MAD Short-Note

Sachiya

LEC 1

What is mobile application development?

It means creating apps for devices such as tablets, smartphones, automobiles, smartwatches, etc…

Why do we need to build mobile apps more than building web applications?

The mobile app offers a more enchanted user experience

Wider reach audience

Offline functionality

What are the Key features of a mobile application?

Grate UI

Fast loading

High performance

Compatible with mobile platform

Adapt to user's need

What are the factors we need to consider before start app development?

Budget

Chose mobile platform

Target audience and market research

Why do mobile apps fail?

App doesn't have market

App does not perform quickly

App does not have good smooth UI

Have limited functions

Hard to adjust to a mobile screen

Why do we use Kotlin

Modern and concise

Safe programming language

Interoperable (can use with Java language)

Structured Concurrency

Easy to learn

We can create powerful apps immediately

What are the uses of kotlin?

Web development

MAD

Server-side development

Data Science

Variable declaration

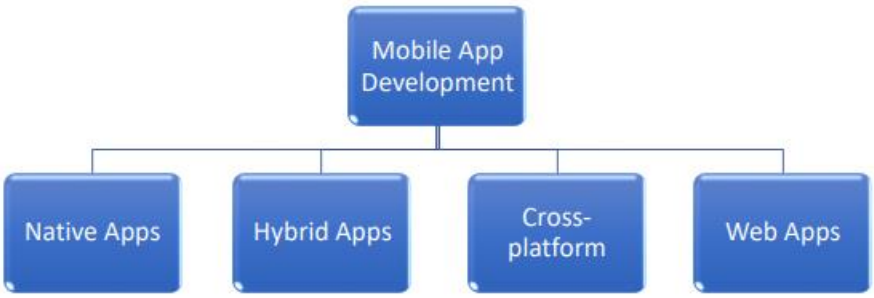
Var count : int=10 (can change after declaration)

Val count : int=10 (can't change)

Null Safety

Var languageName: String? = null

Lec 2



What is a Native mobile application?

Apps are developed by using platform-specific development tools.

(android, IOS, windows)

What are the Hybrid app development advantages?

Less time for development

Allow code sharing

Create a codebase using standard web technology(HTML,CSS,JS)

What is Cross-platform mobile applications

Develop mobile applications that can be used on multiple mobile platforms.

