To make the world's information universally accessible and useful

Android for Everyone

Accessibility in Mobile

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Make Tech Inclusive.
Make Inclusive Tech.

Kim Arnett @kaydacode

More users!

Risk Management

WHY?

Better for Everyone

The right thing to do

Accessibility is not only a “nice” thing to do, your app quality increases as you make it more accessible.

Victoria Gonda @ttgonda

Types of Disabilities

- Motor Impairments
  - May use a hardware device - Accessibility Switch - to control the app or accessibility menu
- Cognitive Impairments
  - May use Action Blocks to set up routines
- Visual Impairments
  - May use increased text size, Braille keyboard, or TalkBack
- Deaf and Hard of Hearing
  - May use Closed Captioning, Live Transcribe or Live Captioning

If you open your accessibility settings, you'll find even more options that folks might use on their device

What are the Web Content Accessibility Guidelines and why do they matter for mobile?

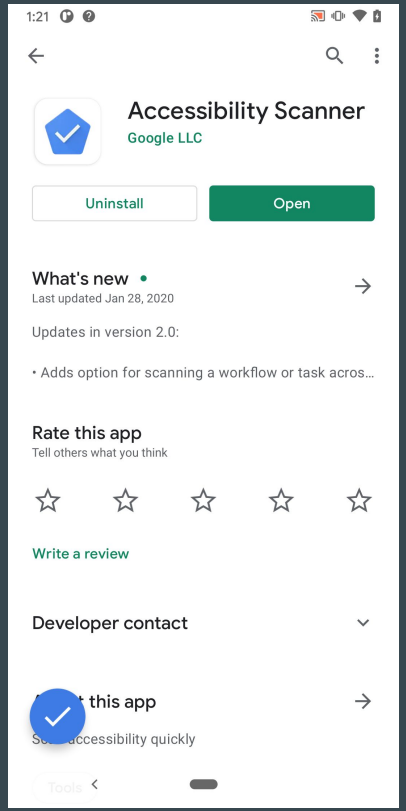
Learn more

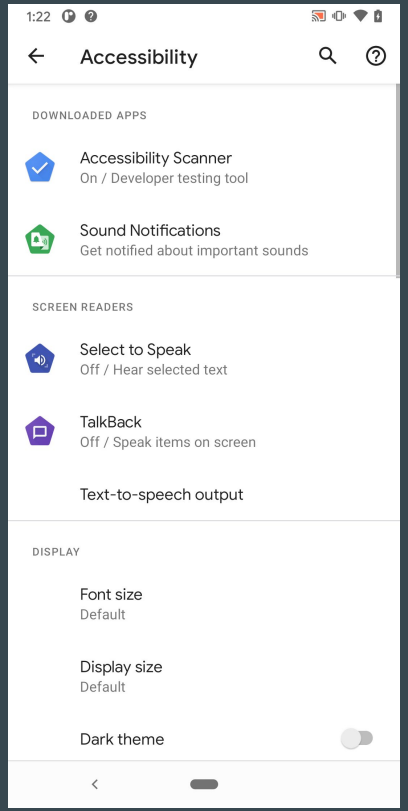
Consistency

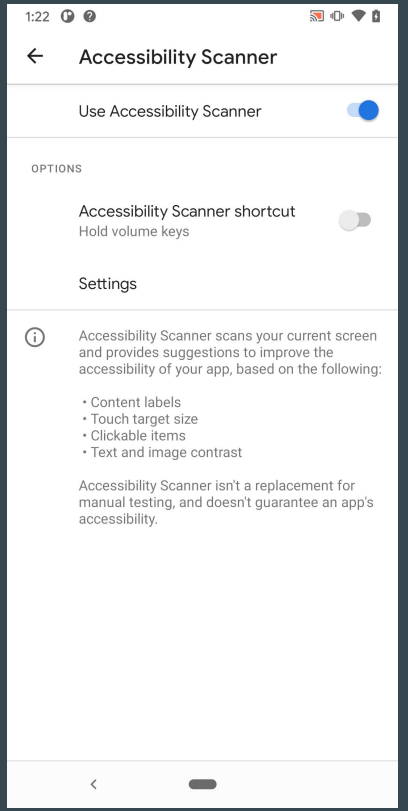
How to test your app for accessibility Learn More

