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## Mvvm android architecture components examples pdf free pdf

These UI-based classes should only contain logic that handles UI and operating system interactions. Data layer The data layer of an app contains the business logic. Expose as little as possible from each module. The data layer's role in app architecture. Your app continues to work in cases when a network connection is flaky or not available. At runtime, another class is responsible for providing these dependencies. If you find an issue with the Architecture Components, report it using the Architecture Components Issue Tracker License Copyright 2018 The Android Open Source Project, Inc. Drive UI from data models Another important principle is that you should drive your UI from data models, preferably persistent models. They're independent from the UI elements and other components in your app. It's a common mistake to write all your code in an Activity or a Fragment. For example, your app could have a GetTimeZoneUseCase class if multiple ViewModels rely on time zones to display the proper message on the screen. I implemented Remote DataSource in the same way.RepositoryModule.kt Then I used Kotlin to create a single bean object of type Repository. That's all! Using Harry Potter API and Jetpack, I made an example of applying MVVM pattern easily. The business logic is what gives value to your app—it's made of rules that determine how your app creates, stores, and changes data. Abstracting other classes in your app away from them helps with testability and reduces coupling within your app. Mobile app user experiences A typical Android app contains multiple app components, including activities, fragments, services, content providers, and broadcast receivers. Although the following recommendations aren't mandatory, in most cases following them makes your code base more robust, testable, and maintainable in the long run: Don't store data in app components. Figure 1. To provide a satisfactory user experience and a more manageable app maintenance experience, it's best to minimize your dependency on them. Before receiving the data of characterList on the network, activate loading status and observe this in DetailActivity, and will update loading status after receiving data.layout.xml used DataBinding to configure the background color and loading screen of RecyclerView. By keeping these classes as lean as possible, you can avoid many problems related to the component lifecycle, and improve the testability of these classes. Hilt automatically constructs objects by walking the dependency tree, provides compile-time guarantees on dependencies, and creates dependency containers for Android framework classes. Domain layer The domain layer is an optional layer that sits between the UI and data layers. Service locator: The service locator pattern provides a registry where classes can obtain their dependencies instead of constructing them. In order to meet the needs mentioned above, you should design your app architecture to follow a few specific principles. For example, don't be tempted to create a shortcut that exposes an internal implementation detail from a module. Persist as much relevant and fresh data as possible. Avoid designating your app's entry points—such as activities, services, and broadcast receivers—as sources of data. Each app component is rather short-lived, depending on the user's interaction with their device and the overall current health of the system. For example, having a well-defined API for fetching data from the network makes it easier to test the module that persists that data in a local database. Don't reinvent the wheel by writing the same boilerplate code again and again. Following the recommended app architecture will help you with this. Repository classes are responsible for the following tasks: Exposing data to the rest of the app. Create well-defined boundaries of responsibility between various modules in your app. The MVVM (Model-View-ViewModel) pattern helps to completely separate the business and presentation logic from the UI, and the business logic and UI can be clearly separated for easier testing and easier maintenance. The ViewModel here is different from the ViewModel of AAC (Android Architecture Component). To learn more about this layer, see the domain layer page. Instead, focus your time and energy on what makes your app unique, and let the Jetpack libraries and other recommended libraries handle the repetitive boilerplate. That way, users can enjoy your app's functionality even when their device is in offline mode. The UI layer is made up of two things: UI elements that render the data on the screen. Resolving conflicts between multiple data sources. Given the conditions of this environment, it's possible for your app components to be launched individually and out-of-order, and the operating system or user can destroy them at any time. Data models represent the data of an app. Recommended app architecture This section demonstrates how to structure your app following recommended best practices, and I implemented a loading using LottieAnimationView.2. Pass RecyclerView logic to BindingAdapterNow you can use the BindingAdapter to connect the adapter to the RecyclerView and implement the itemDecoration.BindingAdapter.ktAnd simply use it.layout.xml3. A collection of samples using the Architecture Components: Samples Reporting Issues You can report an issue on the samples using this repository. Manage dependencies between components Classes in your app depend on other classes in order to function properly. Configure RepositoryRepository is one of the design patterns where Eric Evans is define. You might gain a bit of time in the short term, but you are then likely to incur technical debt many times over as your codebase evolves. The domain layer's role in app architecture. You can make it independent of a particular implementation by using Repository as an interface and creating an implementation.Repository.ktThe method called getCharacters is defined in the Repository interface and this is implement in the RepositoryImpl class. An app architecture defines the boundaries between parts of the app and the responsibilities each part should have. To learn more about this layer, see the UI layer page. You declare most of these app components in your app manifest. See the License for the specific language governing permissions and limitations under the License. The UI layer's role in app architecture. The data layer that contains the business logic of your app and exposes application data. Furthermore, these patterns allow you to quickly switch between test and production implementations. Classes in this layer are commonly called use cases or interactors. The ASF licenses this file to you under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. Examples include DTO (Data Transfer Objects), POJO (Plain Old Java Objects) and entity objects. There are many ways to solve a problem; you might communicate data between multiple activities or fragments, retrieve remote data and persist it locally for offline mode, or handle any number of other common scenarios that nontrivial apps encounter. This means that they are not tied to the UI and app component lifecycle, but will still be destroyed when the OS decides to remove the app's process from memory. Figure 4. If you base your app architecture on data model classes, you make your app more testable and robust. Considering the common architectural principles mentioned in the previous section, each application should have at least two layers: The UI layer that displays application data on the screen. If you are new to Android app development, check out the Android Basics course to get started and learn more about the concepts mentioned in this guide. For example, don't spread the code that loads data from the network across multiple classes or packages in your code base. Common architectural principles If you shouldn't