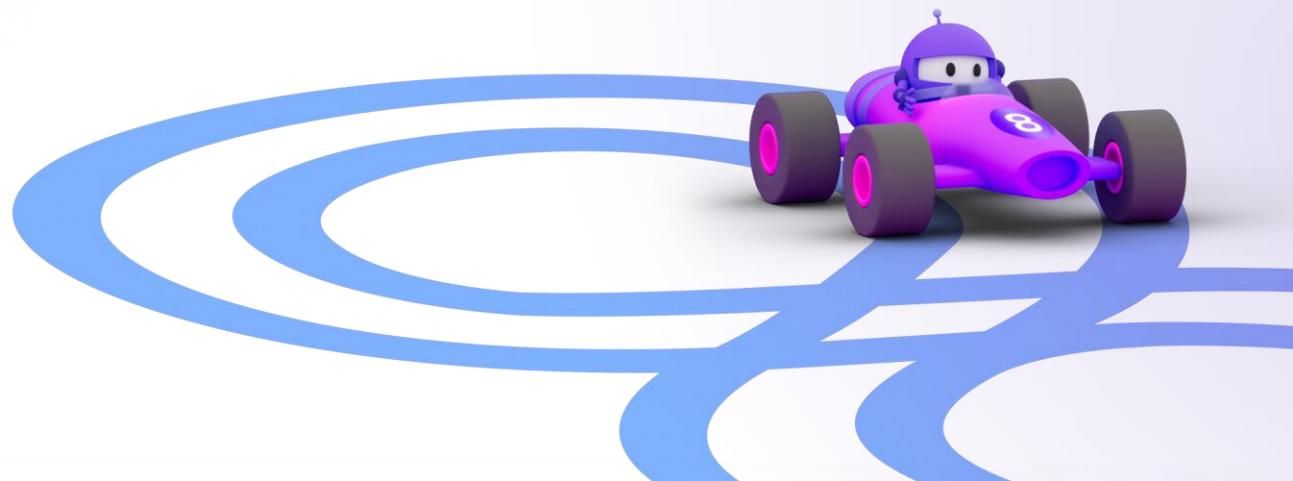


The Journey to Accessible Apps

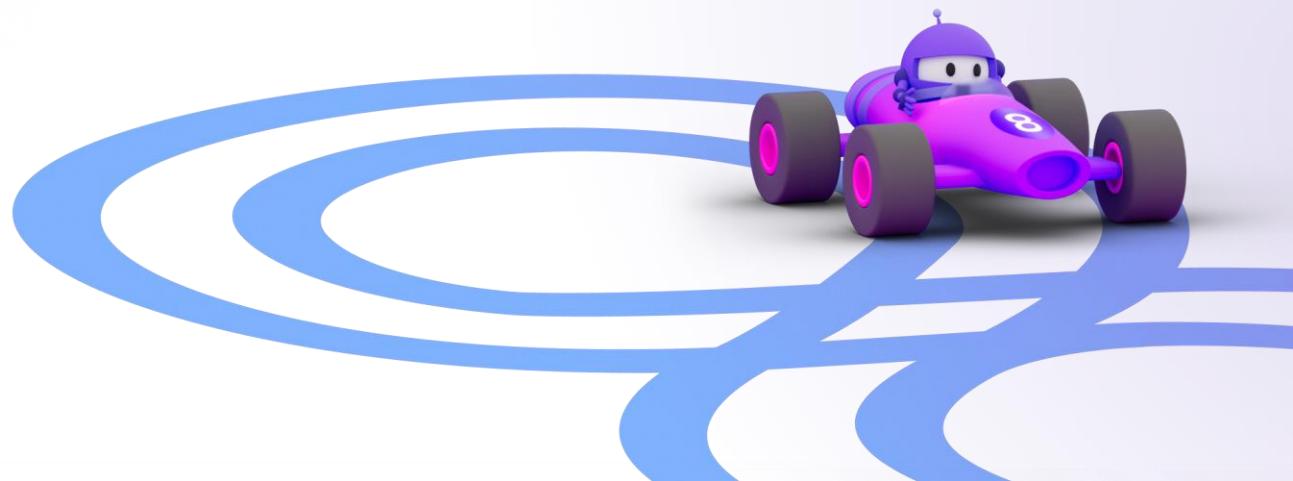
Rachel Kang (she/her)
Product Manager, .NET MAUI
UWC Samsung Future Innovation Lab



My Journey

Who am I?

How did I get here?





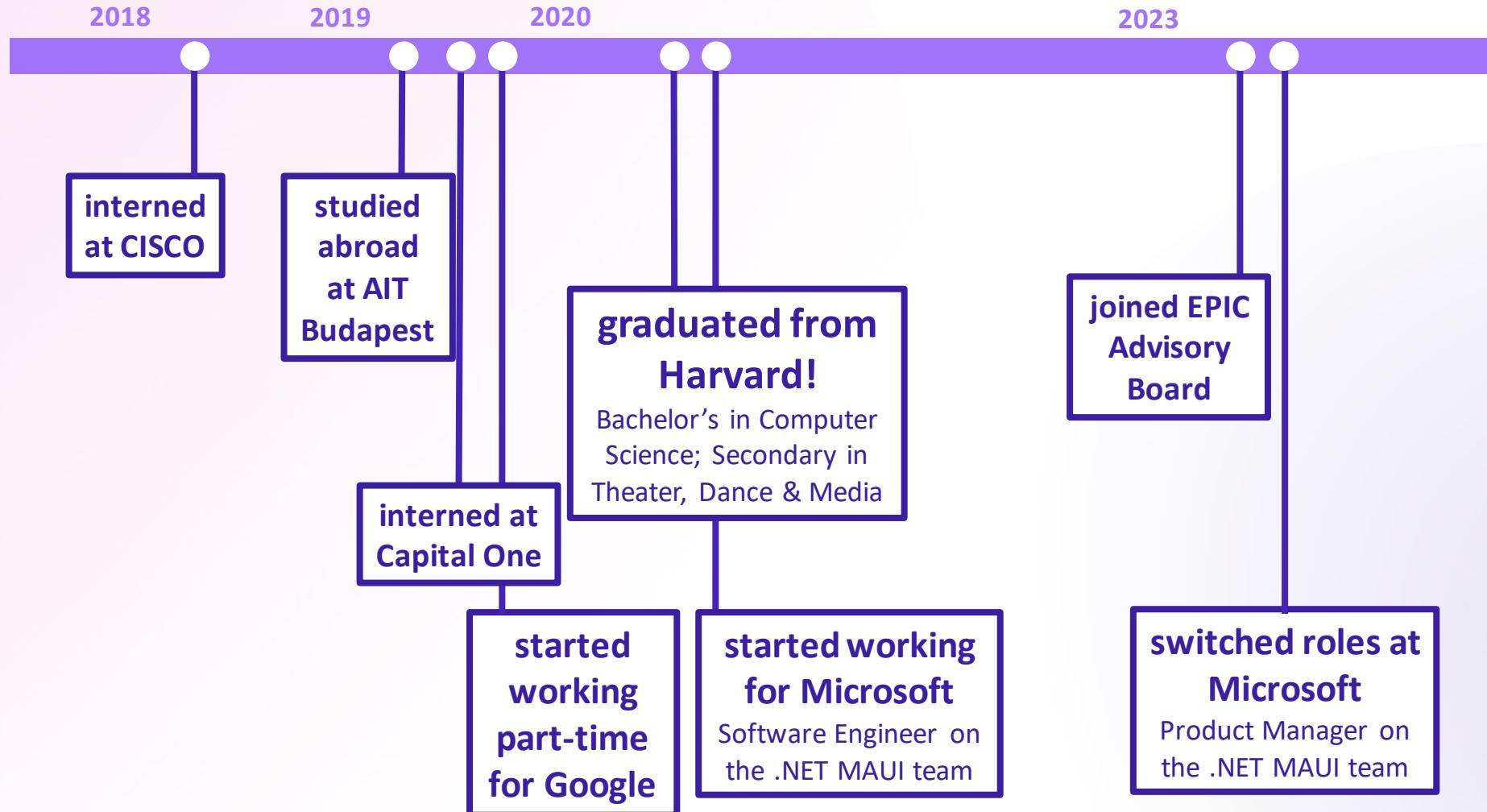
Hi, I'm Rachel!

