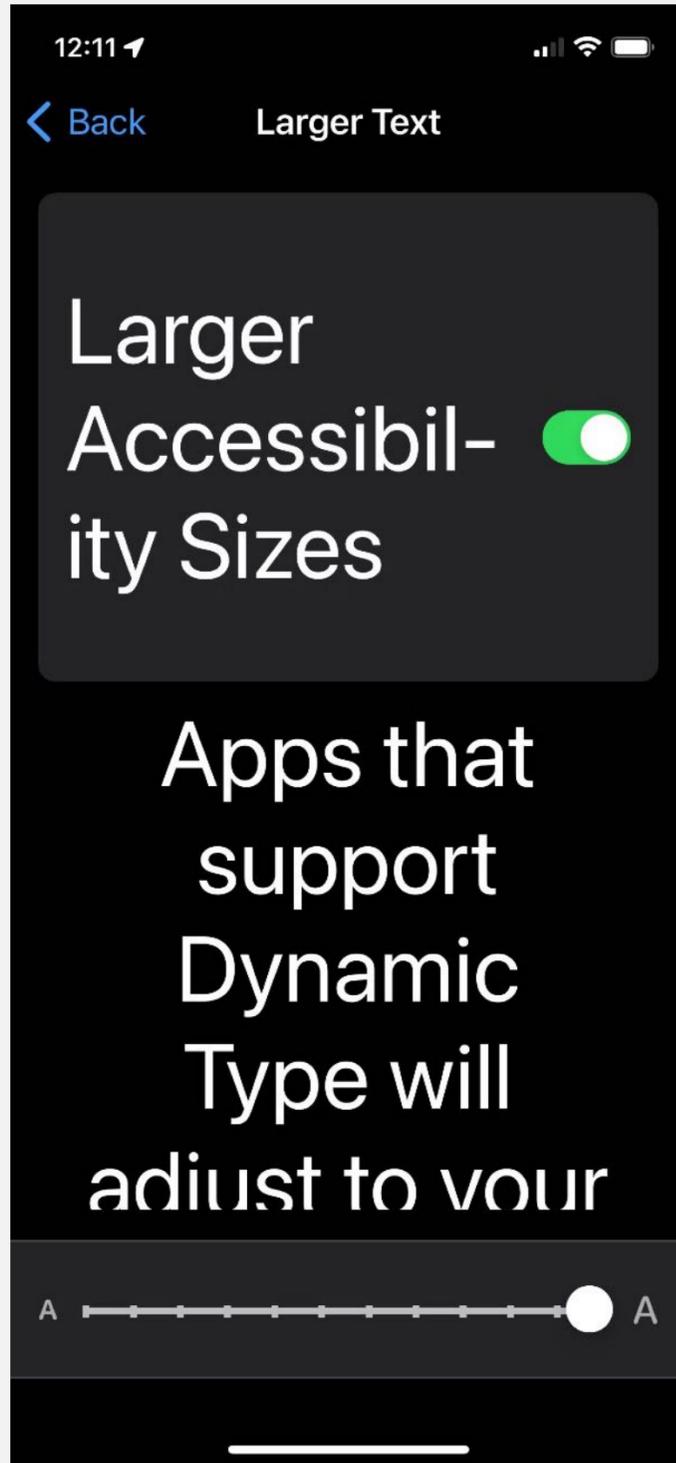
# Zoom 400% Test



**Sicherstellen  
dass  
scrollbarer  
Bereich groß  
bleibt**

**DIE KONZEPTE GELTEN AUCH**

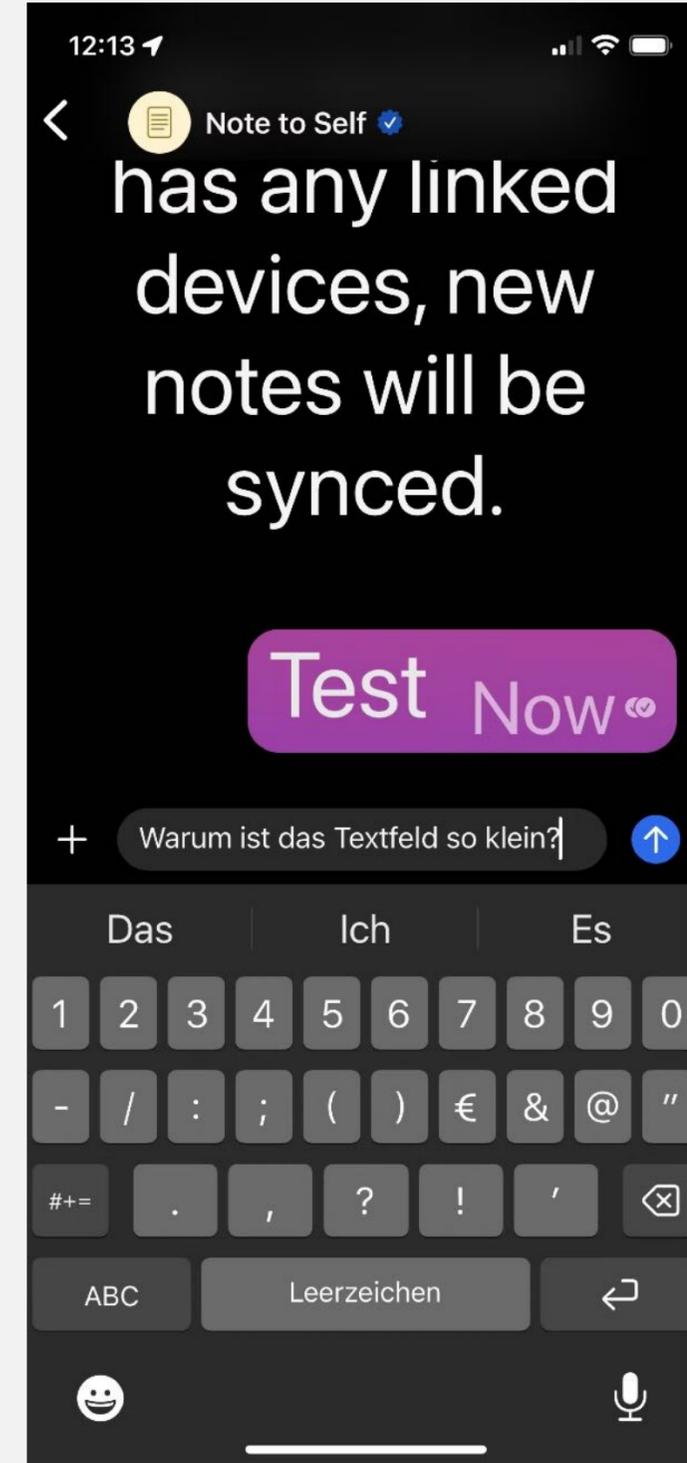
