ANDROID

What is an OS?

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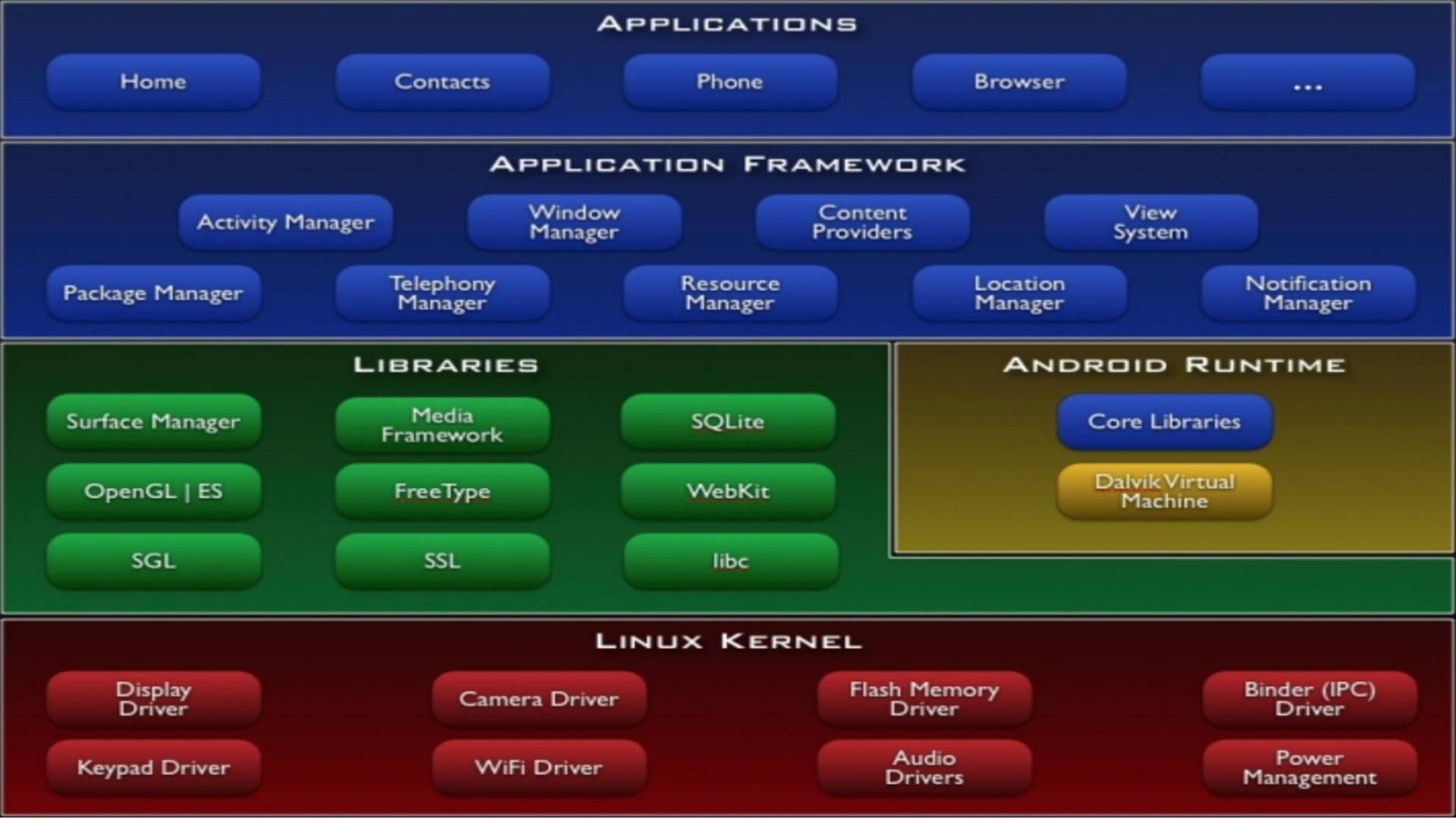
Applications
Home
Contacts
Phone
Browser
...
Application Framework
Activity Manager
Window Manager
Content Providers
View System
Package Manager
Telephony Manager
Resource Manager
Location Manager
Notification Manager
Libraries
Surface Manager
