1(a). What are the main folders and files required to implement an application in android studio?

Answer:

The android app project will contain a different type of app modules, source code files and resource files. We will explore all the folders and files in android app.

Folders:

Java Folder

This folder will contain all the java source code (.java) files which we'll create during the application development, including JUnit test code. Whenever we create any new project / application, by default the class file MainActivity.java will create automatically under the package name.

res (Resources) Folder

It's an important folder which will contain all non-code resources, such as bitmap images, UI strings, XML layouts

Drawable Folder (res/drawable)

It contains the different type of images as per the requirement of application. It's a best practice to add all the images in drawable folder other than app / launcher icons for the application development.

Layout Folder (res/layout)

This folder will contain all XML layout files which we used to define the user Interface of our application.

Mipmap Folder (res/mipmap)

This folder will contain app / launcher icons which are used to show on the home screen. It will contain different density type of icons such as hdpi, mdpi, xhdpi, xxhdpi, xxxhdpi, to use different icons based on the size of device.

Values Folder (res/values)

This folder will contain a various XML files, such as strings, colors, styles definitions and static array of strings or integers.

Manifests Folder

This folder will contain a manifest file (AndroidManifest.xml) for our android application. This manifest file will contain information about our application such as android version, access permissions, metadata, etc. of our application and its components. The manifest file will act as an intermediate between android OS and our application.

Files:

Gradle Scripts

In android, Gradle means automated build system and by using this we can define a build configuration that apply to all modules in our application. In gradle build.gradle (Project), build.gradle (Module) are used to build configurations that apply to all our app modules or specific to one app module.

Android Layout File (activity_main.xml)

The UI of our application will be designed in this file and it will contain Design and Text modes. It will exists in layoutsfolder and the structure of activity_main.xml file in Design mode

Android Main Activity File (MainActivity.java)

The main activity file in android application is MainActivity.java and it will exists in java folder. The MainActivity.java file will contain the java code to handle all the activities related to our app.

(b). Android is an OS, an open source and a platform - explain why?

Android is an open-source operating system based on Linux with a Java programming interface for mobile devices such as Smartphone (Touch Screen Devices who supports Android OS) as well for Tablets too.

Any hardware or software environment in which a program runs, is known as a platform. Since Android has its own runtime environment (JRE) and API, it is called platform.

(c). Write some features of Android with a suitable image.

Android is a powerful open source operating system which provides a lot of great features, those are

- It's an open source and we can customize the OS based on our requirements.
- It support a connectivity for GSM, CDMA, WIFI, NFC, Bluetooth, etc. for telephony or data transfer. It will allow us to make or receive a calls / SMS messages and we can send or retrieve a data across mobile networks
- By using WIFI technology we can pair with other devices using apps
- Android have a multiple APIs to support a location-based services such as GPS
- We can perform all data storage related activities by using light weight database SQLite.
- It have a wide range of media supports like AVI, MKV, FLV, MPEG4 etc. to play or record variety of audio / video and having a different image formats like JPEG, PNG, GIF, BMP, MP3, etc.
- It has an extensive support for multimedia hardware control to perform playback or recording using camera and microphone
- It has an integrated open source Webkit layout based web browser to support HTML5, CSS3
- It supports a multi-tasking, we can move from one task window to another and multiple applications can run simultaneously
- It will give a chance to reuse the application components and the replacement of native applications.
- We can access the hardware components like Camera, GPS, and Accelerometer
- It has a support for 2D/3D/4G Graphics

Fig: Android Features

2(a). Draw the Android architecture and write the main component used an Android application.

Android architecture is a software stack of components to support a mobile device needs. Android software stack contains a Linux Kernel, collection of c/c++ libraries which is exposed through an application framework services, runtime and application.

