Testing Our Architecture

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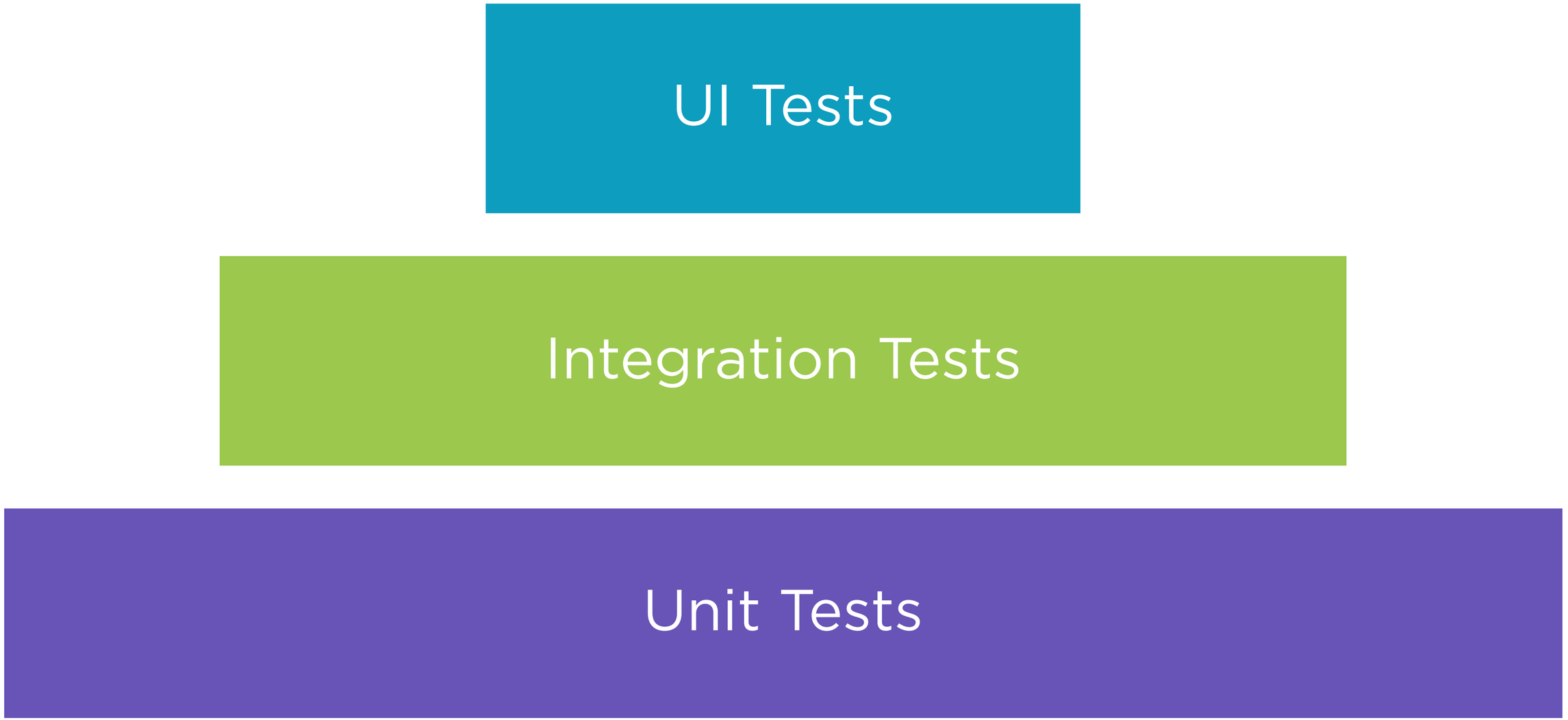
Testable Software