Media Framework
SQLite
OpenGL | ES
FreeType
WebKit
SGL
SSL
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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Threads
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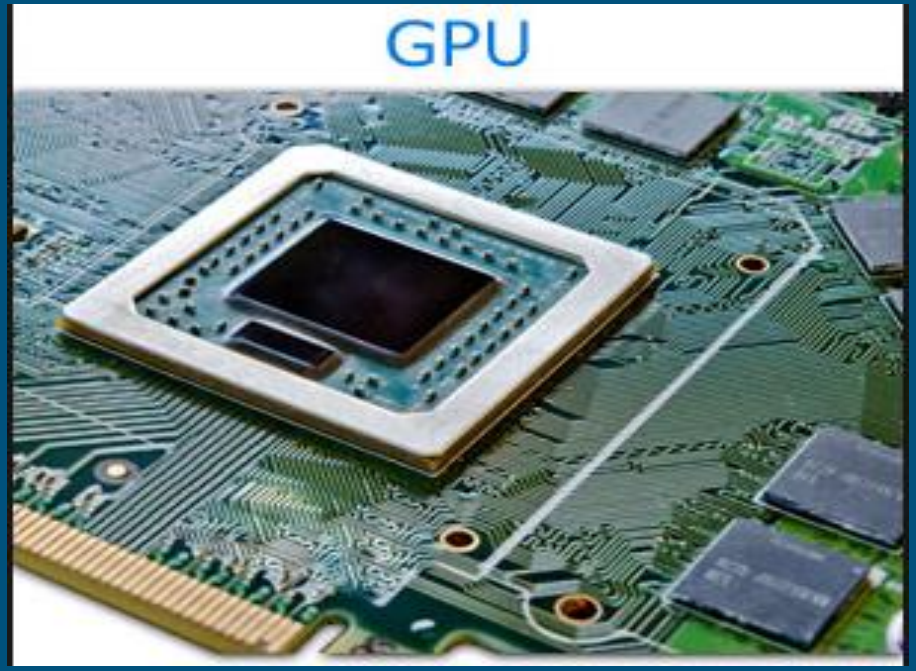
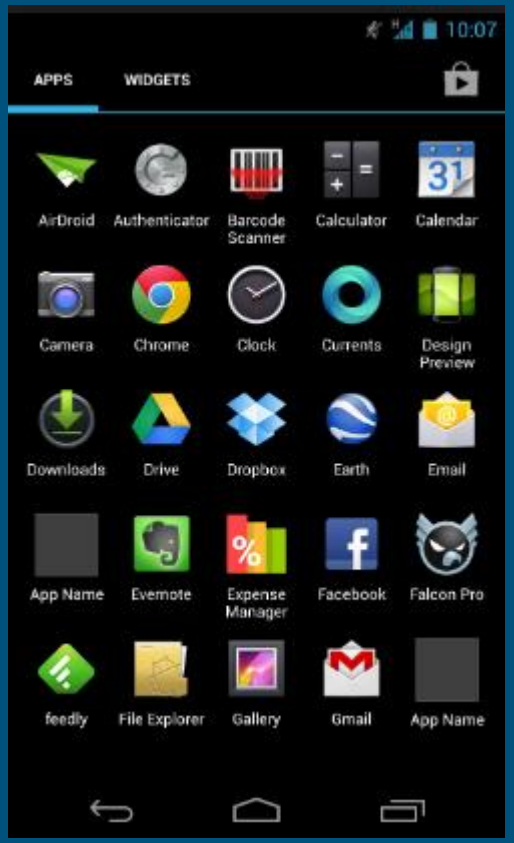
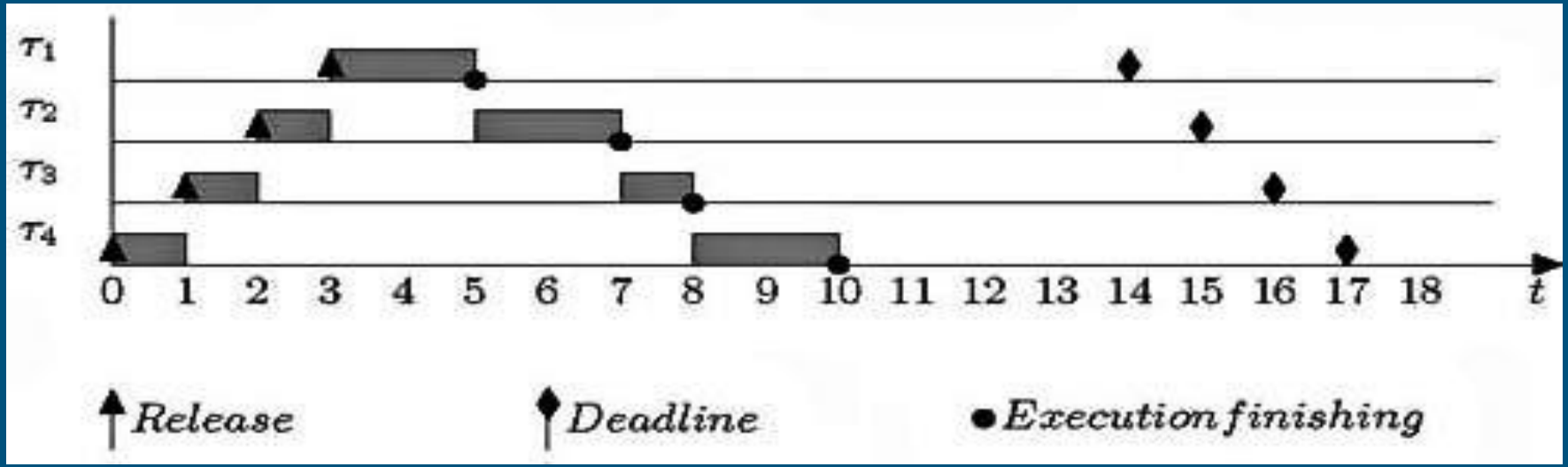
GPU/GUI

