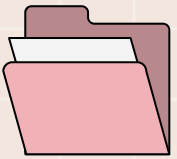
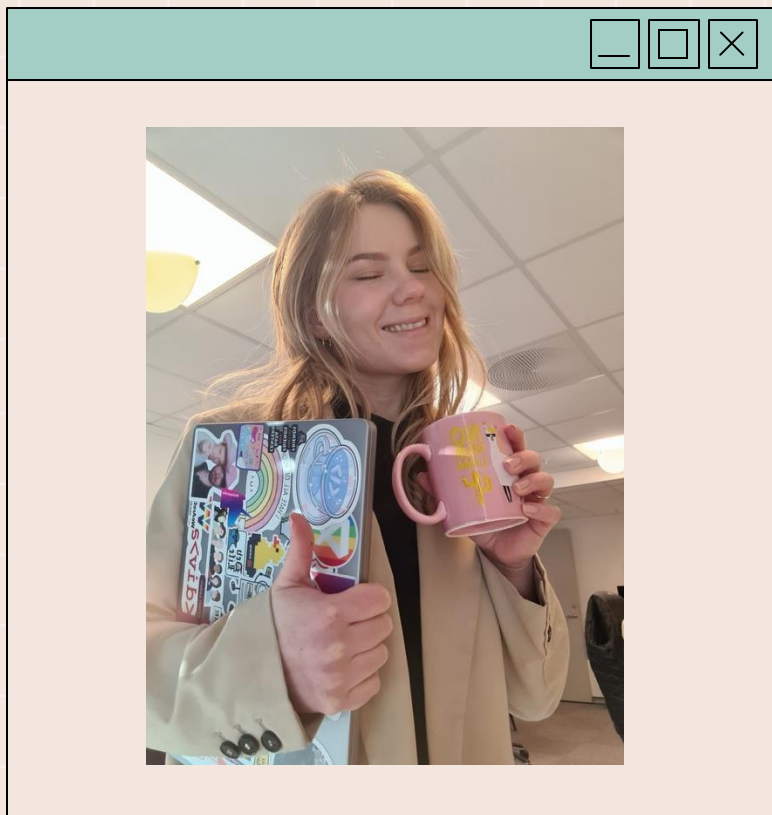


Skyteknologi + Universell utforming =

TDC 2025 – Elise Kristiansen



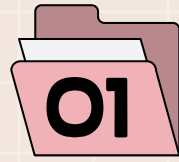


Hallo!

Elise Kristiansen
Frontendutvikler i Variant



HVA SKAL VI GJENNOM, EGENTLIG?



HVA ER
UNIVERSELL
UTFORMING?



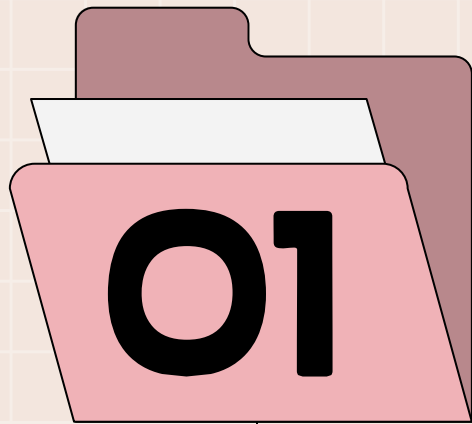
HVA ER EN
SCANNER?



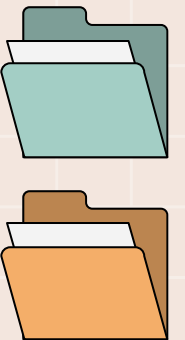
KODE OG LIVE
DEMO



HEMMELIG
MAPPE



HVA ER UNIVERSELL UTFORMING?



HVA ER UNIVERSELL UTFORMING?

HVA?

