Week 3 Lecture

Displaying Lists of Data

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What are we building this week?

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How to display and interactive with a dynamic number of UI elements?

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How to use a RecyclerView to display, and interact with, a dynamic number of UI elements?

Project Demo

What are we building this week?

Week 3 Project Updates

- Rename app
- Display scrolling list of daily weather forecast data
- Weather data should be psuedo-randomized
- Pressing a list item should display touch feedback
- Clicking a list item should display a Toast message

Displaying Dynamic Data

How to display, and interact, with a dynamic number of UI elements?

Modern apps require dynamic data & UI

Dynamic UI

How can we build user interfaces without knowing ahead of time how many items will be on the screen?

Dynamic View Containers

ScrollView

Allows user to scroll a layout too big to fit on the screen

ListView

Displays a scrolling collection of views

ViewPager

Enables swiping horizontally through collections of data

RecyclerView

A flexible container for efficiently displaying, and interacting with, large sets of data.

Why RecyclerView?

Why
RecyclerView?

- Efficient recycling of views
- Flexible layout system
- Support for animations and decorations

Efficient Recycling

- As user scrolls, views leave the screen and are recycled
- This limits the number of new views that must be inflated
- Recycled views are then used to bind new items as they come onto the screen

Flexible Layout System

LinearLayoutManager

Lays items out vertically or horizontally

GridLayoutManager

Lays items out in a grid

Custom LayoutManager

Define your own LayoutManager behavior for custom layouts

Animations & Decorations

- Built in support for animating the addition and removal of items
- Add ItemDecorations to customize how individual items are drawn to the screen

RecyclerView In Action

How does it work?

RecyclerView

RecyclerView.LayoutManager

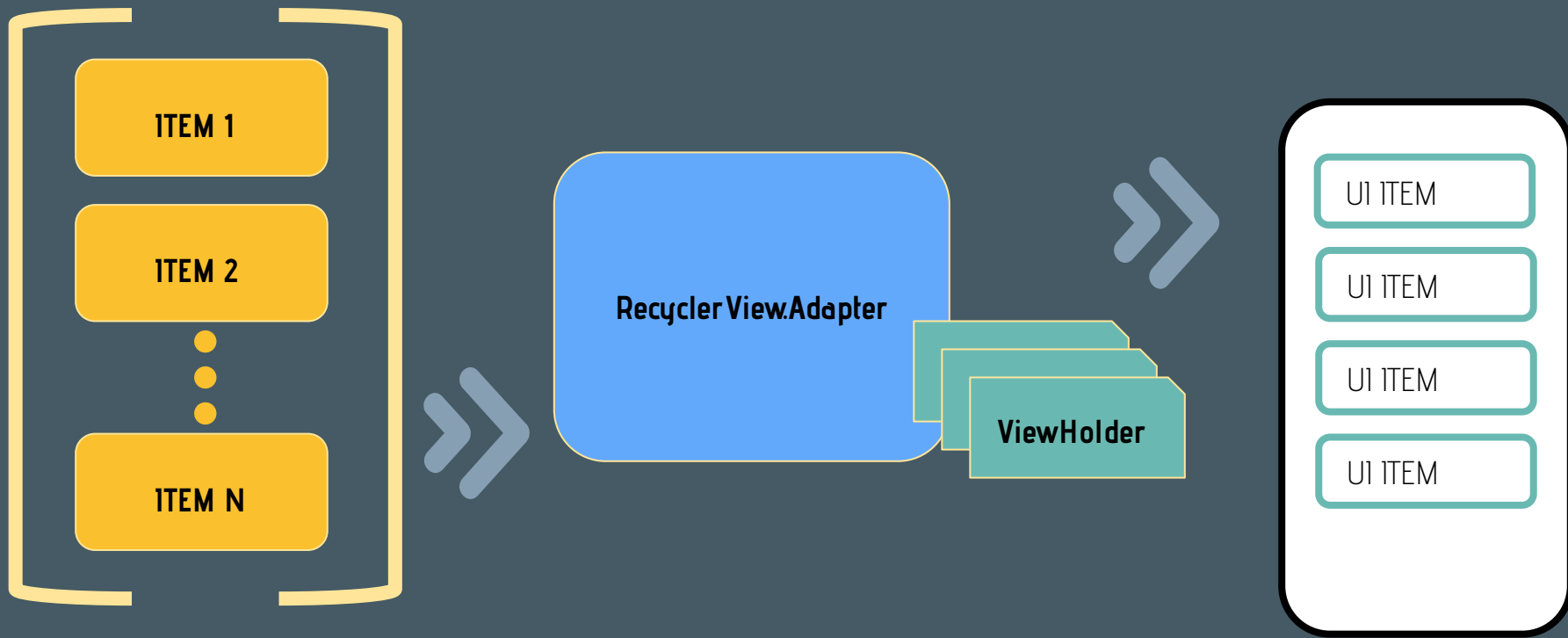Controls how individual views are laid out
on the screen

RecyclerView.Adapter

Connects data to individual views

RecyclerView.ViewHolder

Effeciently binds pieces of data to
individual view items

ITEM 1

ITEM 2

ITEM N

Recycler View.Adapter

ViewHolder

UI ITEM

UI ITEM

UI ITEM

UI ITEM

Defining A Data Model

How will we model our weather data?

