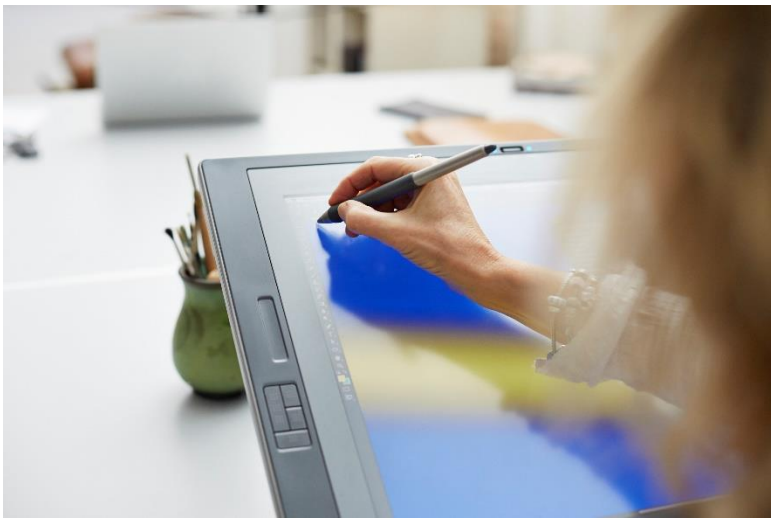
Accessibility in web UI libraries



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Understanding Accessibility

Accessibility is about making the application available for everyone and should be a default way to implement web applications especially the ones intended for a wide target audience. It is vital in building more ethical software as it enables assisting technology to interpret web pages better allowing people with disabilities able to equally perceive, understand and navigate the website. In other words, students with disabilities should be able to use Portflow without barriers. This includes students with colour-blindness, dyslexia and dyscalculia, seizure and migraine triggers among other things.

For the implementation, accessibility includes technical requirements, that relate to the code such as enabling screen readers that read the contents out loud or magnifiers that enlarge the content, as well as, design requirements, that make the content understandable and clear to navigate. There is a Web Content Accessibility Guideline (WCAG), which now is an international ISO standard as well (ISO/IEC 40500). It is developed in cooperation with individuals and organisations around the world to provide a shared standard that would meet the needs of individuals, organisations and governments globally.

Review Criteria

From the extensive accessibility criteria provided by the WCAG, the following criteria were chosen due to their importance and high coverage of the requirements as well as target audience.

- WAI-ARIA stands for Web Accessibility Initiative - Accessible Rich Internet Applications and is a widely recognised standard that helps with making dynamic content and advanced user interface controls more disabled-friendly. By applying WAI-ARIA developers make their web apps more functional for the assistive technologies.
- Colour Contrast helps ensure that all readable text is maximally readable for users with colour-blindness, sensitive or impaired vision.
- Focus Control is about ensuring the application can be used without a mouse, thus keyboard only. This is especially important for the people with motor disabilities (people with tremors, people having little or no control of their hands).

All the criteria are of equal weight as they are equally valuable for the accessibility requirements. The score scale is as follows: 1 point – criteria is covered by the library (by default or by offering tools and information) / 0,5 point – criteria is partially or incorrectly covered by the library (or not clearly defined) / 0 points – criteria is not covered by the library at all.

Potential Libraries

The following UI libraries were chosen due to their popularity and ease of integration with React (tsx).

- Ant Design the current open-source library used. However, for this comparison the latest version (5.4.5) will be analysed (current used by Portflow is 4.24.8).
- Material UI is another open-source library of React UI components implementing the Google's Material Design.
- Chakra UI is modular and accessible component library for React applications.
- Bootstrap is an extensive and feature packed frontend toolkit. It is also one of the oldest React libraries that has matured over the years.
- Next UI is a fast and modern React UI library that is highly customizable.

Comparison

Library	*WAI-ARIA*	*Colour Contrast*	*Focus Control*
Ant Design 5.0	1	1	0,5
Bootstrap	0,5	0,5	0,5
Chakra UI	1	1	1
Material UI	1	1	1
Next UI	0,5	0	0

Conclusion

The accessibility is important to offer equal treatment of the end users instead of creating special treatment. Developers should be striving to make it a default of every application. Material UI and Chakra UI clearly have accessibility as a core priority for all components and it is also supported by comprehensive documentation that's easy to navigate. Even if some accessibility parts are not covered by default, it definitely is made possible to do so for the developer and there is enough information offered on how to do it. AntD 5.0 is close in covering the criteria, however, the student found the information a bit lacking in the documentation. Bootstrap is partially covering the criteria and is completely open about it. Transparency and the right suggestions are a good start towards more accessibility, perhaps in the next version. Sadly, Next UI had no information on accessibility, though it has options for the developer to do so.

All in all, MUI and Chakra are both great choices as more accessible UI libraries. However more research definitely should be done to weight the costs of switching, both time and financial as the price was not taken into account in this research.

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