**FÜR MOBILE ANWENDUNGEN**



Settings



Mastodon



Signal



# Selbst testen



# System Features aktivieren

## Accessibility Shortcuts

---

### Vision



Zoom



Colour Filters



Increase Contrast



Reduce Transparency

---

### Motor



Full Keyboard Access



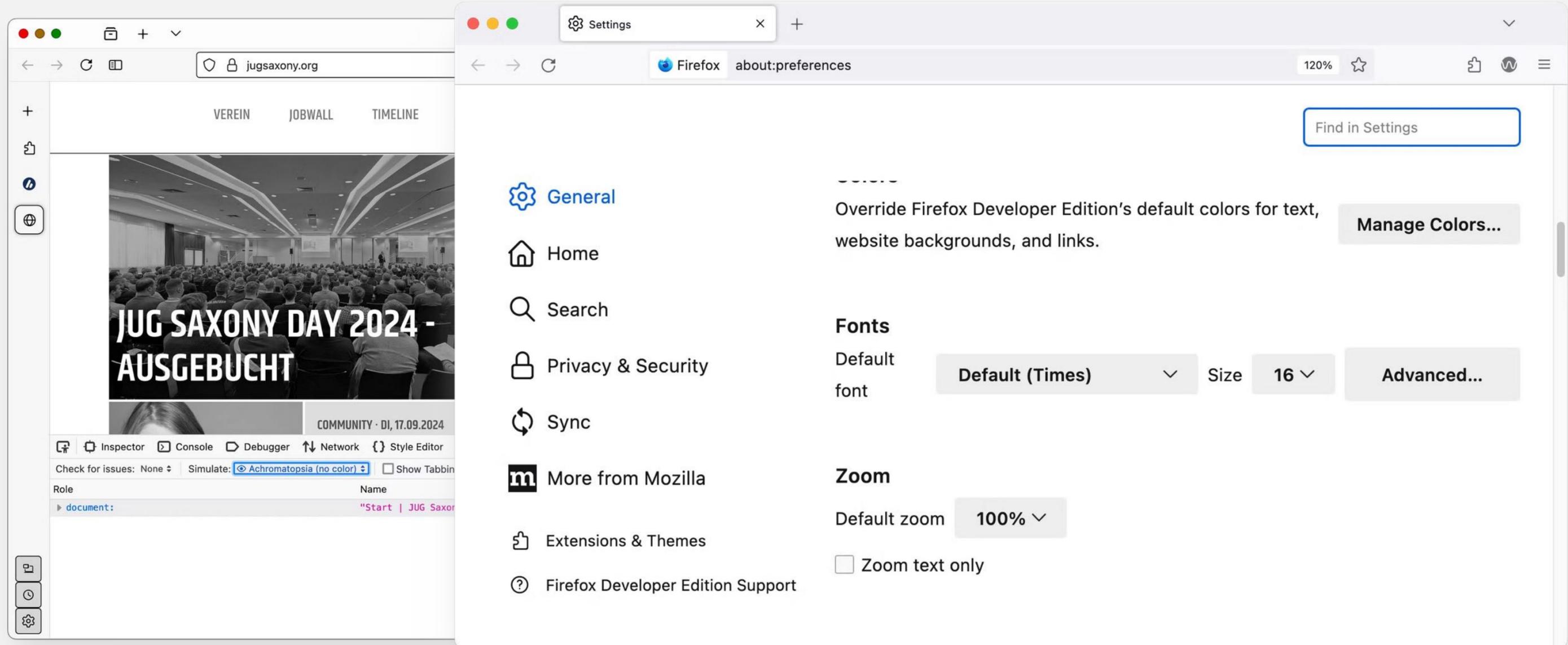
Accessibility Keyboard

---

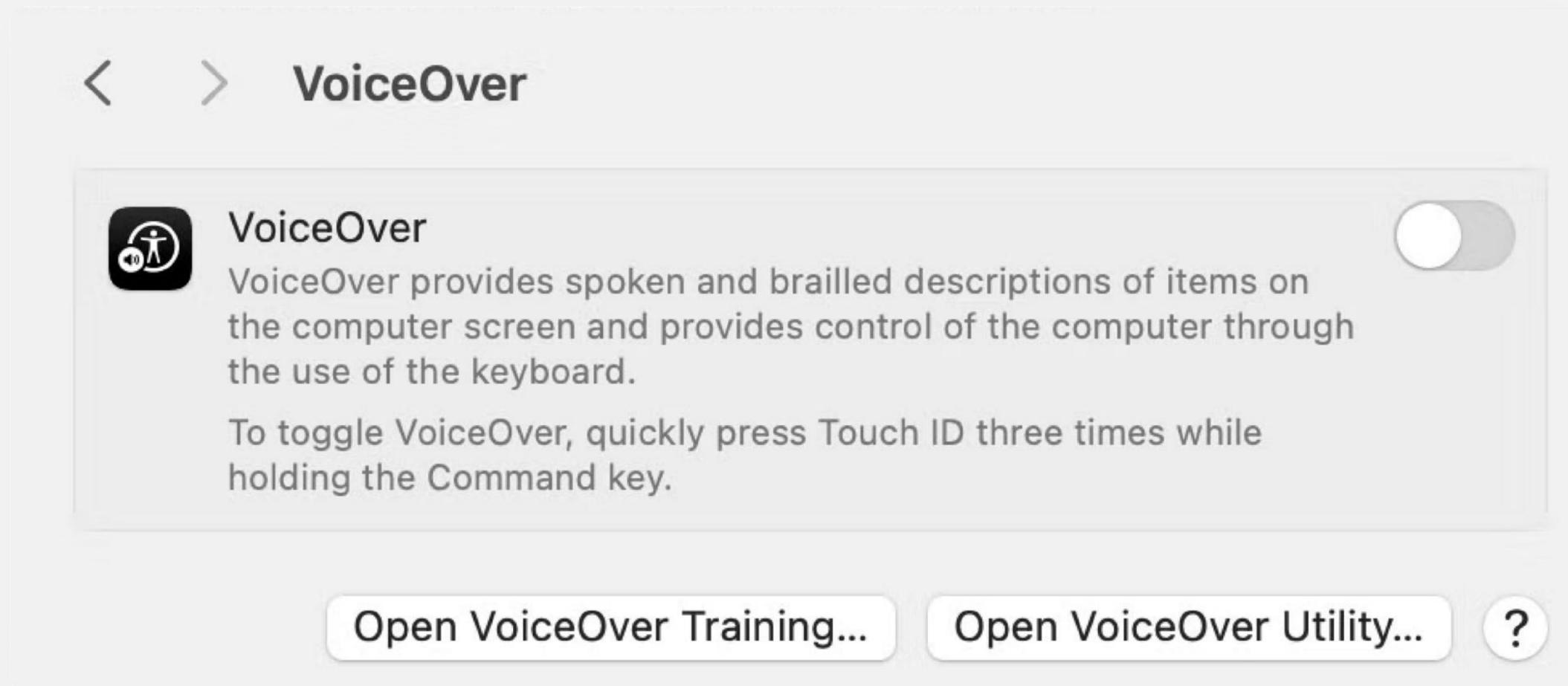
Keyboard Shortcuts...