The ability to test each component separately

Low maintenance effort for tests' code

Efficiency in terms of testing effort and code coverage

The Testing Pyramid




SOFTWARE TESTING
SEARCH.....100%

Unit Testing

- Used to test a single component

- Mocking the OS

- Mocking other components

Integration Testing

- Used to test multiple components

- Test the interaction between them

- Usually run on an emulator or real devices

UI Testing

- Used to make sure the UI flow is working as expected

- Makes sure he user sees what he is suppose to see

- Always run on an emulator or real devices

Testing with ARCH

- We can test each component separately

- Our components are small and relatively easy to test

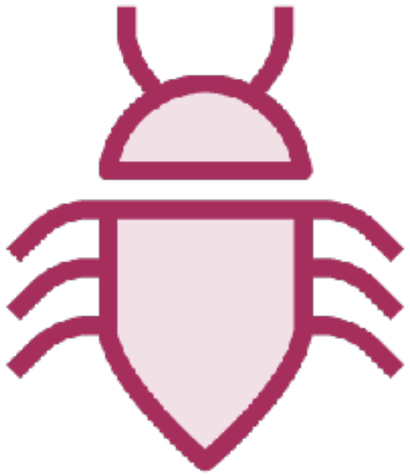
Testing with ARCH

- Our components are modular

- Simple to mock other components if needed

App’s Specific UI Testing

Android UI Testing



- Specific app’s UI testing

- Random UI testing

Test Automation Frameworks

Appium

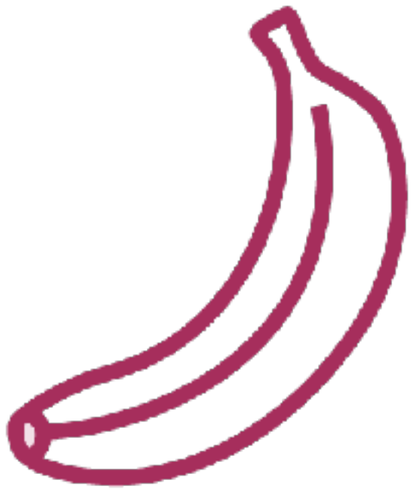
Calabash

Espresso

REFERENCE TO NORA's COURSE

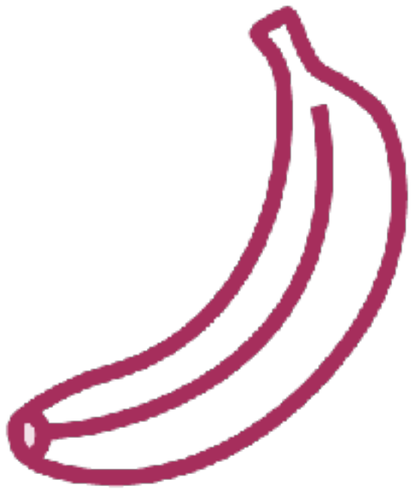
https://app.pluralsight.com/library/courses/android-ui-tests-espresso-fundamentals/table-of-contents

Random UI Testing



- UI/Application Exerciser Monkey:

  - Random UI testing command line tool
  - It can run on the emulator
  - Used to perform stress tests



- And It’s configureable:
  - Number of events
  - Frequency of events
  - Distribution of events
  - And more

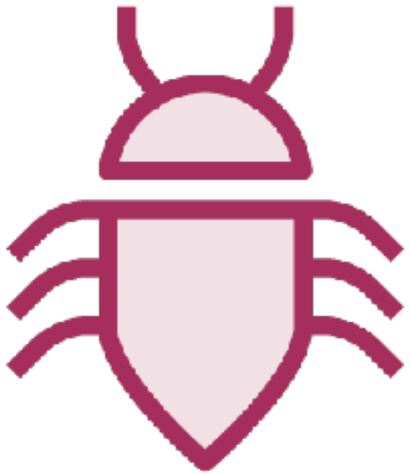
Demo

Crypto Boom App

- Run Exerciser Monkey:
  - Define a number of events
  - Run it
  - Inspect result

exerciser monkey demo

Unit Testing



Android Unit Testing

- JVM unit testing using JUnit:
    - Under “test”

- Android unit testing (Instrumented):
    - Under “androidTest”

Android Unit Testing

- For tests which need interaction with the Android framework:
  - AndroidRunner
  - Robolectric

