

What is Android?

Answer: Android is an open source operating system and is mainly popular for Smartphones and Tablets.

This operating system is Linux Kernel based. Using Android operating system, the developer develops the functions or programs which can perform basic as well as the advanced type of operations on the Smartphone.

What is Android SDK?

Answer: To develop a mobile application, Android developers require some tools and this requirement is satisfied by “Android SDK” which is a set of tools that are used for developing or writing apps.

It has a Graphical User Interface which emulates the Android environment. This emulator acts as an actual mobile device on which the developers write their code and then debug/test the same code to check if anything is wrong.

Name the languages supported for Android development.

Answer: a) Java is the widely used language for Android development.

It also supports C/C++ and when used with Android SDK, it improves the performance speed too. b) Kotlin

What are the advantages of Android Operating System?

Answer: It is an open-source and platform independent. It supports various technologies like Bluetooth, Wi-Fi, etc

Define and explain Android Framework.

Answer: Android framework is a set of API's using which the Android developers write code for the mobile apps. It contains the methods and classes to write the programming code.

Android framework includes a different set of tools to create image pane, text field, buttons, etc. It also includes “Activities” with which the user interacts and “Services”, which are the programs that run in the background. It is a package of different components like Intents, Broadcast Receivers, Content Providers, etc.

Which components are necessary for a New Android project?

Answer: Whenever a new Android project is created, the below components are required:

- **manifest:** It contains xml file.
- **build/:** It contains build output.
- **src/:** It contains the code and resource files.
- **res/:** It contains bitmap images, UI Strings and XML Layout i.e. all non-code resources.
- **assets/:** It contains a file which should be compiled into a .apk file.

Provide the important core components of Android.

Answer: The core components of Android operating systems are:

- Activity
- Intents
- Services
- Content Provider
- Fragment

Explain briefly – what is meant by Activities?

Answer: Activities are the part of the mobile app which the user can see and interact with.

For Example, if you open an SMS app which has multiple activities like create new SMS, add a contact from the address book, write the content in the SMS body, send SMS to the selected contact, etc.

Activity keeps a track of the following:

- Keeps track of what a user is currently looking for in an app.
- Keeps a track of previously used processes, so that the user can switch between ongoing process and previous process.
- It helps to kill the processes so that the user can return to their previous state

What is meant by Services?

Answer: Service is an Android component which runs in the background and acts independently. It does not provide any user interface.

Though the services are running behind the scene, a user can continue their work on different apps. Most of the time, the users are not aware of the services which are running in the background. These services allow the system to kill the process without interrupting the user's ongoing work

A service is implemented as a subclass of Service class:

```
Public class MainService extends Service
{
}
```

What is an Intent?

Answer: Android has an Intent class when the user has to navigate from one Activity to another. Intent displays notifications from the device to the user and then the user can respond to the notification if required.

Given below are the two types:

- Implicit Intents
- Explicit Intents

Explain Implicit and Explicit Intents.

Answer: Implicit Intent calls the system components while explicit Intents invoke the Activity class.

What is .apk extension in Android?

Answer: It is a default file format that is used by Android Operating System. Application Package Kit (APK) is used for installation of mobile apps. The .apk contains resource file, certificate, manifest file and other code.
APK files are archive files in the zip format with .apk extension.

Which are the dialog boxes supported by Android platform?

Answer: Android supports four types of dialog boxes:

- **AlertDialog:** It has a maximum of 3 buttons and sometimes AlertDialog includes check boxes and Radio buttons to select the element.
- **ProgressDialog:** It displays the progress bar or wheels.
- **TimePickerDialog:** Using this dialog box, a user selects the Time.
- **DatePickerDialog:** Using this dialog box, a user selects the Date

What is AIDL?

Answer: In the Android platform, there are remote methods which facilitate the use of methods from one program to another. To create and implement the remote methods the first step is to define communication interface in AIDL.

AIDL stands for Android Interface Definition Language. It facilitates the communication between the client and service. It also communicates the information through inter-process communication.

For communication between processes, the data is broken down into chunks which are easily understandable by the Android platform.

What are the data types supported by AIDL?

Answer: Data Types supported by AIDL are as follows:

- String
- List
- Map
- charSequence
- Java data types such as INT, Long, Char, Boolean etc

Explain AndroidManifest.xml file and why do you need this?

Answer: Every application must have AndroidManifest.xml file in the root directory. It contains the information about your app and provides the same to the Android system.

The information includes the package name, Android components such as Activity, Services, Broadcast Receivers, Content Providers, etc. Every Android system must have this information before running any app code

AndroidManifest.xml file performs the following tasks:

- It provides a name to the Java package and this name is a unique identifier for the application.

- It describes the various components of the application which include Activity, Services, Content Providers, etc. Also, it defines the classes which implement these components.
- It is responsible to protect the application and it declares the permission for accessing the protected part of the app.
- It also declares the Android API which is going to be used by the application.
- It contains the library file details which are used and linked to the application.

What is Orientation?

Answer: Orientation is the key feature in Smartphones nowadays. It has the ability to rotate the screen between Horizontal or Vertical mode.