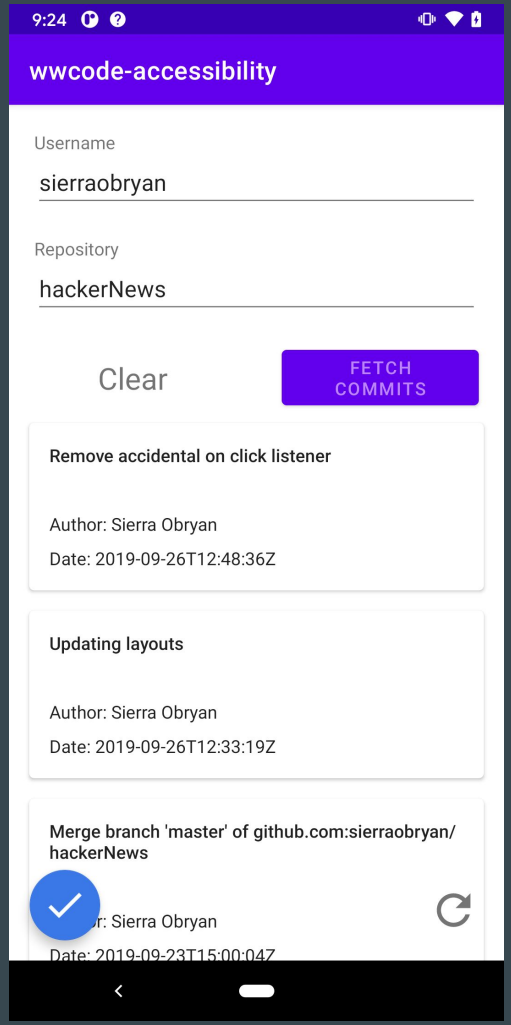
- User and Manual testing
- Analysis Tools
  - Accessibility Scanner
  - UI Automator Viewer
  - Lint
- Automated Testing
  - Espresso and Robolectric

Using the Accessibility Scanner [Get the app]