What are the advantages of using cross-platform mobile applications

Code reusable

Control cost/Low cost

Low development time

Easier implementation

Sameness

What are the disadvantages of using cross-platform mobile applications

Loss of flexibility

Poor user experience

Difficulty in satisfying all users

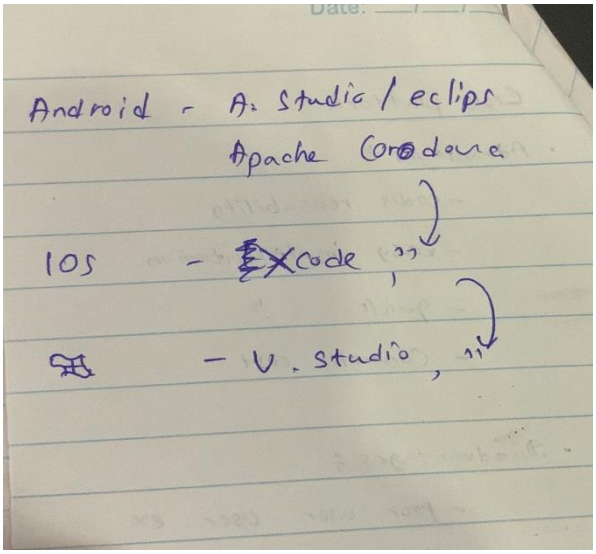
Native tools-

Xcode

Appcode

Apache Cordova

Android Studio



Hybrid tools -

Ionic

Apache Cordova

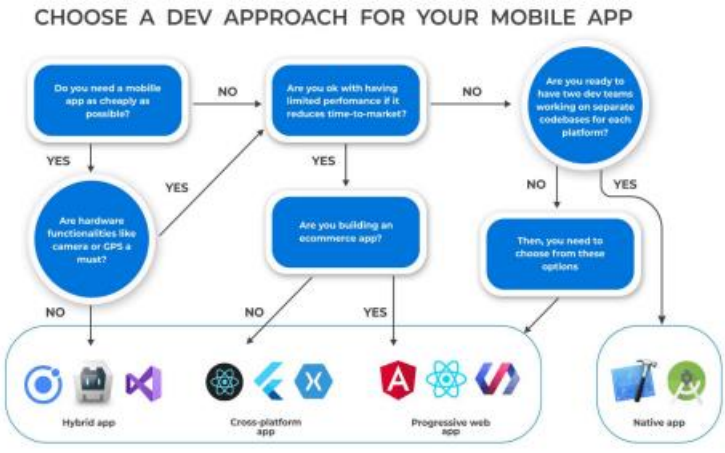
Visual studio

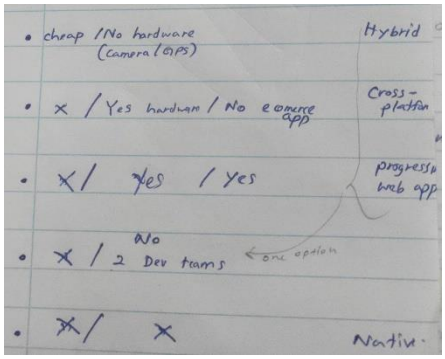
Cross-platform tools -

React native

Flutter

Apache Cordova





What are the fundamentals of mobile applications development

Choice of technology

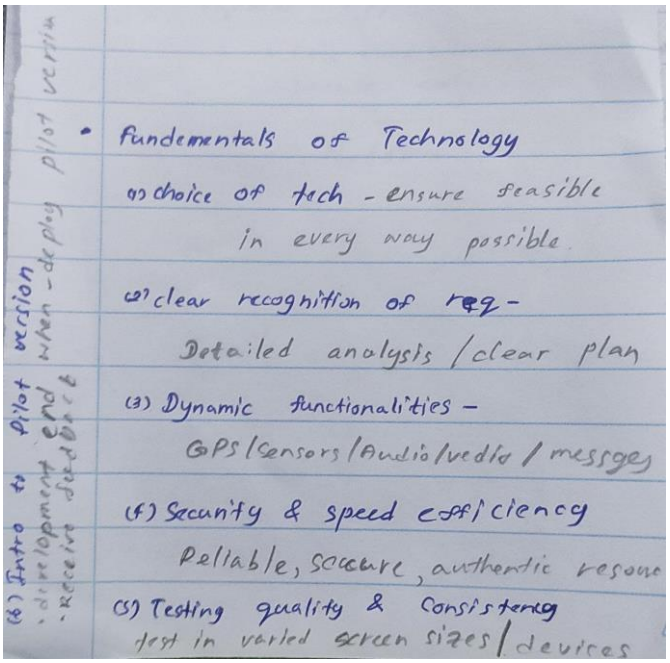
Clear recognition of the requirement

Dynamic functionality(GPS,Sensors)

Security and speed

Testing Quality of app

Introduce a pilot version



Lec 3

What is the main perspective of the mobile app development?

User perspective (Simplicity shouldn't be fake)

What are the things that make simple UI unsustainable?

Having too many features.

User won't use every thing.

What are the Types of users ?

Experts – need never seen tec.

Willing adopters – do not need a new version.

Mainstreamers – use it to get the job.

Usage of colors?

60 - 30 – 10

What is UI and UX ?

UI-visual and interactive design of a app interface (what user can see and interact with)

UX-enhancing user satisfaction of an app, while involving users' opinion about the app

(mobile application influences how users observe it and Help to fulfil user's need)

Lec 4

What are the Features of android?

