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CMSC436: Programming Handheld Systems
Modern App Architecture
Today’s Topics

Architecture Principles
Notional App Architecture
Android App Behavior

Apps are made from Android components

Activity, Fragments, Services, etc.

Multiple entry points for app launch, so apps can start in different components

Android can kill components on reconfiguration / low memory
Some Architectural Considerations

Framework components represent a contract between app and Android framework

- Limit app dependency on framework components
- Don’t store app data or state in your app components
- Don’t design app components so they depend on each other
Architectural Principles

Separation of concerns
Drive UI from data models
Single source of truth
Unidirectional Data Flow
Separation of Concerns

App implemented in separate classes
Each class has a single responsibility
Drive UI from Data Models

UI and data are separate
Data models encapsulate an app’s underlying data
UI presents the data
Single Source of Truth

Each data type has a single owner
Only the owner can modify/mutate data instances
  Owner exposes immutable instances to non-owners
Unidirectional Data Flow

App operation includes states and events
Each flows in a single direction, e.g.,
  State flows from data towards UI
  Events flow from UI towards data
Apps should have at least two layers:

A *UI layer* that displays application data on the screen

A *data layer* that contains the app’s business logic and exposes its application data

An optional *domain layer* to simplify and reuse the interactions between the UI and data layers
UI Layer

UI elements
  Displays on screen

State holders
  Hold data, expose it to UI
Data Layer

Implements app’s business logic

Composed of repositories and data sources

Each data source manages one source of data (e.g., sensor, network server, local database)

Repositories contain zero or more data sources

One repository for each type of data
Next Time

User Interface Classes
Example Applications

FragmentDynamicLiveDataLayout