use app components to store application data and state, how should you design your app instead? Keep in mind that mobile devices are also resource-constrained, so at any time, the operating system might kill some app processes to make room for new ones. This guide encompasses best practices and recommended architecture for building robust, high-quality apps. Photo by 贝莉儿 DANIST on UnsplashFirst, let's talk about what the MVVM pattern is. See the NOTICE file distributed with this work for additional information regarding copyright ownership. It is commonly used service or repository that need to access or cache data, you can see from the figure above, ViewModel knows Model but does not know View and View can know ViewModel but does not know Model. You should use it only when needed—for example, to handle complexity or favor reusability. The OS can destroy them at any time based on user interactions or because of system conditions like low memory. Keep in mind that you don't own implementations of Activity and Fragment; rather, these are just glue classes that represent the contract between the Android OS and your app. You should create a repository class for each different type of data you handle in your app. To learn more about this layer, see the data layer page. Each data source class should have the responsibility of working with only one source of data, which can be a file, a network source, or a local database. You can use either of the following design patterns to gather the dependencies of a particular class: Dependency injection (DI): Dependency injection allows classes to define their dependencies without constructing them. Lines 16-20 connect lifecycleOwner and ViewModel and Data, and observe the characterList of DetailViewModel.DetailViewModel.ktViewModelModule.ktDetailViewModel has data of characterList and loading status. Note: The recommendations and best practices present in this page can be applied to a broad spectrum of apps to allow them to scale, improve quality and robustness, and make them easier to test. Samples The following Google samples demonstrate good app architecture. Focus on the unique core of your app so it stands out from other apps. Consider how to make each part of your app testable in isolation. Abstracting sources of data from the rest of the app. Go explore them to see this guidance in practice: For example, the domain layer depends on data layer classes. Separation of concerns The most important principle to follow is separation of concerns. The Android OS then uses this file to decide how to integrate your app into the device's overall user experience. State holders (such as ViewModel classes) that hold data, expose it to the UI, and handle logic. The ViewModel in AAC is a class that knows the Lifecycle to hold the data used by the View in changes like screen rotation. Centralizing changes to the data. At this point, the ViewModel doesn't care if the requested data was retrieved locally or from the network. Page 2 A collection of samples using the Architecture Components: Samples Reporting Issues You can report an issue on the samples using this repository. When the ViewModel requests the data that will be used for the View, the Repository will provide you this by choosing the appropriate data locally or on the network. Given that a typical Android app might contain multiple components and that users often interact with multiple apps in a short period of time, apps need to adapt to different kinds of user-driven workflows and tasks. characterList receives data from the network via the repository asynchronously in the LiveData block. Because these events aren't under your control, you shouldn't store or keep in memory any application data or state in your app components, and your app components shouldn't depend on each other. This layer is optional because not all apps will have these requirements. General best practices Programming is a creative field, and building Android apps isn't an exception. Each use case should have responsibility over a single functionality. Note: This page assumes a basic familiarity with the Android Framework. Reduce dependencies on Android classes. You build these elements using Views or Jetpack Compose functions. Now let's use AAC JetPack to apply the MVVM pattern to your project more easily. ArchitectureIn this example, it is implemented based on MVVM pattern and repository pattern and Local DataSource is not used.1. Connecting View and ViewModelDetailActivity.ktDetailActivity has the object that binds the layout file using the binding method of BaseActivity. You can also execute UI logic.ViewModelThe ViewModel implements the data and commands connected to the View to notify the View of state changes via change notification events. You may obtain a copy of the License at Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. Data source classes are the bridge between the application and the system for data operations. We recommend following dependency injection patterns and using the Hilt library in Android apps. These patterns allow you to scale your code because they provide clear patterns for managing dependencies without duplicating code or adding complexity. Your app components should be the only classes that rely on Android framework SDK APIs such as Context, or Toast. Note: The arrows in the diagrams in this guide represent dependencies between classes. Whenever the data changes, either due to user interaction (such as pressing a button) or external input (such as a network response), the UI should update to reflect the changes. Licensed to the Apache Software Foundation (ASF) under one or more contributor license agreements. If instead, you mix the logic from these two modules in one place, or distribute your networking code across your entire code base, it becomes much more difficult—if not impossible—to test effectively. Figure 2. Containing business logic. Instead, they should only coordinate with other components to retrieve the subset of data that is relevant to that entry point. Remember that not all of your users enjoy constant, high-speed connectivity—and even if they do, they can get bad reception in crowded places. The domain layer is responsible for encapsulating complex business logic, or simple business logic that is reused by multiple ViewModels. The data layer is made of repositories that each can contain zero to many data sources. UI layer The role of the UI layer (or presentation layer) is to display the application data on the screen. Figure 3. Persistent models are ideal for the following reasons: Your users don't lose data if the Android OS destroys your app to free up resources. If you want to use the MVVM pattern while developing Android, you can implement it without using AAC ViewModel.ModelModel is a non-visual class that has the data to use. You can add an additional layer called the domain layer to simplify and reuse the interactions between the UI and data layers. Similarly, don't define multiple unrelated responsibilities—such as data caching and data binding—in the same class. However, you should treat them as guidelines and adapt them to your requirements as needed. Thank you for reading! If this posting was helped, please give a star at GitHub.The all code can be found here. The MVVM pattern is a pattern derived from the MVP pattern defined by Martin Fowler in the 1990s. For example, you might create a MoviesRepository class for data related to movies, or a PaymentsRepository class for data related to payments. Let's take a look at View, ViewModel and ModelViewView is responsible for the layout structure displayed on the screen. Then, the View that receives the state change notification determines whether to apply the change. As Android apps grow in size, it's important to define an architecture that allows the app to scale, increases the app's robustness, and makes the app easier to test. Diagram of a typical app architecture.





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