Following are main components of android architecture those are

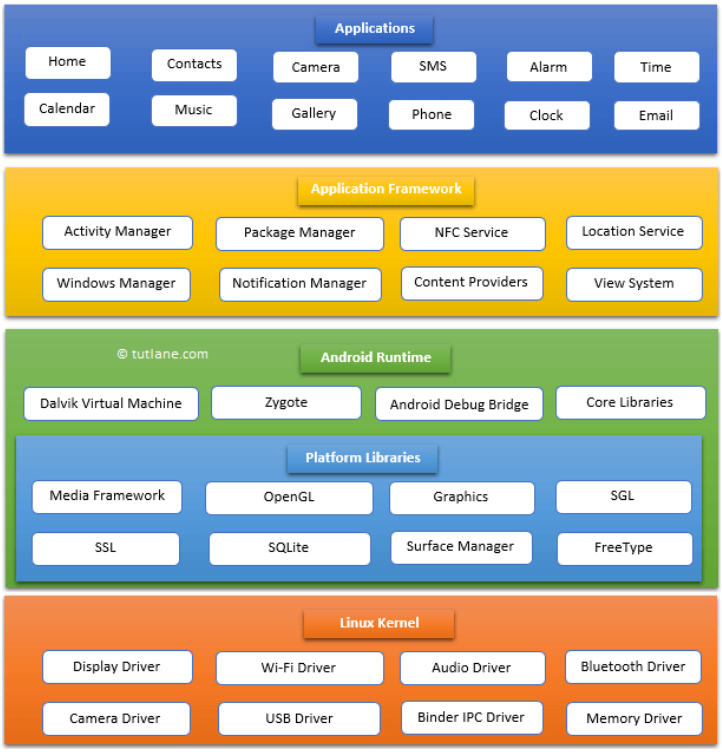
Applications

Android Framework

Android Runtime

Platform Libraries

Linux Kernel



(c). Make list of Android platform version, code name with their API level.

Table: Android versions with API Level

Version	Release Date	Code Name	API Level
1.0	23 Sep, 2008	Alpha/Apple Pie/NA	1
1.1	9 Feb, 2009	Banana Bread/NA	2
1.5	30 Apr, 2009	Cupcake	3
1.6	15 Sep, 2009	Donut	4
2.0/2.1	26 Oct, 2009	Éclair	5-7
2.2	20 May, 2010	Froyo	8
2.3	6 Dec, 2010	Gingerbread	9-10
3.0/3.1/3.2	22 Feb, 2011	Honeycomb	11-13
4.0	18 Oct, 2011	Ice Cream Sandwich	14-15
4.1/4.2/4.3	9 Jul, 2012	Jelly Bean	16-18
4.4	31 Oct, 2013	KitKat	19-20
5.0/5.1	12 Nov, 2014	Lollipop	21-22
6.0	5 Oct, 2015	Marshmallow	23
7.0	2016 End	Nougat	24
8.0	21 Aug, 2017	Oreo	26
9.0	6 Aug, 2018	Pie	28
10	23 Sept, 2019	Android 10/ Quince tart	29
11		Android 11/Red Velvet Cake	30
12		Android 12/ Snow cone	31, 32
13		Android 13/Tiramisu	33
14		Android 14/UPSIDE_DOWN_CAKE	34

3(a). How many ways can be setup android development environment and what are the different components of Android Studio?

The Android SDK is compatible with Windows, Mac and Linux operating systems to build android applications based on our requirements.

We can setup android development environment using following two ways

1. Setup Eclipse IDE Manually (**Depreciated**)

2. Android Studio

Android Studio is the combination of following components to allow users to implement android applications.

1. Eclipse IDE
2. Android SDK
3. Android Virtual Device
4. Eclipse Plugin

(b). Write the meaning of the following statement.

i. xmlns:android="http://schemas.android.com/apk/res/android"?

xmlns:android defines an android XML Namespace and The URI that's used, even if it doesn't point to an existing resource, generaly points to a resource under the control of the author or organisation defining the vocabulary.

ii. <?xml version="1.0" encoding="utf-8"?>

This is the XML *optional* preamble.

- version="1.0" means that this is the XML standard this file conforms to
- encoding="utf-8" means that the file is encoded using the UTF-8 Unicode encoding.

(c). Differentiate between:

i. Margin and Padding

In any view component, Margin pushes space outside where padding pushes content inside.

ii. View and ViewGroup?

View is a simple rectangle box that responds to the user's actions.

ViewGroup is a collection of Views(TextView, EditText, ListView, etc..), somewhat like a container.

iii. match_parent and wrap_content

match_parent is used when we want the height or width of a view to be as big as its parent view.
wrap_content is used when we want the view to occupy only as much space as required by it.

