Washtenaw Community College
ANN ARBOR, MICHIGAN

CPS251

Android Development

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FlowRow and FlowColumn

Introduction

Have you ever tried to display a list of items that's too wide for your screen? Or maybe you've needed to show multiple columns of content that need to wrap when they run out of space? That's exactly what FlowRow and FlowColumn are designed to handle!

Think of them like text wrapping in a word processor: when text hits the edge of the page, it automatically moves to the next line. FlowRow and FlowColumn do the same thing for your UI elements, making them perfect for creating responsive layouts that adapt to different screen sizes.

Quick Reference

Component	Description	Common Use
FlowRow	Arranges items horizontally with automatic wrapping	Tag clouds, button groups, filter chips
FlowColumn	Arranges items vertically with automatic column wrapping	Image galleries, card layouts, content grids

When to Use FlowRow and FlowColumn

- When you need items to wrap to new lines/columns automatically

- For responsive layouts that adapt to different screen sizes
- When displaying dynamic content that might grow or shrink
- For creating tag clouds, filter chips, or button groups
- When building image galleries or card layouts

Important Note: Experimental API

Before we dive into the examples, there's one important thing to know: `FlowRow` and `FlowColumn` are part of Jetpack Compose's experimental layout system. This means they work great but might have minor changes in future updates. To use them, you need to add this line above any composable function that uses them:

```
@OptIn(ExperimentalLayoutApi::class)
```

FlowRow in Action

Let's look at a basic example of `FlowRow` that displays several items:

```
@OptIn(ExperimentalLayoutApi::class)
@Composable
fun FlowRowExample() {
    FlowRow(
        modifier = Modifier.padding(16.dp),
        horizontalArrangement = Arrangement.spacedBy(8.dp),
        verticalArrangement = Arrangement.spacedBy(8.dp)
    ) {
        Text("Item 1", modifier = Modifier.background(Color.LightGray).padding(8.dp))
        Text("Item 2", modifier = Modifier.background(Color.LightGray).padding(8.dp))
        Text("Item 3", modifier = Modifier.background(Color.LightGray).padding(8.dp))
        Text("Item 4", modifier = Modifier.background(Color.LightGray).padding(8.dp))
        Text("Item 5", modifier = Modifier.background(Color.LightGray).padding(8.dp))
        Text("Item 6", modifier = Modifier.background(Color.LightGray).padding(8.dp))
```

```
    }
}
```

The items shown above automatically wrap to the next line when they run out of space. This is perfect for creating responsive layouts!

FlowColumn Example

Here's how FlowColumn works - it's similar to FlowRow but stacks elements vertically and wraps to new columns when needed:

```
@OptIn(ExperimentalLayoutApi::class)
@Composable
fun FlowColumnExample() {
    FlowColumn(
        modifier = Modifier.padding(16.dp),
        verticalArrangement = Arrangement.spacedBy(8.dp),
        horizontalArrangement = Arrangement.spacedBy(8.dp)
    ) {
        Text("Item 0", modifier = Modifier.background(Color.Cyan).padding(8.dp))
        Text("Item 1", modifier = Modifier.background(Color.Cyan).padding(8.dp))
        Text("Item 2", modifier = Modifier.background(Color.Cyan).padding(8.dp))
        Text("Item 3", modifier = Modifier.background(Color.Cyan).padding(8.dp))
        Text("Item 4", modifier = Modifier.background(Color.Cyan).padding(8.dp))
        Text("Item 5", modifier = Modifier.background(Color.Cyan).padding(8.dp))
        Text("Item 6", modifier = Modifier.background(Color.Cyan).padding(8.dp))
        Text("Item 7", modifier = Modifier.background(Color.Cyan).padding(8.dp))
        Text("Item 8", modifier = Modifier.background(Color.Cyan).padding(8.dp))
        Text("Item 9", modifier = Modifier.background(Color.Cyan).padding(8.dp))
    }
}
```

Interactive Example: Dynamic FlowRow

Let's make things more interesting by creating a dynamic FlowRow and FlowColumn that lets users add items at runtime:

FlowRow Part:

```
@OptIn(ExperimentalLayoutApi::class)
@Composable
fun DynamicFlowRow() {
    // State to track number of items
    var itemCount by remember { mutableStateOf(1) }

    Column(
        modifier = Modifier.padding(16.dp)
    ) {
        // Button to add more items
        Button(onClick = { itemCount++ }) {
            Text("Add Row Item")
        }

        Spacer(modifier = Modifier.height(16.dp))

        // FlowRow automatically wraps items to new rows when they exceed the width
        FlowRow(
            horizontalArrangement = Arrangement.spacedBy(8.dp),  // Space between items
horizontally
            verticalArrangement = Arrangement.spacedBy(8.dp)     // Space between rows
        ) {
            // Create items based on itemCount
            for (i in 1..itemCount) {
                Text(
                    "Item $i",
                    modifier = Modifier
                        .background(Color.LightGray)  // Light gray background for visibility
```

```
                .padding(horizontal = 12.dp, vertical = 8.dp)  // Padding inside each item
            )
        }
    }
}
```