- For object mocking:
  - Mockito

Demo

Crypto Boom App

- Write an unit for our CryptoMapper class
  - Junit apis
  - Learn about code coverage

Demo

Crypto Boom App

- Write an instrumented unit test for our CoinDao class
  - Mockito
  - Junit apis
  - Our emulator

Summary

Our Architecture Is Convenient for Testing

- Defined layers
- Short components
- Components decoupled from each other
- Simple for mocking

Summary

Various Types of Tests

- UI tests:
    - Specific UI tests (Espresso)
    - Random UI tests (Exerciser Monkey)

Summary

Various Types of Tests

- Unit tests:
    - JVM unit tests
    - Android unit tests (Instrumentation)
- Mock objects (Mockito)

Tests Types

JVM Unit Tests

Instrumented Unit Tests

Instrumented UI Tests

Runs locally

Runs on emulator or device


BUG

Congratulations!!!

Summary

Why is architecture important?

- Maintainable and extendable software
- Testable software
- Readable and easy to understand for new developers

Summary

Common Patterns

- SOLID Principles
- MVC, MVP and MVVM
- The clean architecture

The SOLID Principles for Object Oriented Design

Single responsibility principle

Open / close principle

Liskov substitution principle

Interface segregation principle

Dependency inversion principle

Summary

Common Patterns

- MVC
- MVP
- MVVM

Activity

CoinModel

CryptoCoinEntity

Tracker:
- Activity lifecycle
- Location

bindViews

MyCryptoAdapter

Network Logic for API request

Persist data to local storage

RecyclerView

EntityToModelMapperTask

Runtime permission logic

Read data from local storage

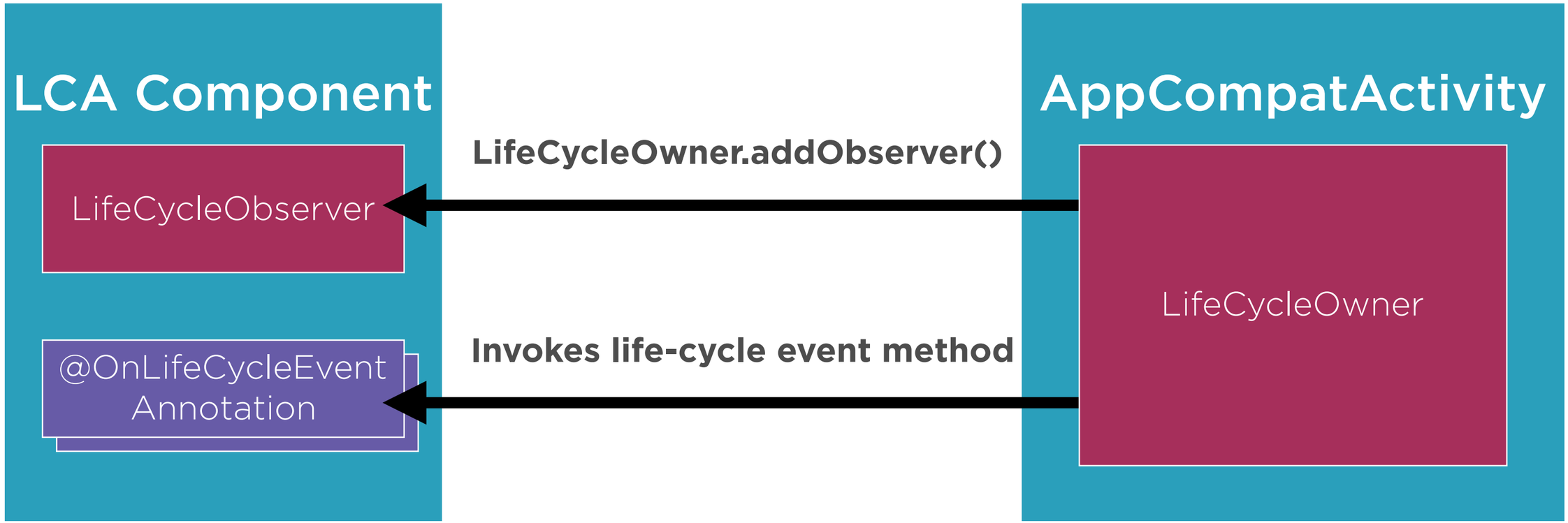
Summary

Android Architecture Components

- What are their benefits?