What do we mean by "modeling data"?

How do you model data? Why do we model data?

Why Do We Model Data?

- Represent the real world in code
- Manipulate, store, and display real-world information as needed
- Data can be modeled in a variety of ways
  - Object Oriented Programming
  - Pure data in functional programming

```kotlin
data class DailyForecast(
  val temp: Float,
  val date: Date,
  val humidity: Float
  val precip: Float
)
```

Kotlin Data Classes

A special type of class perfect for modeling data
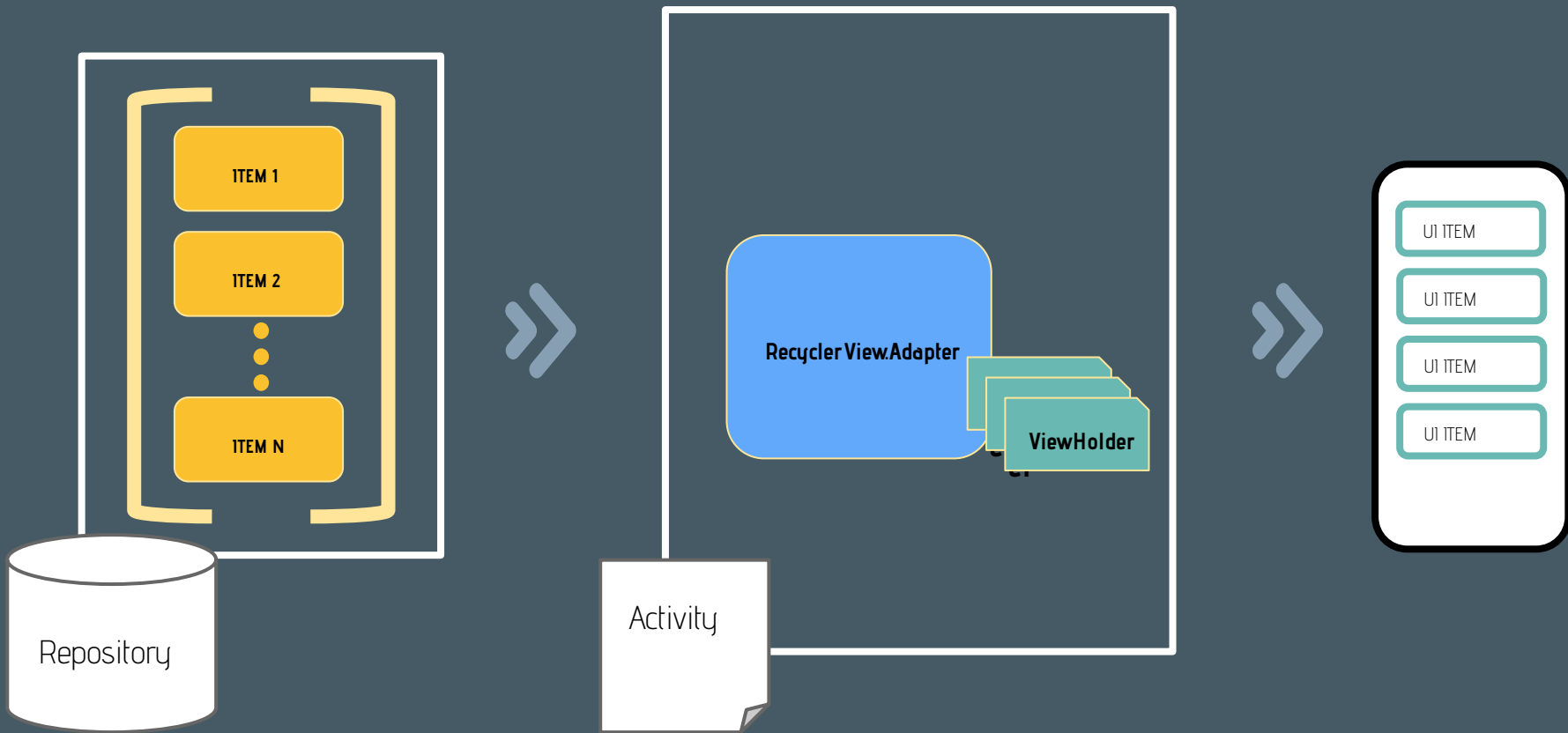
How do we pass data to our Activity?

Passing Data?

- App architectures
  - MVVM, MVP, MVC, MVI
- Model – View – ViewModel
- Repositories to load and manipulate data

Repository Pattern

- Load and provide data from a single class
- Data can be loaded from multiple data sources
  - Network, Database
- UI is updated based on exposed data

Repository

ITEM 1

ITEM 2

ITEM N

Recycler View.Adapter

ViewHolder

Activity

UI ITEM

UI ITEM

UI ITEM

UI ITEM

LiveData

- An observable data holder
- Can provide data to our Activity from our repository
- LiveData is lifecycle aware

LiveData

Must be observed

Observe LiveData to be notified when their value's change

MutableLiveData

A special type of LiveData that can be modified. Useful for providing clean separation of concerns between UI and Repository layers of code

Prevent Common Issues

Avoid memory leaks and crashes by properly handling lifecycle/configuration changes

Implementing A RecyclerView

How to use a RecyclerView to display, and interact with, a dynamic number of UI elements?

Check Canvas For Additional Resources & Assignments

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