4(a). What are the two modes of UI and why they are for?

The two modes of UI in Android are declarative and imperative.

Declarative UI is defined using XML, which is a human-readable language that describes the layout and appearance of the UI. Declarative UI is easy to read and write, and it makes it easy to separate the layout of the UI from its behavior.

Imperative UI is defined using code, which is a more powerful way to control the UI. Imperative UI gives you more control over the behavior of the UI, but it can be more difficult to read and write.

(b). How many layouts are available in Android? Explain.

There are 7 layouts in android:

1. Linear 2. Table 3. Frame 4. Relative 5. WebView 6. List View 7. Grid View

(c). What is for android gravity and ems?

Android gravity is a property that contains how a view is positioned within its parent layout.

Android ems is a unit of measurement that multiplies the size of width.

(d). Make a list of Mobile Devices and Mobile Companies for Android.

Mobile Devices for Android (2023)

Here is a list of some of the most popular Android mobile devices available as of September 2023:

- Samsung Galaxy S23
- Samsung Galaxy S23 Ultra
- Samsung Galaxy Z Fold 4
- Samsung Galaxy Z Flip 4
- Google Pixel 7
- Google Pixel 7 Pro
- OnePlus 11 Pro
- Xiaomi 13 Pro
- Oppo Find X6 Pro
- Vivo X90 Pro+
- Realme GT3 Pro

Mobile Companies for Android (2023)

Here is a list of some of the most popular Android mobile companies as of September 2023:

- Samsung
- Google
- OnePlus
- Xiaomi
- Oppo
- Vivo
- Realme
- Motorola
- Nokia

- Sony
- Asus
- LG

This is just a small sample of the many Android mobile devices and companies available. There are many other great options to choose from, depending on your budget and needs.

Please let me know if you have any other questions.

(e). Describe about Brick Model.

A Brick model is a digital representation of a building that can be used by computers to understand and manage the building. It is a common language for representing building data that can be used by a variety of applications and services.

5. (a) How many callback methods are in android? Explain their behavior at different stages in android.

There are 7 callback methods in android.

onCreate()

This is the first callback method and it fires when the system creates an activity for the first time. During the activity creation, activity entered into a Created state.

onStart()

The onStart() callback method will invoke when an activity entered into Started State by completing onCreate()method. The onStart() method will make an activity visible to the user and this method execution will finish very quickly.

onResume()

When an activity entered into Resumed state, the system invokes onResume() call back method. In this state activity start interacting with user that means user can see the functionality and designing part of an application on the single screen.

onRestart()

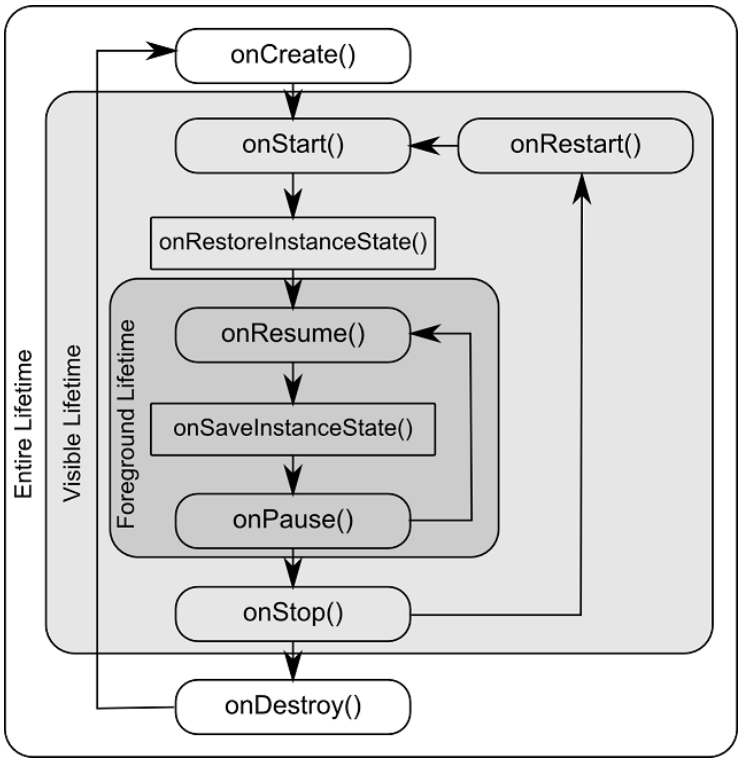
The system will invoke onRestart() method when an activity restarting itself after stopping it. The onRestart() method will restore the state of activity from the time that is being stopped.

onDestroy()

The system will invoke onDestroy() method before an activity is destroyed and this is the final callback method which received by the android activity.