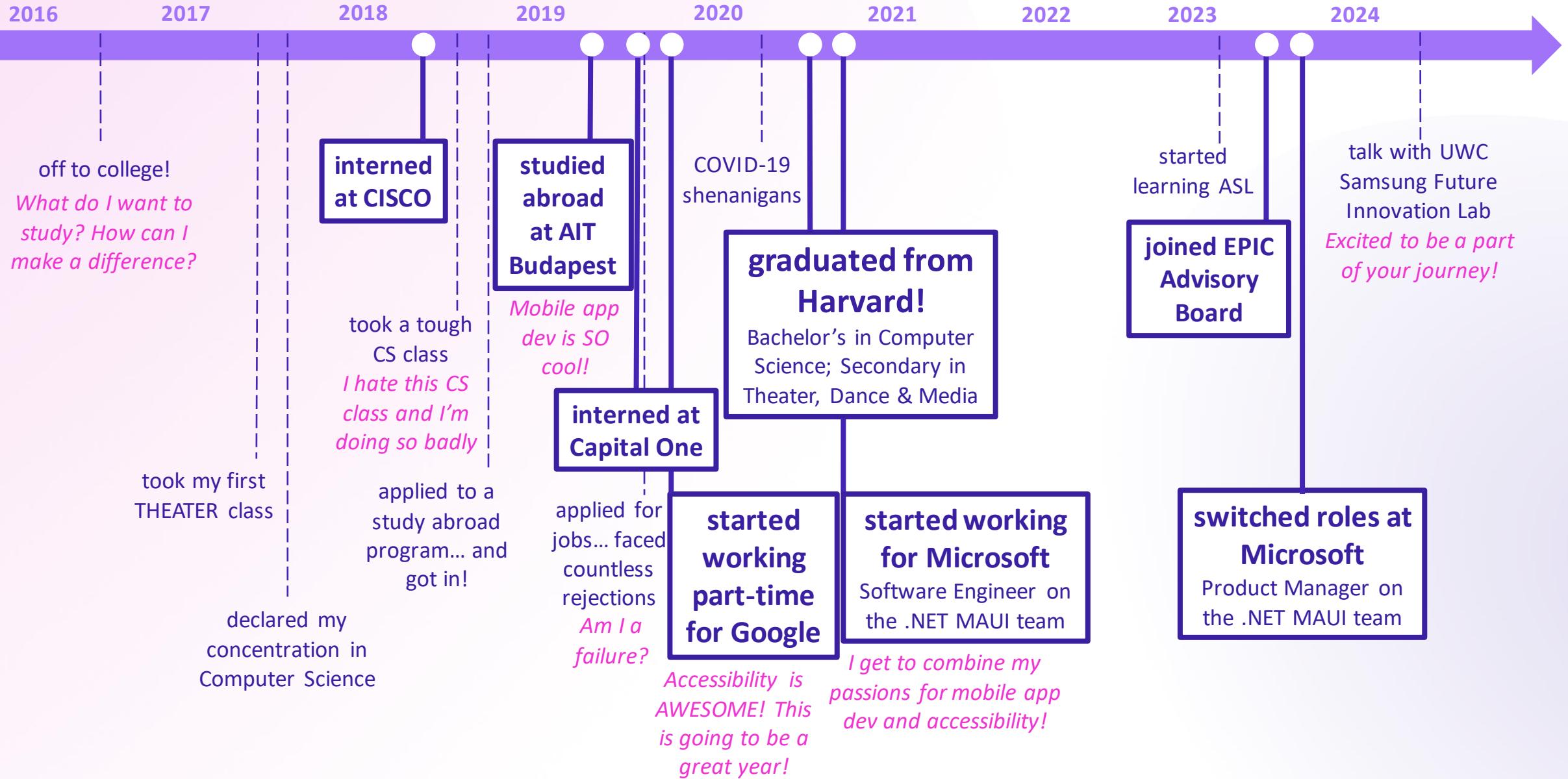
- Born and raised in New York, and currently based in Boston
- Love eating, reading, crocheting, traveling, acting, and spending time with friends
- Passionate about all things accessibility and inclusive design

 @therachelkang

 @rachelkang

 <https://www.linkedin.com/in/rachel-j-kang>





Enjoy your journey!

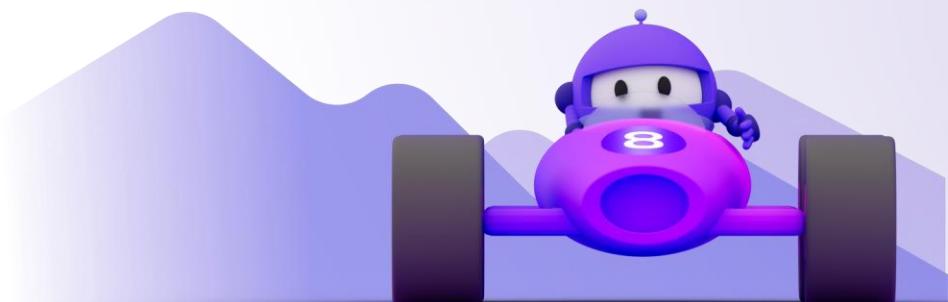
Every step of your
journey is exactly
where it's meant to be



The Journey to Accessible Apps

What does it mean to be accessible?