Accessibility Settings...

# Browser A11y Features verwenden



# VoiceOver App verwenden



# VoiceOver im Web

1. Liest `<title>` vor
2. Mit Tab zwischen selektierbaren Elementen springen
  - a. Links, Form Elemente etc.
3. Mit Modifier Key und Pfeiltasten (L + R) zwischen Textblöcken (Überschriften, Absätze etc.) springen



# Nachschlage Werke

oder "wie geht es nach diesem Talk weiter?"



# W3: Grundlagen

The screenshot shows the W3C Web Accessibility Initiative (WAI) Fundamentals Overview page. The page is titled "Accessibility Fundamentals Overview" and provides a comprehensive overview of web accessibility resources. The page is structured as follows:

- Header:** W3C Web Accessibility Initiative WAI logo, navigation links (Get Involved, About W3C WAI), and a search bar.
- Navigation:** A horizontal menu with links for Accessibility Fundamentals, Planning & Policies, Design & Develop, Test & Evaluate, Teach & Advocate, and Standards/Guidelines.
- Breadcrumbs:** Home / Accessibility Fundamentals
- Left Sidebar:**
  - Accessibility Fundamentals:** A list of links including Introduction to Accessibility, Accessibility is About People, Components of Web Accessibility, Accessibility Principles, Research, and Digital Accessibility Courses.
  - Languages/Translations:** A list of links for English (Original), Español, Français, All Translations, and Translating WAI Resources.
- Main Content:**
  - Accessibility Fundamentals Overview:** A section titled "The following resources provide information for getting started with accessibility:" containing several sub-sections:
    - Introduction to Web Accessibility:** Introduces web accessibility and links to additional resources. Includes accessibility in context; why accessibility is important for individuals, businesses, society; making digital technology accessible; evaluating accessibility; and basic examples. Includes a link to a 4-minute video introduction.
    - Accessibility: It's About People:** Explains the people aspect of accessibility and the role of accessibility in diversity, equality, and inclusion (DEI). Links to several resources, including a video series on the impact and benefits of web accessibility, a resource on how people with disabilities use the web, and older users and web accessibility resources.
    - Essential Components of Web Accessibility:** Shows how web accessibility depends on several components of web development and interaction working together and shows the relationship between the WAI guidelines and other standards.
    - Accessibility Principles:** A link to the accessibility principles page.

<https://www.w3.org/WAI/fundamentals/>

# W3: Prinzipien

The screenshot shows the W3C Web Accessibility Initiative (WAI) Accessibility Principles page. The page is titled "Accessibility Principles" and is part of the "Accessibility Fundamentals" section. The page includes a navigation menu with options like "Accessibility Fundamentals", "Planning & Policies", "Design & Develop", "Test & Evaluate", "Teach & Advocate", and "Standards/Guidelines". The main content area features a "Summary" section, a "Page Contents" section with a list of links, and a "Languages/Translations" section with a list of language options. The page also includes a search bar and a "Get Involved" link.

**Accessibility Fundamentals**

- Introduction to Accessibility
- Accessibility is About People
- Components of Web Accessibility
- Accessibility Principles**
- Research
- Digital Accessibility Courses

**Languages/Translations**

- English (Original)
- العربية
- Čeština
- Español
- Français

## Accessibility Principles

### Summary

This page introduces some of the web accessibility requirements for websites, web applications, browsers, and other tools. It provides references to the international standards from W3C Web Accessibility Initiative (WAI) and to [stories of web users](#).

