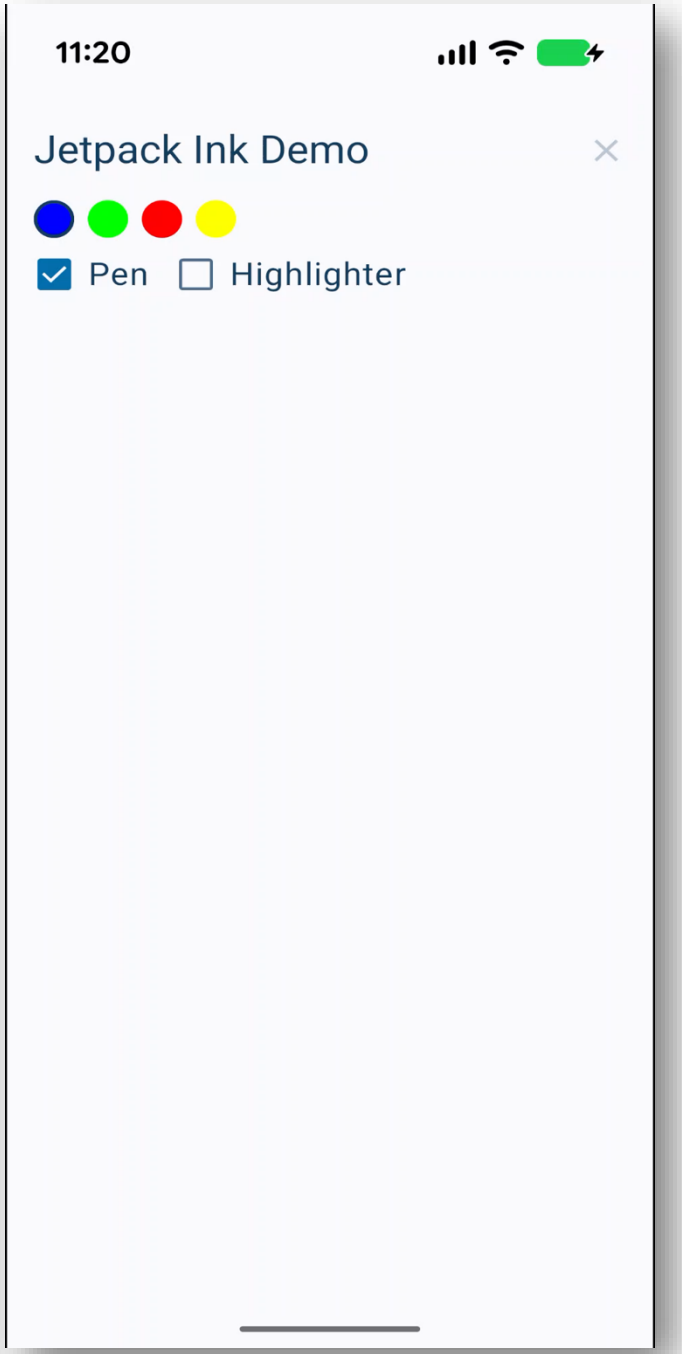
Supporting stylus input on Android using Jetpack Ink API