Why should you care?



Over 1 billion people
currently experience
some form of disability

| | Permanent | Temporary | Situational |
|------------|-----------|-----------|-------------|
| Touch | | | |
| One arm | | | |
| See | | | |
| Blind | | | |
| Hear | | | |
| Deaf | | | |
| Speak | | | |
| Non-verbal | | | |

The Persona Spectrum

We use the Persona Spectrum to understand related mismatches and motivations across a spectrum of permanent, temporary, and situational scenarios. It's a quick tool to help foster empathy and to show how a solution scales to a broader audience.

<https://inclusive.microsoft.design/tools-and-activities/Inclusive101Guidebook.pdf>

Designing for accessibility is not limited
to individuals with disabilities

The best solutions
benefit everyone

Marketing Sync



22:05



Leave



Serenna Davis

Charlotte de Crum



Babak Shammai:

So what did you all think of today's kickoff meeting for the new building project?



Beth Davies



Babak Shammai



Hillary Reyes

Participants

...

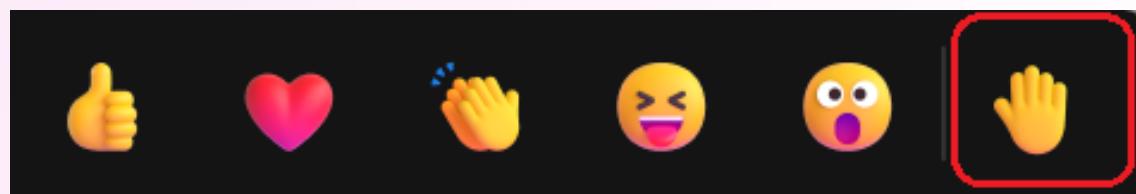


Invite someone or dial a number



Share invite

In this meeting (3)



Aadi Kapoor



Aaron Buxter



Daniela Mandera
Organizer



Others invited (14)



Babak Shammas
Accepted



Beth Davies
Accepted



Bruno Zhao
Tentative



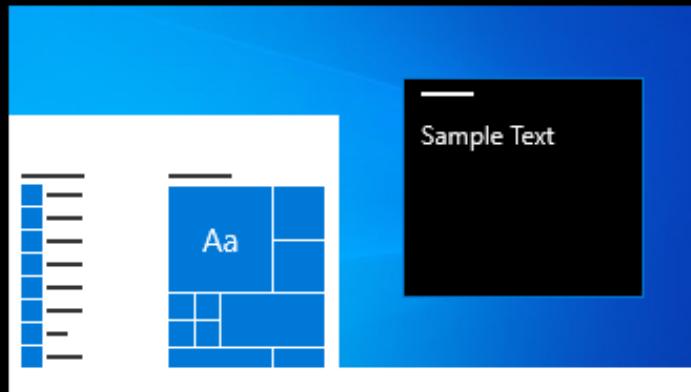
August Bergmaa
Tentative

[Home](#) 

Personalization

[Background](#)[Colors](#)[Lock screen](#)[Themes](#)[Fonts](#)[Start](#)[Taskbar](#)

Colors



Choose your color

Custom



Choose your default Windows mode

Light

Dark

Choose your default app mode

Light

Dark

Related Settings

[High contrast settings](#)

[Sync your settings](#)

[Help from the web](#)

[Changing desktop or background colors](#)

[Changing taskbar color](#)

 [Get help](#)

 [Give feedback](#)



Huge business opportunity

**“disability touches 73% of consumers
and controls over \$13 trillion in
annual disposable income.”**

<https://www.rod-group.com/research-insights/annual-report-2020/>

Growing number of legal consequences

POLITICS

Supreme Court hands victory to blind man who sued Domino's over site accessibility

PUBLISHED MON, OCT 7 2019 9:40 AM EDT | UPDAT



Tucker Higgins
@IN/TUCKER-HIGGINS-5B162295/
@TUCKERHIGGINS

ON SMALL BUSINESS

U.S. Businesses Get Hit With Record Numbers of Disability Lawsuits

By Amy Yee | Bloomberg

April 14, 2022 at 5:03 p.m. EDT

FOOD // WINE, BEER & SPIRITS

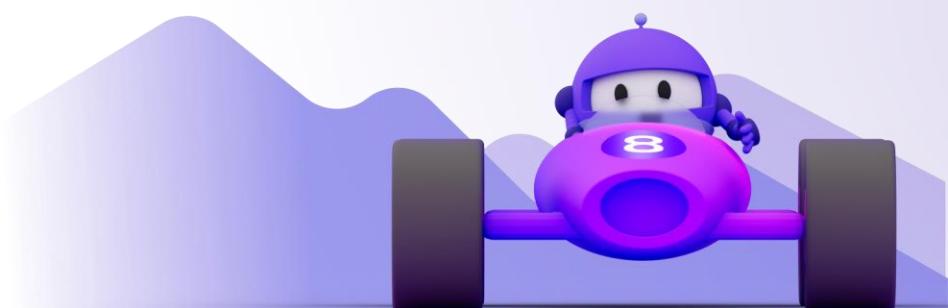
50 Bay Area wineries got hit with disability lawsuits. The winemakers say they're 'predatory'



Esther Mobley

The Journey to Accessible Apps

What makes our apps accessible?



Inclusive Design Principles

- Provide comparable experience
- Consider situation
- Be consistent
- Give control
- Offer choice
- Prioritize content
- Add value

<https://inclusivedesignprinciples.org>

Inclusive Design Principles

- Provide comparable experience → i.e. content for alternatives
- Consider situation → i.e. color contrast
- Be consistent → i.e. consistent design patterns
- Give control → i.e. allow zoom
- Offer choice → i.e. accessible alternatives
- Prioritize content → i.e. prioritizing tasks
- Add value → i.e. make task completion easier

<https://inclusivedesignprinciples.org>

Web Content Accessibility Guidelines

Web Content Accessibility Guidelines

1 – Perceivable

Information and user interface components must be presentable to users in ways they can perceive.

- 1.1 - Text alternatives
- 1.2 - Time-based media
- 1.3 - Adaptable
- 1.4 - Distinguishable

2 – Operable

User interface components and navigation must be operable.

- 2.1 - Keyboard accessible
- 2.2 - Enough time
- 2.3 - Seizures and physical reactions
- 2.4 - Navigable
- 2.5 - Input modalities

3 – Understandable

Information and the operation of user interface must be understandable.

- 3.1 - Readable
- 3.2 - Predictable
- 3.3 - Input assistance

4 – Robust

Content must be robust enough that it can be interpreted by a wide variety of user agents, including assistive technologies.

- 4.1 - Compatible

The Journey to Accessible Apps

How do we put these insights into practice?

How do you design and develop accessible apps?

How do you test apps for accessibility?