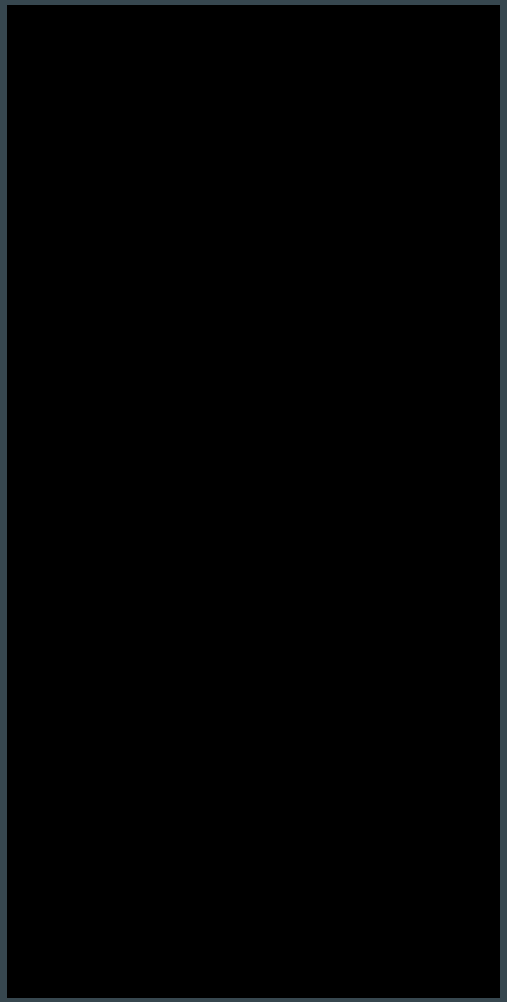




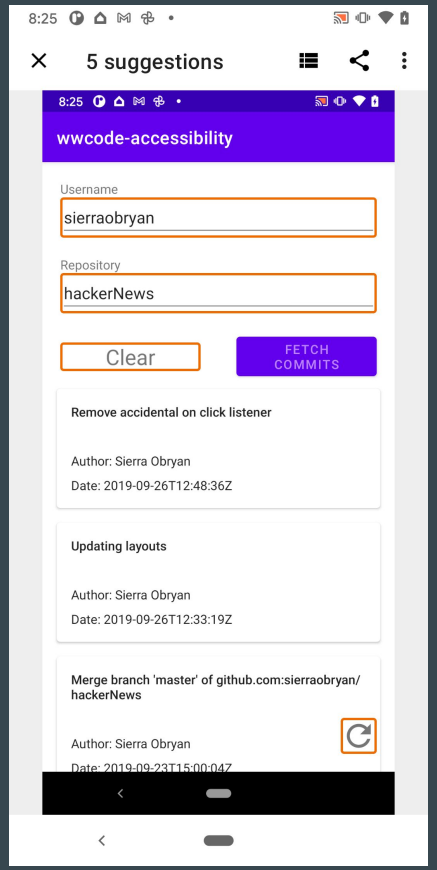


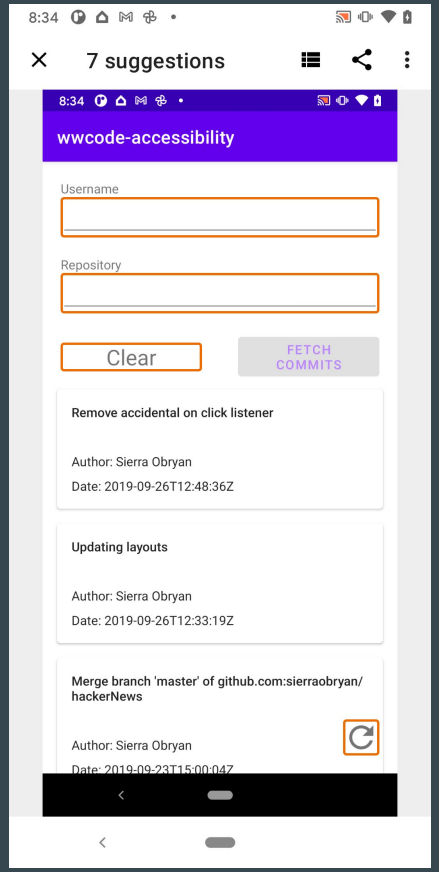


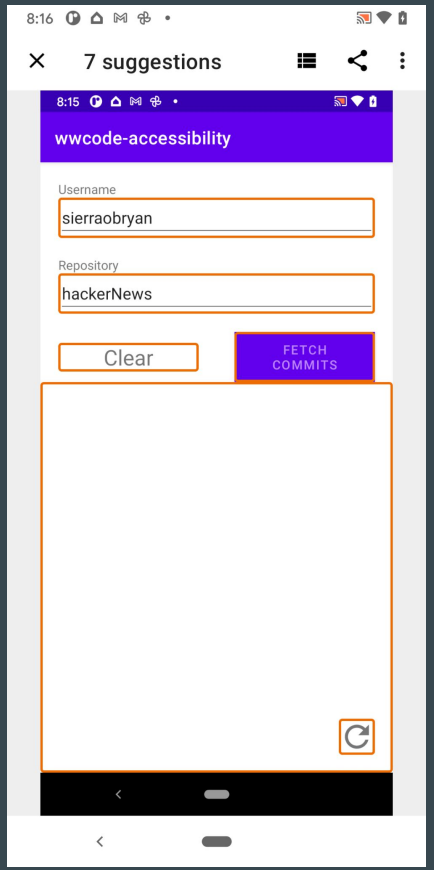
Let’s see how it works for a simple app



Accessibility Scanner is a good tool but it is NOT perfect - it can only check what's on the screen