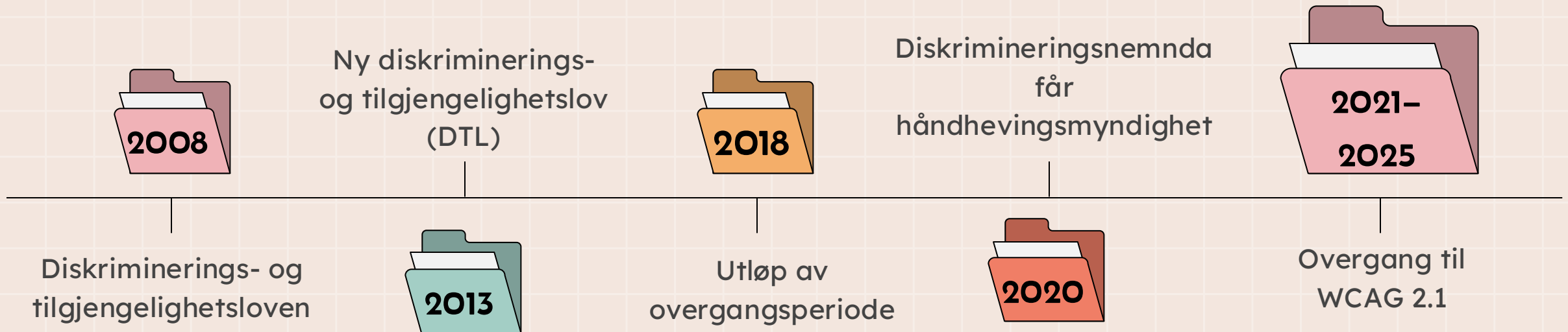
- Lovpålagt krav
- Samfunnsdeltakelse, uavhengig av funksjonsevne

HVORFOR?

- Internett er åpent for alle og brukes av alle
- 9 av 10 er på nett hver dag
- Unngå ekskludering
- En universelt utformet nettside er *good for business* på fler måter

LOVEN OM UNIVERSELL UTFORMING

Forskrift om universell utforming av informasjons- og kommunikasjonsteknologiske (IKT)-løsninger





Hva er WCAG?

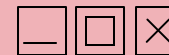
Internasjonal standard for universell utforming på nett



WCAG A Minimumskrav - Grunnleggende tilgjengelighet	WCAG AA Juridisk krav i Norge - Mål for offentlig og private aktører
WCAG AAA Høyeste nivå - Ikke krav, men best practice	