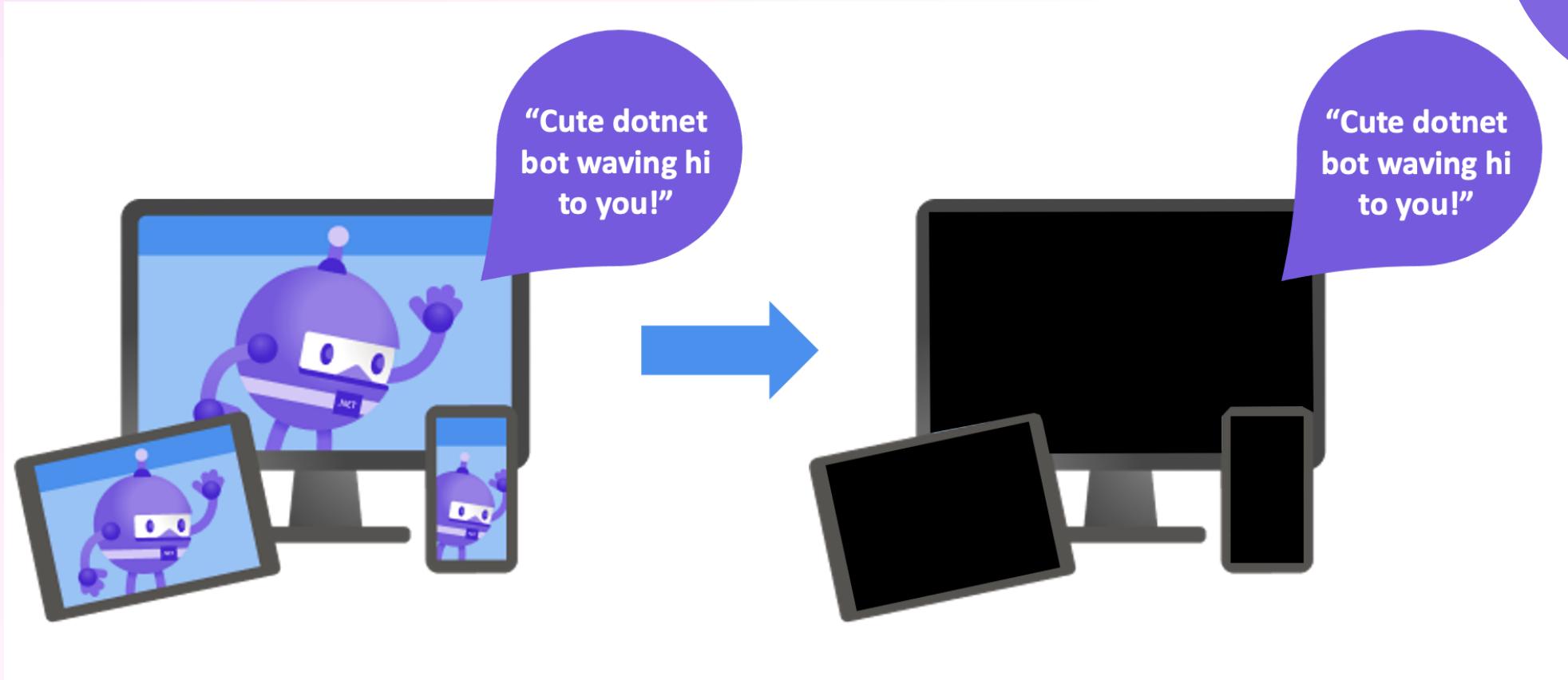
With .NET MAUI,
you'll be able to
create accessible
apps more
seamlessly than
ever before

#9557 by PureWeen was merged 18 days ago • Approved

- [Fix SearchBar semantics ✓ area/a11y area/controls 🎮 control-entry](#)
#7802 by rachelkang was merged on 8 Jun • Approved ➔ 6.0-sr2
- [\[Windows\] Set WinUI picker description to title ✓ area/a11y area/controls 🎮 control-picker platform](#)
#6970 by rachelkang was merged on 9 May • Approved
- [Only set AccessibilityTraits for heading when it matters ✓ area/a11y](#)
#6749 by PureWeen was merged on 2 May • Approved
- [Tweak templates to fix accessibility bugs ✗ area/a11y area/templates 📄](#)
#6322 by rachelkang was merged on 20 Apr • Approved ➔ 6.0.300
- [Update template styles ✗ area/a11y area/templates 📄 area/Xaml </>](#)
#6312 by rachelkang was merged on 21 Apr • Approved ➔ 6.0.300-rc.3
- [Remove interfering keyboard focus logic ✓ area/a11y area/controls 🎮 area/shell 🌐 control-entry](#)
#6246 by rachelkang was merged on 25 Apr • Approved ➔ 6.0.300-rc.3
- [Create custom Automation Peer for MauiButton ✓ area/a11y area/controls 🎮 control-button](#)
#6139 by PureWeen was merged on 18 Apr • Approved
- [Respect UserAppTheme in RequestedTheme ✓ area/a11y t/bug](#)
#5071 by mattleibow was merged on 6 Mar • Approved ➔ 6.0.300-previe...
- [Windows FlowDirection ✓ area/a11y](#)
#4936 by PureWeen was merged on 1 Mar • Approved ↴ 18 tasks ➔ 6.0.300-previe...
- [\[iOS\] Implement IsFocused property and Focus\(\), Unfocus\(\) methods ✓ area/a11y platform/iOS](#)
#4588 by jsuarezruiz was merged on 17 Feb • Approved ⚡ 1 of 2 tasks
- [\[Android\] Implement IsFocused property and Focus\(\), Unfocus\(\) methods ✓ area/a11y platform](#)
#4587 by jsuarezruiz was merged on 17 Feb • Approved ⚡ 1 of 2 tasks
- [\[Windows\] Implement IsFocused property and Focus\(\), Unfocus\(\) methods ✓ area/a11y platform](#)
#4562 by jsuarezruiz was merged on 19 Feb • Approved ⚡ 1 of 2 tasks
- [\[Android\] Fix SetSemanticFocus ✗ area/a11y platform/android 🎨](#)
#3993 by rachelkang was merged on 20 Jan • Approved ↴ 12 tasks
- [Fix keyboard navigation with modal pages ✓ area/a11y](#)
#3631 by PureWeen was merged on 16 Dec 2021 • Approved ↴ 18 tasks

Semantic Properties

1



Semantic Properties

SemanticProperties.Description

SemanticProperties.Hint

SemanticProperties.HeadingLevel

```
<Image Source="logo.png"  
      SemanticProperties.Description=".NET logo" />
```

```
Image image = new Image { Source = "logo.png" }  
SemanticProperties.SetDescription(image, ".NET logo");
```

<https://docs.microsoft.com/dotnet/maui/fundamentals/accessibility>

Semantic Extensions

A large purple circle containing the white number '2'.