Thomas Künneth

Experts

Photo Art by Monika Künneth



https://github.com/tkuenneth/JetpackInkDemo

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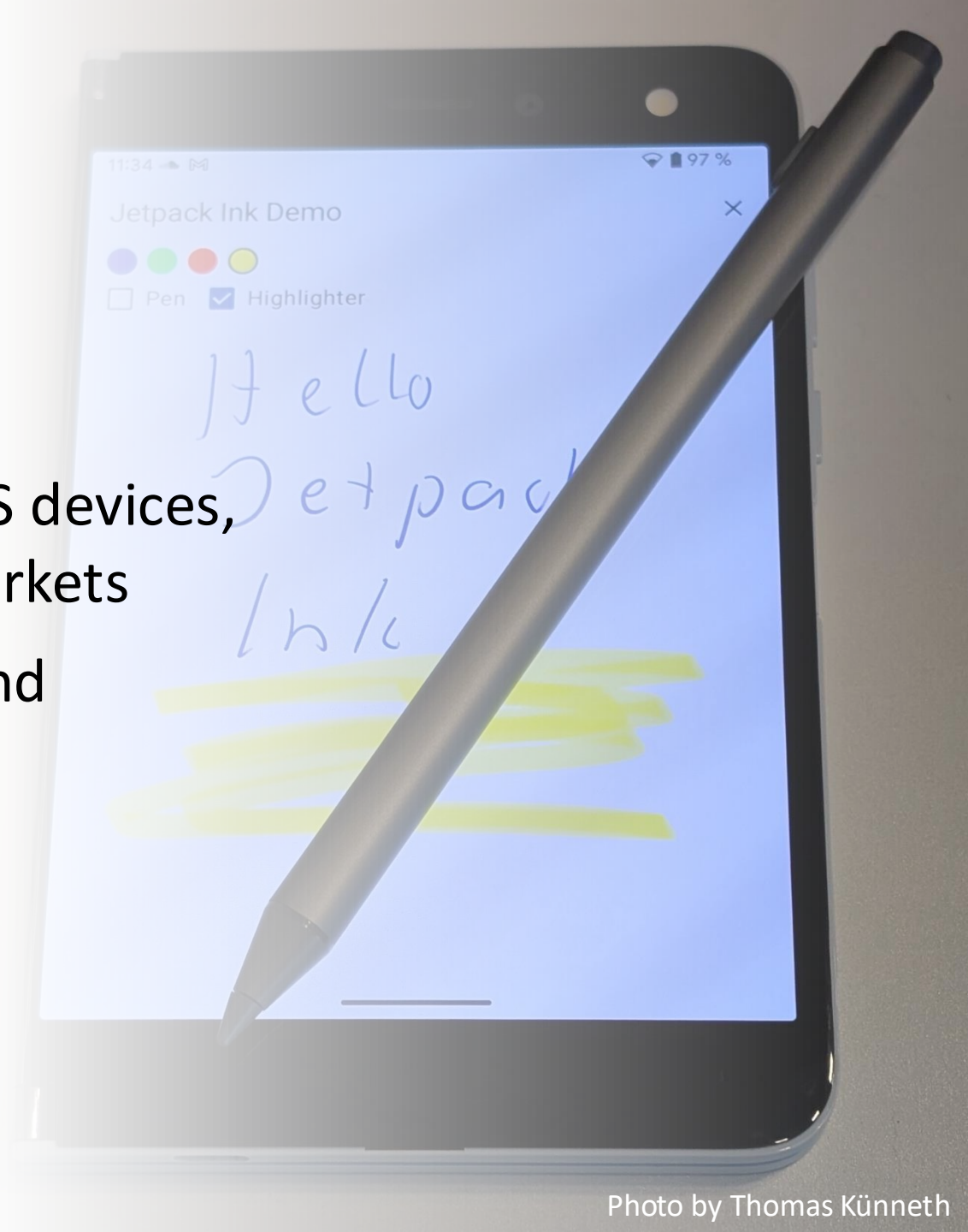
Do styluses matter?

- Very popular among Samsung users
- Standard feature on modern ChromeOS devices, especially in education and creative markets
- Elsewhere, stylus support is sporadic and inconsistent