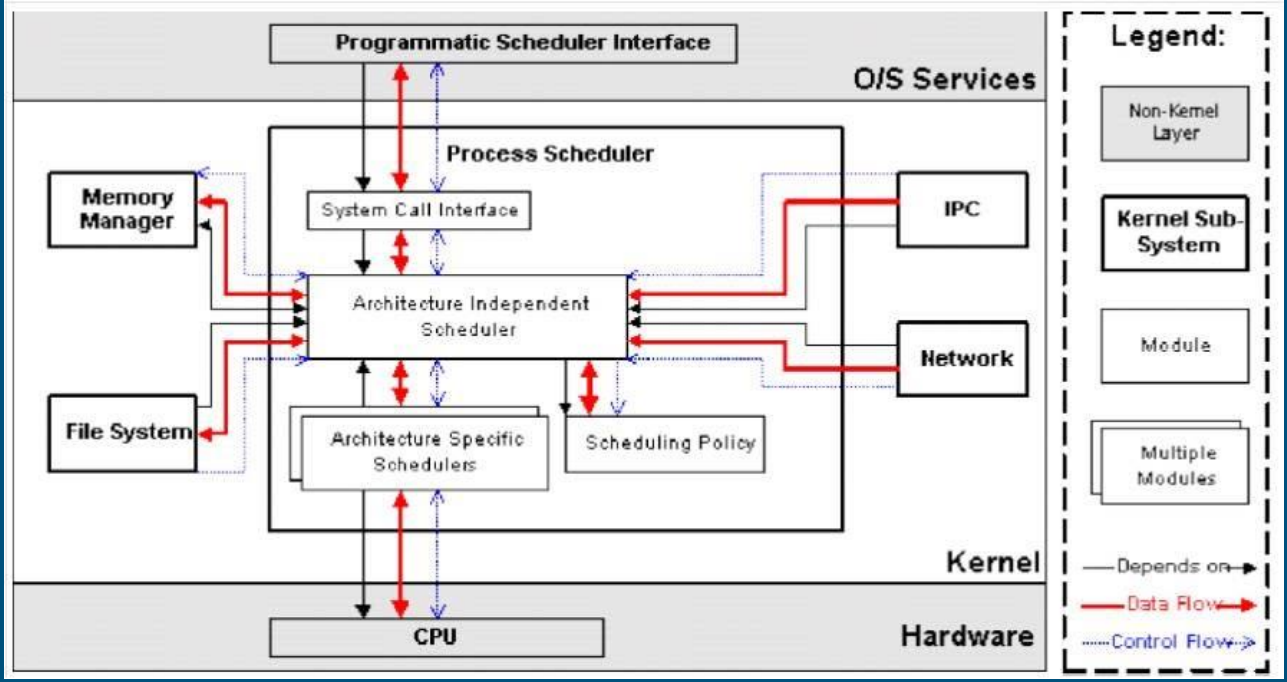

GPU


10:07
APPS
WIDGETS
AirDroid
Authenticator
Barcode Scanner
Calculator
Calendar
Camera
Chrome
Clock
Currents
Design Preview
Downloads
Drive
Dropbox
Earth
Email
App Name
Evernote
Expense Manager
Facebook
Falcon Pro
feedly
File Explorer
Gallery
Gmail
App Name

Real Time Scheduling

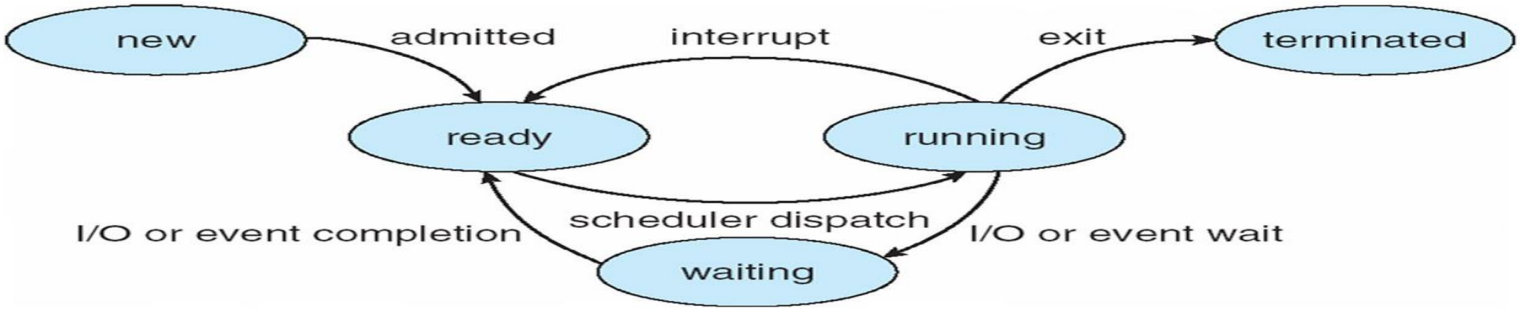


Scheduling



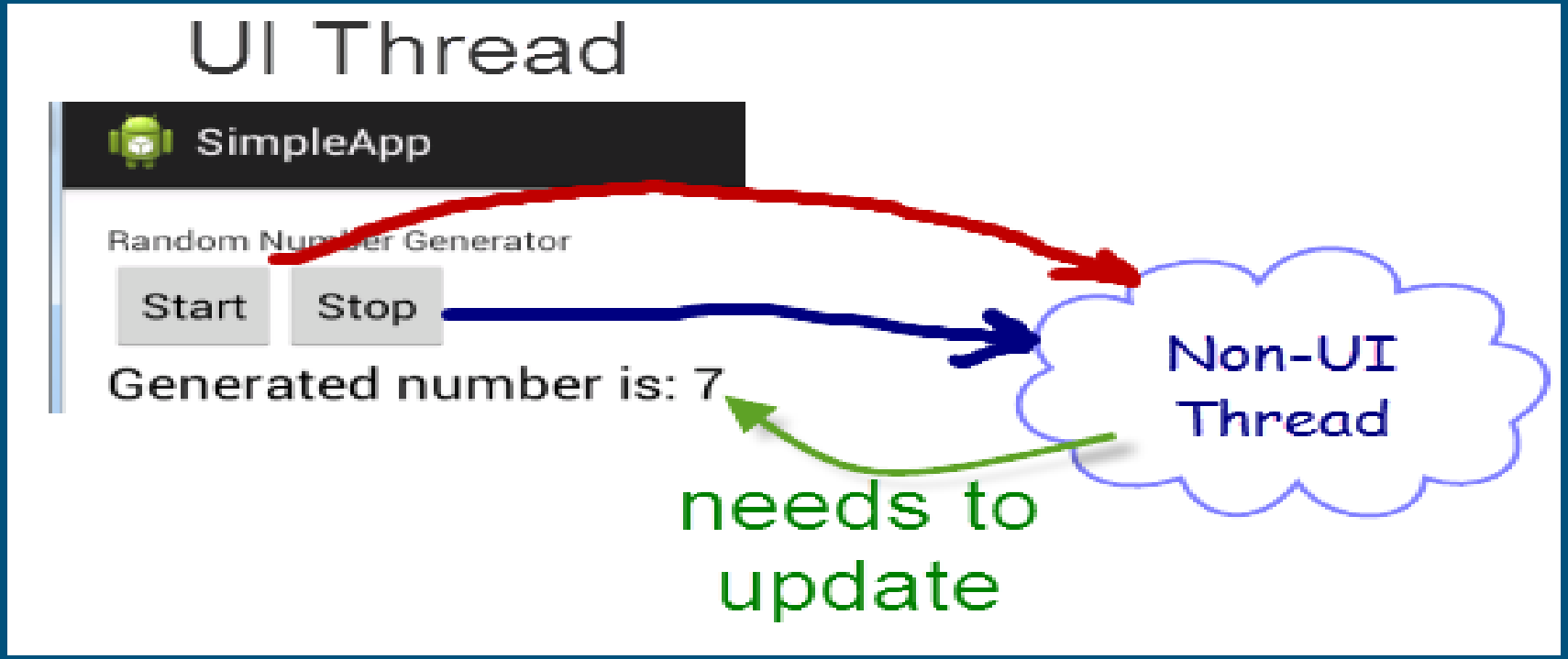
https://sites.google.com/a/itspaclub.com/www/android-linux-kernel/1-kernel-overview/1-4-process-scheduler-architecture

