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Android Beginner : Introduction to Android Application Development

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Questions:

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What Is Android?

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What is a GDG?

- Google Developer Groups (GDGs) are for developers who are interested in Google's developer technology;
- …everything from the Android, App Engine, and Google Chrome platforms, to product APIs like the Maps API, YouTube API and Google Calendar API.

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- Google developer group for MMUST students.
- Open membership
- Aims at teaching newbie how to develop professional Android apps using the Android SDK

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- This talk is designed for students interested in designing, creating, deploying, and testing applications for the Android™ mobile phone platform.

- It is valuable to both novices and gurus, who already have experience in developing mobile applications for other platforms.

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Prerequisites:

- Basic Knowledge of any OOPS language would be preferable and
- Passion for learning something out of the box.

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Mobile OS

- Symbian
- iPhone
- RIM's BlackBerry
- Window mobile
- Linux
- PalmwebOS
- **Android**

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Why Android

- A simple and powerful SDK
- No licensing, distribution, or development fees
- Development over many platform Linux, Mac OS, windows
- Excellent documentation
- Thriving developer community
- **BEST SELLING**

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Android Development Environment

- Download the latest JDK (Java distribution)

- Download the Eclipse IDE (e.g. Galileo) from: www.eclipse.org/downloads/

- Install the Android SDK starter package from:
- http://developer.android.com/sdk/index.html

- In Eclipse, install the ADT (Android Developer
- Tools) plugin:
- http://developer.android.com/sdk/eclipse-adt.html
- Instructions on setting up the SDK and
- development Environment can be found on:
- http://developer.android.com/sdk/installing.html

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Other IDE

- Android Studio
- IntelliJ (IntelliJIdea)
- Netbeans

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The ADT(Android Developer Tools) plugin

- Gives access to Android development tools from within the Eclipse IDE
- Automates the process of building a new Android project by setting up all the basic files needed for development
- Allows code signing of your app so it can be Distributed e.g on Google Market now the Play Store

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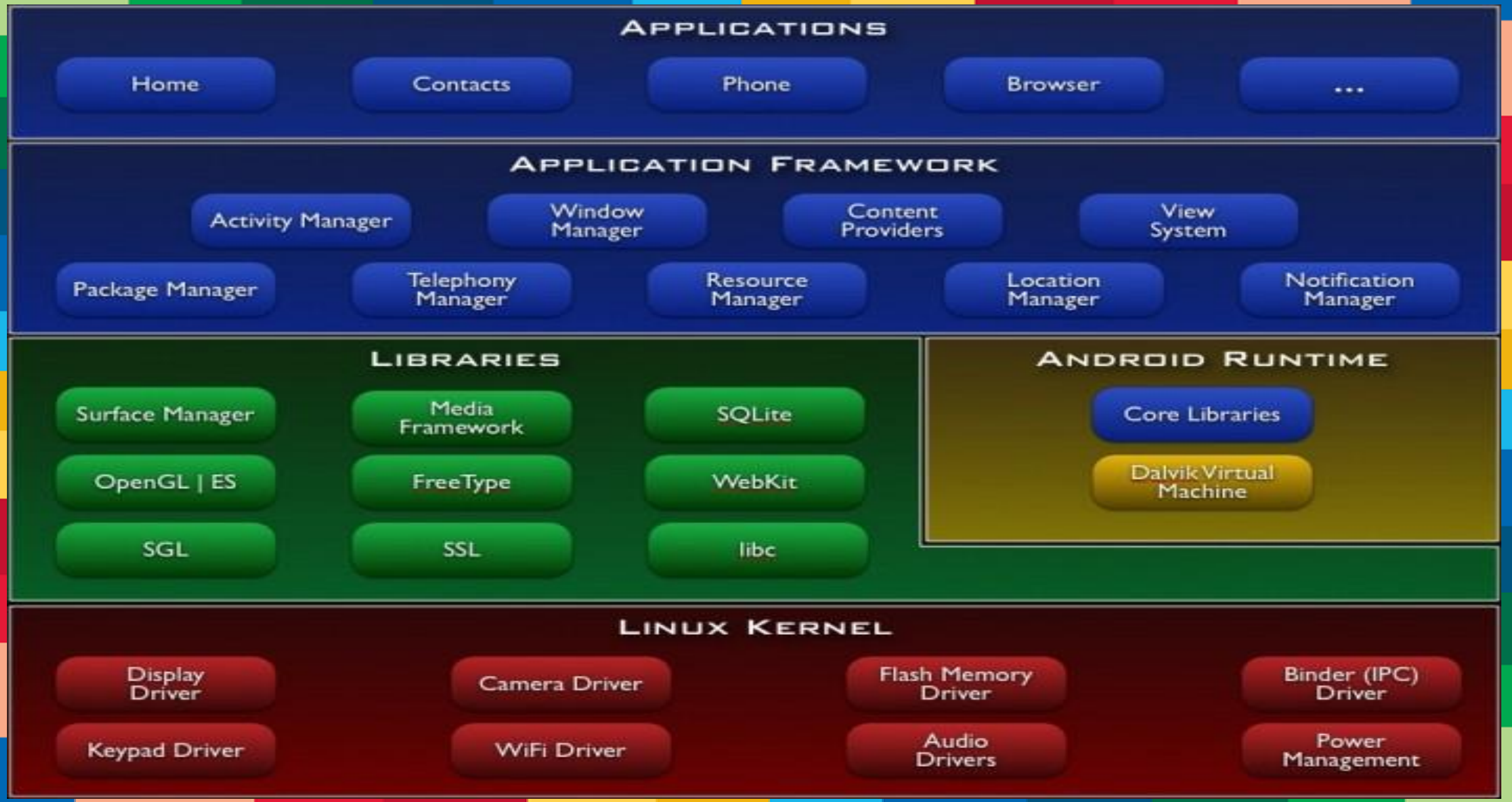
Applications
Home
Contacts
Phone
Browser
...
Application Framework
Activity Manager
Window Manager
Content Providers
View System
Package Manager
Telephony Manager
Resource Manager
Location Manager
Notification Manager
Libraries
Surface Manager
Media Framework
SQLite
OpenGL | ES
FreeType
WebKit
SGL
SSL
libc
Android Runtime
Core Libraries
Dalvik Virtual Machine
Linux Kernel
Display Driver
Camera Driver
Flash Memory Driver
Binder (IPC) Driver
Keypad Driver
WiFi Driver
Audio Drivers
Power Management