(b) Sketch the entire, visible and foreground lifetimes of android activity or fragment transition during execution.

The concepts of lifetimes and lifecycle methods are illustrated in Figure:



6. (a) What is Android Layout? Briefly describe different types of layout with respective diagram.

In android, Layout is used to define the user interface for an app or activity and it will hold the UI elements that will appear to the user.

Android Linear Layout: In android, LinearLayout is a ViewGroup subclass which is used to render all child View instances one by one either in horizontal direction or vertical direction based on the orientation property.

Android Relative Layout: In android, RelativeLayout is a ViewGroup which is used to specify the position of child View instances relative to each other (Child A to the left of Child B) or relative to the parent (Aligned to the top of parent).

Android Frame Layout: In android, FrameLayout is a ViewGroup subclass which is used to specify the position of View instances it contains on the top of each other to display only single View inside the FrameLayout.

Android Table Layout: In android, TableLayout is a ViewGroup subclass which is used to display the child View elements in rows and columns.

Android Web View: In android, WebView is a browser which is used to display the web pages as a part of our activity layout.

Android List View: In android, ListView is a ViewGroup which is used to display scrollable single column list of items.

Android Grid View: In android, GridView is a ViewGroup which is used to display items in a scrollable grid of columns and rows.

(b) Differentiate between Linear and Relative layout.

Linear Layout	Relative Layout
We can adjust views and widgets linearly i.e. Horizontally and vertically.	We can adjust views and widgets according to one's satisfaction.
It is useful when we arrange views in a linear fashion	It is useful when we arrange views in a relative fashion.
LinearLayout is less used as compared to RelativeLayout.	RelativeLayout is used more in applications.
We can use LinearLayout inside RelativeLayout.	We can also use RelativeLayout as a Child of LinearLayout.

(c) what is Android Intent for, and how many types of intent are?

Android Intents

In android, Intent is a messaging object which is used to request an action from another component.

In android, intents are mainly used to perform following things.

- Starting an Activity
- Starting a Service
- Delivering a Broadcast

There are two types of intents available in android, those are

1. Implicit Intents
2. Explicit Intents

7. (a) How to create "menu" in Android, what are the different items of "menu".

To create menu we need to create a new folder menu inside our project resourse directory (/res/menu) and add a new XML file to design the menu with following items.

a. Menu
b. Item
c. Group

The different types of menu are:

a. Option menu
b. Context menu
c. Pop-up menu

(b) Which method is used to handle item click event for popup menu onMenuItemClick() ?

To perform and action when the user selects a menu item, we need to implement the popupmenu.onMenuItemClickListener interface and register it with our pop-up menu by calling

setOnMenuItemClickListener. When the user selects an item, the system calls the onMenuItemClick*(callback in the interface.

(c) How to call the method “MenuInflater.inflate()” for “menu”? Write the code.

Once we are done with creation of menu, we need to load the menu resource from the activity using menuInflater.inflate() like as show below

@override

```
public void showPopup(View v) {
    PopupMenu popup = new PopupMenu(this, v);
    MenuInflater inflater = popup.getMenuInflater();
    inflater.inflate(R.menu.menu_example, popup.getMenu());
    popup.show();
}
```

(d) Difference between context menu and option menu in android.

Here is a summarized difference between context and option menu in android:

Characteristic	Context menu	Options menu
Trigger	Long-press on a view	Press the menu button or the three dots icon in the action bar
Purpose	Provide actions that are specific to the view	Provide actions that are global to the activity
Location	Displayed next to the view that the user is long-pressing on	Displayed in the action bar