Processes



From - http://images.slideplayer.com/8/2466335/slides/slide_12.jpg

Threads



From: http://www.intertech.com/Blog/android-non-ui-to-ui-thread-communications-part-3-of-5/

Thread Scheduling

```
new Thread(new Runnable() {
  @Override
  public void run() {
    Process.setThreadPriority(Process.THREAD_PRIORITY_BACKGROUND);

    // ...
  }
}).start();
```

Scheduling tasks via the AlarmManager System Service

```
Calendar cal = Calendar.getInstance();

Intent intent = new Intent(this, MyService.class);
PendingIntent pintent = PendingIntent.getService(this, 0,
intent, 0);

AlarmManager alarm = (AlarmManager)
getSystemService(Context.ALARM_SERVICE);
// schedule for every 30 seconds
alarm.setRepeating(AlarmManager.RTC_WAKEUP,
cal.getTimeInMillis(), 30*1000, pintent);
```

2. Memory / Hardware

1. Memory management
2. RAM
3. Cache
4. Network chip
5. MicroSD
6. Power Supply

Memory Management

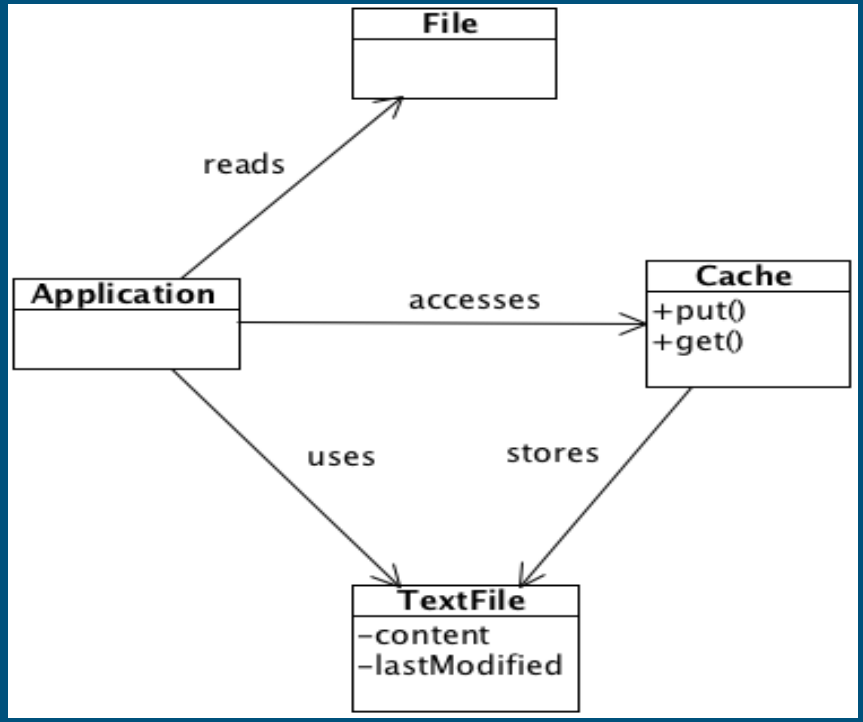
From: http://bit.ly/1Royt26

