The Journey to Accessible Apps

Rachel Kang (she/her)

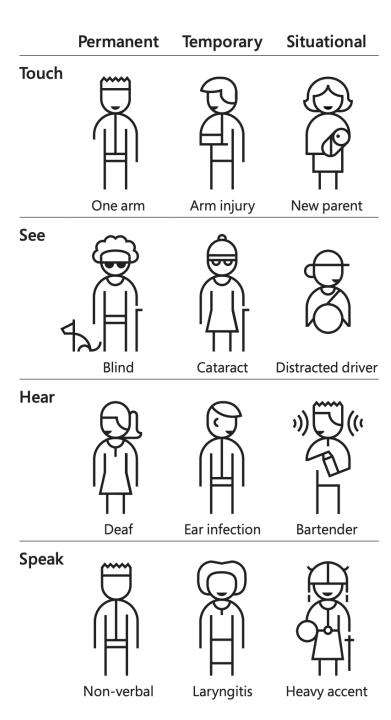Software Engineer, .NET MAUI

@CPTMSDUG

Hi, I'm Rachel!

- I work on .NET MAUI
- I love eating, reading, and exploring (foodsta is @nomonayum)
- I'm passionate about all things accessibility and inclusive design
- My first presentation as a full-time professional was at CPTMSDUG 3 years ago!

🐦 @therachelkang

🐙 @rachelkang

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

The Journey to Accessible Apps

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	Arm injury	New parent
See	Blind	Cataract	Distracted driver
Hear	Deaf	Ear infection	Bartender
Speak	Non-verbal	Laryngitis	Heavy accent

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 people experiencing disabilities

The best solutions benefit everyone
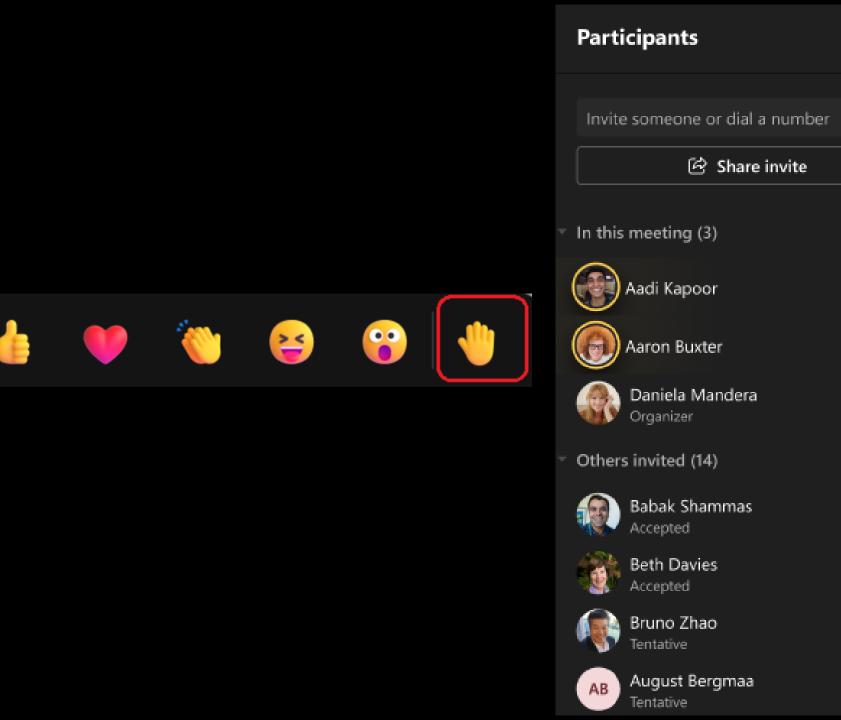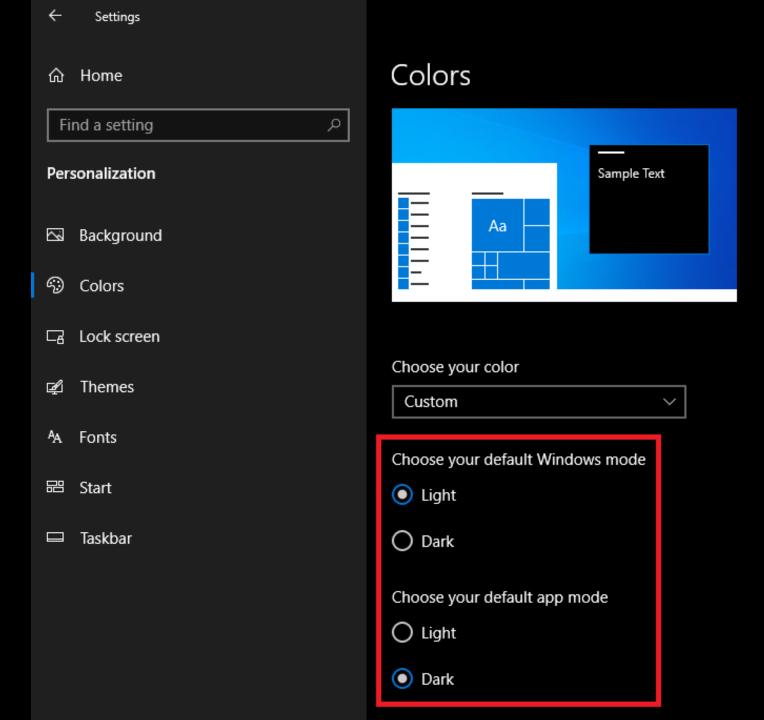
Participants