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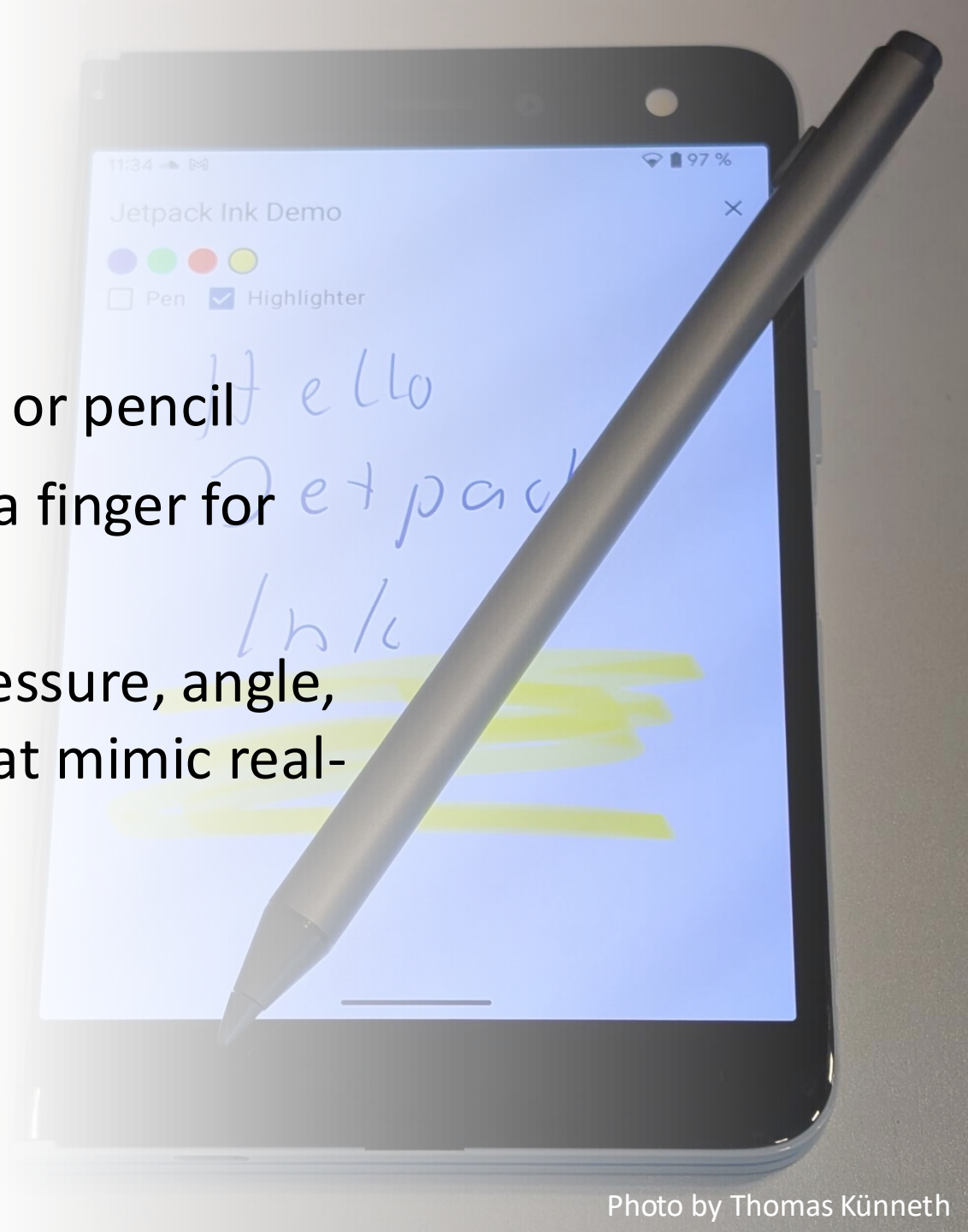
A premium experience

- Using a stylus feels like using a real pen or pencil
- A stylus offers much finer control than a finger for detailed tasks
- Styluses provide rich data, including pressure, angle, and tilt, allowing for realistic strokes that mimic real-world tools