`SetSemanticFocus()`

`Announce()`

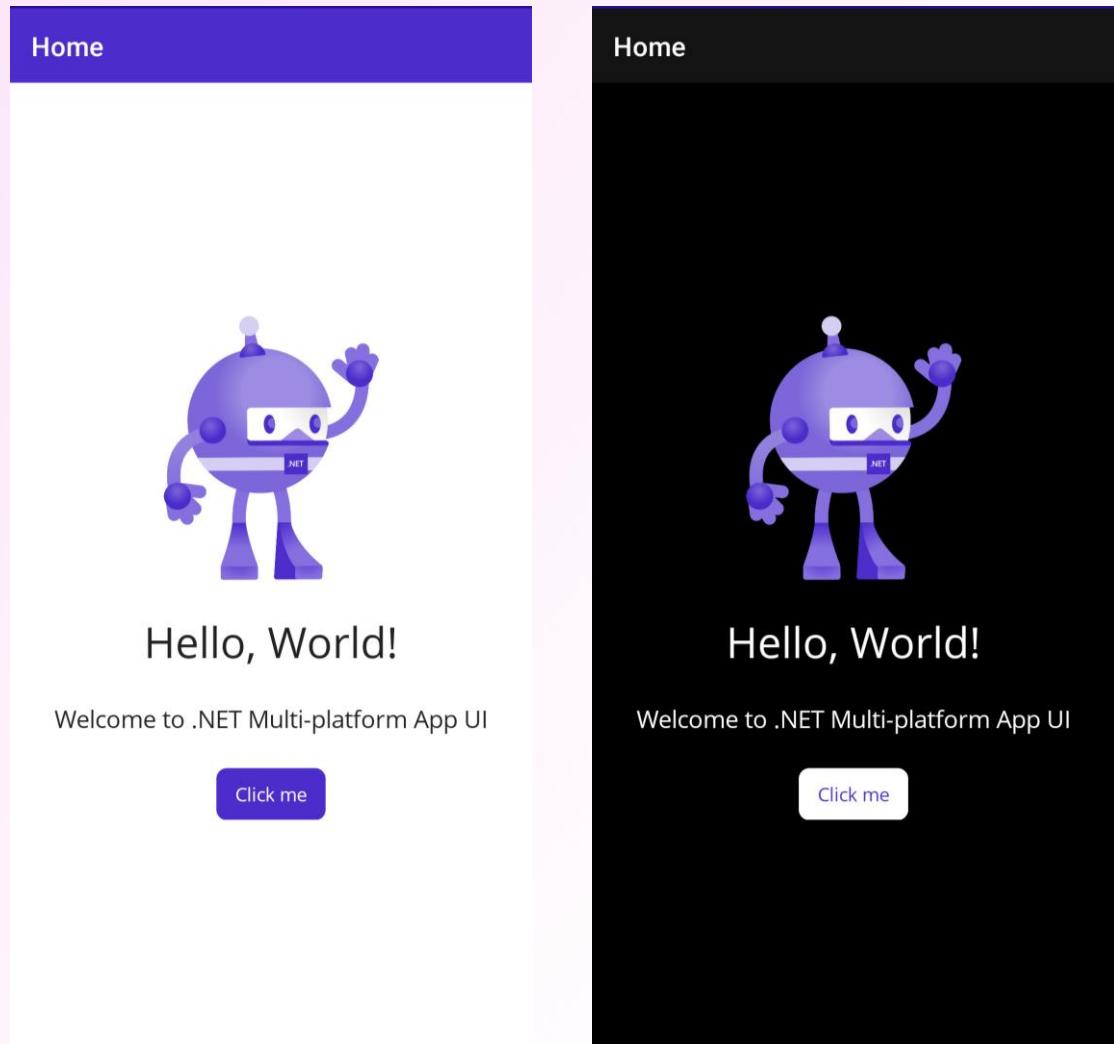
```
Image image = new Image { Source = "logo.png" }  
image.SetSemanticFocus();
```

```
SemanticScreenReader.Announce("I am being announced!");
```

<https://docs.microsoft.com/dotnet/maui/fundamentals/accessibility>

App Theming

3



<Setter

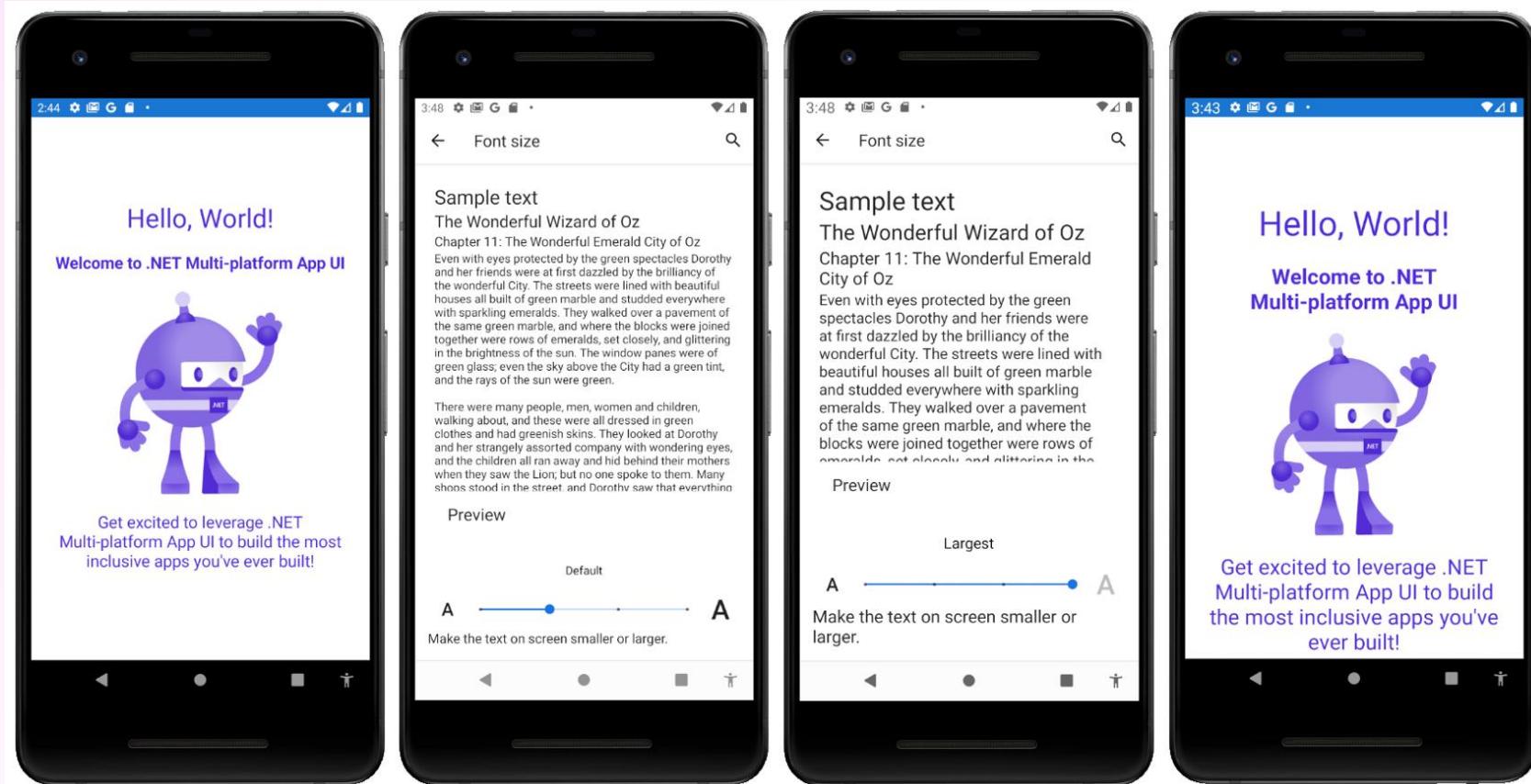
```
Property="BackgroundColor"  
Value="{AppThemeBinding  
Light={StaticResource White},  
Dark={StaticResource Black}}"
```