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Android Programming Components

Activity

http://developer.android.com/guide/topics/fundamentals/activities.html

Service

http://developer.android.com/guide/topics/fundamentals/services.html

Content Providers

Broadcast Receivers

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Activity

- The basis of android applications
- A single Activity defines a single viewable Screen
- Can have multiple per application Each is a separate entity
- They have a structured life cycle Different events in their life happen either via the user touching buttons or programmatically

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Services

- Run in the background and Can continue even if Activity that started it dies
- Should be used if something needs to be done while the user is not interacting with application Otherwise, a thread is probably more applicable
- Should create a new thread in the service to do work in, since the service runs in the main thread
- Can be bound to an application In which case will terminate when all applications bound to it unbind
- Allows multiple applications to communicate with it via a common interface
- Needs to be declared in manifest file
- Like Activities, has a structured life cycle

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Content Providers

- Makes a specific set of application data available to other application

  Examples
  - Data stored in filesystem
  - Data stored in SQLite db

- A ContentResolver is used to call the methods in a content provider

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Broadcast Receivers

- Receive and react to broadcasts , Many of these broadcasts originate in system code
  - Low battery
  - Picture has been taken
  - Change in timezone
  - Change in language
- Do not have a user interface
- Can start an activity that interacts with the user

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Data Storage

- Data for application is private only to that application e.g Content providers are used to share data.
- Four means of storing data
  - Preferences
  - Files
  - Databases
  - Network

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Important folders

Assets – Used for storing an apps assets like offline webpages and fonts
Bin – stores the compiled android apk file
Gen – stores do not modify, auto-generated R.java file
libs- stores third party libs in .jar format
res

- anim – stores animations definition
- animation - stores animations definition
- drawable – stores images
- layout – stores the layouts/the GUI
- menu – stores the apps menu
- raw – stores raw files like music files in .ogg format
- values – stores app values e.g. dimensions, strings, styles

src –stores the java classes

*MANIFEST

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Android Manifest xml File

<action>
<activity>
<activity-alias>
<application>
<category>
<data>
<grant-uri-permission>
<instrumentation>
<intent-filter>

<manifest>
<meta-data>
<permission>
<permission-group>
<permission-tree>
<provider>
<receiver>
<service>
<uses-configuration>
<uses-library>
<uses-permission>
<uses-sdk>

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ANDROID TOOLS

The Android Emulator Implementation of the Android virtual machine
Test and debug your android applications.