Attractive UI

Storage

Media support

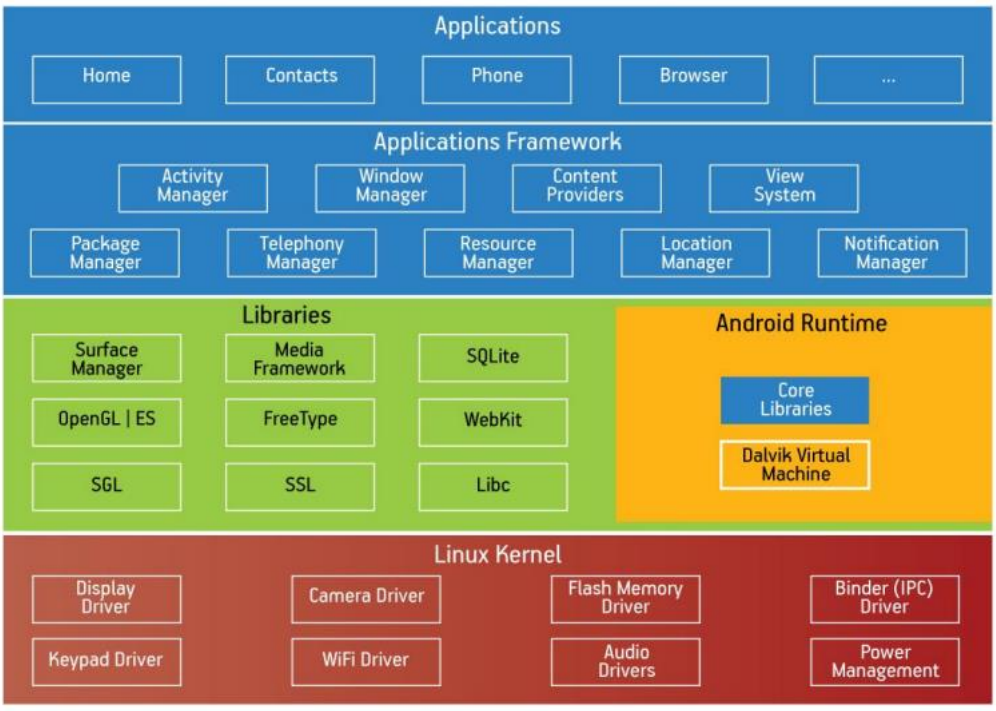
Messaging

Multi-touch

Wifi

Connectivity

Android platform architecture



Linux kernel

handles networks and a wide range of device drivers

Libraries

This layer operates on top of Linux kerne

App framework

Set of activities that forms the environment in which apps are run and managed

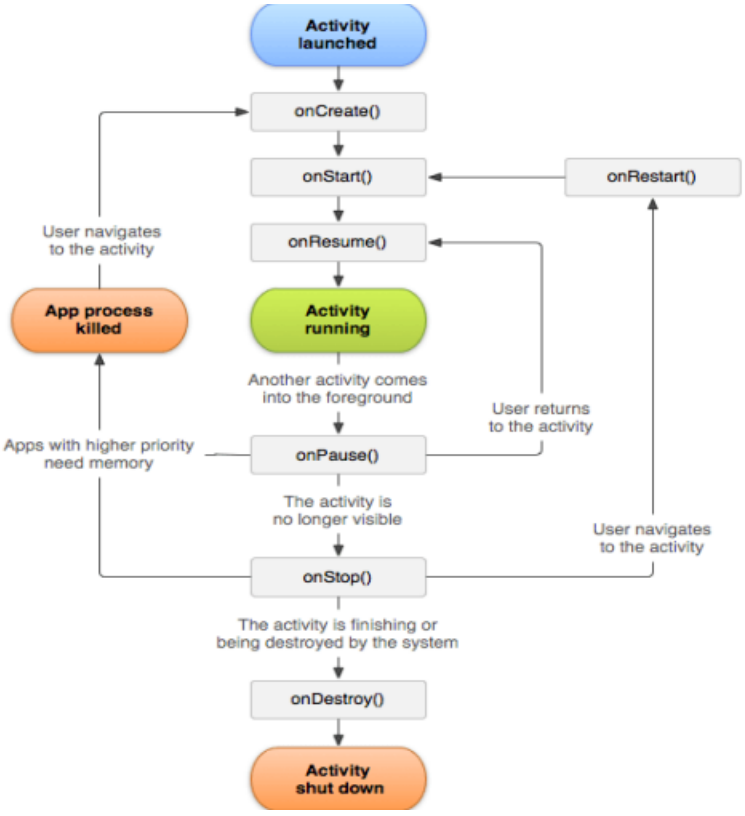
Applications

This layer contains, native apps provided with the OS and the third-party apps by the users will install hear