/>

Font Autoscaling

4

FontAutoScalingEnabled



Keyboard Accessibility

A large, solid purple circle is positioned in the top right corner. Inside the circle, the number '5' is written in a large, white, sans-serif font.

5

WCAG 2.1 – Keyboard Accessible:
Make all functionality available from a keyboard.

- Keyboard Focus
 - Some control must and will always have focus
- Keyboard Navigation
 - Controls must be keyboard navigable (tab, arrow keys)
- Keyboard Shortcuts
 - Keyboard accelerators enhance the keyboard experience

Keyboard Accessibility

5

Meaningful content ordering

Source order

```
<StackLayout>
    <Element 1 />
    <Element 2 />
    <Element 3 />
</StackLayout>
```

Visual order

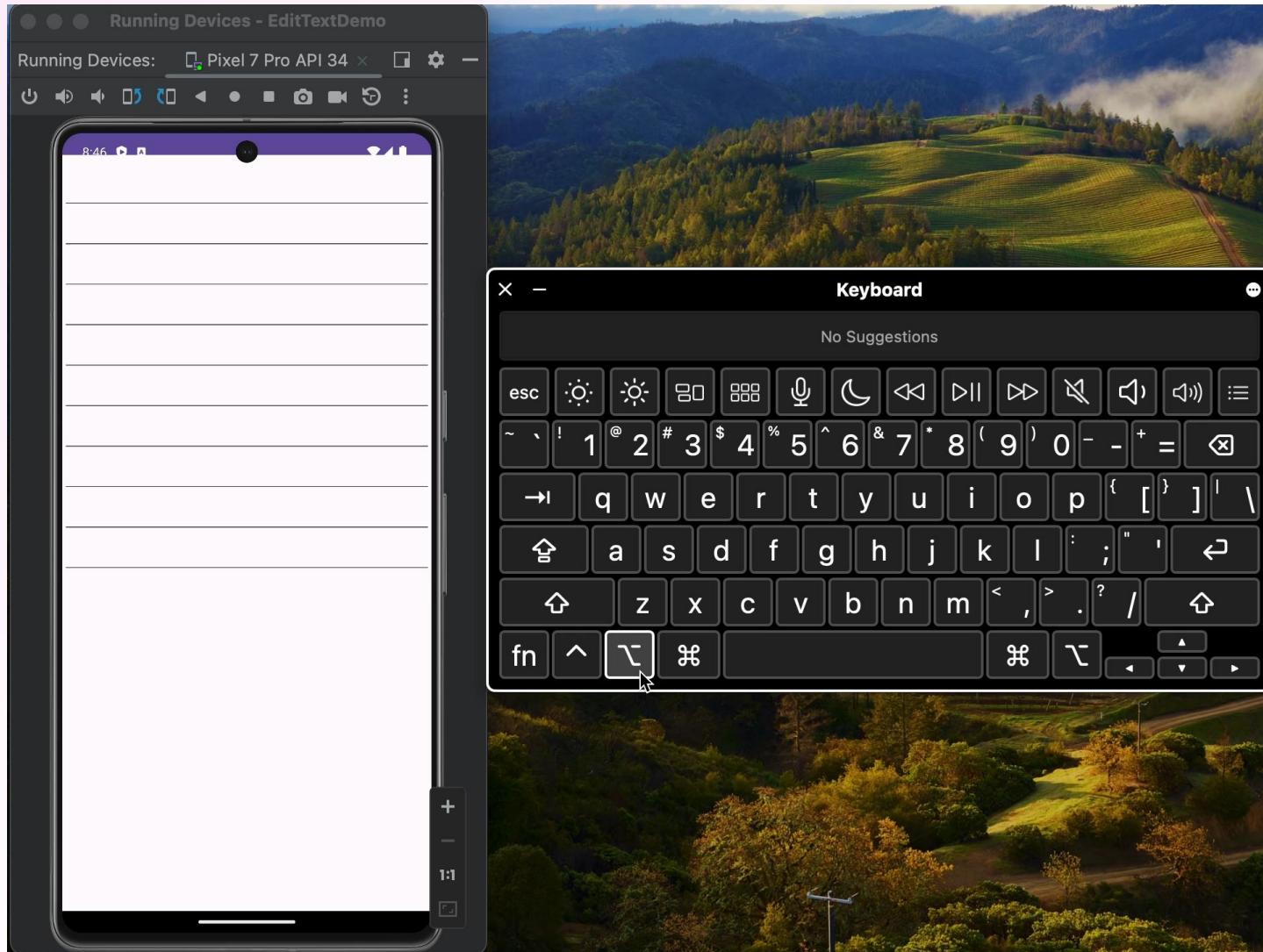


Semantic order

“Element 1,
Element 2,
Element 3”