From: http://bit.ly/25fpKsT

RAM

From - http://bit.ly/22ogLE4

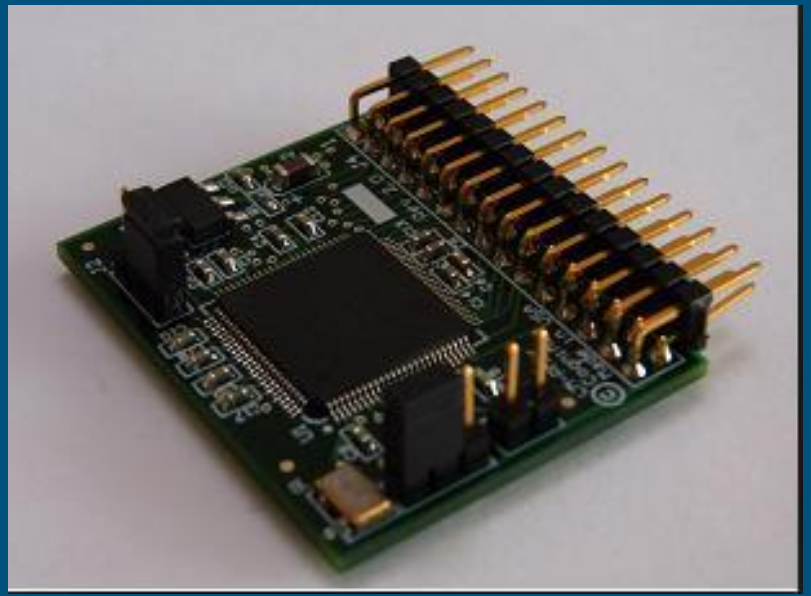
Caching



From - http://www.cacheonix.org/articles/Caching_Files_in_Java_Class_Diagram.png

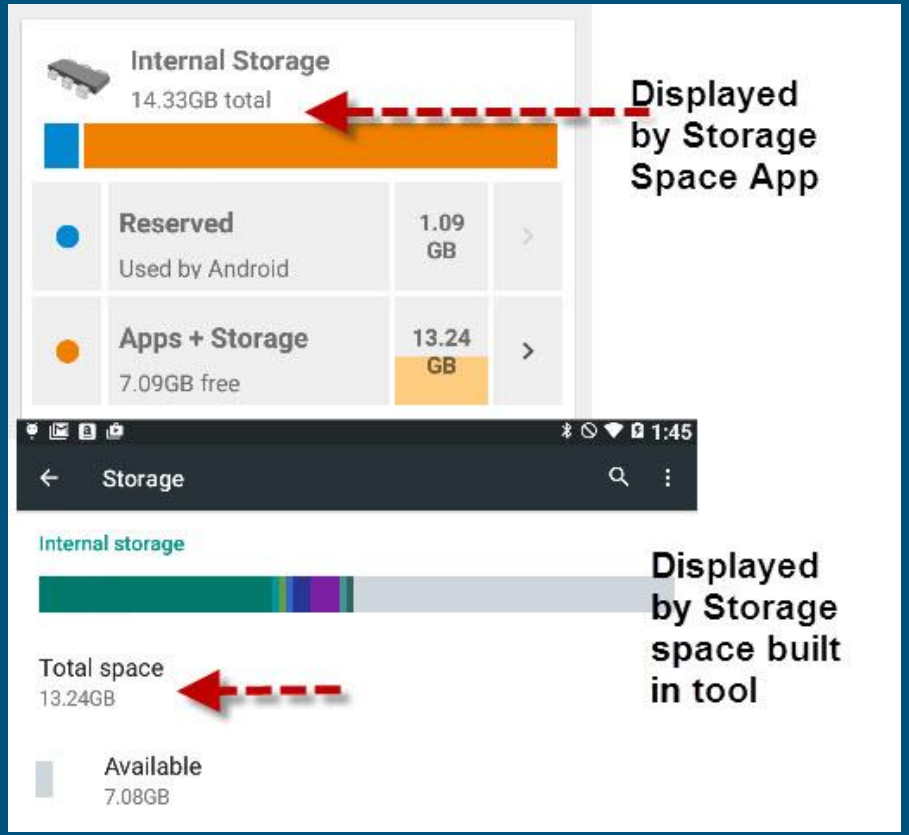
Network Chip

From: http://bit.ly/246BYSa



From: http://bit.ly/1Ty4irG

Internal/External Storage



From:http://bit.ly/1szoBhv

Battery

From - http://www.creotix.com/tech/interesting/advantages-of-rooting-android-phone/1469/

Memory / Hardware - Code

```
MemoryInfo mi = new MemoryInfo();
ActivityManager activityManager = (ActivityManager)
  getSystemService(ACTIVITY_SERVICE);
activityManager.getMemoryInfo(mi);
long availableMegs = mi.availMem / 1048576L;


//Percentage can be calculated for API 16+:
 long percentAvail = mi.availMem / mi.totalMem;
```

3. Software

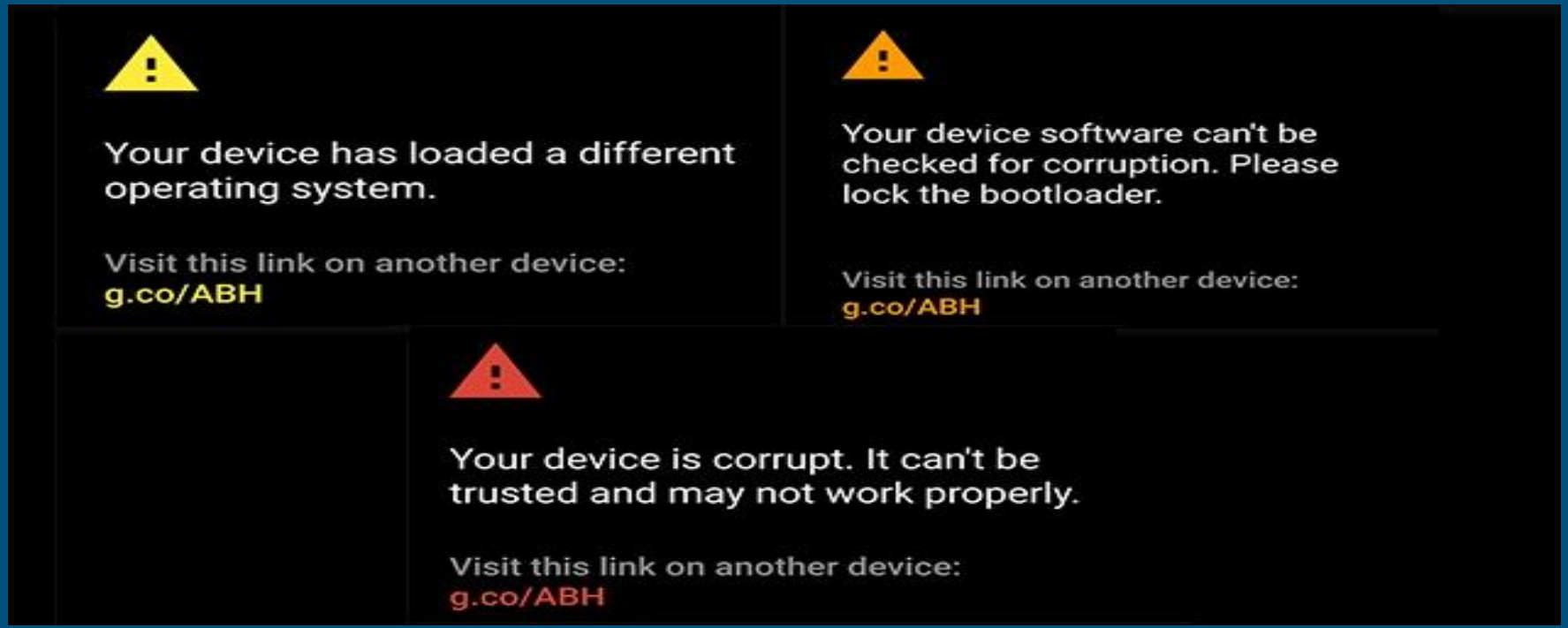
1. Security
2. Error / warning messages
3. CRUD of methods
4. Drivers
5. Resolution Compatibility
6. Version history

