

\* Explain Android Operating System with its advantages and application.

⇒ The Android Operating System is a popular and widely used mobile operating system.

First time Android Operating System mobile is released by a HTC Company.

Android Operating System is free and open-source mobile software.

Android is a mobile operating system which is built on Linux kernel and open-source platform.

Android Features are user-friendly interface with customizable features.

Android supports multitasking and allowing users to run multiple applications simultaneously.

## ⇒ Advantages:

1. **Open Source:** Android is built on open-source nature which means that the source code is freely available for adapt into their devices.
2. **User Interface:** Android provides a user-friendly interface with customizable home screens, widgets and notification system.
3. **Multitasking:** Android supports multitasking, allowing users to run multiple application at a one time.
4. **Security:** Android system user can also employ lock screen passwords, fingerprints for added security.
5. **Storage:** Android phones also have unique hardware capabilities for store the data into the phones.
6. **Automation:** The Tasker app allows control of app permissions,



=> Application :

1 Communication Apps :

- Messaging apps
- Email Clients
- Voice and Video calling apps.

2 Social Media Apps :

- Social Networking platforms
- Photo sharing apps.

3 Navigation :

- GPS navigation apps
- Location based

4 Health and Fitness :

- Fitness tracking apps
- Calorie tracking apps.

5 File management apps

6 Entertainment app :

- Streaming Service
- Gaming app

7 System Optimization Tools,

8 Camera apps with filters.

## \* Explain Android Architecture.

=> There are main Five component of an Android Architecture.

- 1) Android Application
- 2) Application Framework
- 3) Native Libraries
- 4) Android Runtime
- 5) Linux Kernel

### 1 Android Application:

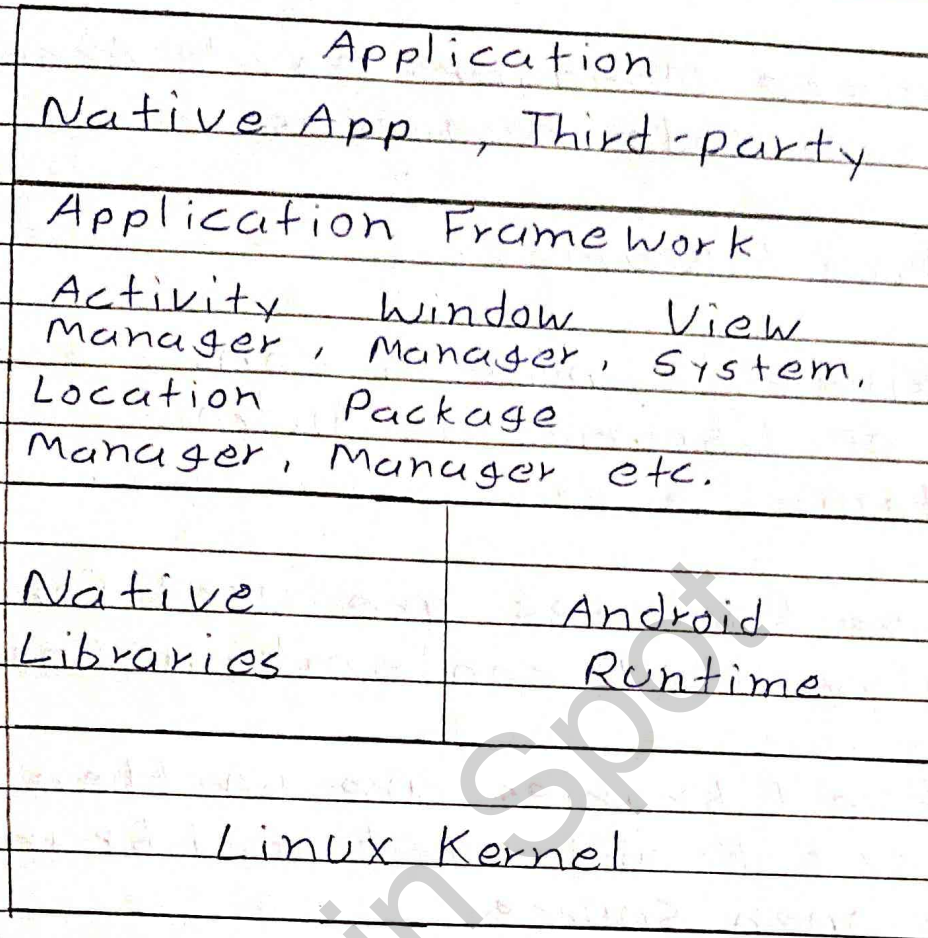
Android Application is the top-most layer of Android Architecture.

This layer mainly consists of native Android application and third-party installed apps.

All the Application are run within the Android Runtime.

All the Native Application or Pre-installed system app are include in this layer.





## 2 Application Framework :

Every Application is design in the layer.

There are many type of services is include in this layer.

- Activity Manager : This class is used to testing and debugging method.
- Content Provider : Provides data from application to other layers.

- Resource Manager: Provide Access to non-code resources.

### 3 Native Libraries:

Native Libraries is consists a set of libraries in Android System.

Native Libraries are used for display HTML content in Android.

Native Libraries are written in C/C++ and most of libraries are open source.

This are the some Native Libraries: SSL, SQLite, Libc, Webkit etc.