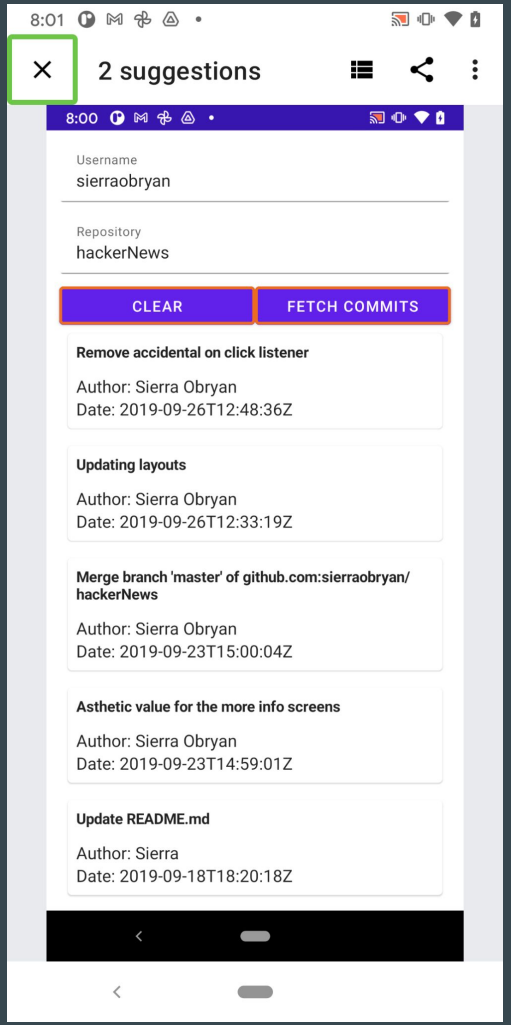


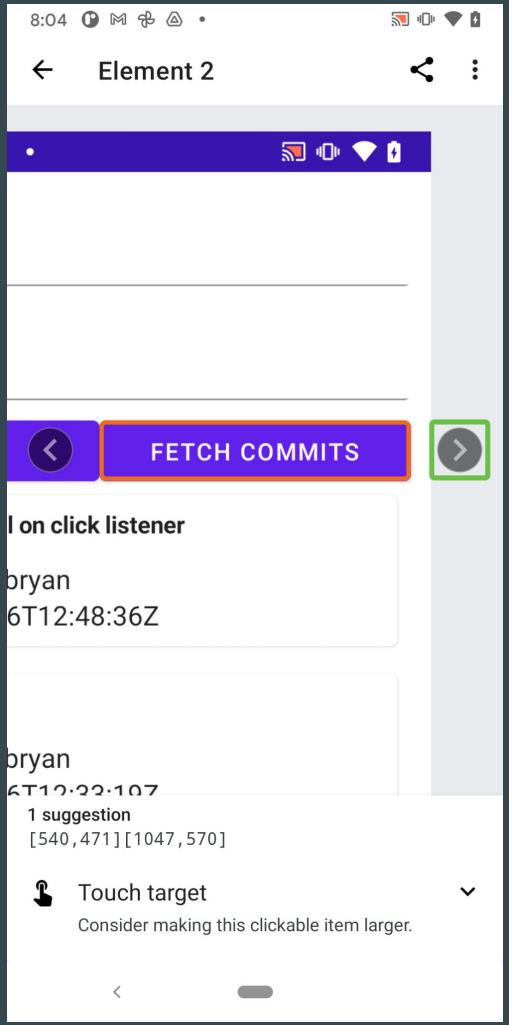




Does the scanner work for apps written with Compose?

Yes!


8:01
2 suggestions
8:00
Username
sierraobryan
Repository
hackerNews
CLEAR
FETCH COMMITS
Remove accidental on click listener
Author: Sierra Obryan
Date: 2019-09-26T12:48:36Z
Updating layouts
Author: Sierra Obryan
Date: 2019-09-26T12:33:19Z
Merge branch 'master' of github.com:sierraobryan/hackerNews
Author: Sierra Obryan
Date: 2019-09-23T15:00:04Z
Asthetic value for the more info screens
Author: Sierra Obryan
Date: 2019-09-23T14:59:01Z
Update README.md
Author: Sierra
Date: 2019-09-18T18:20:18Z


8:04
Element 2
FETCH COMMITS
1 suggestion
[540,471][1047,570]
Touch target
Consider making this clickable item larger.