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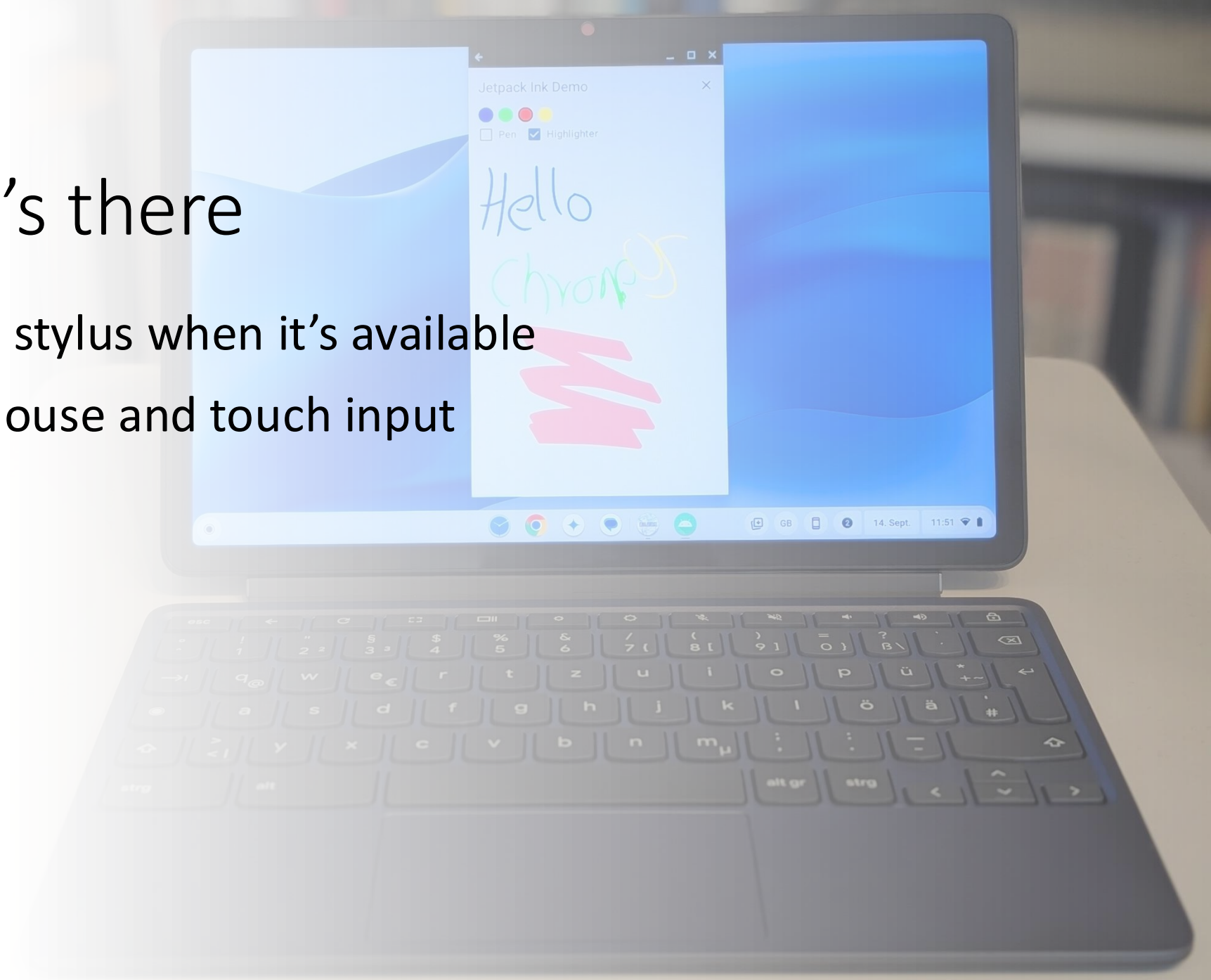
Support what’s there

- Take advantage of a stylus when it’s available
- But don’t neglect mouse and touch input



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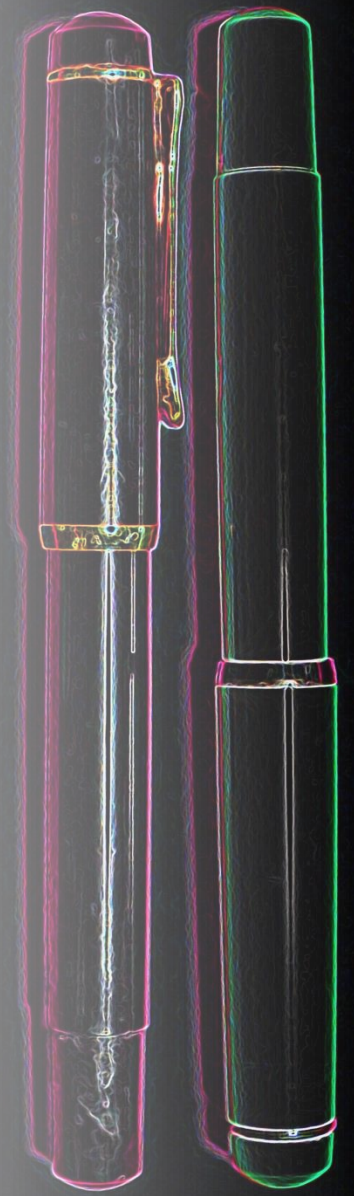
Jetpack Ink API