- How to utilize them in our application?

Lifecycle Aware Components



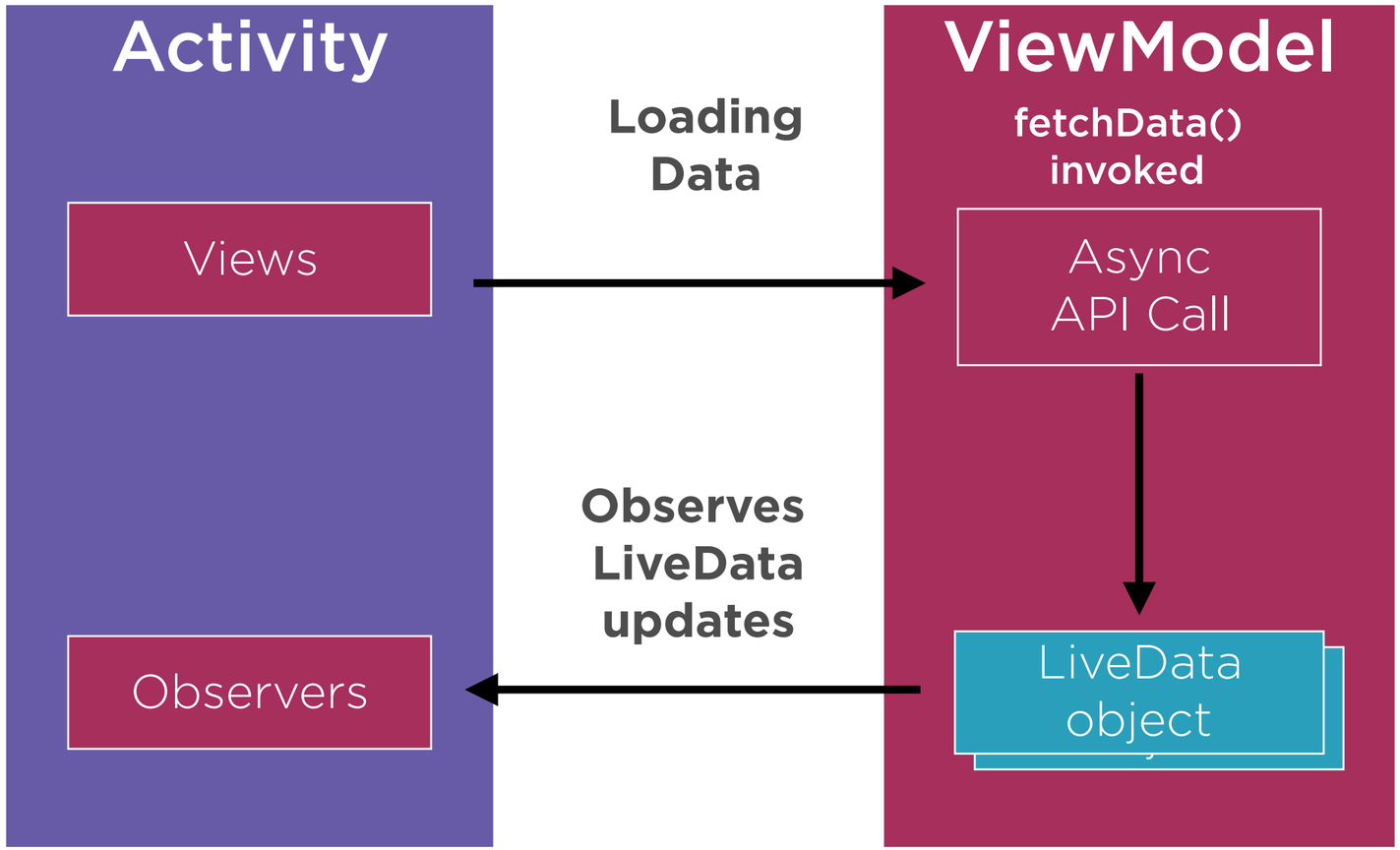
Summary

ViewModel and the LiveData Framework

- How to combine both together

- How to decouple our application logic from our activities

ViewModel and LiveData Framework

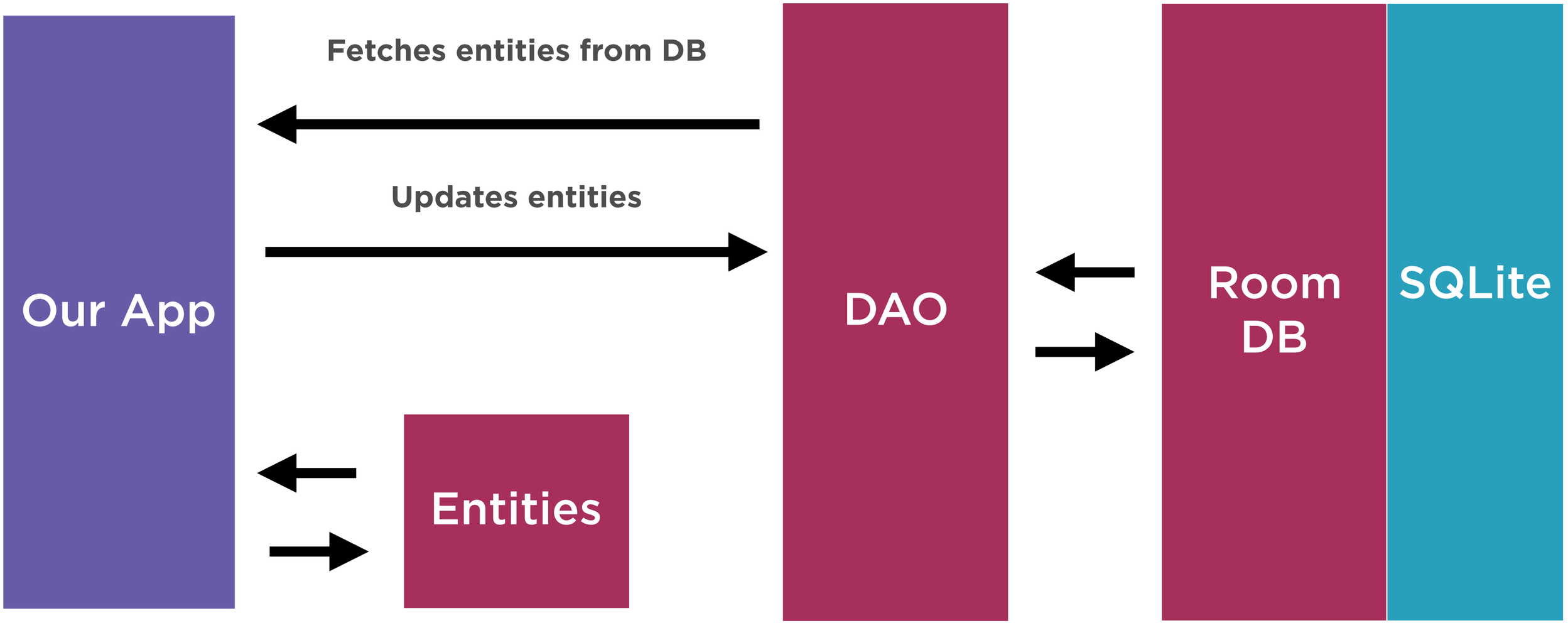


Summary

Room Persistence Solution

- Provides us with a simple abstraction layer on top of SQLite
- Uses powerful annotations for:
  - Inserting
  - Updating
  - Deleting
  - Querying

Room Persistence Solution



Summary

Android Testing

- How to use the UI Excelsior Monkey tool
- How to user Mockito for mocking objects
- How to write JVM and instrumentation Unit tests