$\approx 15-25\%$

av befolkningen har en form for funksjonsvariasjon

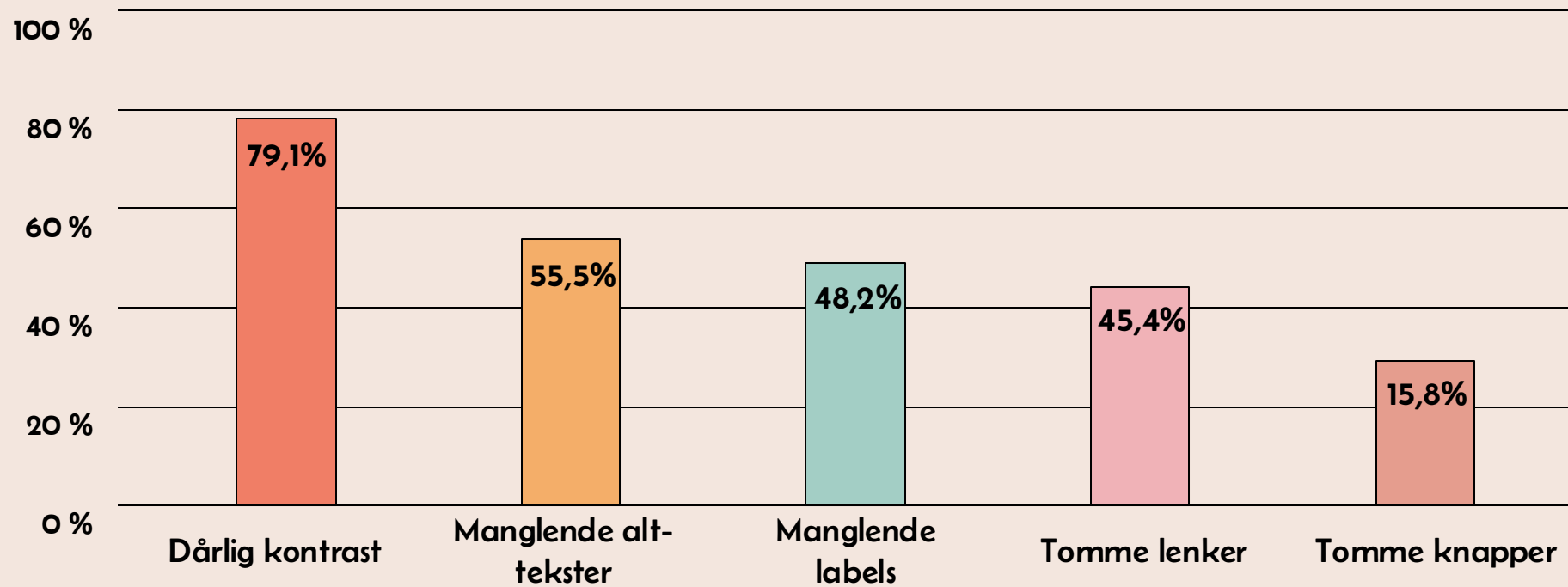


94.8%

Av nettsider har minst én WCAG AA feil

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

Typiske problemer på nettsider



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



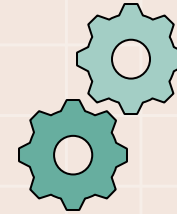
02



HVA ER EN SCANNER?



ULIKE SCANNERE



OVERVÅKNING AV NETTSIDE

- SiteImprove
- BrowserStack
- axe Monitor
- Deque WorldSpace

KOMMANDOLINJE-SCANNERE

- pa11y
- ESLint
 - eslint-plugin-jsx-a11y
- axe-core CLI
- Lighthouse CLI

MANUELLE VERKTØY

- Inspectorens selector
- Accessibility treeet i Elements-fanen
- Issues-fanen i Chrome/Edge DevTools

«FUN» WITH SKJERMLESER ❤️

A presentation window frame with a teal header bar containing three window control icons (minimize, maximize, close). The main content area is light beige and contains a title and a bulleted list.

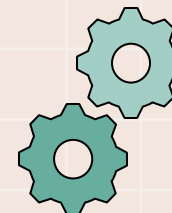
Ulike verktøy for overvåkning av nettside

- SiteImprove
- BrowserStack
- Axe Monitor

Kommandolinje- og ci-scannere

- ESLint
 - eslint-plugin-jsx-a11y
- axe-core CLI
- Lighthouse CLI

ULIKE SCANNERE



OVERVÅKNING AV NETTSIDE

- SiteImprove
- BrowserStack
- axe Monitor
- Deque WorldSpace

KOMMANDOLINJE-SCANNERE

- pa11y
- ESLint
 - eslint-plugin-jsx-a11y
- axe-core CLI
- Lighthouse CLI

MANUELLE VERKTØY

- Inspektorens selector
- Accessibility tree i Elements-fanen
- Issues-fanen i Chrome/Edge DevTools

HVA DEKKES IKKE AV EN SCANNER?