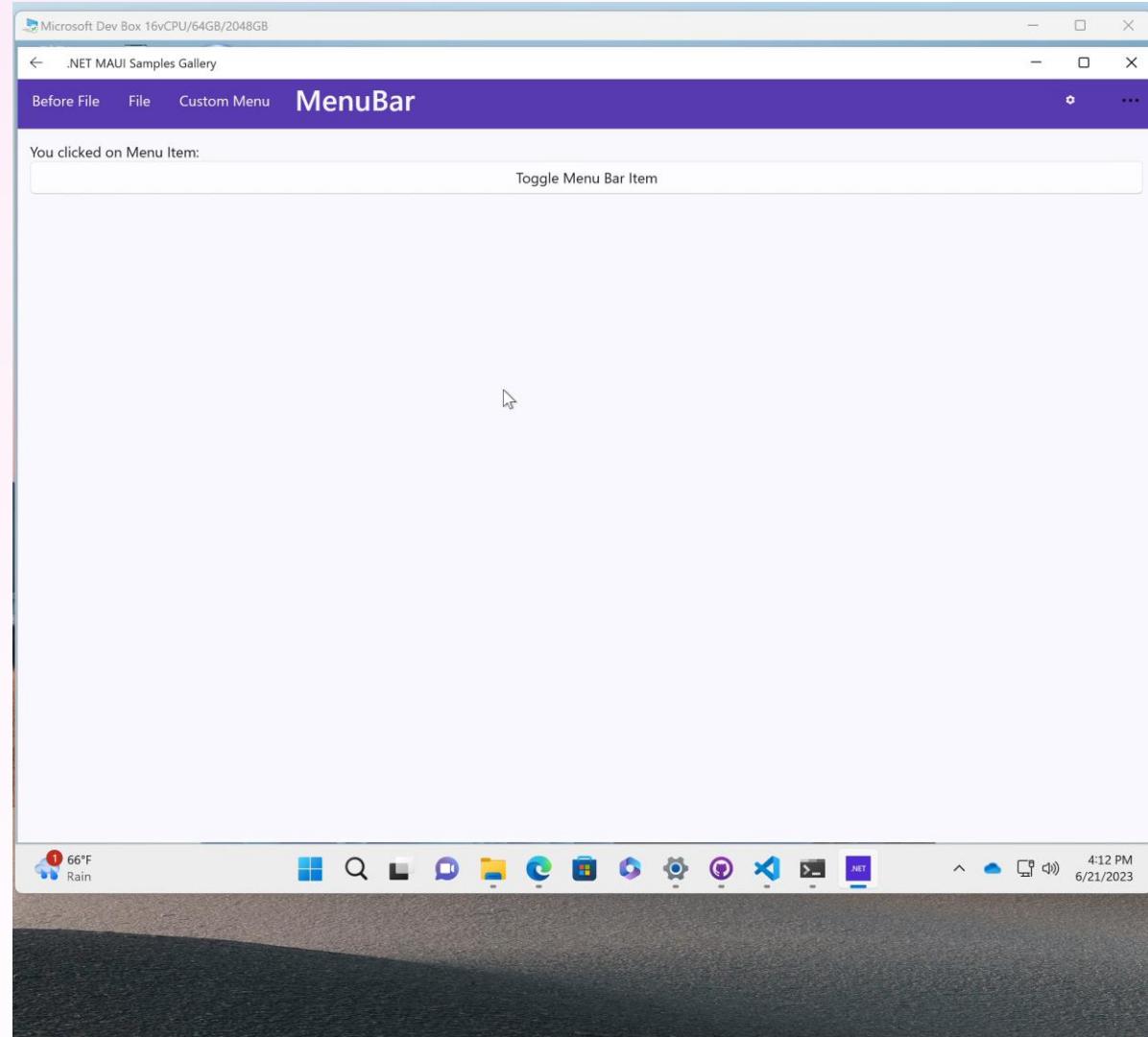
Keyboard Accessibility

5



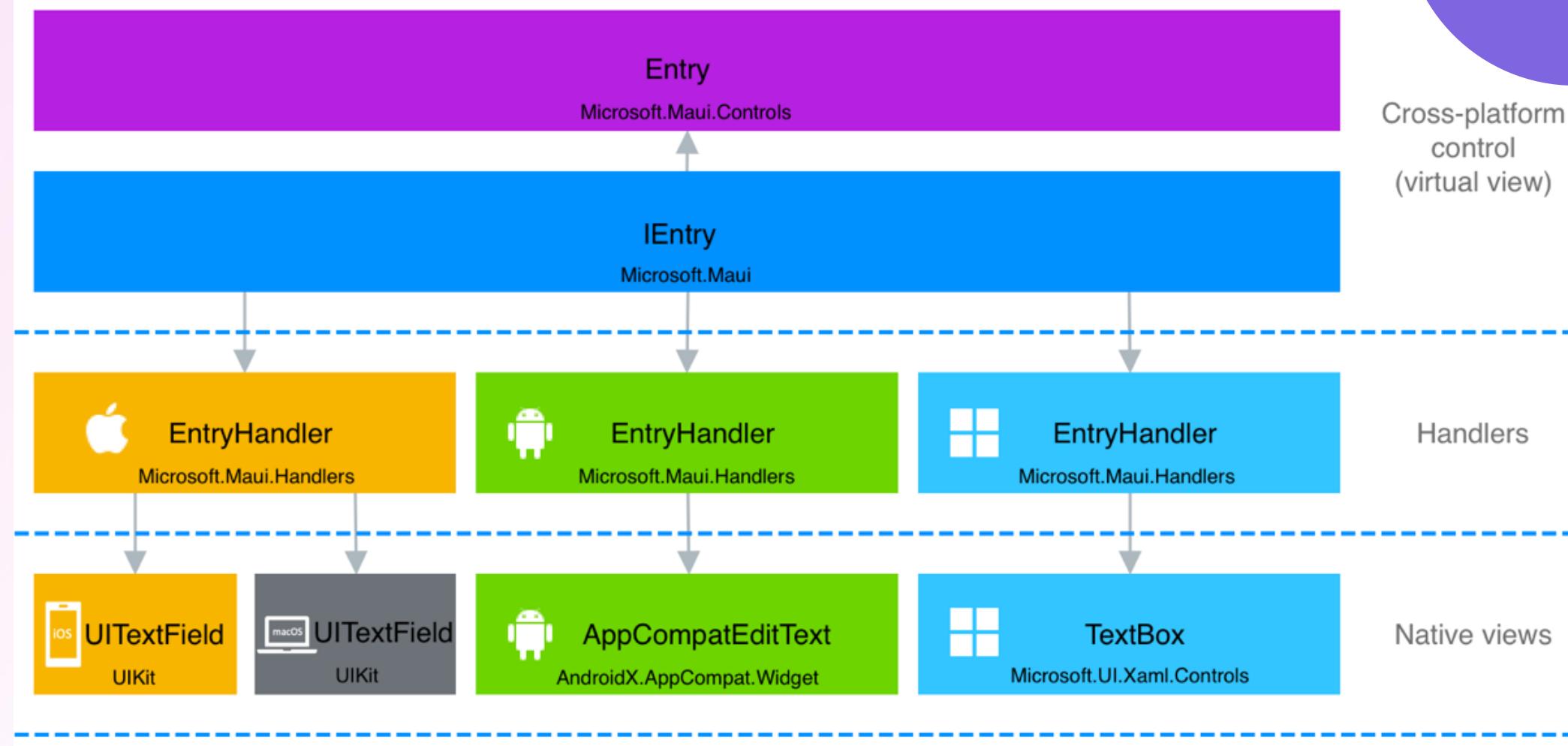
Keyboard Accessibility

5



Custom Handlers

6



Custom Handlers

A large purple circle containing the white number 6, positioned in the top right corner of the slide.

```
Microsoft.Maui.Handlers.EntryHandler.Mapper.AppendToMapping  
("MyEntry", (handler, view) =>  
{  
#if ANDROID  
    // Android code  
  
#elif IOS || MACCATALYST  
    // iOS code  
  
#elif WINDOWS  
    // WinUI code  

```

Custom Handlers

6

'Tab' button does not work when shift button from last button #7064

Closed

As a desktop developer I can support a... #14021

AllenMiaoFil opened this issue on May 12, 2022 · 13 comments



AllenMiaoFil commented on May 12, 2022

...