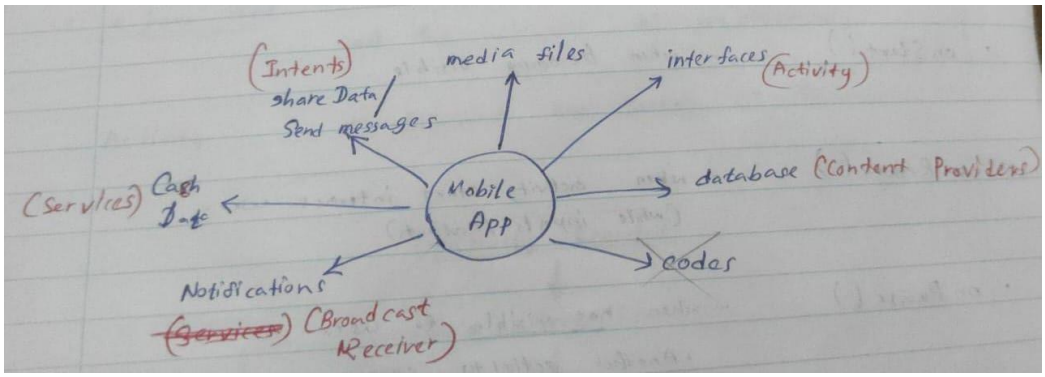
Android runtime

Core libraries- These libraries enable developers to develop android applications using Java programming language

Dalvik Virtual Machine – Kind of Java Virtual Machine specially designed and optimized for Android



Lec 5



Key differences between Dalvik and ART

Compilation method: Dalvik uses JIT compilation, while ART uses AOT compilation

Performance: ART is generally faster than Dalvik because it compiles code ahead of time, leading to faster startup times and improved overall performance.

Storage requirements: ART requires more storage space than Dalvik because it compiles code to native machine code during installation, while Dalvik compiles code at runtime

Compatibility: While both virtual machines can run the same Android apps, some apps may not work properly on ART if they are not compatible with the AOT compilation process

What is Activity Manager

This class gives information about, and interacts with, activities, services, and the containing process.

What is intents?

This is an object that can be used to requirest an action from another app component

What are Android Services mean?

This is a fundamental component of the Android operating system an they enable developers to create long-running background task

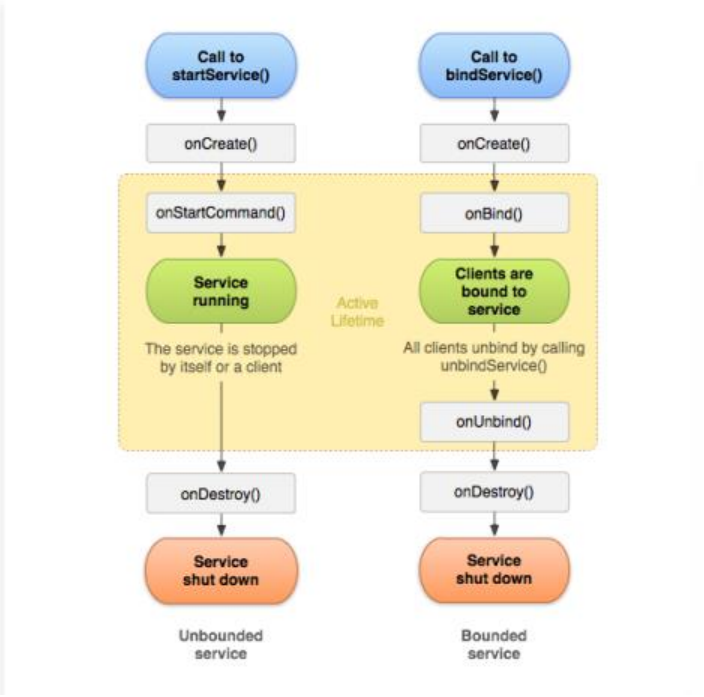
What are the type of android services?