Invite someone or dial a number

Share invite

In this meeting (3)

Aadi Kapoor   1 🖐

Aaron Buxter   2 🖐

Daniela Mandera
Organizer

Others invited (14)

Babak Shammas
Accepted

Beth Davies
Accepted

Bruno Zhao
Tentative

August Bergmaa
Tentative

← Settings

Colors

Personalization

Home

Find a setting

Background

Colors

Lock screen

Themes

Fonts

Start

Taskbar

Sample Text

Aa

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

worth hundreds of billions

£274 billion
The spending power of disabled people
and their household continues to increase
and is currently estimated to be worth
£274 billion per year to UK businesses

https://wearepurple.org.uk/the-purple-pound-infographic

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 | UPDATED TUE, OCT 8 2019•6:31 PM EDT

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

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FOOD // WINE, BEER & SPIRITS

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

Esther Mobley

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

By Amy Yee | Bloomberg

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

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

Global a11y standard and legal benchmark for both web and mobile

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

https://www.w3.org/WAI/standards-guidelines/WCAG

The Journey to Accessible Apps
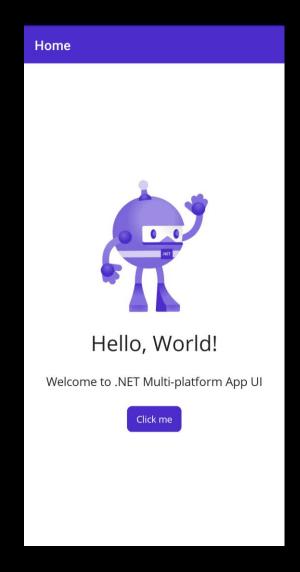
How do we put these insights into practice?

How do you design and develop accessible apps?

How do you test apps for accessibility?