Description

The 'Tab' functionality does not work any more when you shift button with 'Tab' from the last button to first button.

Assignees



rachelkang



Labels



rachelkang commented on Aug 31, 2022

Member

...

Hi, [@AllenMiaoFil](#) - thanks for bringing this to our attention. This behavior you describe seeing on Windows is the same as the WinUI platform behavior, and therefore is actually the current expected behavior. While `Tab` will bring you to the next element (from the first button to the second button), `Shift + Tab` will bring you back to the previous element (From the second button to the first button).

That being said, if you have any specific scenarios to share or any further thoughts/ideas for how keyboard navigation should work, please do share, as we will be further developing on it in the future.

Custom Handlers

6



rachelkang commented on Sep 6, 2022

Member ...

@AllenMiaoFil I've just learned that Windows has a property to change the keyboard navigation mode to reflect just what you're looking for! The property is called [TabFocusNavigation](#) and can be leveraged with handlers.

You can learn more about .NET MAUI handlers here: <https://docs.microsoft.com/dotnet/maui/user-interface/handlers/customize>

For this scenario, putting this bit of code in your code-behind and then calling on it from the constructor will do the trick :)

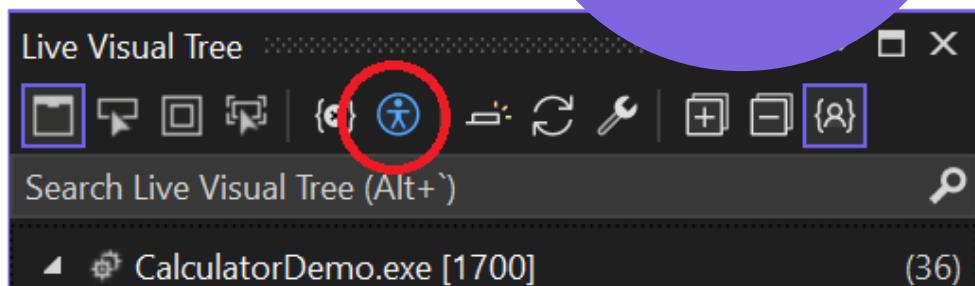
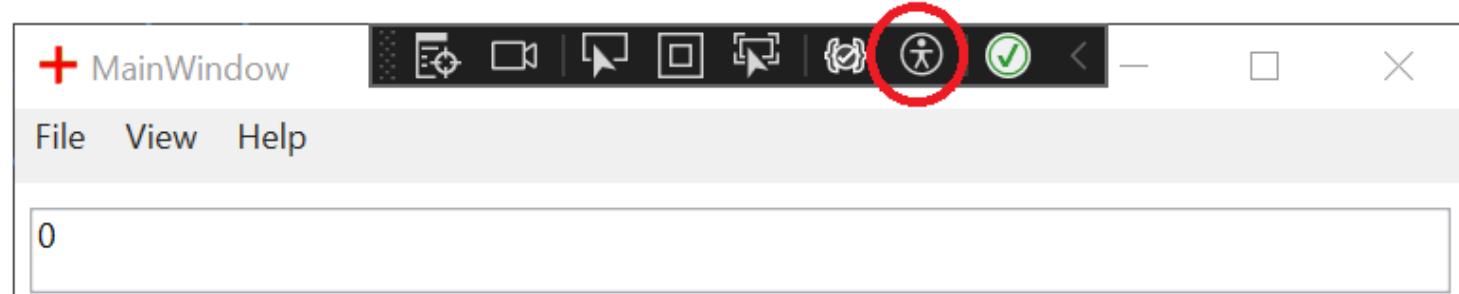
```
void ModifyTabNavigation()
{
    Microsoft.Maui.Handlers.LayoutHandler.Mapper.AppendToMapping("MyCustomization", (handler, view) =>
    {
#if WINDOWS
        handler.PlatformView.TabFocusNavigation = Microsoft.UI.Xaml.Input.KeyboardNavigationMode.Cycle;
#endif
    });
}
```



Let me know if you have any further questions :)

Accessibility Checker

7



| Automation ID | Rule | Description | How To Fix |
|---------------|-------------|--|--|
| | NameNotNull | The Name property of a focusable element must not be null. | Provide a UI Automation Name property that concisely identifies the element. |
| PaperBox | NameNotNull | The Name property of a focusable element must not be null. | Provide a UI Automation Name property that concisely identifies the element. |

The Journey to Accessible Apps

- **Empathy** is the name of the game
- Explore accessibility settings and features
 - Screen readers
 - VoiceOver (iOS, Mac); TalkBack (Android); Narrator (Windows)
 - NVDA, JAWS (third party Windows)
 - Input modalities
 - Keyboard, Pointer, Touch, Voice, Eye gaze, etc.
- Research accessibility models and APIs
 - .NET MAUI semantic properties and extensions
- Stay up to date on the latest!

The Journey Continues!

The Journey to Accessible Apps · Visual Text

The Journey to Accessible Apps · Screen Readers

The Journey to Accessible Apps

April 14th, 2021

No matter what stage of the app development process you're at, and no matter your level of familiarity with developing inclusive apps, it is always the right time to make your apps more inclusive. Get started on your journey to developing inclusive apps today.

Ensuring your apps are inclusive has wide implications. It involves making sure that your app appeals to audiences of all different identities – of age, gender, ethnicity, ability, education, and so much more. It involves making sure all your app's users are granted an equitable user experience. It involves executing proper customer validation and working with a representative team.

With all these moving parts, it can be tough to know where to start – but fear not! You can start here, with accessibility, today.

the following ways:

both in design and logical ordering,

that provides an may entirely replace the elementary in many e of sighted users, even

t individuals may ties to accomplish tasks, fferent situations. Assistive

<https://devblogs.microsoft.com/xamarin/the-journey-to-accessible-apps>

Thank you!

 @therachelkang

 @rachelkang

 <https://linkedin.com/in/rachel-j-kang>

 <https://aka.ms/discord-maui> > #maui-accessibility