Android supports two types of screen Orientations as mentioned below:

- **Portrait:** When your device is vertically aligned.
- **Landscape:** When your device is horizontally aligned.

setOrientation() is a method using which you can set a screen alignments. HORIZONTAL and VERTICAL are two values which can be set in the setOrientation() method. Whenever there is a change in the display orientation i.e. from Horizontal to Vertical or vice versa then onCreate() method of the Activity gets fired.

Basically, when the orientation of the Android mobile device gets changed then the current activity gets destroyed and then the same activity is recreated in the new display orientation. Android developers define the orientation in the AndroidManifest.xml file.

Which tools are used for debugging on the Android platform?

Answer: To understand the cause of the failure or cause of any issue, debugging is important. On the Android platform **Android Monitor.bat** utility is used while on iOS platform, iPhone Configuration utility is used for debugging purposes.

There are different tools for debugging which include – Android DDMS, Android Debug Bridge, iOS simulator, Debugging from Eclipse with ADT, Remote debugging on Android with Chrome etc.

Which scenario can test only on real devices but not on emulator?

Answer: Emulators are used for performing similar kind of testing which is performed on the real devices. Basically, emulators are used as a replacement for real devices as sometimes real devices are not available for testing, use of real mobile devices for testing purpose is costlier at times.

But there are few scenarios which cannot be tested using emulator, these can be tested only using real devices. These scenarios are interrupted scenarios i.e. message, phone call interruption while using the app, low battery, Bluetooth, memory card mount and unmount etc.

Name the mobile automation tools that are available in the market.

Answer: There are quite a few mobile automation testing tools that are available in the market but these are used only if the project requires it and if the application supports the automation. These tools are paid as well as free tools, hence analysis needs to be done within the project team and then the appropriate mobile automation tool needs to be selected. Silk Mobile, SeeTest, Ranorex are the paid mobile automation tool while Appium, KIF, Robotium, Calabash are few free tools.

What are the different data storage options available on the Android platform?

Answer: Android platform provides a wide range of data storage options. These options must be used based on the need such as data is secure and used with the permission only or can be accessed publicly.

Below is the list of data storage options on the Android platform:

- **SharedPreferences:** It stores data in XML files. It is the simplest way to store private data in the key-value pair.
- **SQLite:** It stores structure data in the private database.
- **Internal Storage:** It stores data in the device file system and any other app cannot read this data.
- **External Storage:** Data is stored in the file system but it is accessible to all apps in the device

Explain Sensors in Android.

Answer: Android-enabled devices have built-in Sensors which measures Orientation, Motion and other conditions.

These sensors provide data with high accuracy, which will help to monitor positioning and movement of the device. Some of the sensors are hardware based and few are software based.

There are three categories of sensors as mentioned below:

- **Motion Sensors:** These sensors measure the rotational & acceleration forces and it includes gravity sensors, rotational vector sensor, accelerometers, etc.
- **Environmental Sensors:** It measures air temperature, pressure, humidity, etc.
- **Position Sensors:** It measures the physical position of the device and includes orientation sensors and magnetometers.

There are four types of Java Classes as shown below:

- Sensor Manager
- Sensor
- SensorEvent
- SensorEventListener

What is the difference between Mobile Application Testing and Mobile Testing?

Answer: Mobile app testing is the testing of applications on a device which mainly focuses on functions and features of the application.

And Mobile Testing is the testing of the actual mobile device and focuses on the mobile features like Call, SMS, Contacts, Media Player, inbuilt browsers etc.

What is ANR?

Answer: ANR stands for Application Not Responding. It is a dialog box that appears if the application is no longer responding.

Explain Activity Lifecycle briefly.

Answer: When a user interacts with the app and moves here and there, out of the app, returns to the app, etc. During all this process “Activity” instances also move in the different stages in their lifecycle.

There are seven different states like – onCreate(), onStart(), onRestart(), onResume(), onPause(), onStop(), and onDestroy(). These are termed as a ‘callback’. Android system invokes these callbacks to know that the state has been changed.

Explain Android Architecture briefly.

Answer: Android architecture is in the form of software stack components.

The below diagram describes the different layers in the Android architecture.

- **Linux Kernel:** Linux Kernel is placed at the bottom of the software stack and is the foundation of the Android architecture. Using Linux kernel, Android provides a connection between the other layers of the software. It helps to develop drivers like the keypad, display, audio for device manufacture etc.
- **Hardware Abstraction Layer (HAL):** HAL provides an interface between device drivers and API framework. It consists of library modules which are specific to the hardware component.
- **Android Runtime:** Linux kernel provides multi-tasking execution environment so that multiple processes can execute each process runs on its own instance of Android Runtime (ART). Android has core runtime libraries like Dalvik VM specific libraries, Java Interoperability Libraries, Android Libraries and C/C++ libraries.
- **Application Framework (Java API Framework):** The entire android functionalities are available through the API. It consists of multiple services like Activity Manager, Resource Manager, Notification Manager, etc., which form the environment in which the android application runs.
- **Applications:** The Android application is a top layer and all types of in-built applications such as SMS, Browsers, Contact, etc are included in this top layer. It also includes third party applications which are installed by the user such as Games, etc.