Design & Develop

Color Contrast

- https://webaim.org/resources/contrastchecker

App Theming

- Dark mode
- Light mode
- High contrast mode

Design & Develop

Font size auto-scaling

Design & Develop
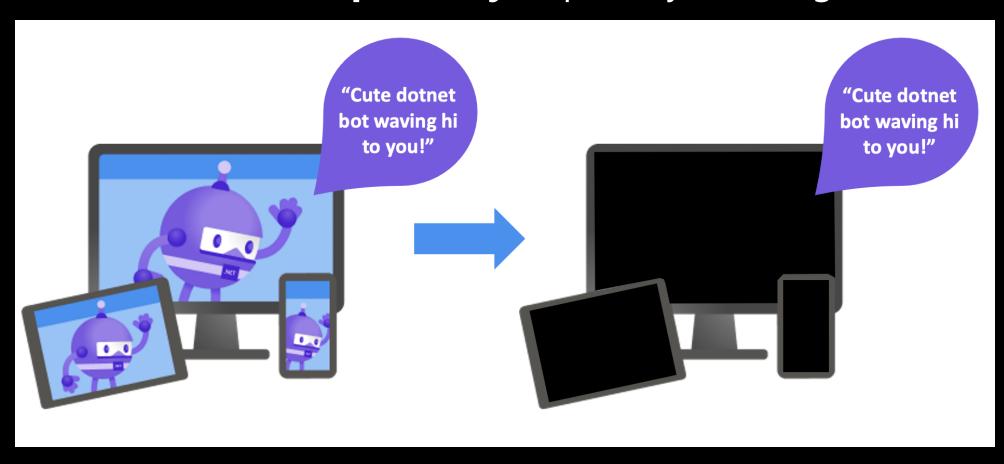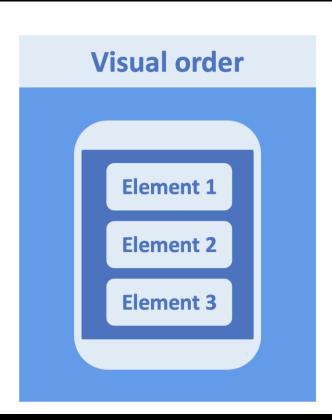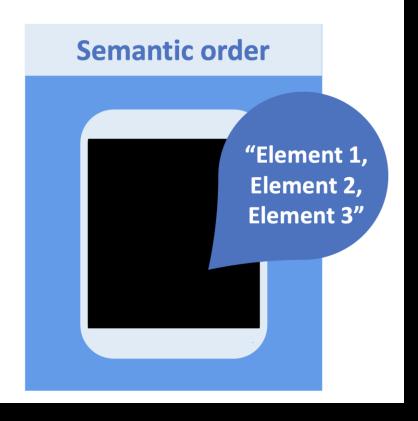
Screen reader compatibility, especially for images and icons

Design & Develop

Meaningful content ordering

Design & Develop
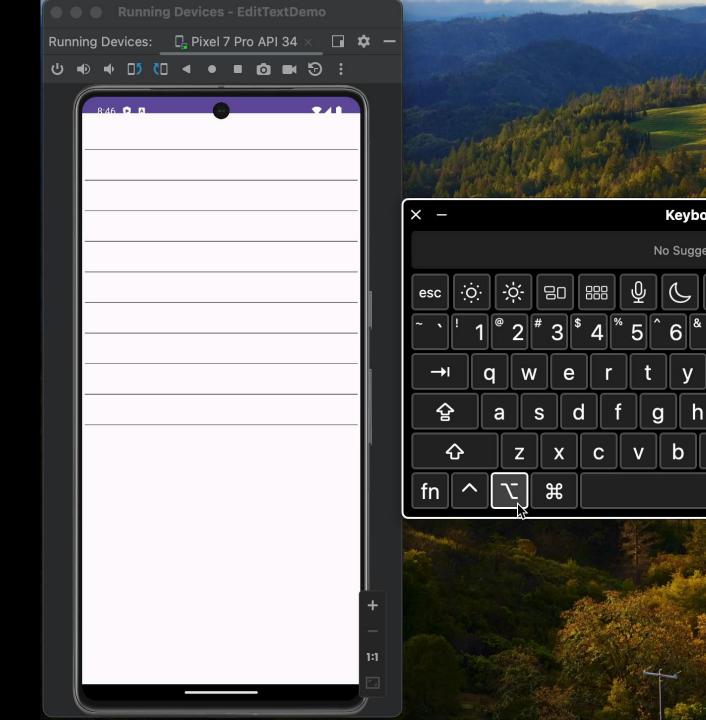
Keyboard accessibility

- Guideline 2.1 – Keyboard Accessible: Make all functionality available from a keyboard.
- Focus
- Navigation
  - Tab
  - Arrow keys
- Shortcuts

