

CHAPTER 2

SYSTEM REQUIREMENTS

2.1 SOFTWARE REQUIREMENT

- **ANDROID OPERATING SYSTEM**

Android is a mobile operating system developed by Google, based on a modified version of the Linux kernel and other open source software and designed primarily for touchscreen mobile devices such as smartphones and tablets. In addition, Google has further developed Android TV for televisions, Android Auto for cars, and Wear OS for wrist watches, each with a specialized user interface. Variants of Android are also used on game consoles, digital cameras, PCs and other electronics.

Android's source code is released by Google under an open source license, and its open nature has encouraged a large community of developers and enthusiasts to use the open-source code as a foundation for community-driven projects, which deliver updates to older devices, add new features for advanced users or bring Android to devices originally shipped with other operating systems. These community-developed releases often bring new features and updates to devices faster than through the official manufacturer/carrier channels, with a comparable level of quality; provide continued support for older devices that no longer receive official updates. Cyanogen, Lineage, Paranoid, AICP OS are some of the customized operating system developed by communities.

Historically, device manufacturers and mobile carriers have typically been unsupportive of third-party firmware development. Manufacturers express concern about improper functioning of devices running unofficial software and the support costs resulting from this. Moreover, modified firmware such as Cyanogen sometimes offer features, such as tethering, for which carriers would otherwise charge a premium. As a result, technical obstacles including locked bootloaders and restricted access to root permissions are common in many devices. However, as community-developed software has grown more popular, and following a statement by the Librarian of Congress in the United States that permits the "jailbreaking" of mobile devices, manufacturers and carriers have softened their position

regarding third party development, with some, including HTC, Motorola, Samsung and Sony, providing support and encouraging development.

As a result of this, over time the need to circumvent hardware restrictions to install unofficial firmware has lessened as an increasing number of devices are shipped with unlocked or unlockable bootloaders, similar to Nexus series of phones, although usually requiring that users waive their devices' warranties to do so. However, despite manufacturer acceptance, some carriers in the US still require that phones are locked down, frustrating developers and customers.

- **ANDROID STUDIO SDK**

Android is an open source and Linux-based Operating System for mobile devices such as smartphones and tablet computers. Android was developed by the Open Handset Alliance, led by Google, and other companies. Android applications are usually developed in the Java language using the Android Software Development Kit.

The Android software development kit (SDK) includes a comprehensive set of development tools. These include a debugger, libraries, handset emulator based on QEMU, documentation, sample code, and tutorials. Currently supported development platforms include computers running Linux (any modern desktop Linux distribution), Mac OS X 10.5.8 or later, and Windows 7 or later. The SDK is not available on Android itself, but software development is possible by using specialized Android applications.

The officially supported integrated development environment (IDE) was Eclipse using the Android Development Tools (ADT) Plugin, though IntelliJ IDEA IDE (all editions) fully supports Android development out of the box, and NetBeans IDE also supports Android development via a plugin. Android Studio, made by Google and powered by IntelliJ, is the official IDE; however, developers are free to use others, but Google made it clear that ADT was officially deprecated to focus on Android Studio as the official Android IDE. Additionally, developers may use any text editor to edit Java and XML files, then use command line tools (Java Development Kit and Apache Ant are required) to create, build and debug Android applications as well as control attached Android devices (e.g., triggering a reboot, installing software package(s) remotely).

Enhancements to Android's SDK go hand in hand with the overall Android platform development. The SDK also supports older versions of the Android platform in case developers wish to target their applications at older devices. Development tools are downloadable components, so after one has downloaded the latest version and platform, older platforms and tools can also be downloaded for compatibility testing.

Android applications are packaged in .apk format and stored under /data/app folder on the Android OS (the folder is accessible only to the root user for security reasons). APK package contains. dex files (compiled byte code files called Dalvik executables), resource files, etc.

- **GRADLE**

Gradle is an open-source build automation system that builds upon the concepts of Apache Ant and Apache Maven and introduces a Groovy-based domain-specific language (DSL) instead of the XML form used by Apache Maven for declaring the project configuration. Gradle uses a directed acyclic graph ("DAG") to determine the order in which tasks can be run.

Gradle was designed for multi-project builds, which can grow to be quite large. It supports incremental builds by intelligently determining which parts of the build tree are up to date; any task dependent on those parts does not need to be re-executed. The initial plugins are primarily focused on Java, Groovy and Scala development and deployment, but more languages and project workflows are on road map.

2.2 HARDWARE REQUIREMENT

Android Smartphone with flashlight, light sensor capability and Android version v5.0(Lollipop) or above for better functioning of the application.

Components required for audio transfer

- LED
- Solar Cell
- Speaker
- Auxiliary Cable
- Connecting Wires
- Battery

• LIGHT EMITTING DIODE

A light-emitting diode (LED) is a two-lead semiconductor light source. It is a p–n junction diode that emits light when activated. When a suitable current is applied to the leads, electrons are able to recombine with electron holes within the device, releasing energy in the form of photons. This effect is called electroluminescence, and the colour of the light (corresponding to the energy of the photon) is determined by the energy band gap of the semiconductor. LEDs are typically small (less than 1 mm²) and integrated optical components may be used to shape



FIG 2.1 LIGHT EMITTING DIODE(LED)

- **SOLAR CELL**

A solar cell, or photovoltaic cell, is an electrical device that converts the energy of light directly into electricity by the photovoltaic effect, which is a physical and chemical phenomenon. It is a form of photoelectric cell, defined as a device whose electrical characteristics, such as current, voltage, or resistance, vary when exposed to light. Individual solar cell devices can be combined to form modules, otherwise known as solar panels. In basic terms a single junction silicon solar cell can produce a maximum open-circuit voltage of approximately 0.5 to 0.6 volts.

Solar cells are described as being photovoltaic, irrespective of whether the source is sunlight or an artificial light. They are used as a photodetector (for example infrared detectors), detecting light or other electromagnetic radiation near the visible range, or measuring light intensity.

The operation of a photovoltaic (PV) cell requires three basic attributes:

- The absorption of light, generating either electron-hole pairs or excitons.
- The separation of charge carriers of opposite types.
- The separate extraction of those carriers to an external circuit.



FIG 2.2 SOLAR CELL

- **SPEAKER**

The demodulated signal will be at low voltage range. So it is Amplified to the arbitrary voltage level using an amplifier. The speaker will convert the electrical signal to the audible form using electro magnets present in it.



FIG 2.3 SPEAKER