### 4 Android Runtime:

Android Runtime includes the Dalvik Virtual Machine.

Android uses ~~DA~~ JVM to optimize battery life, memory and performance.



DVM is used to convert class file into the apk file.

## 5 Linux Kernel:

Linux Kernel is the bottom-most and important layer of the Android Architecture.

Linux Kernel is the core part of the Android Architecture.

Linux Kernel provides some important features like,

- Security
- CPU Management
- Memory Management
- Devices Management
- Driver Management etc.

The kernel acts as an abstraction layer between the hardware and the upper layers of Android Architecture.

\* Explain Steps of Android Studio Installation, Emulator install and Build the First Android App.

=> Steps to Installation of Android Studio:

- 1 Download Android Studio:  
Using the Android Studio website, download the latest version of Android Studio according to your operating system.
- 2 Install Android Studio:  
Follow the installation process.
- 3 Install SDK Components:  
Android Studio will prompt you to install the Android SDK components.
- 4 Configure Android Studio:  
After installation, launch Android Studio and configure the SDK components.



=> Set Up Emulator Steps:

1 Open AVD Manager:

In Studio go to Tools → AVD Manager, to open the Android Virtual Device Manager.

2 Create a New Virtual Device:

Click on 'Create Virtual Device' and choose a hardware profile and a system image.

3 Configure Hardware Profile:

Adjust settings such as RAM and click "Finish" to create the virtual device.

4 Start Emulator:

Back in the AVD Manager and select your virtual device and click on 'play'.

=> Create a New Android Project:

1 Open Android Studio:

Launch Android Studio.

2 Create a New Project:

Click on "Start a new Android Studio Project."

3 Configure Project:  
Enter the project name, select the Language Java or Kotlin and Click "Next".

4 Select Template:  
Choose a template for your first activity and Click "Finish".

5 Run Configuration:  
Click on the green Run button to build and run your app.

6 Wait For Build:  
Android Studio will build your app and deploy on the emulator.

7 Explore your App:  
Once the app is deployed and you should see your app running in the emulator.

\* Explain Activity life cycle.

⇒ Android Activity life cycle is used to represent the various states that an Android activity goes through.



There are Seven States of Activity.

- 1) onCreate()
- 2) onStart()
- 3) onResume()
- 4) ~~Activity Running~~ onRestart()
- 5) onPause()
- 6) onStop()
- 7) onDestroy()

1) onCreate():

This method is called when first activity is created. It is used for initialization tasks at the starting point of the activity.

2) onStart():

This method is called when the activity becomes visible to the user.

3) onResume():

This method is called when the activity comes into the foreground and becomes interactive.

Activity Launched

↓  
onCreate()

Navigates to

Activity onStart() ← onRestart()

↓  
onResume()

App Process Killed

↓  
Activity Running  
Another Activity Comes

Higher Priority activity

onPause() → User Activity No longer visible  
Return to Activity

onStop() → User Navigates to the activity  
Activity Finish

onDestroy()

↓  
Activity Shut Down



#### 4 onPause():

This method is called when the activity is to lose focus or move to the background.

#### 5 onStop():

This method is called when the activity is no longer visible to the user.

#### 6 onDestroy():

This method is called when the activity is no longer in memory.

#### 7 onRestart():

This method is called when the activity is restarting after being stopped.

## \* Four Building blocks of Android:

### A Activity:

In Android Activity is represents a single screen with a user interface

Activity is a Fundamental component of an android application.

Activities play a crucial role in providing a visual interface for users.

Every activity in an Android app must be declared in the 'AndroidManifest.xml' File.

Multiple Activities can communicate with each other using a different mechanisms.

In Android Application, Every Activity goes into the seven state: onCreate(), onStart(), onResume(), onStop(), onDestroy(), onPause() and onRestart().



## B Services:

In Android development, Services is a component that runs in the background.

Services is an independent of a user interface and used to perform long-running operation.

Services are used to handle tasks that need to continue even when activity is not run in the foreground.

There are Three Types of Services:

- i Foreground Service: Services are used for task that are performed by user.
- ii Background Service: Services that perform task in the background.
- iii Bound Service: A Service is bound to an activity or another application component.

Every Service has its own lifecycle:  
`onCreate()`, `onStartCommand()`,  
`onBind()`, `onUnbind()`, `onDestroy()`.



## C Broadcast Receiver:

Broadcast Receiver allow the different parts of Android Application to communicate with each other.

Using Broadcast Receiver every application can communicate with each other.

There are Two Types of Broadcast Receiver.

- i System Broadcast: Android system generates broadcast for various events.
- ii Custom Broadcast: Android developer can define and send their own broadcast within their application.

A Broadcast Receiver does not have a user interface and has a short lifespan.

Every Broadcast Receiver must be declared in the 'Android-Manifest.xml' File.



## D Intent:

In Android Development, Intent is a messaging object that allow to do communication between components within an application.

Using Intent we can do the communication between different application component.

Intent is used the exchange of data and perform various operation in Android System.

There are Two Types of Intent.

- Explicit Intent: Allow to go in one activity to another activity with user knowledge.

Ex. Resepi Book

- Implicit Intent: Allow to go in one activity to another activity without user knowledge.

Ex. Phone Call