ANDROID OPERATING SYSTEM

Introduction :

Android is a mobile operating system based on the Linux kernel and developed by Google. It is designed primarily for touchscreen mobile devices such as smartphones and tablets. Android is open-source, which means that developers have the freedom to modify and customize the source code. It is the most widely used mobile operating system in the world, with over 2 billion active monthly users. Android provides users with a customizable home screen, a large app store (Google Play Store), and the ability to multitask between apps. It also offers features such as notifications, camera and video, email, and GPS navigation.

Structure of Android Operating System :

The structure of the Android operating system is based on a layered architecture, which includes five main components: the Linux kernel, the libraries, the Android runtime, the application framework, and the applications.

Linux Kernel:

The Linux kernel is the core component of the Android operating system. It acts as a bridge between the hardware and the software, managing the communication between the two and providing a secure and stable platform for the rest of the operating system to run on. The Linux kernel used in Android has been modified to accommodate the needs of a mobile device, such as power management, memory management, process management, and support for different hardware components. Additionally, the Android-specific parts of the kernel, such as device drivers, are open-source and customizable, allowing manufacturers to add their own hardware components and device-specific features to their devices. The use of the Linux kernel in Android provides a solid and well-established foundation for

the operating system, as well as the benefits of the open-source community, such as security updates and bug fixes.
Libraries: On top of the kernel, there are several libraries that provide more specific functionality. These include libraries for graphics, media, and database access, among others.

Android Runtime :

Android Runtime (ART) is the virtual machine responsible for running applications on Android devices. It is the component of the Android operating system that provides the environment for executing the Android application code. ART replaces the previous virtual machine, Dalvik, in newer versions of Android. ART uses ahead-of-time (AOT) compilation, which means that the application code is compiled into machine code before it is executed, improving the performance and speed of the application. ART also includes features such as improved garbage collection, better memory management, and improved application launch times. The use of ART in Android helps to ensure that applications run smoothly and efficiently on a wide range of devices with different hardware specifications.

Application Framework :

The Android Application Framework is a collection of APIs and services that provide the infrastructure for building and running Android applications. It acts as a bridge between the operating system and the application, providing the necessary components and resources that the application needs to run. The framework includes services such as an Activity Manager, which manages the lifecycle of activities, and a Content Provider, which enables applications to share data with each other. It also includes APIs for user interface components, data storage, network communication, and accessing hardware components such as the camera and GPS. The Application Framework in Android is designed to be flexible and extensible, allowing developers to build complex and sophisticated applications that can take advantage of the capabilities of the device.