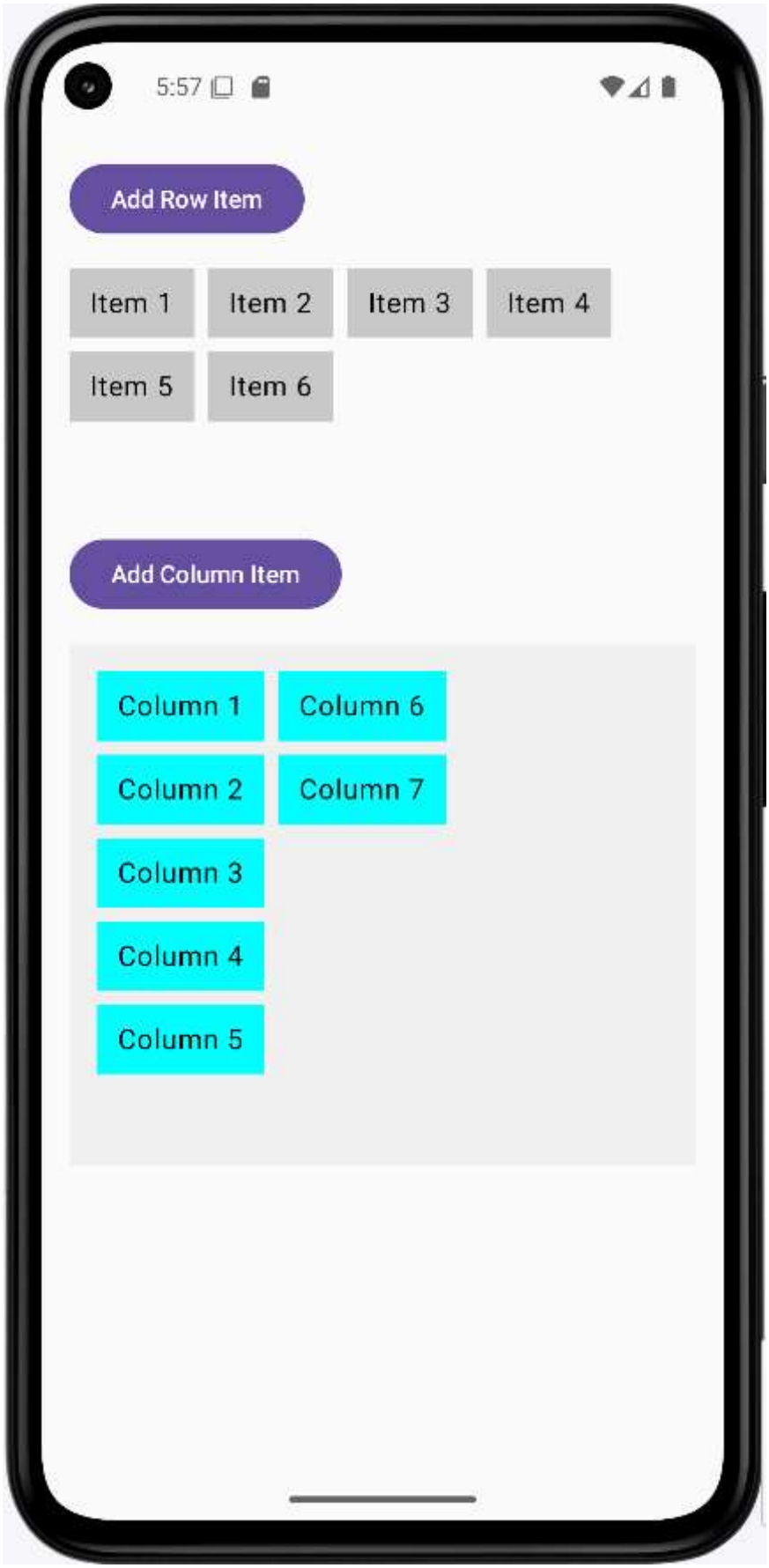
FlowColumn Part

```
@OptIn(ExperimentalLayoutApi::class)
@Composable
fun DynamicFlowColumn() {
    // State to track number of items
    var itemCount by remember { mutableStateOf(1) }

    Column(
        modifier = Modifier.padding(16.dp)
    ) {
        // Button to add more items
        Button(onClick = { itemCount++ }) {
            Text("Add Column Item")
        }

        Spacer(modifier = Modifier.height(16.dp))

        // Box with fixed height to demonstrate flowing behavior
        Box(
            modifier = Modifier
                .fillMaxWidth()
                .height(300.dp)  // Fixed height container
                .background(Color.LightGray.copy(alpha = 0.2f))  // Light background to show
container
                .padding(16.dp)
```

```
        ) {
            // FlowColumn automatically wraps items to new columns when they exceed the
height
            FlowColumn(
                modifier = Modifier.fillMaxWidth(),
                verticalArrangement = Arrangement.spacedBy(8.dp),    // Space between items
vertically
                horizontalArrangement = Arrangement.spacedBy(8.dp)   // Space between
columns
            ) {
                // Create items based on itemCount
                for (i in 1..itemCount) {
                    Text(
                        "Column $i",
                        modifier = Modifier
                            .background(Color.Cyan)  // Cyan background for visibility
                            .padding(horizontal = 12.dp, vertical = 8.dp)  // Padding inside each item
                    )
                }
            }
        }
    }
}
```

How this example renders

Above is just a snippet of the code to view the full code, you need to go to my GitHub page and look at the **chapter5 flow_code.kt file**.



Tips for Success

- Always add the `@OptIn(ExperimentalLayoutApi::class)` annotation when using these components
- Use `horizontalArrangement` and `verticalArrangement` to control spacing between items
- Consider using `Modifier.padding()` to add space around your flow layouts
- Test your layout with different screen sizes to ensure proper wrapping

Common Mistakes to Avoid

- Forgetting to add the `@OptIn` annotation
- Not considering the minimum width/height of items when they wrap
- Using flow layouts when a simple `Row` or `Column` would suffice
- Not testing the layout with different content sizes

Best Practices

- Use flow layouts for dynamic content that might change size
- Add appropriate spacing between items using arrangement parameters
- Consider accessibility when items wrap to new lines/columns
- Test your layout with various screen sizes and orientations