Test

Ensure both Automated AND Manual test coverage

Write all the automated tests possible
• Unit tests, UI tests

Use all the tools at your disposal
• Accessibility Checker in Visual Studio
• Accessibility Insights

MainWindow

File   View   Help

0

Live Visual Tree

Search Live Visual Tree (Alt+`)

▲ ⚙ CalculatorDemo.exe [1700]   (36)

Accessibility Checker

▶ ■

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.

Layout Inspector

Comp...   Pixel 7 Pro API 34

- LinearLayout
  - SwitchCompat
  - SwitchCompat
  - SwitchCompat

Attributes

SwitchCompat   <unnamed>

SwitchCompat

x	0dp
y	41dp
width	48dp
height	48dp

Layout

layout_width	wrap_content
layout_height	wrap_content
layout_gravity	clip_horizontal|clip_vertical|fill
layout_marginLeft	0dp
layout_marginTop	0dp
layout_marginRight	0dp
layout_marginBottom	0dp
layout_weight	0.0

All Attributes

accessibilityFocused	false
accessibilityHeading	false
accessibilityLiveRegion	none
activated	false
alpha	1.0
autoLink	
autoSizeMaxTextSize	-1
autoSizeMinTextSize	-1
autoSizeStepGranularity	-1
autoSizeTextType	none
background	@drawable/?
baseline	103

Image

System Name   globe

Modifiers

Accessibility

Label   Inherited
Identifier   Inherited

Style

Render Mode   Inherited
Aspect Ratio   Inherited
Color   Accent Color

Resizing

Mode   Inherited

Insets   − Inher +   − Inher +
          Top   Bottom
         − Inher +   − Inher +
          Leading   Trailing

Padding

Padding   − Inherited +

Frame

Size   − Inher +   − Inher +
         Width   Height

Image Scale

Large

Add Modifier

FastPass

1 Automated checks

2 Tab stops

3 Needs review

Needs review

Sometimes automated checks identify *possible* accessibility problems that need to be reviewed and verified by a human.

Instances to review 1

⌄ Collapse all   Visual helper 🔵

⌄ 🔵 **ImageContrastCheck**: Meaningful graphics must have sufficient contrast.

Resources for this rule

More information about ImageContrastCheck

WCAG 1.4.11New for WCAG 2.1

Class name	android.widget.ImageView
Content description	Cute dot net bot waving hi to you!
How to check	Use Accessibility Insights for Windows (or the Colour Contrast Analyser if you're testing on a Mac) to manually verify that the ImageView has sufficient contrast compared to the background. If the background is an image or gradient, test an area where the contrast appears to be the lowest.

👁 Highlight visible   ⋮

Target app screenshot

5:35

Hello, World!

Welcome to .NET Multi-platform App UI

Get excited to leverage .NET Multi-platform App UI to build the most inclusive apps you've ever built!

FastPass

1 Automated checks

2 Tab stops

3 Needs review

Start over

Needs review

Sometimes automated checks identify *possible* accessibility problems that need to be reviewed and verified by a human.

Instances to review

Congratulations!

No instances to review were found. Continue investigating your app's accessibility compliance through manual testing.

Target app screenshot

3:57

Hello, World!

Welcome to .NET Multi-platform App UI

Get excited to leverage .NET Multi-platform App UI to build the most inclusive apps you've ever built!