Started services

Bound services

Service lifecycle

Service Lifecycle



Service Communication

Service can send an intend to broadcast recever

Can also communicate with a client component using a messengror a binder

Best practices of using services

It's critical to use services wisely to guarantee top performance and efficiency

designed to use as few resources as possible and to release those resources when they are no longer needed

do not drain the device's battery by running indefinitely in the background

what are broadcast receivers ?

fundamental component of the Android system that **enable apps to receive and respond to system-wide or app-specific**

(dormant component of android that listens to system-wide broadcast events or intents)

What are Type of broadcast receivers?

Static broadcast re. - listen for system-wide broadcast messages

Dynamic broadcast re. - listen for app-specific broadcast messages

What are the Best Practices on using Broadcast Receivers?

should be designed to use as few resources as possible and to release those resources when they are no longer needed

do not drain the device's battery by running indefinitely in the background

Example for broadcast receivers?

Battery level receiver

Network connectivity receiver.

Sms receiver.

Power state receiver.

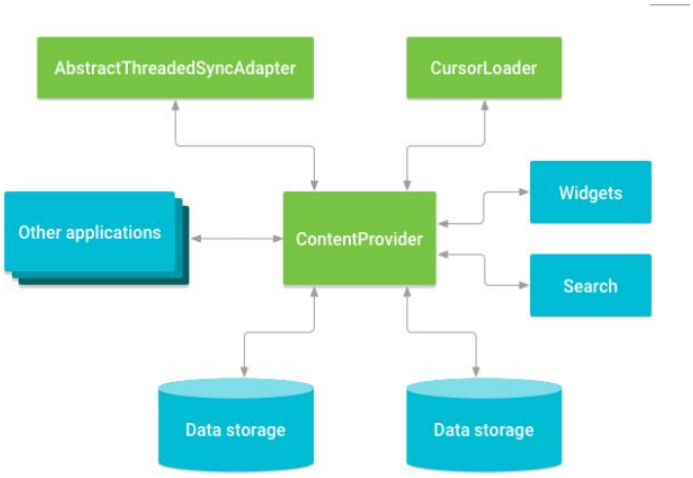
What are Content Providers?

Fundamental component that allows apps to share data with others

What are the type of contend providers?

Built-in – provide access to system wide data(media,contact)

Custom – provide access to app specific data (user preference, app setting)



Examples of Content Providers

Lec 6

What is data persistence?

Ability to store data local even after the app is closed or device turn off

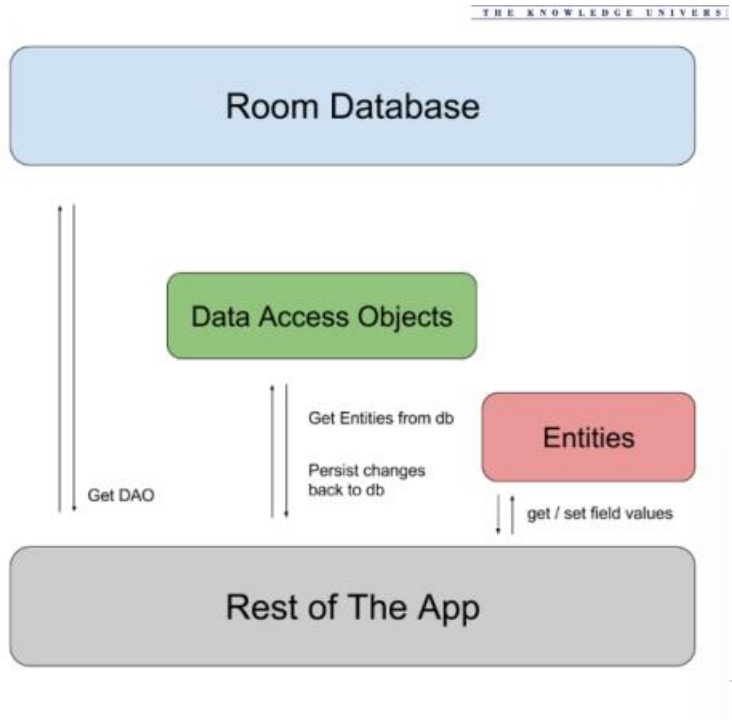
What are the technique used for data persistence?