- Abstracts away the complexities of graphics and geometry, allowing you to focus on your app's unique inking features
- Built-in low latency support and optimized rendering ensure a smooth and responsive inking experience

- First release 1.0.0-alpha01 was made available early October 2024
- As of September 2025, current release is 1.0.0-alpha06
- Google currently updating docs and samples



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- Leverages benefits of styluses
- Also works with finger and mouse input
- Modular design allows you to pick and choose the components you need

- **Strokes**: Foundation of the library; represents ink input and its visual representation
- **Brush**: Defines the look of your strokes: color, thickness, and style
- **Rendering**: Efficiently draws the ink, ensuring it looks great in both Jetpack Compose and Android Views

- **Geometry**: Provides the building blocks for creating tools like erasers and selection areas
- **Authoring**: Captures touch input and turns it into smooth, responsive ink on the screen with lowest possible latency
- **Storage**: Helps saving and loading strokes

```
dependencies {
    implementation(libs.androidx.ink.authoring)
    implementation(libs.androidx.ink.authoring.compose)
    implementation(libs.androidx.ink.brush)
    implementation(libs.androidx.ink.geometry)
    implementation(libs.androidx.ink.rendering)
    implementation(libs.androidx.ink.strokes)
    implementation(libs.androidx.ink.storage)
}
```