Test

Manually run through the app yourself

Have the experts manually run through your app too

- Design manual test cases and run them regularly
- Work with accessibility experts and testers to get your app validated for accessibility through a more comprehensive process

Left panel (issues list)

A11y_.NET Core_Recipes App My Recipes New_New Recipe_New Recipe_Labels or Instructions: In "New Recipe" screen required fields are not marked up with any chevron/symbols. `a11y/recipes-app` `a11y-resolved`
`area/a11y` `p/1` `platform/windows 🪟` `t/bug`
#15743 by Swati1700 was closed on Jul 28 · .NET 8 GA 💬 1

A11y_.NET Core_Recipes App My Recipes New_New Recipe_NonTextContrast: Disabled "Save" button is not looking like disabled. `a11y/recipes-app` `a11y-resolved` `area/a11y` `p/1` `platform/windows 🪟` `t/bug`
#15740 by Swati1700 was closed on Jul 28 · .NET 8 GA 💬 2

A11y_.NET Core_Recipes App My Recipes New_New Recipe_NonTextContrast: Disabled "Save" button is not looking like disabled. `a11y/recipes-app` `a11y-resolved` `area/a11y` `p/1` `platform/macOS 🍎` `t/bug`
#15636 by Swati1700 was closed on Sep 12 · .NET 8 GA 💬 1

A11y_.NET Core_Recipes App My Recipes New_New Recipe_Voiceover: After changing the value for review, voice over is not announcing incorrect rating value. `a11y/recipes-app` `a11y-resolved`
`area/a11y` `p/1` `platform/macOS 🍎` `t/bug`
#15634 by Swati1700 was closed on Sep 12 · .NET 8 GA 💬 6

A11y_.NETCore_RecipesAppMyRecipesNew_NewRecipe_NonTextContrast: Disabled "Save" button is not looking like disabled. `a11y/recipes-app` `a11y-resolved` `area/a11y` `p/1` `platform/iOS 🍎` `t/bug`
#15628 by PoojaNamde was closed on Aug 17 · .NET 8 GA 💬 1

A11y_.NETCore_RecipesAppMyRecipesNew_NewRecipe_ScreenReader: Voice over is not announcing "Recipe Name" field as required field and not marked up with any chevron/symbol. `a11y/recipes-app` `a11y-resolved`
`area/a11y` `p/1` `platform/iOS 🍎` `t/bug`
#15627 by PoojaNamde was closed on Aug 17 · .NET 8 GA 💬 1

A11y_.NETCore_RecipesAppMyRecipesNew_NewRecipe_NonTextContrast: Disabled "Save" button is not looking like disabled. `a11y/recipes-app` `a11y-resolved` `area/a11y` `p/1` `platform/android 🤖` `t/bug`
#15626 by PoojaNamde was closed on Jul 25 · .NET 8 GA 💬 2

A11y_.NETCore_RecipesAppMyRecipesNew_NewRecipe_Screen: Talkback is not announcing "Recipe Name" field as required field and not marked up with any chevron/symbol. `a11y/recipes-app` `a11y-resolved`
`area/a11y` `p/1` `platform/android 🤖` `t/bug`
#15625 by PoojaNamde was closed on Jul 25 · .NET 8 GA 💬 1

A11y_.NETCore_RecipesAppMyRecipesEdit_EditRecipe_ScreenReader: After changing the value for review, voice over is not announcing new value, it's reading previous value. `a11y/recipes-app` `a11y-resolved` `area/a11y` `p/1`
`platform/iOS 🍎` `t/bug`
#15622 by PoojaNamde was closed on Aug 17 · .NET 8 GA 💬 4

A11y_.NET Core_MAUI_Recipe Search_Keyboard : The Recipe Items are not able to access using keyboard. `a11y/recipes-app` `a11y-resolved` `area/a11y` `p/1` `t/bug`
#15599 by Ashutoshsahoo164 was closed yesterday · .NET 8 GA 🔀 1 💬 11