Let’s jump in and talk about solving some of are accessibility suggestions!

Touch Targets Learn More

The recommended size for each interactive UI element's focusable area, or **touch target size**, is at least 48px by 48px.

This does **not** mean the UI element's visible area must be at least 48px by 48px.

This can be achieved with padding and height / width or minHeight / minWidth.

paddingTop + height/minHeight + paddingBottom ≥ 48dp
paddingStart + width/minWidth + paddingEnd ≥ 48dp

PS - what does minHeight do? Just adds padding to meet the required height

How do I decide when to set a size or set a min?

How do we do this in XML?

```
<TextView/EditText
    android:id="@+id/element_id"
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:minHeight="48dp"
    ...
/>
```

For dynamic text, consider using minHeight.

Remember :

Localization == Dynamic

Combine width + height and padding to keep the same UI but increase touch target

```
<ImageView
    android:layout_width="40dp"
    android:layout_height="40dp"
    ...
/>
```

```
<ImageView
    android:layout_width="48dp"
    android:layout_height="48dp"
    android:padding="8dp"
    ...
/>
```

```
TextField(
    value = value,
    onValueChange = onValueChanged,
    modifier = modifier
        .fillMaxWidth()
        .heightIn(min = 48.dp)
        .clip(shape = shapes.medium),
)
```

Use heightIn to set min (and max!) height and width

```
Icon(
    imageVector = icon,
    contentDescription = contentDescription,
    modifier = Modifier
        .clickable { ... }
        .size(40.dp)
)
```

What about Jetpack Compose?

Use modifiers to set size and padding

```
Icon(
    imageVector = icon,
    contentDescription = contentDescription,
    modifier = Modifier
        .clickable { ... }
        .padding(8.dp)
        .size(40.dp)
)
```

Color Contrast Learn more

Slides: 5.88 : 1

AA Compliance requires at least a requires **4.5 : 1** for regular text and **3 : 1** for large text

7.62 : 1 **3.92 : 1** **2.38 : 1**

How do I meet these requirements and stick to my theme?
Use Material Color Palettes!
How do I check my colors? There are lots of tools online!

Labels (and hints) Learn more

The basics of adding labels is that each UI element in your app includes a description that describes the element's purpose.

We do this using `contentDescription` although we get some for free - we do not need to provide a description for `TextView` because Android Accessibility automatically announces the text as the description.

Some best practices: Use the right UI element, don’t include the UI element in the description, descriptions should be unique, skip over decorative effects

Localized, Concise, descriptive

There’s a lot to think about with Labels

Does it need a label? It depends but generally...

TextView: No

EditText: Include a hint

Text Button: No

ImageButton: Yes

ImageView: Maybe

Is it a decorator?

Can it be skipped?

Do they make more sense together?

Should it be grouped?

How will it be read?

Does it include numbers or abbreviations?

Use the right UI Element

If you're adding an onClick action to one of these...	Consider using these...
I want to add an onClick to a TextView	Use a Button
I want to add an onClick to a ImageView	Use an ImageButton
I want to make a Text Composable clickable	Use a Button Composable
I want to make a Icon Composable clickable	Use a IconButton Composable

EditText Learn more

```
<TextView
    android:id="@+id/name"
    android:text="@string/username"
    android:labelFor="@id/username_input"
    ...
    />

<EditText
    android:id="@+id/username_input"
    android:layout_width="0dp"
    android:minHeight="48dp"
    android:layout_height="wrap_content"
    ...
    />
```