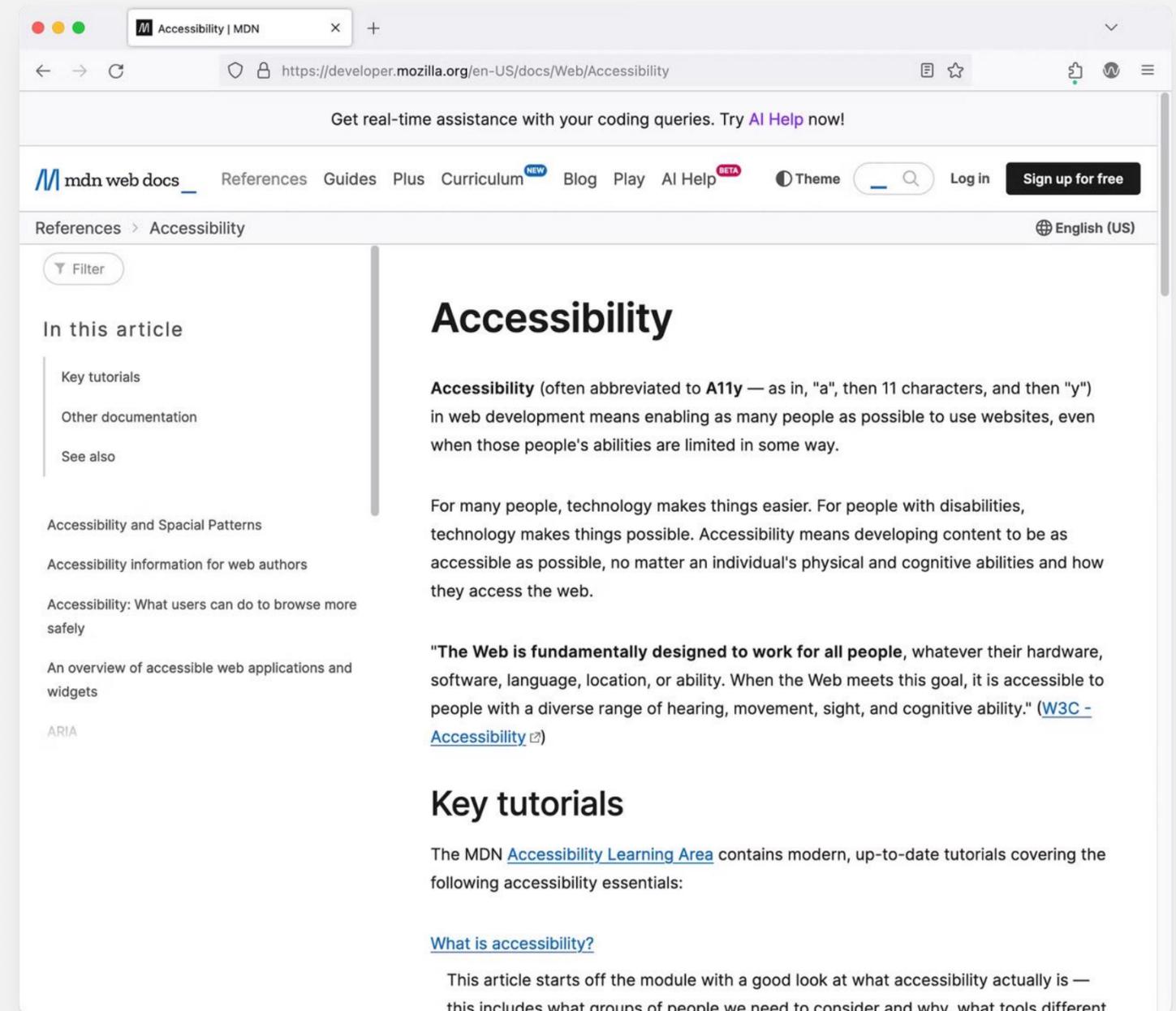
**Note:** This is not a complete list of all accessibility requirements.

### Page Contents

- [Web accessibility standards](#)
- [Perceivable information and user interface](#)
  - [Text alternatives for non-text content](#)
  - [Captions and other alternatives for multimedia](#)
  - [Content can be presented in different ways](#)
  - [Content is easier to see and hear](#)
- [Operable user interface and navigation](#)
  - [Functionality is available from a keyboard](#)
  - [Users have enough time to read and use the content](#)
  - [Content does not cause seizures and physical reactions](#)
  - [Users can easily navigate, find content, and determine where they are](#)

<https://www.w3.org/WAI/fundamentals/accessibility-principles/>

# MDN web docs



<https://developer.mozilla.org/en-US/docs/Web/Accessibility>

**Und noch so viel mehr...**

**Aber dann wäre der Talk zu lange**



# Thanks!

## Questions?

Need help with  
accessibility?



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