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1 What are the advantages of android development? Explain in detail.

Android Application development has followin Advantages

> High Reach of SDK for all categories of applications :

Android SDK includes all the features required for applications development using Maps, GPS, Audio, Media, Network, Graphics etc.

> Android being Open Source gives wide range of development :

Android being opensource are not bound under any Restrictions. Any individuals is free to make any type of application using all the resources available. All the resources used by Android Development team are publically open to use in own applications.

> Applications are not sandboxed.

Android applications are not restricted to their own domain. Any application can use or access the Resources from other applications.

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This helps ~~them~~ us to stop the reinventing of wheel by allowing the use of something that exists already. Some of the examples for this are : photo application from android

> Application reach to audience is cheap:

Android has been successfull in delivering Smartphones at very cheap rates to the people. The devices using Android are cheap and easily affordable.

> Development setup is cheap:

Since Android is open source and is not restricted to any proprietary, it's development doesn't require any purchase of licensed software or any development machines in specific.

> Less Hassles from publishing plateforms

The publishing plateforms for android Apps doesn't have to undergo any approval process. Thus app doesn't takes time to be available for public use.

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> Can Handle Background Processes.

Android SDK has Efficient components that can handle all background processes and thus help the application to make full use of it.

2. Explain Directory Structure of android.

The Android project contains different type of app modules, Source code files and Resource files. We will explore all the folders and files in android app.

1 Manifest Folder
2 Java Folder
3 Res (Resourses) Folder
   > Drawable Folder
   > Layout Folder
   > Mipmap Folder
   > Values Folder
4 Gradle Scripts

> ManiFests Folder:

Manifests folder Contains Android Manifest.xml for our creating the android applicati
This file contains information about our application such as android version, metadata

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States packages for Java file and other application Components. It acts as an inter mediator between android OS and our application.

> Java folder

Java folder contains all the Java & kotlin Source code (.java) file which we create during the app development, including other Test files. if we create any new project using Java, by default class will be MainActivity.java. it will be created automatically under the package name "com.geekometer.manan".

> Resourses (res) folder :

Resource folder is the most important folder because it contins all the the non-code source like image, XML Layout, UI strings for our android application.

-> res/drawable

It contains the diffent type of image used for the development of the application We need to add all the image in drawable folder for the application development.

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→ res / layout

Layout folder Contains all XML Layout files which we used to define the user Interface of our application. It contains the activity_main.xml file.

→ res / mipmap

This folder Contains Launcher.xml file's to define icons which are used to show on the home scrn. It contains contains different density type of icons depends upon the size of the device such as. hdpi, mdpi, xhdpi.

→ Res / values.

Values folder contains a number of xml files like

Strings,
colors,
dimens,
styles.

One of the most important file is string.xml files which Contains the string Resourses

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> Gradle Scripts folder.

Gradle means automated build system and it contains number of files which are used to define a build configuration which can be apply to all modules pkgins and implementations are used to build Configurations that can be applied to all our application module's.

3. Explain android architecture in detail.

Android is an opensource, linux-based Software stack Created for a wide array of devices and from factor The following diagram Show the major Components of the android platmform.

It has five components.

System Apps
Java API framework
Native C/C++ Libraries + Android Runtime.
Hardware Abstraction layer (HAL)
Linux kernel.