Shared preferences -	suitable for a small amount of data (store primitive type Data (Boolean, float, int, long, string))
Internal storage -	suitable for sensitive data (store private data)
External storage -	store data in a public directory.
SQLite database -	suitable for storing large amounts of structured data.
Cloud storage -	suitable for storing data in remote servers (Google Drive, Dropbox, Amazon S3, and Microsoft OneDrive)

What are the benefits of using Room?

Compile-time verification of SQL queries.

Streamlined database migration paths



What is Firebase?

It is a comprehensive mobile development platform that provides a suite of tools and services for Android developers to build high-quality app. (real-time cloud database, user authentication, cloud messaging, analytics, crash reporting)

Lec 7

What is the definition of a sensor?

A sensor is a device that detects and responds to some type of input from the physical environment. These sensors measure motion, orientation, and various environmental conditions

What are the sensor categories?

Motion sensors - measure acceleration forces and rotational forces (accelerometers, gravity sensors, gyroscopes, and rotational vector sensors)

Environment sensors - measure various environmental parameters (ambient air temperature and pressure, illumination, and humidity)

Position sensors - measure the physical position of a device (orientation sensors and magnetometers)

What are the type of sensors?

Hardware-base

Software-base

Android Version	Supported Sensor Types
Android 1.5 (Cupcake)	Accelerometer, Magnetic field
Android 1.6 (Donut)	Accelerometer, Magnetic field, Orientation, Temperature
Android 2.1 (Eclair)	Accelerometer, Magnetic field, Orientation, Temperature, Proximity, Light
Android 2.2 (Froyo)	Accelerometer, Magnetic field, Orientation, Temperature, Proximity, Light, Pressure
Android 2.3 (Gingerbread)	Accelerometer, Magnetic field, Orientation, Temperature, Proximity, Light, Pressure
Android 4.0 (Ice Cream Sandwich)	Accelerometer, Magnetic field, Orientation, Gyroscope, Light, Proximity, Pressure
Android 4.1 - 4.3 (Jelly Bean)	Accelerometer, Magnetic field, Orientation, Gyroscope, Light, Proximity, Pressure, Humidity, Temperature
Android 4.4 (KitKat)	Accelerometer, Magnetic field, Orientation, Gyroscope, Light, Proximity, Pressure, Humidity, Temperature, Step counter, Step detector
Android 5.0 (Lollipop)	Accelerometer, Magnetic field, Orientation, Gyroscope, Light, Proximity, Pressure, Humidity, Temperature, Step counter, Step detector
Android 6.0 (Marshmallow)	Accelerometer, Magnetic field, Orientation, Gyroscope, Light, Proximity, Pressure, Humidity, Temperature, Step counter, Step detector
Android 7.0 – 12.0	Accelerometer, Magnetic field, Orientation, Gyroscope, Light, Proximity, Pressure, Humidity, Temperature, Step counter, Step detector, Heart rate

What are the Best practices when using sensors?