A11y_.NET Core_MAUI_Recipe App_Screen reader : Narrator is announcing button but there is no visible control/button present in the screen `a11y/recipes-app` `a11y-resolved` `area/a11y` `p/1` `t/bug`
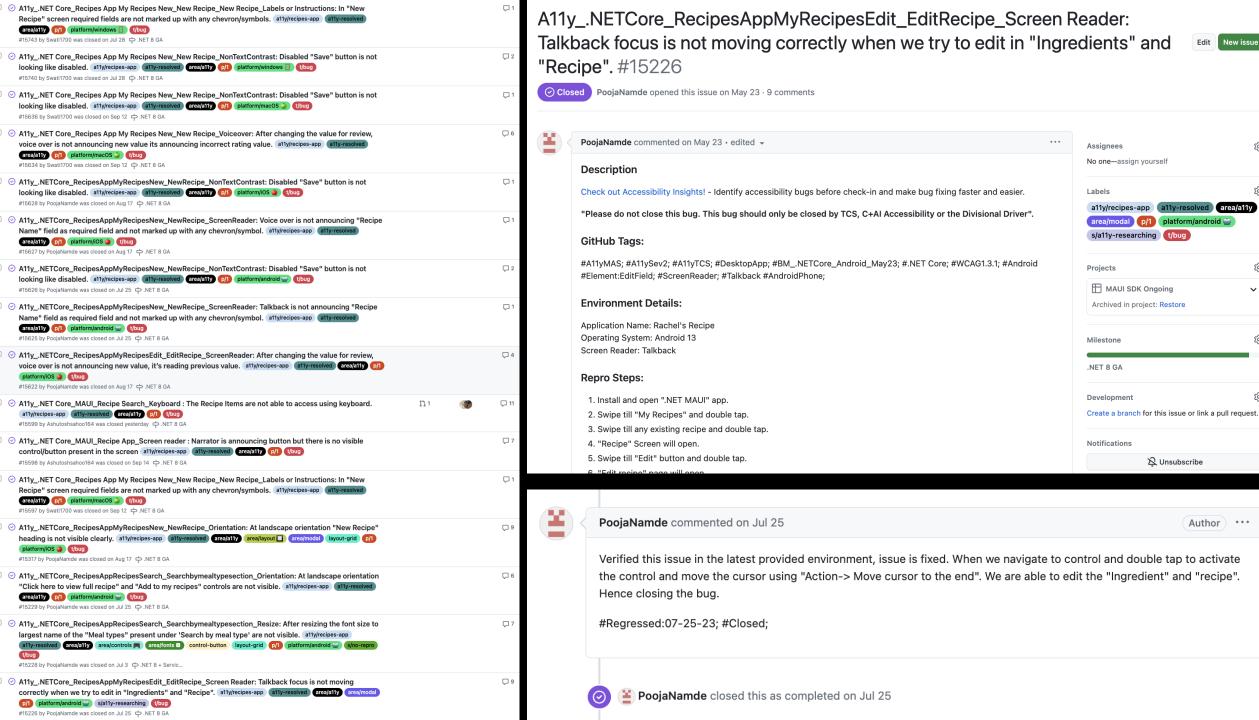#15598 by Ashutoshsahoo164 was closed on Sep 14 · .NET 8 GA 💬 7

A11y_.NET Core_Recipes App My Recipes New_New Recipe_New Recipe_Labels or Instructions: In "New Recipe" screen required fields are not marked up with any chevron/symbols. `a11y/recipes-app` `a11y-resolved`
`area/a11y` `p/1` `platform/macOS 🍎` `t/bug`
#15597 by Swati1700 was closed on Sep 12 · .NET 8 GA 💬 1

A11y_.NETCore_RecipesAppMyRecipesNew_NewRecipe_Orientation: At landscape orientation "New Recipe" heading is not visible clearly. `a11y/recipes-app` `a11y-resolved` `area/a11y` `area/layout ▫` `area/modal` `layout-grid` `p/1`
`platform/iOS 🍎` `t/bug`
#15317 by PoojaNamde was closed on Aug 17 · .NET 8 GA 💬 9