Security

From - http://bit.ly/1TCFZuK

From - http://bit.ly/1Ucb5cE

Warning Messages



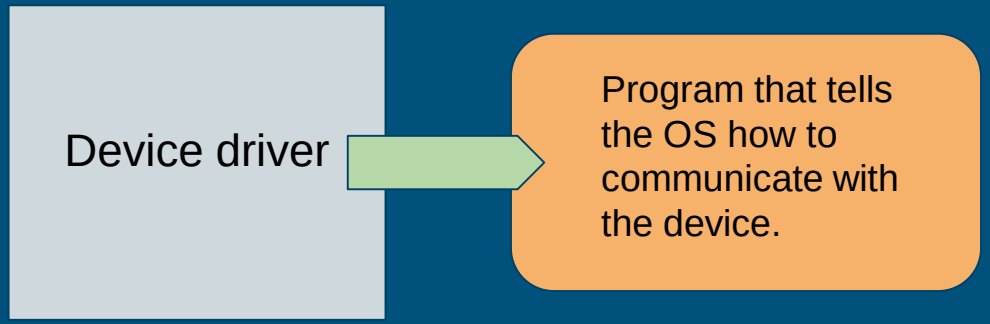
From - http://gadgets.ndtv.com/mobiles/news/google-set-to-add-operating-system-safety-warnings-in-android-m-720797

CRUD

```
// From MainActivity.onCreate()

PostDatabase DB = new PostDatabase(MainActivity.this);
SQLiteDatabase sqlDB = DB.getWritableDatabase();

// Execute queries...

sqlDB.close();
```

http://codetheory.in/working-sqlite-database-crud-operations-android/

What is a device driver?