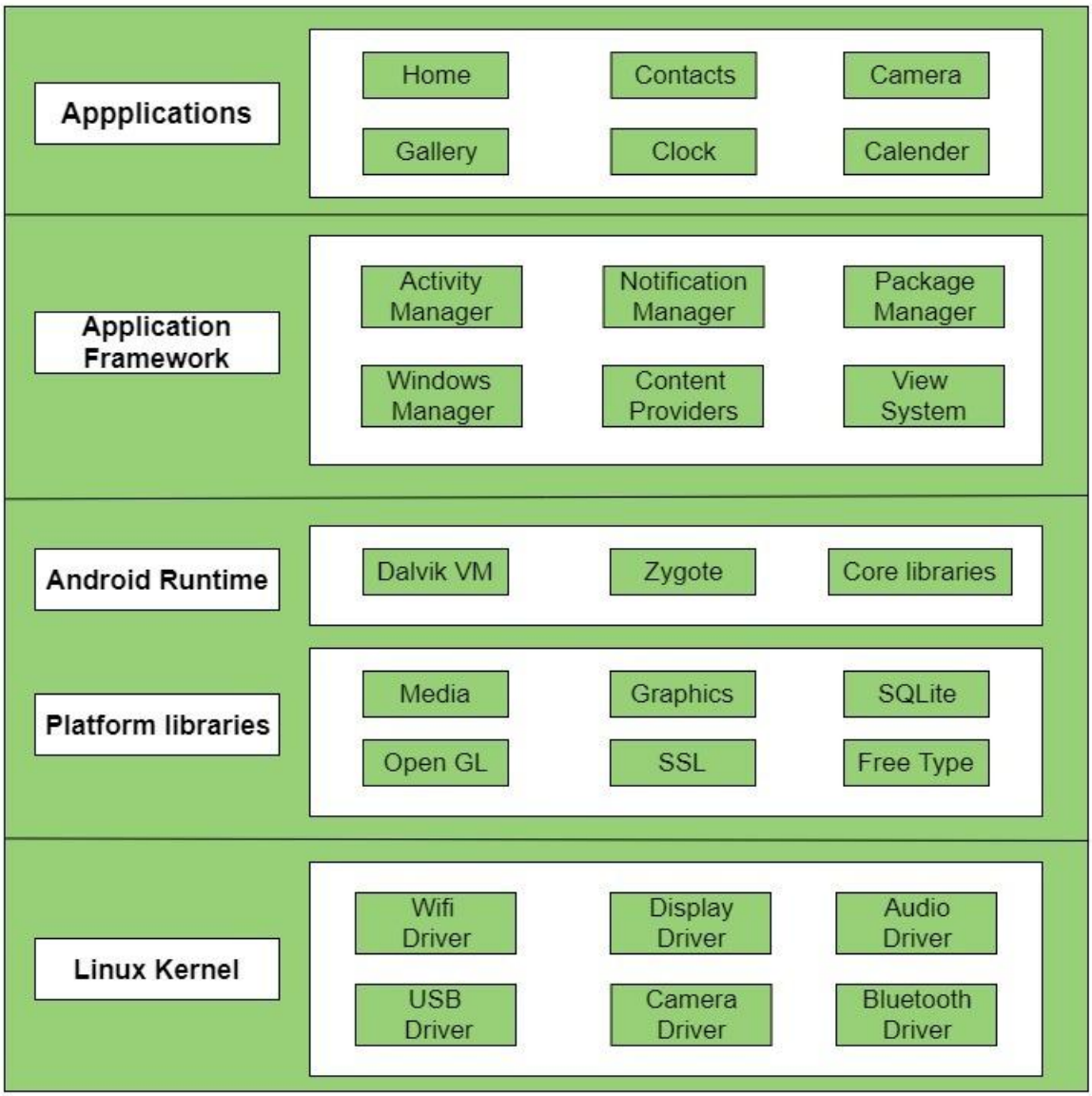
Platform libraries :

The Platform Libraries include various C/C++ core libraries and Java based libraries such as Media, Graphics, Surface Manager, OpenGL etc. to provide support for android development.

- Media library provides support to play and record audio and video formats.
- Surface manager responsible for managing access to the display subsystem.
- SGL and OpenGL both cross-language, cross-platform application program interface (API) are used for 2D and 3D computer graphics.
- SQLite provides database support and FreeType provides font support.
- Web-Kit This open source web browser engine provides all the functionality to display web content and to simplify page loading.
- SSL (Secure Sockets Layer) is security technology to establish an encrypted link between a web server and a web browser.

Applications :

Applications, often referred to as "apps," are software programs designed to run on mobile devices, such as smartphones and tablets. On the Android platform, apps are available for download through the Google Play Store. There are a wide variety of apps available, covering a wide range of categories, such as games, social networking, productivity, and more. Android apps are written in Java programming language and can be created by anyone, including individual developers and large companies. These apps take advantage of the capabilities of the device, such as the camera, GPS, and internet connectivity, to provide users with a diverse and powerful range of features and services. The open nature of the Android platform means that users have access to a vast library of apps, allowing them to customize and personalize their device to suit their needs and preferences.



Conclusion :

In conclusion, the structure of the Android operating system is designed to provide a flexible and extensible platform for building mobile applications. The layered architecture allows for the separation of concerns between the different components, making it easier to develop, maintain, and update the system.

Reference : geeksforgeeks.org, chatgpt .