Module 1: Introduction to Mobile Application Development

Write a detailed report on the architecture of Android

Android is an open-source operating system based on the Linux kernel.

1.Linux Kernel

The foundation of Android's architecture is the Linux Kernel

2. Hardware Abstraction Layer (HAL)

The Hardware abstraction Layer serves as a connection point between the Android operating system and the device's hardware components.

3. Native Libraries

Native libraries are written in C or C++

Media Framework: Handles audio and video playback and recording.

OpenGL/ES: Enable 2D and 3D graphics rendering.

SQLite: Provides lightweight database support for data storage.

WebKit: Powers the web browser engine.

4. Android Runtime (ART)

ART is the runtime where Android apps run and get managed where they being executed.

5. Application Framework

The Application Framework is a high-level layer that provides APIs for developing Android applications. It includes a rich set of reusable components and system services.

6. Applications Layer

The Applications layer is the top part of the Android system, where all the apps are. These include apps you install yourself and the ones that come with the phone, like Messages, Camera, and Settings.

User Apps: Third-party applications downloaded from the Google Play Store.

Explain the key components, including Activities, Services, Broadcast Receivers, and Content Providers.

Activities: These are the screens you see in an app.

 example: when you open an app, like a whatsapp the screen where you see messages is an activity.

 Each screen in an app is one activity.

 Services: These run in the background to do tasks that don't need a user interface.

 example: a music app playing songs while you're using another app

Broadcast Receivers:

A broadcast receiver listens for system-wide events like low battery warnings or Wi-Fi connections

Content Providers: Content providers handle data sharing between apps.

 it uses a content provider to get that information.

 example: when a messaging app accesses your contacts

Compare Native, Web, and Hybrid applications. What are the advantages and disadvantages of each type?

1. Native Applications

These are apps developed specifically for one platform like (Android, iOS, etc.) using the native programming languages (Java/Kotlin for Android, Swift/Objective-C for iOS).

Advantage

Perfomance: native app gave a best or high performance

access: they can access all device fetures like a camera and gps sensors

Better User Experience: native apps follow the platform's Ui,UX guidelines that why that can run smooth

Disadvantages:

Development Cost: Developing separate apps for different platforms e.g. Android and iOS requires more resources time and cost.

Maintenance: Each platform requires individual maintenance and updates which can be time-consuming.

Longer Time to Market: Due to the separate development for each platform, native apps usually take longer to development

2. Web Applications

Advantages:

Cross-Platform Compatibility: Web apps can run on any platform with a browser iOS, Android, Windows, etc

Lower Development Cost

Easy Updates: Web apps are hosted on servers, so updates can be pushed instantly without requiring users to download new versions.

No Installation Required: Users don't need to install anything on their devices, making web apps easy to access via a browser.

Disadvantages:

Performance: Web apps not perform like a native app

Limited Access to Device Features: Web apps have limited access to certain device features like the camera, sensors, or local storage, depending on the browser and platform.

Dependence on Internet: Web apps need an internet connection to run

3. Hybrid Applications

Advantages:

Cross-Platform Development: hybrid app can run multipin operating system with single code base

Cost: Hybrid apps can save time and cost compared to developing separate native apps for different platforms.

Disadvantages:

Performance: not perform like a native app not smooth

User Experience: user can fill less perfomace compare to native app