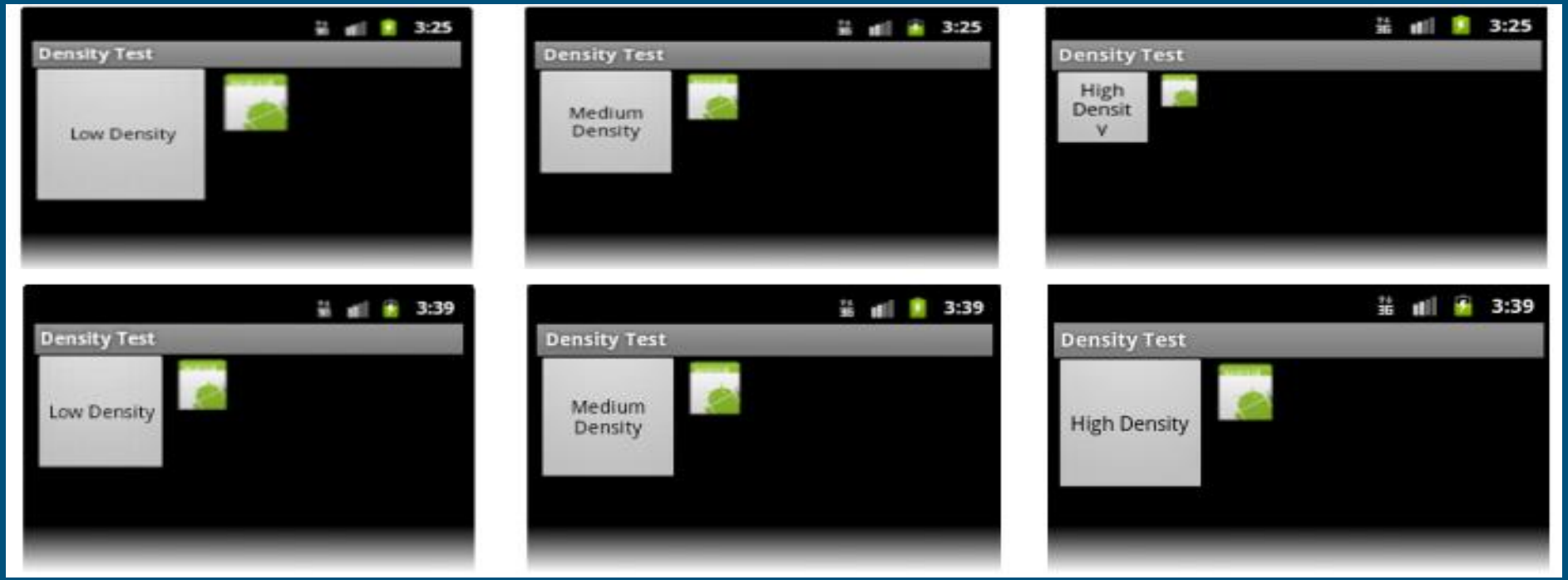


https://source.android.com/devices/

Example of HAL code for audio devices

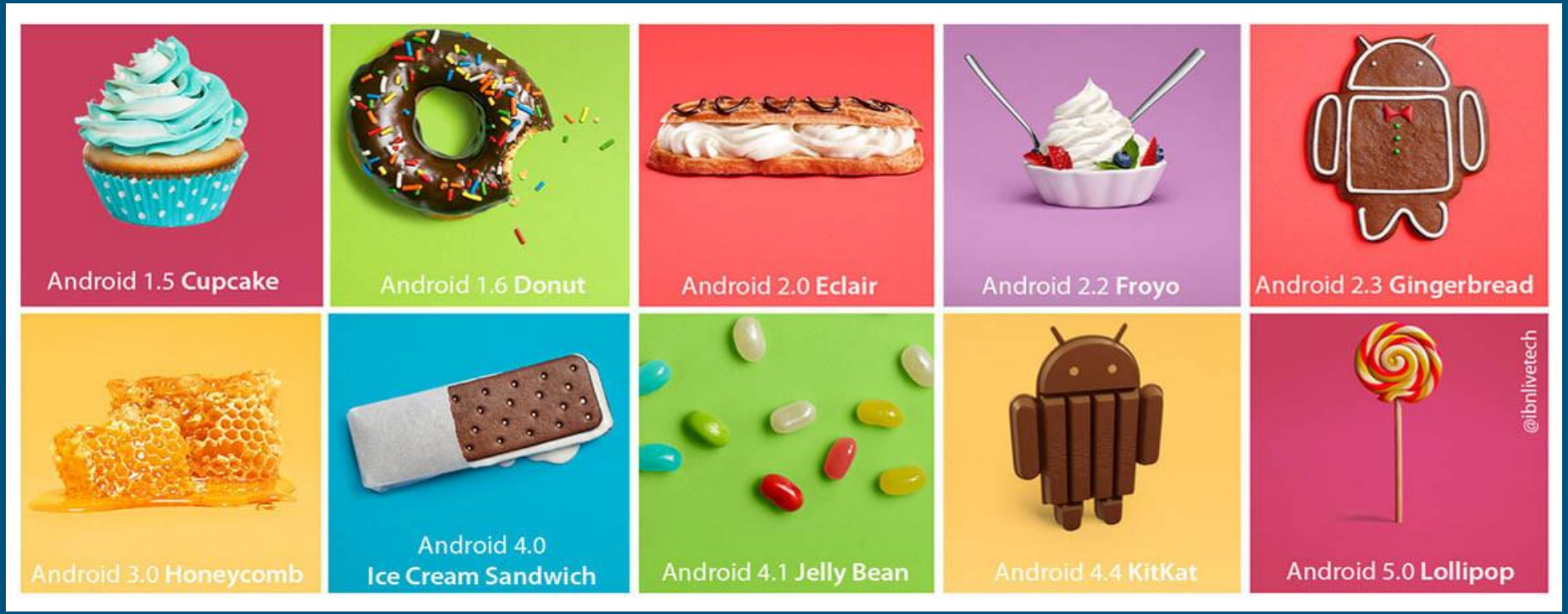
```
struct audio_hw_device {
    struct hw_device_t common;
     * used by audio flinger to enumerate what devices are supported by
     * each audio_hw_device implementation.
     *
     * Return value is a bitmask of 1 or more values of audio_devices_t
     */
    uint32_t (*get_supported_devices)(const struct audio_hw_device *dev);
  ...
};
typedef struct audio_hw_device audio_hw_device_t;
```

Resolution Compatibility



From: https://developer.android.com/guide/practices/screens_support.html

Android Version History

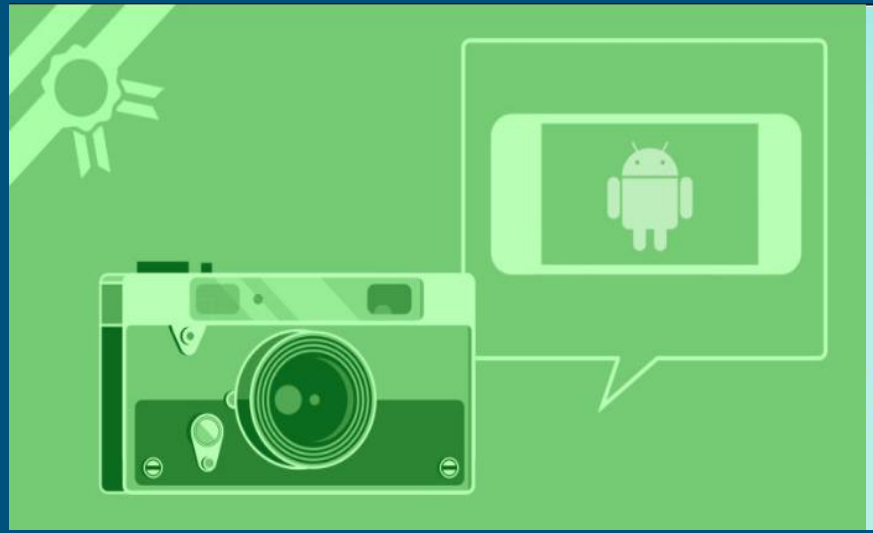


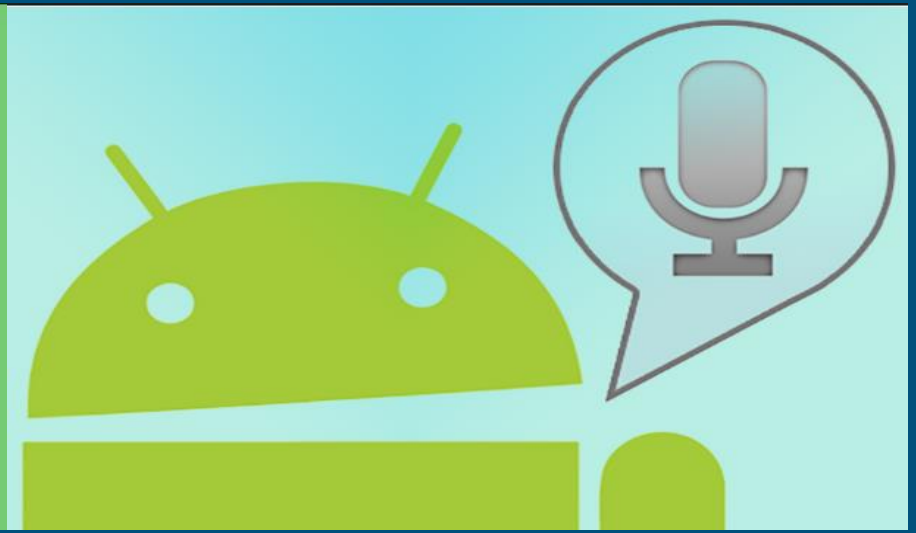
From - http://www.appsonclick.com/android-application/