- Gode tekster som er riktige ut i fra konteksten de er i (i alt-tekster og lenker feks)
- Tydelig språk
- Brukervennlig tastaturnavigasjon
- Enkelte fargekontraster
- Dynamiske endringer etter nettsiden er innlastet
- God semantikk

ACCESSIBILITY



P

A

11

Y



KODEEEKSEAMPLER



SCANNER I COMMAND LINE

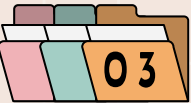
- Pa11y
 - `npm install -g pa11y`
 - `pa11y https://2025.trondheimdc.no/program/`

NYTTIGE OPTIONS

- --standard
- --runner
- --level
- --timeout

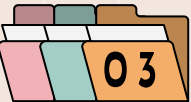
SCANNER I COMMAND LINE

- Pa11y
 - `pa11y --standard WCAG2AAA https://2025.trondheimdc.no/program/`



SCANNER I CI / CD

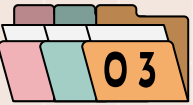
- Pa11y CI
 - `npm install -g pa11y-ci`



KODEN

pa11yci.json:

```
{
  "defaults": {
    "timeout": 30000
  },
  "urls": [
    "file:///Users/elisekristiansen/frkfrontend_onepager/index.html",
    "file:///Users/elisekristiansen/frkfrontend_onepager/about.html",
    "file:///Users/elisekristiansen/frkfrontend_onepager/ting.html",
    "file:///Users/elisekristiansen/frkfrontend_onepager/articles.html"
  ]
}
```

KODEN

- Kommando: pa11y-ci
- Testkode:
 <h1></h1>

KODEN

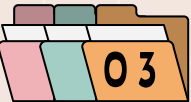
- Kommando: pa11y-ci
- Testkode:

```
<div style="background-color: lightcyan">  
  <h2 style="color: white">Tekst med dårlig kontrast</h2>  
</div>
```

KODEN

- Kommando: pa11y-ci
- Testkode:

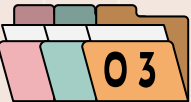
```
<div style="background-color: white">  
  <h2 style="color: PaleVioletRed ">  
    Også tekst med dårlig kontrast  
  </h2>  
</div>
```



KODEN

pa11yci.json:

```
{
  "defaults": {
    "timeout": 30000
  },
  "urls": [
    "https://frkfrontend.no",
    "https://frkfrontend.no/about",
    "https://frkfrontend.no/ting",
    "https://frkfrontend.no/articles"
  ]
}
```



KODEN

I.github/workflows/deploy.yml:

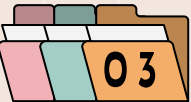
```
- name: Kjør tilgjengelighetstester
  run: pa11y-ci
  env:
    PUPPETEER_EXECUTABLE_PATH: /usr/bin/chromium-browser
```

```
pa11y-ci --sitemap http://frkfrontend.no/sitemap.xml
```

KODEN

I gitlab-ci.yml:

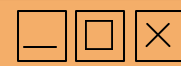
```
pa11y-ci:
  image: registry.gitlab.com/gitlab-ci-utils/gitlab-pa11y-ci:latest
  stage: deploy
  needs: [Build development, Deploy review, Migrate review]
  variables:
    PATH_PREFIX: https://nettside.no/
  only: [merge_requests, main]
  script:
    - >
      pa11y-ci
      --sitemap https://www.nettside.no/sitemap.xml
      --sitemap-find $PATH_PREFIX
      --sitemap-replace https://$PROJECT_NAME-$COMMIT.staging-url.no/
```



KODEN

I.github/workflows/deploy.yml:

```
- name: Kjør tilgjengelighetstester
  run: pa11y-ci
  env:
    PUPPETEER_EXECUTABLE_PATH: /usr/bin/chromium-browser
```





.github/workflows/deploy.yml
[deploy.yml](#)



Filter workflow runs

83 workflow runs

Event ▾ Status ▾ Branch ▾ Actor ▾

 **Deploy of really bad code**
.github/workflows/deploy.yml #83: Commit [c1a175a](#) pushed by [elisekrist](#)

main

 3 minutes ago
 2m 6s

...