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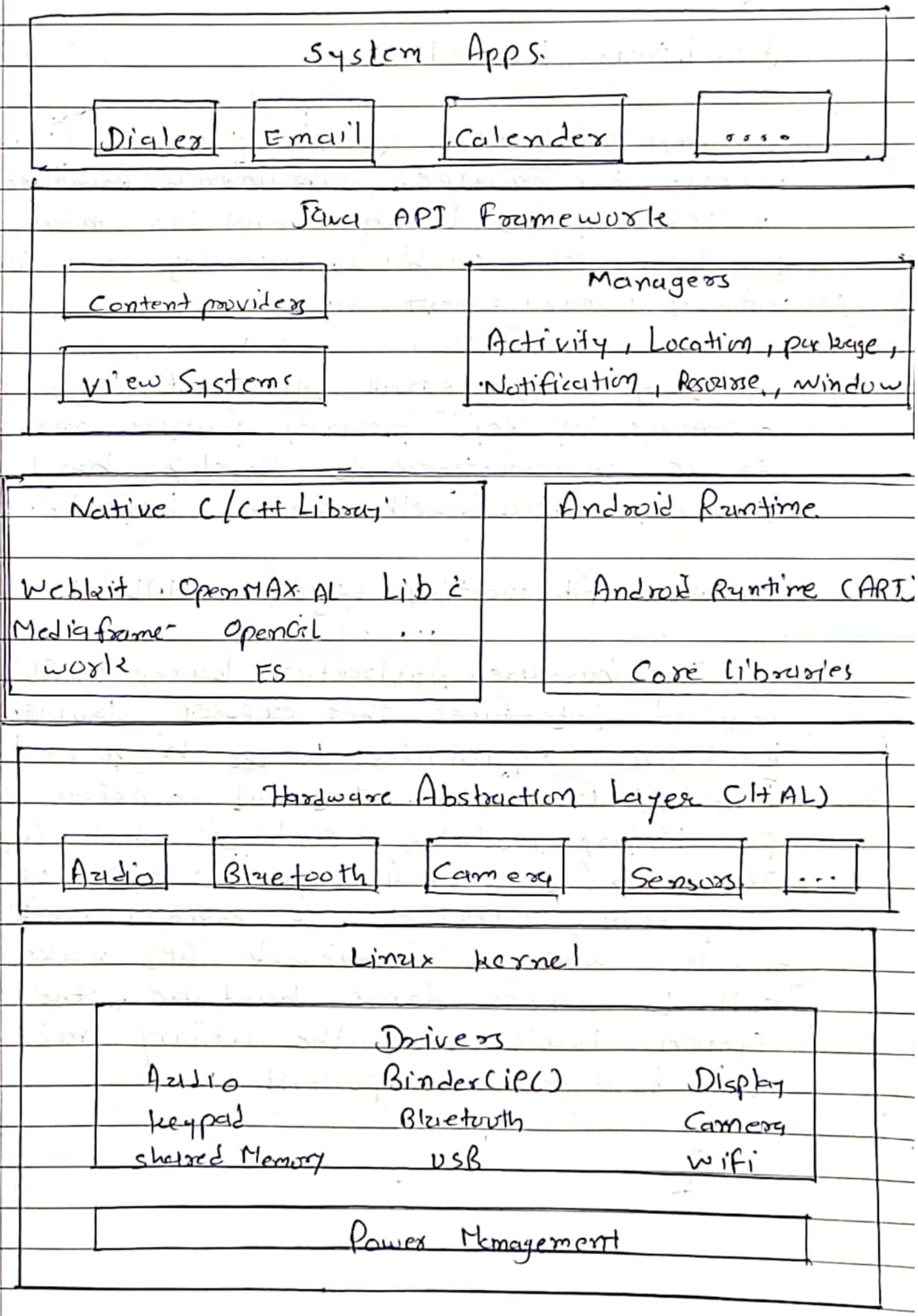

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> The Linux kernel

The formdation of android plateform is linux kernel. For example, The Android Runtime (ART) relies on the Linux kernel for underlying. functionalities such as threading and low-level memory management.

Using a linux kernel allows Android to take advantage of key security feature and allows device manufacturers to develop hardware drivers for a well known kernal

> Hardware Abstraction Layer (HAL)

The hardware Abstraction Layer (HAL) provide standerd interfaces that exposes device hardware capabilities to the higher-level Java API framwork. The HAL consists of multi-ple library modules, each of which implements an interface for a specific type of hardware Component, such as the camera or bluetooth module. when a framework API makes a call to access device hardware, the Android System loads loads the library module for that hardware component.

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> Android Runtime

For devices running Android version 5.0 (API Level 21) or higher, each app runs in its own process and with its own instance of Android Runtime (ART). ART is written to run multiple virtual machines on low-memory devices by executing dex files, a bytecode format designed specifically for Android that's optimized for minimal memory footprint. Buildtools, such as d8, decompile Java sources into dex bytecode, which can run on the Android platform.

Some of the major features of ART include following:

> Ahead of time (AOT) and Just-in-time (JIT) compilation
> Optimized garbage collection (GC)
> On Android 9 (API level 28) and higher, conversation of an app package's Dalvik Executable format (DEX) files to more compact machine code.
> Better debugging support, including a dedicated sampling profiler, detailed diagnostic exceptions and crash Reporting, and the ability to set watchpoint to monitor specific fields.

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> Native C/C++ Libraries :

Many core Android system components and services, such as ART and HAL, are built from native code that require native liabrary written in C and C++. The android platefom provides Java framework APIs to expose the functionalities of some of this for libraris to apps. For example you can access OpenGL ES through the android framework's Java OpenGL API to support for drawing and manipulating 2D and 3D graphic in your app.

If you are developing an app that requires C or C++ code, you can use the Android NDK to access some of these native platform libraries from your native codes.

> Java API framework

The entire feature set of the android OS is available to you through APIs written in Java language. These APIs from building blocks you need to create Android apps by simplifying the reuse of core, modular system components and services, which include the following :

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> A rich and extensible view system you can use to build an app's UI, including lists, grids, text, boxes, button, and even and embeddable web browser
> A Resource Manager, providing access to non-code resources such as localized strings graphics, and layout files.
> A notification Manager that enables all apps to display custom alerts in the status bar.
> An Activity Manager that manages the lifecycle of apps and provids common navigation back stack
> Content Providers that enables apps to access data from other apps, such as the contacts app, or to share their own data.

> System Apps

Android comes with a set of Core apps from emails, SMS, calender, Internet Browsing, contacts & more. Apps included with platform have no specia status among the apps the user chooses to install. So a third party app can become the user's default web browser, SMS messenger, or even the default keyboard (some exceptions apply such as system settings app)

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The apps functions both as apps for users and to provide key capabilities that developer can access from their own app. for example if your app would like to deliver an SMS package, you don't need to build that functionality from scratch. you can instead invoke which ever SMS app is already installed to deliver a message to the reciepient you specify.

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