A11y_.NETCore_RecipesAppRecipesSearch_Searchbymealtypesection_Orientation: At landscape orientation "Click here to view full recipe" and "Add to my recipes" controls are not visible. `a11y/recipes-app` `a11y-resolved`
`area/a11y` `p/1` `platform/android 🤖` `t/bug`
#15229 by PoojaNamde was closed on Jul 25 · .NET 8 GA 💬 6

A11y_.NETCore_RecipesAppRecipesSearch_Searchbymealtypesection_Resize: After resizing the font size to largest name of the "Meal types" present under 'Search by meal type' are not visible. `a11y/recipes-app`
`a11y-resolved` `area/a11y` `area/controls 🎛` `area/fonts 🔤` `control-button` `layout-grid` `p/1` `platform/android 🤖` `s/no-repro`
`t/bug`
#15228 by PoojaNamde was closed on Jul 3 · .NET 8 + Servic... 💬 7

A11y_.NETCore_RecipesAppMyRecipesEdit_EditRecipe_Screen Reader: Talkback focus is not moving correctly when we try to edit in "Ingredients" and "Recipe". `a11y/recipes-app` `a11y-resolved` `area/a11y` `area/modal`
`p/1` `platform/android 🤖` `s/a11y-researching` `t/bug`
#15226 by PoojaNamde was closed on Jul 25 · .NET 8 GA 💬 9

Right panel (issue detail)

A11y_.NETCore_RecipesAppMyRecipesEdit_EditRecipe_Screen Reader: Talkback focus is not moving correctly when we try to edit in "Ingredients" and "Recipe". #15226

Edit New issue

🔒 **Closed** PoojaNamde opened this issue on May 23 · 9 comments

PoojaNamde commented on May 23 · edited ▾

Description

[Check out Accessibility Insights!](#) - Identify accessibility bugs before check-in and make bug fixing faster and easier.

"Please do not close this bug. This bug should only be closed by TCS, C+AI Accessibility or the Divisional Driver".

GitHub Tags:

#A11yMAS; #A11ySev2; #A11yTCS; #DesktopApp; #BM_.NETCore_Android_May23; #.NET Core; #WCAG1.3.1; #Android #Element:EditField; #ScreenReader; #Talkback #AndroidPhone;

Environment Details:

Application Name: Rachel's Recipe
Operating System: Android 13
Screen Reader: Talkback

Repro Steps:

1. Install and open ".NET MAUI" app.
2. Swipe till "My Recipes" and double tap.
3. Swipe till any existing recipe and double tap.
4. "Recipe" Screen will open.
5. Swipe till "Edit" button and double tap.
6. "Edit recipe" page will open.

Assignees ⚙
No one—assign yourself

Labels ⚙
`a11y/recipes-app` `a11y-resolved` `area/a11y`
`area/modal` `p/1` `platform/android 🤖`
`s/a11y-researching` `t/bug`

Projects ⚙
▦ MAUI SDK Ongoing ⌄
Archived in project: [Restore](#)

Milestone ⚙
.NET 8 GA

Development ⚙
[Create a branch](#) for this issue or link a pull request.

Notifications
🔕 Unsubscribe

PoojaNamde commented on Jul 25 [Author] ⋯

Verified this issue in the latest provided environment, issue is fixed. When we navigate to control and double tap to activate the control and move the cursor using "Action-> Move cursor to the end". We are able to edit the "Ingredient" and "recipe". Hence closing the bug.

#Regressed:07-25-23; #Closed;

✓ 🗒 **PoojaNamde** closed this as completed on Jul 25

The journey to accessible apps continues

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 to Accessible Apps: Meaningful Content

The Journey to Accessible Apps: Making 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.

both in design and
gical ordering,

the following ways:
hat provides an
ay entirely replace the
lementary in many
e of sighted users, even

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

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

Thank you!

🐦 **@therachelkang**

🐙 **@rachelkang**

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