5. Input / Output

1. Camera / Audio
2. GPS
3. Peripherals
4. Sensors
5. Touchscreen
6. Vibrations

Camera/Audio





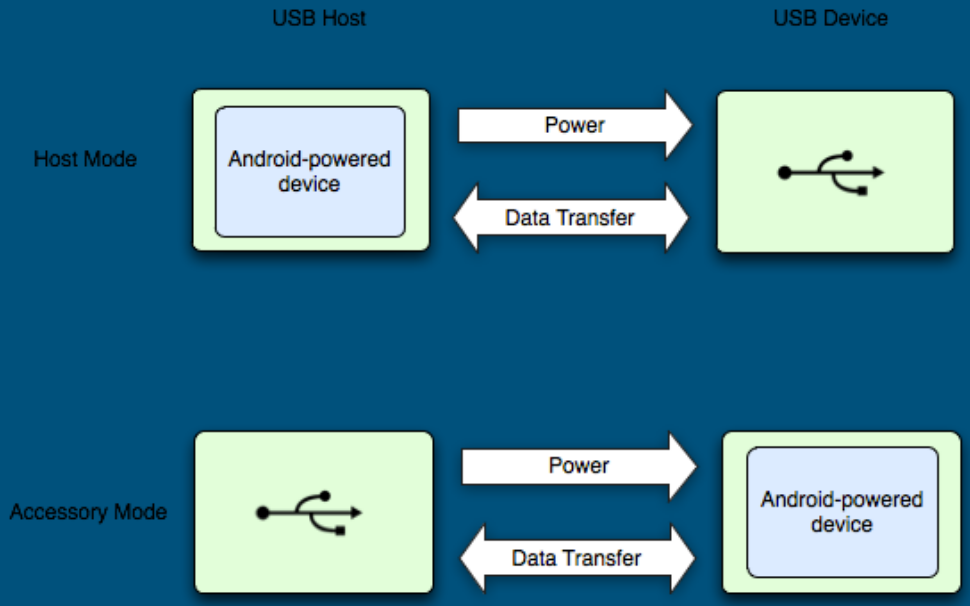
http://bit.ly/1WN7sgI

http://bit.ly/1qHUTFS

GPS

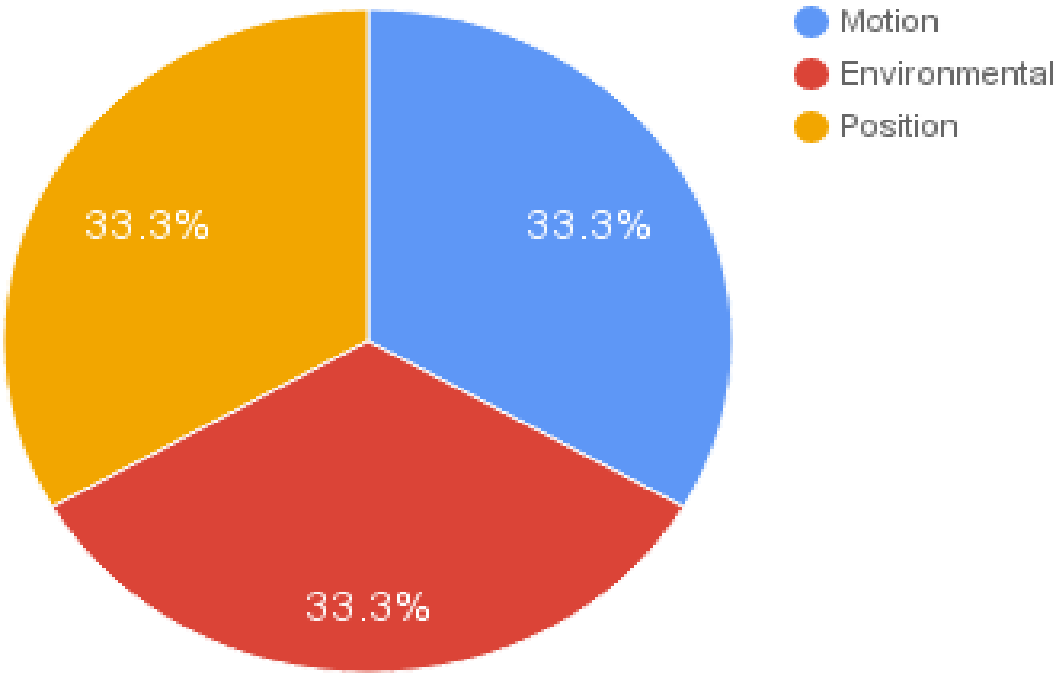
http://lifehacker.com/5873007/how-can-i-fix-my-androids-crappy-gps

Peripherals



https://developer.android.com/guide/topics/connectivity/usb/index.html

Sensors in Android Devices



Touchscreen

From: http://www.coolav.co.uk/benq-rp702touch.html

Android Vibrations

From - http://bit.ly/1WgEGVT

From - http://bit.ly/1YUp2xo

Code for Creating Touchscreen Event

```
public boolean onTouchEvent(MotionEvent e) {
  // get touchX and touchY
  switch (e.getAction()) {
    // .... other cases ...
    case MotionEvent.ACTION_UP:
          thread.setBubble(touchX, touchY);
          float totalTime = e.getEventTime() - e.getDownTime();
      Toast.makeText(ctx, "Touch time in ms was " + totalTime,
                     Toast.LENGTH_SHORT).show();
          break;
    }
  return true;
}
```


That's all Folks!