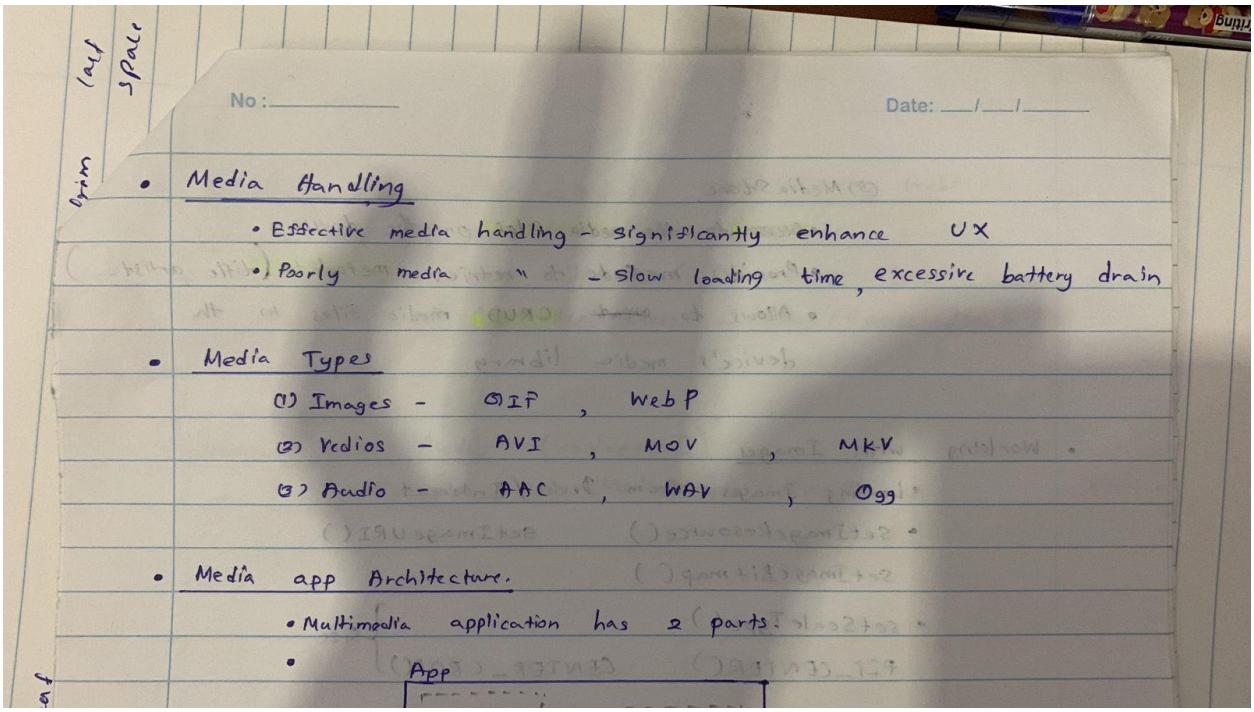
Use appropriate sensor

Minimize sensor usage

Test on multiple devices

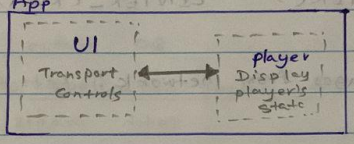
Respect user privacy

(read 161 – 177 in merged mad pdf)



(3) Audio - AAC, WAV, Ogg

- Media app Architecture.
  - Multimedia application has 2 parts:
  -



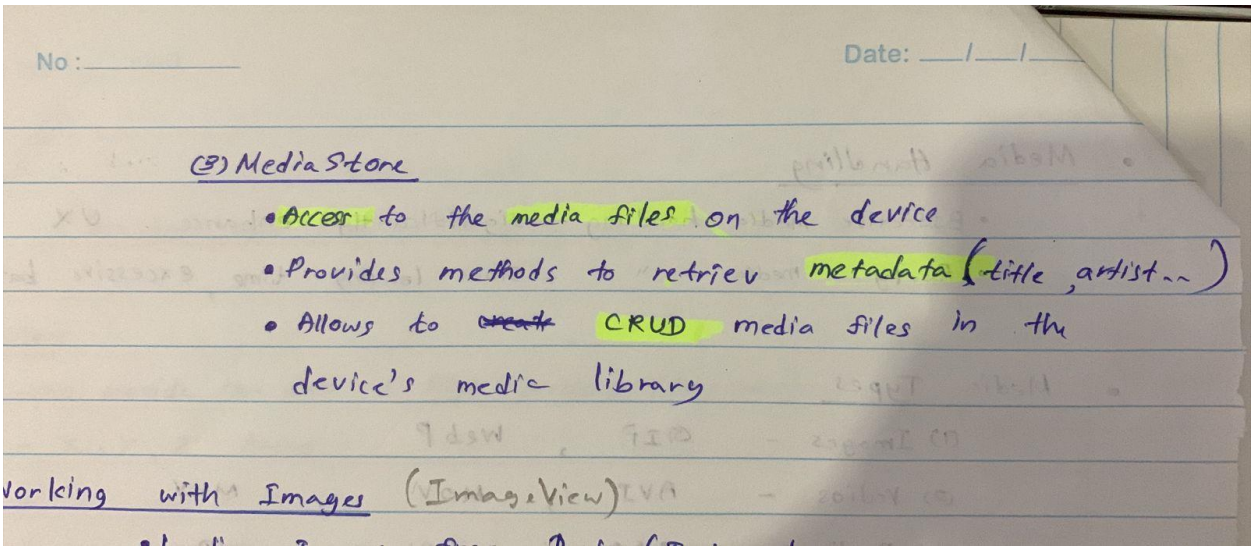
  - In android you can build your own player or choose from these function :
    - MediaPlayer Class - bare-bones for a player
    - ExoPlayer Open source library
      - support high performance features like DASH (not available in MediaPlayer class)
      - Android 4.1 + ↑

