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Foundation Components

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Foundation Components are a set of core system components for Android Applications which include Kotlin language support, Testing utilities, and backwards compatibility support.

AppCompat

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The **AppCompat** (Appcompat/appcompat) library contains key components for building Android Applications such as:

App Bars ([Compose View](#), [Android View](#))

Navigation Drawers ([Compose View](#), [Android View](#))

Permissions ([Requesting](#), [Declaring](#))

Resources ([Compose View](#), [Android View](#))

Dialog Boxes ([Compose View](#), [Android View](#)) **Share Actions** ([Simple Data](#), [ShareActionProvider](#))

Android KTX

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The **Android KTX** library contains **Extension functions**, **Extension properties**, **Lambdas**, **Named parameters**, **Parameter default values**, and **Coroutines** some of the modules include:

Fragment KTX ([Android Documentation](#))

Lifecycle KTX ([Android Documentation](#))

Navigation KTX ([Navigation KTX](#))

Room KTX ([Android Documentation](#))

ViewModel KTX ([Android Documentation](#))

Test

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The **Test** library includes:

Espresso UI for UI testing ([Android Documentation](#))

AndroidJUnitRunner for unit testing ([Android Documentation](#))

Multidex

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Multidex allows applications to be split across multiple *Dex* (executable) files which makes it possible to run larger applications (containing more than 65,536 methods) within the Android virtual machine (*Dalvik*) on devices running Android versions before Lollipop.

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Architecture Components are libraries that make it easier for developers to deal with changes to data and lifecycles and local storage. They include tools for things like data binding, paging, navigation, and abstraction for local SQLite databases.

Room

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Room provides an abstraction layer for SQLite and is used for persisting local data. It gives developers compile-time verification of SQL queries, annotations that minimize boilerplate code, and database migration paths. It requires an, **Entity** (Model), **DAO** (Data Access Object/Service), and a **Database** (instance of a Room DB).

WorkManager

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WorkManager is an API for scheduling asynchronous tasks (single execution or repeatable) that will run even when the application is exits or if the device restarts when certain Work Constraints are met.

Lifecycle

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Lifecycle allows developers to create lifecycle-aware components such as Activities, Fragments, and ViewModels.

ViewModel

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ViewModel allows developers to store and manage UI-related data with actions scoped to component lifecycles and persists data through configuration changes. It also makes it easy to share data across Fragments and Composables.

LiveData

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LiveData is a lifecycle-aware data holder Class that implements the observable pattern which ensures that components observers are only updated when in an active lifecycle state.

Navigation

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Navigation contains a set of tools for implementing application navigation. It requires a **Navigation graph**, **NavHost**, and **NavController** and handles things like fragment transactions, standardized resources, and deep linking and provides a scope for ViewModels.

Paging

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Paging is a library which eases the loading, caching, and display of pages of information from large datasets from local and remote storage.

Data Binding

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Data Binding is a support library for binding UI components in layouts to application data sources in a declarative format.

Behavior Components

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Behavior Components are libraries that handle user interaction with an application through the UI. They include tools for things like notifications, downloading, permissions, sharing, and the Google assistant.

DownloadManager

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DownloadManager is a system service that handles long-running/large HTTP downloads in a background process.

Media & Playback

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- Android Documentation

Media & Playback represents a set of libraries for playing audio and video with support for backwards-compatibility which include:

Media3 (Android Documentation)

Media2 (Android Documentation)

Media (Android Documentation)

ExoPlayer (ExoPlayer Documentation)

Permissions

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- Android Documentation
- Declare Permissions
- Request Permissions
- List of Permissions

Permissions are a set of systems used to grant applications permission to access restricted data and actions by either declaring permissions in the Android Manifest or by requesting them at runtime. Types of permissions include:

Normal Permissions, *Low Risk* (Android Documentation)

Signature Permissions, *App Specific* (Android Documentation)

Runtime Permissions, *High Risk* (Android Documentation)

Special Permissions, *Platform/OEM Specific* (Android Documentation)

Notifications

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- Android Documentation

Notifications libraries provide a way to use push notifications and assign special system actions to notifications like vibrations, sounds, and status bar icons.

Sharing

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- Simple Data
- ShareActionProvider

Sharing provides a way to share data with other applications through Intent.

Slices

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Slices are UI templates that can display interactive content from an application inside other applications like Google Search and Google Assistant.

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UI Components are a set of libraries which deal with UI and contain widgets, layouts, animations, palettes, and emojis, as well as support for driving mode, Android TV, and Wear OS.

Animation & Transition

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Auto

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Emoji

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Fragment

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