Pairs of elements where one describes the other

```
<TextView
    android:id="@+id/repo"
    android:text="@string/repository"
    ...
    />

<EditText
    android:id="@+id/repo_input"
    android:layout_width="0dp"
    android:layout_height="wrap_content"
    android:minHeight="48dp"
    android:hint="@string/repository"
    ...
    />
```

Hint is example of valid input and available to the screen reader

Grouping Labels Learn more

- Out of the box, the TalkBack will read each RecyclerView as one continuous label and include the position in the list

```
<androidx.constraintlayout.widget.ConstraintLayout
   android:id="@+id/container a"
   android:layout width="match parent"
   android:layout height="wrap content"
   android:screenReaderFocusable="true" (3)
>

</androidx.constraintlayout.widget.ConstraintLayout>

<androidx.constraintlayout.widget.ConstraintLayout
   android:id="@+id/container b"
   android:layout width="match parent"
   android:layout height="wrap content"
   android:screenReaderFocusable="true" (3)
>

</androidx.constraintlayout.widget.ConstraintLayout>
```

1. If I add screenReaderFocusable to one of the UI elements, it will read it separately
2. If this were not a recyclerView, I can use view attributes to make it read as natural group - this can make finding information on your screen more efficient
3. Sometimes you may want to read the container itself

What about Jetpack Compose?

For some composables, we have access to the content description in function parameters

```
@Composable
fun Image(
    painter: Painter,
    contentDescription: String?,
    modifier: Modifier = Modifier,
    alignment: Alignment = Alignment.Center,
    contentScale: ContentScale = ContentScale.Fit,
    alpha: Float = DefaultAlpha,
    colorFilter: ColorFilter? = null
)
```

Now let’s look at our TextField

```
TextField(
    ...
    placeholder = { Text(text = "Placeholder") },
    ...
)
```

IThe placeholder text is like a hint - it will show in our Textfield when there is no input.

```
TextField(
    ...
    label = { Text(text = "Label") },
    ...
)
```

A label will act like both like the placeholder and as a label above the TextField

Semantics add context to your UI elements.

Content Description
State Description
Progress Bar Range Info
Heading
Pane Title
Disabled
Live Region
Focused
Invisible to User
Scroll Axis Range
Pop up
Dialog
Role
Password
Selectable Group
Custom Actions
onClick
onLongClick

We can also combine our views

In this example, our all three Texts will be read as a group

```
Column(
    modifier = Modifier.weight(1f)
        .semantics(mergeDescendants = true) {}
) {
    Text(text = commit.commitMessage)
    Text(text = "Author: ${commit.author}")
    Text(text = "Date: ${commit.date}")
}
```

In this example, our Column, Text, and TextField will be each be read separately.

```
Column(modifier = Modifier
    .fillMaxWidth()
    .semantics {
        contentDescription = "Container"
    }
) {
    Text(text = "Text")
    TextField(label = { Text(text = "Label") })
}
```

There are a lot of tools to help

And so there are many UI attributes to help build an accessible UI (learn more)

```
labelFor
screenReaderFocusable
accessibilityHeading
```

```
All of our
Semantics Properties!
```

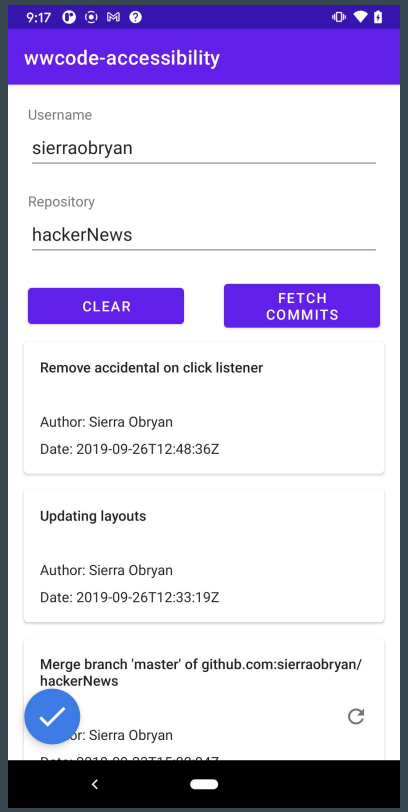
A TtsSpan is a special type of span that can pass in metadata to give contextual information about the string. This information can help Text to Speech correctly pronounce a text element