← .github/workflows/deploy.yml

✖ Deploy of really bad code #83

🔄 Re-run jobs ⌵ ⋮

🏠 Summary

Jobs

✖ accessibility-test

Run details

🕒 Usage

📄 Workflow file

Triggered via push 3 minutes ago	Status	Total duration	Artifacts
👤 elisekrist pushed → c1a175a main	Failure	<u>2m 6s</u>	—

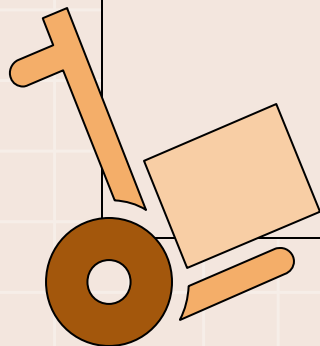
deploy.yml
on: push

✖ accessibility-test 2m 2s

📄 - +

Annotations
1 error

✖ accessibility-test
Process completed with exit code 2.



—□×

accessibility-test

failed 1 minute ago in 2m 2s

Search logs

Explain error

↺⚙

Run accessibility tests6s

1 ▶ Run pally-ci

6 Running Pally on 4 URLs:

7 > <https://frkfrontend.no/> - 3 errors

8 > <https://frkfrontend.no/about> - 0 errors

9 > <https://frkfrontend.no/ting> - 0 errors

10 > <https://frkfrontend.no/articles> - 0 errors

11

12 Errors in <https://frkfrontend.no/>:

13

14 • Heading tag found with no content. Text that is not intended as a heading

15 should not be marked up with heading tags.

16

17 (html > body > header > div:nth-child(2) > h1:nth-child(2))

18

19 <h1></h1>

20

21 • Img element missing an alt attribute. Use the alt attribute to specify a

22 short text alternative.

23

24 (html > body > header > div:nth-child(2) > img)

25

26

27

28 • This element has insufficient contrast at this conformance level. Expected a

29 contrast ratio of at least 3:1, but text in this element has a contrast

30 ratio of 1.05:1. Recommendation: change background to #7b9a9a.

31

32 (html > body > header > div:nth-child(2) > div:nth-child(4) > h2)

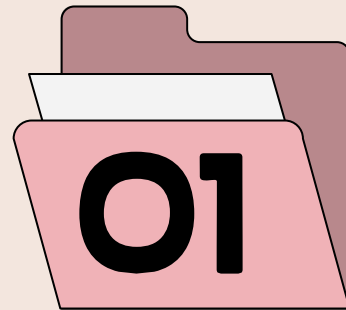
33

34 <h2 style="color: white">Tekst med dårlig kontrast</h2>

35

36 ✖ 3/4 URLs passed

37 **Error:** Process completed with exit code 2.



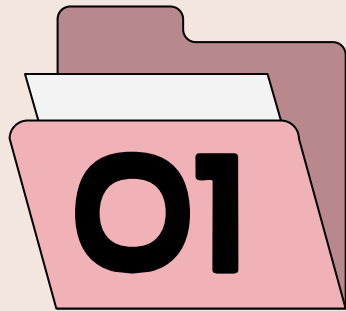
**HVA ER
UNIVERSELL
UTFORMING?**



**HVA ER EN
SCANNER?**



**KODE OG
LIVE DEMO**



Certificate of Completion

Du.

You have successfully completed

Pally-kurset mitt

Congratulations!

20/10/2025

Date


Signature

04

TAKK!

SPØRSMÅL?

Email: elise.kristiansen@variant.no

Linkedin: Elise Kristiansen

Bluesky: [frkfrontend.no](https://bsky.app/profile/frkfrontend.no)

KILDER

- <https://gitlab.com/gitlab-ci-utils/gitlab-pa11y-ci>
 - <https://www.uutilsynet.no>
- <https://lovdata.no/dokument/SF/forskrift/2013-06-21-732>
 - <https://webaim.org/projects/million/>