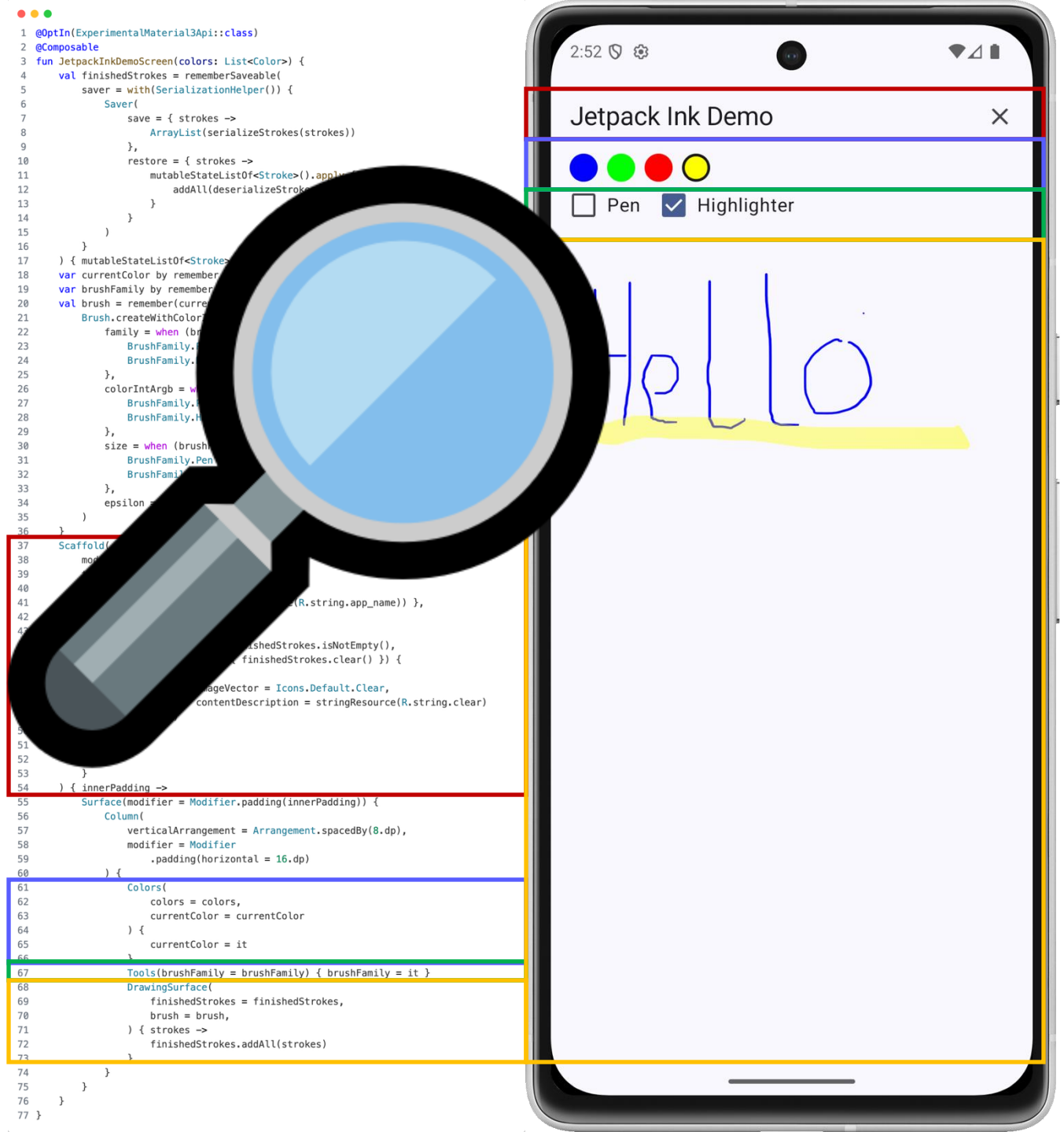
```
[versions]
inkVersion = "1.0.0-alpha06"

[libraries]
androidx-ink-authoring = { module = "androidx.ink:ink-authoring", version.ref = "inkVersion" }
androidx-ink-authoring-compose = { module = "androidx.ink:ink-authoring-compose", version.ref = "inkVersion" }
androidx-ink-brush = { module = "androidx.ink:ink-brush", version.ref = "inkVersion" }
androidx-ink-geometry = { module = "androidx.ink:ink-geometry", version.ref = "inkVersion" }
androidx-ink-rendering = { module = "androidx.ink:ink-rendering", version.ref = "inkVersion" }
androidx-ink-strokes = { group = "androidx.ink", name = "ink-strokes", version.ref = "inkVersion" }
androidx-ink-storage = { group = "androidx.ink", name = "ink-storage", version.ref = "inkVersion" }
```

```kotlin
class MainActivity : ComponentActivity() {

    @OptIn(ExperimentalMaterial3Api::class)
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        enableEdgeToEdge()
        setContent {
            MaterialTheme(
                colorScheme = defaultColorScheme()
            ) {
                JetpackInkDemoScreen(
                    colors = listOf(
                        Color.Blue, Color.Green, Color.Red, Color.Yellow
                    )
                )
            }
        }
    }
}
```

That's what we will be focusing on 😊



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```kotlin
val finishedStrokes = rememberSaveable(
    saver = with(SerializationHelper()) {
        Saver(
            save = { strokes ->
                ArrayList(serializeStrokes(strokes))
            },
            restore = { strokes ->
                mutableStateListOf<Stroke>().apply {
                    addAll(deserializeStrokes(strokes))
                }
            }
        )
    }
) { mutableStateListOf<Stroke>() }
```

Parameter passed to `DrawingSurface`.
The list contains all completed strokes.

No persistence, but we survive configuration changes 😎

Updated by the color and tool selectors

```
1  var currentColor by remember { mutableStateOf(colors.first()) }
2  var brushFamily by remember { mutableStateOf(BrushFamily.Pen) }
3  val brush = remember(currentColor, brushFamily) {
4      Brush.createWithColorIntArgb(
5          family = when (brushFamily) {
6              BrushFamily.Pen -> StockBrushes.pressurePenLatest
7              BrushFamily.Highlighter -> StockBrushes.highlighterLatest
8          },
9          colorIntArgb = when (brushFamily) {
10             BrushFamily.Pen -> currentColor.toArgb()
11             BrushFamily.Highlighter -> currentColor.copy(alpha = 0.4F).toArgb()
12         },
13         size = when (brushFamily) {
14             BrushFamily.Pen -> 5F
15             BrushFamily.Highlighter -> 55F
16         },
17         epsilon = 0.1F
18     )
19 }
```