Constraint layout

- support high performance features like DASH (not available in MediaPlayer class)
- Android 4.1 + ↑

- Media APIs
  - (1) Media Player API
    - basic framework / support common media formats MP4/3GP/MP3...
    - foreground / background
  - (2) Exo Player (more advanced / complex / flexible than MediaPlayer)
    - Supports DASH / HLS
    - Better performance / Battery / more control over connecti...
    -

(1) Unam. setText("a")



LEC 8

What is software testing?

Software testing is the process of evaluating and verifying that a software product or application does what it is supposed to do.

What are the type of android testing?

Testing on real android device

Immediate new android version support

Test custom UI elements

Test performance

What should we need to do before the mobile app's first release?

Research on OS and Devices

Test bed (configuration for execution or performance, specially designed for testing)

Test plan (document that describes the scope of testing, test strategy, objectives, effort, schedule, and resources required

Automation tool

Testing techniques or methods

What are the Best practices in android app testing?

Device selection

Best testing of the application

Connectivity

Manual or automated testing

What are the testing types for Mobile apps?

Functional testing

Android UI testing

Compatibility testing

Interface testing

Network testing

Performance testing

Installation testing

Security testing

Field testing

Interrupt testing (offline scenario verification)

What are the mobile testing tools?

Kobiton

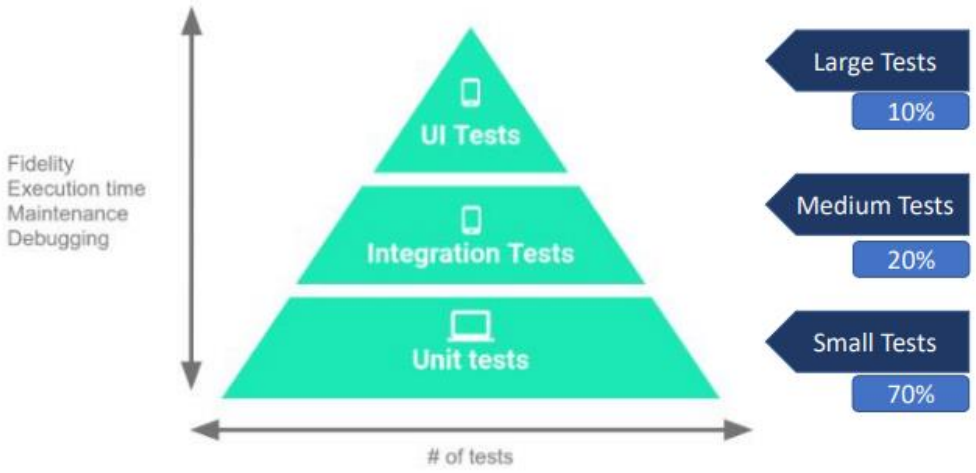
Testproject

TestingBot

Testroid

MonkeyRunner

Writing Tests



Testing Pyramid