- Dalvik Debug Monitoring Service (DDMS) - Monitor and Control the Dalvik virtual machines, Logcat(see logged msgs)
- Android Debug Bridge (ADB) Manage the state of an emulator instance or Android-powered device , Copy files, install compiled application packages, and run shell commands.
- TraceView - Graphical analysis tool for viewing the trace logs from your Android application
  Debug your application and profile its performance
- MkSDCard - Creates an SDCarddisk image

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Running your apps from the IDE

Similar to launching a regular Java app, use the launch configurations

Specify as an Android Application and create a new one

Specify activity to be run

- Can select a manual option, so each time program is run, you are asked whether you want to use the actual phone or the emulator

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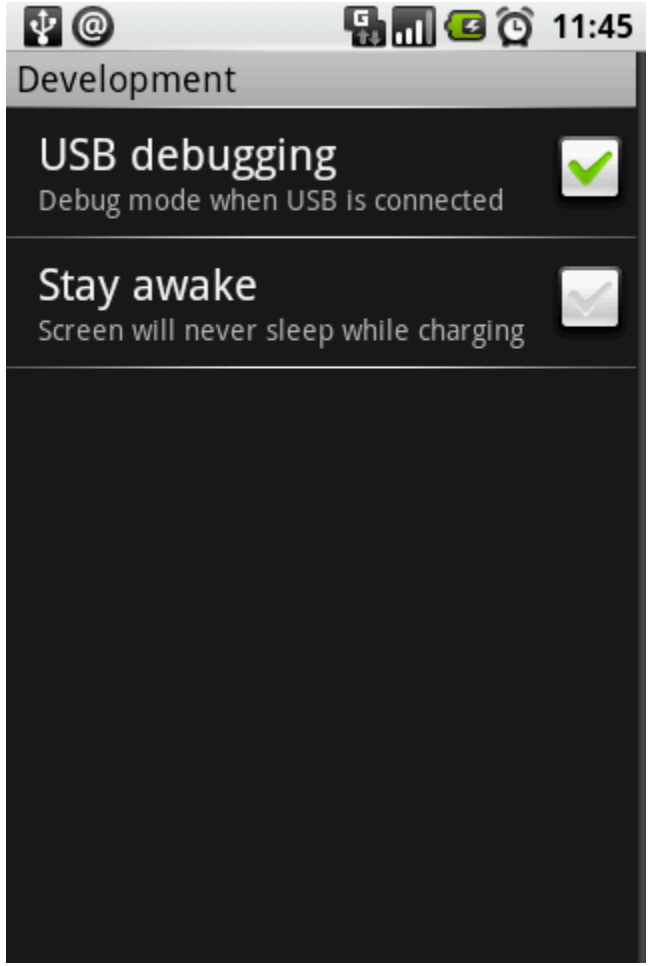
USB Debugging

- Should be enabled on phone to use developer features

- In the main apps screen select menu

Donut,Éclair, Froyo,Gingerbread, Honeycomb - > Settings - >Applications -> Development -> USB Debugging(Check)

ICS, Jelly Beans, KitKat, Lollipop -> Settings -> Developer Options -> Usb Debugging



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Android Debug Bridge (ADB)

- Used for a wide variety of developer tasks and can be read from the log file
- Location : In the ‘platform-tools’ directory of the main android sdk directory
- Recommend putting this directory and the ‘tools’ directory on the system path adb.exe

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Debugging

Instead of using traditional System.out.println, in Android we use the

Log.*(“TAG”,”MESSAGE”);

Multiple types of output (debug, warning, error,info, wtf …)

Log.d(<tag>,<string>), Log.i(<tag>,<string>), Log.wtf(<tag>,<string>)

Can be read using logcat.

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Debugging

To print out the whole log, which auto-updates

adb logcat

Erase log

adb logcat –c

Filter output via tags

adb logcat <tag>:<msg type> *:S

can have multiple <tag>:<msg type> filters

<msg type> corresponds to debug, warning,

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