```
enum class BrushFamily { Pen, Highlighter }
```

Parameter passed to `DrawingSurface`.
Brushes are essential for inking

```kotlin
@Composable
fun DrawingSurface(
    finishedStrokes: Collection<Stroke>,
    brush: Brush,
    modifier: Modifier = Modifier,
    addStrokes: (Collection<Stroke>) -> Unit
) {
    val canvasStrokeRenderer = remember { CanvasStrokeRenderer.create() }
    val latestBrush by rememberUpdatedState(brush)
    Box(modifier = modifier.clipToBounds()) {
        InProgressStrokes(
            defaultBrush = brush,
            nextBrush = { latestBrush },
            onStrokesFinished = addStrokes
        )
        FinishedStrokes(
            finishedStrokes = finishedStrokes,
            canvasStrokeRenderer = canvasStrokeRenderer
        )
    }
}
```

```kotlin
DrawingSurface(
    finishedStrokes = finishedStrokes,
    brush = brush,
) { strokes ->
    finishedStrokes.addAll( elements = strokes)
}
```

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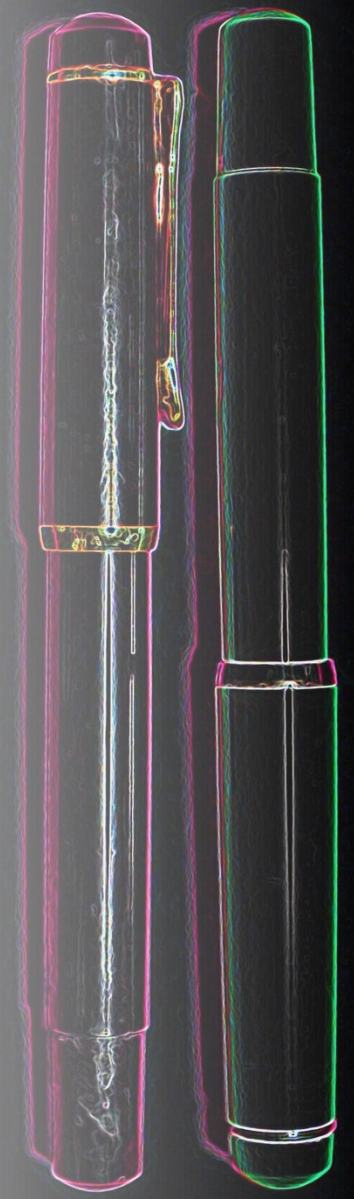
```
val canvasStrokeRenderer = remember { CanvasStrokeRenderer.create() }
```

```
@Composable
fun FinishedStrokes(
    finishedStrokes: Collection<Stroke>,
    canvasStrokeRenderer: CanvasStrokeRenderer
) {
    val canvasTransform = remember { Matrix() }
    Canvas(modifier = Modifier.fillMaxSize()) {
        // This is a no-op as canvasTransform is an identity matrix.
        drawContext.canvas.nativeCanvas.concat(canvasTransform)
        finishedStrokes.forEach { stroke ->
            canvasStrokeRenderer.draw(
                stroke = stroke,
                canvas = drawContext.canvas.nativeCanvas,
                strokeToScreenTransform = canvasTransform
            )
        }
    }
}
```

Wrap up

- Works great, fun to use
- Some areas look and feel a little barebones
- Part of the philosophy
  - Get the basic parts stable
  - Add more goodies along the way



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What to look at next

- Persistance and state preservation: basic loading and saving capabilities in the `storage` package
- Editing and erasing: support available through the `geometry` package
- Scrolling and zooming: nothing there, it’s entirely up to you

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Experts

Resources

- Android Developers Blog post; https://android-developers.googleblog.com/2024/10/introducing-ink-api-jetpack-library.html
- API Reference https://developer.android.com/jetpack/androidx/releases/ink
- Add inking to your app with the Ink API https://developer.android.com/develop/ui/compose/touch-input/stylus-input/about-ink-api
- Ink API Compose by Nicos Nicolaou https://github.com/NicosNicolaou16/Ink_Api_Compose

Thank you!

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