123456789 TYPE_DIGIT

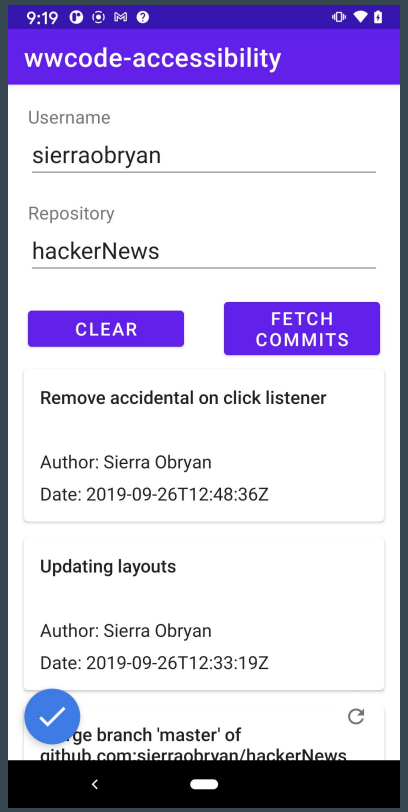
“1 hundred 23 million 4 hundred 56 thousand 7 hundred 89” vs
“1 2 3 4 5 6 7 8 9 ”

Think about (different) Displays Learn more

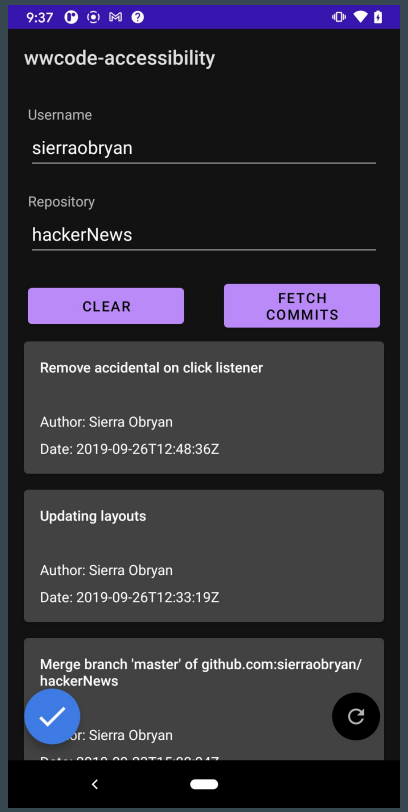
Normal



Large Text



Dark Mode



What else?

- Custom Views and Accessibility APIs
  - Swipe to delete
  - Actions
  - Spans with link
  - Custom Alerts
- Other Media

Swipe to delete

```
ViewCompat.addAccessibilityAction(mailCell, R.string.remove, (v,b) ->
    mailCell.delete());
```

Spans with links

```
ViewCompat.enableAccessibleClickableSpanSupport(hamsterInfoView);
```

Custom view

```
ViewCompat.setAccessibilityPaneTitle(alertView, R.string.alertTitle);
```

```
Column(
    modifier = Modifier
        .semantics { paneTitle = "Alert Title" }
) { ... }
```

Accessibility-friendly title for a screen's pane

Adding a custom action

```
Column(
    modifier = Modifier
        .semantics {
            customActions = listOf(
                CustomAccessibilityAction(
                    label = "Delete",
                    action = { delete(); true }
                )
            )
        }
) { ... }
```

UI Testing!

What's next?

The Web Content Accessibility Guidelines are set to be updated in 2021

what does that mean for mobile?

Draft 1 was published in late January and continues to have updates

where do I learn more?

Android Accessibility by Tutorials! by Victoria Gonda

I'm just getting started with Accessibility + Compose

what should I do next?

Jetpack Compose: Accessibility and the new Code Lab

To make the world's information universally accessible and useful

Thank you!

...

Where to find me?

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