Activity

CoinModel

CryptoCoinEntity

Tracker:
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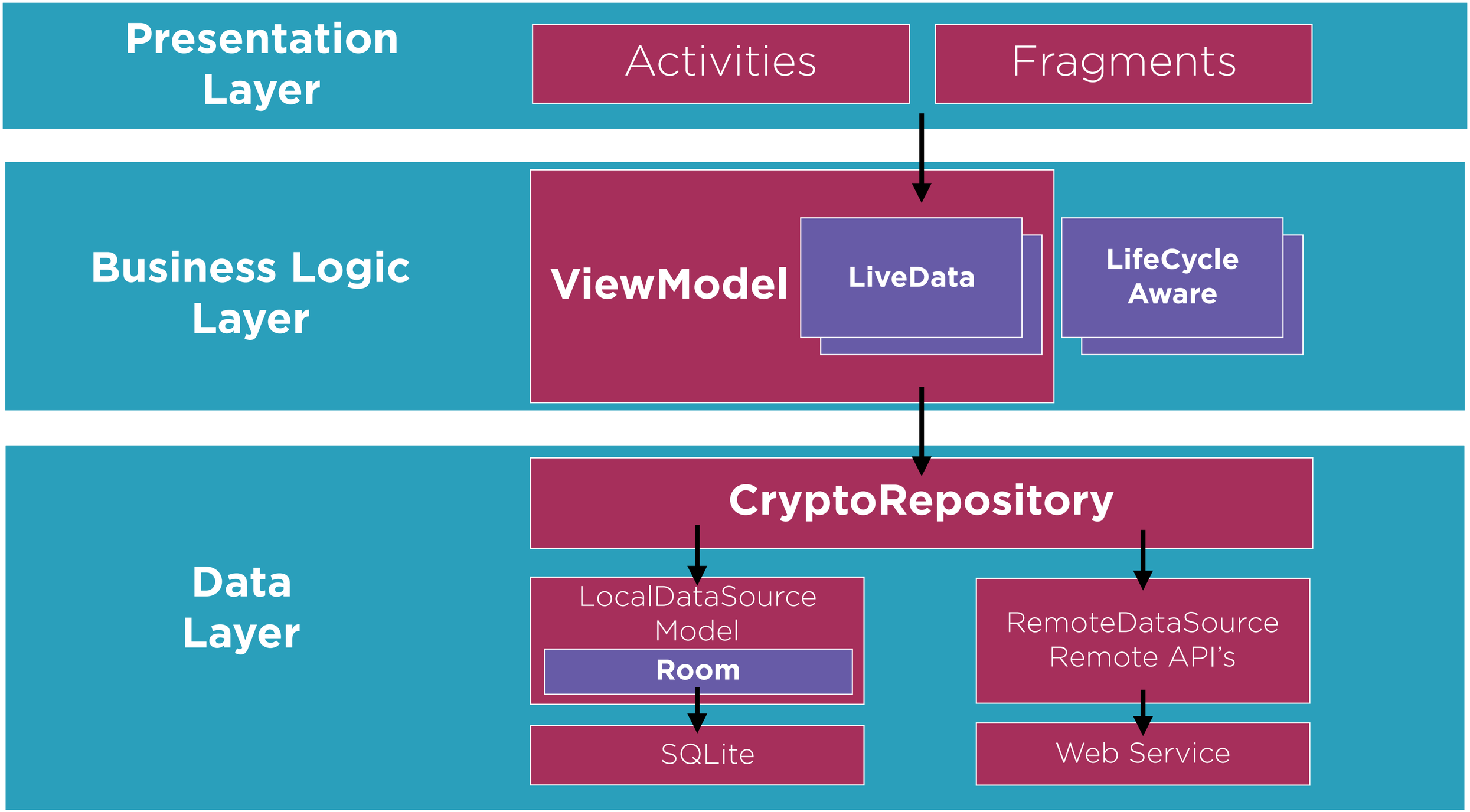
Presentation Layer
Activities
Fragments
Business Logic Layer
ViewModel
LiveData
LifeCycle Aware
Data Layer
CryptoRepository
LocalDataSource
Model
Room
SQLite
RemoteDataSource
Remote API's
Web Service