

## What is Android OS?

---



Android is the name of the operating system used for many mobile devices such as phones and tablets. An operating system is software responsible for the basic functions of a device and defines much of your user experience.

Android was developed primarily by Google in 2008 and is used by many manufactures like Samsung, Motorola, LG, and Google itself. The primary alternative to Android is iOS, an operating system developed by Apple and used almost exclusively by their own line of products. You are no doubt aware of how divisive the topic of Android VS iOS can be. This is nothing new to the tech industry, particularly because it is a great source of free promotion, but you should know that neither are the superior product. It really does come down to a personal preference. As of this writing most mobile device users are using the Android operating system.

As is the case with any Operating System it is very important that you keep your device up to date with the latest version. These updates can include quality of life improvements and new features, but more importantly patch and resolve any security issues or vulnerabilities. When prompted to install an update you should do so as soon as possible. This lesson assumes you are using the latest version of Android, which is **version 13**.

**Please also note that your user experience may be slightly different based on the device that you are using. For instance, you may need to use different methods to reach different features.**

## Power

---

Your device has 3 states of power: on, off, and sleep. Sleep is a state of low power that keeps essential tasks active and shuts down the rest. This allows your computer to return to full power quickly when you wake it back up. Your device likely has at least 3 buttons along its sides, one will be for power and the other two to raise and lower the volume on your device. To turn your device on or off you'll need to hold the power button down for a few seconds (some devices will not power off this way, and instead require that you shut them down from a menu). To put a device to sleep or wake it up you will just need to press the button once.

Your mobile device will be powered by an internal battery. If this battery gets too low your device will not be able to turn back on or wake up. If this happens simply charge the device for a while. Most devices will display the battery percentage while charging even if powered up, but the battery must pass a certain threshold (usually around 5%) before they can do this.

A battery's ability to hold a charge can degrade over time. This can be caused by keeping the battery depleted for too long, but most often it is caused by frequently leaving it on the charger or connected to power when the battery is at 100%.

## Touch

---

One of the primary reasons Android was designed was to accommodate a touch screen environment, so let's start there. Touch screens are not designed to detect weight, pressure, friction, or anything of that nature when registering touch. This would cause phones to go nuts from simply being stored in your pocket or a bag. Instead they are designed to register touch based on the conductivity of your skin. This is why your phone won't register your input through something like a thick pair of wool gloves.

When touching your screen try to touch your screen gently with the tip of your finger (not the finger nail). Many devices are now sensitive enough to allow for biometrics like fingerprint detection. This can give you a powerful tool in securing your device. In this case press your finger flatly and firmly against the screen. If you are having trouble with touch, there do exist a number of styli to assist you. A stylus is a pen-like object with a conductive tip that will register touch on a touchscreen. Do not use pencils or ink pens as you can damage your screen and they will not register touch.

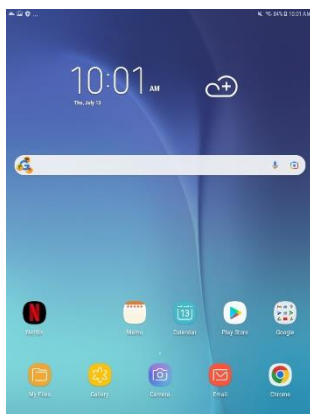
There are a few ways to touch your screen, and depending on what you touch they can serve different functions.

- **Tap:** Briefly touch the screen and lift your finger off of it. This is your primary means of opening apps or interacting with functions. You can consider this the Android version of "left clicking."
- **Swipe:** Touch the screen, keep your finger in place, and drag it across the screen. This is often used to change pages or scroll content up and down.
- **Pinch:** is when you place two fingers on the screen, keep them in place, and move them towards each other or away from each other. This is often done to enlarge/zoom in or shrink/zoom out.
- **Hold** is when you touch the screen with your finger and leave it in place for a few seconds. This often introduces additional functions or options, like moving icons or deleting apps. You can consider this the Android version of "right clicking."

\* Some devices also allow you to perform specific functions by swiping specific patterns. These are called gestures.

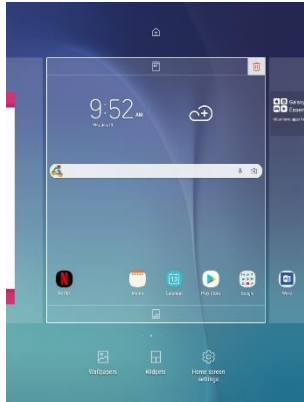
## Home

---



Your home screen is the main display of your device. You can think of it like the desktop of a computer, it is a surface upon which shortcuts and widgets can rest. A shortcut is an icon that will open an app or a function when tapped. A widget is a feature that performs a function or displays active information, like the time, weather, or your calendar.

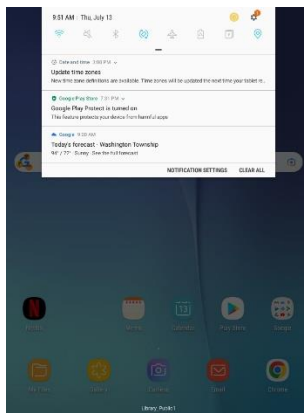
The home screen can consist of multiple pages, accessible by swiping left and right (swiping right from your first screen will often open a different function, like a news feed or your system settings).



Tapping and holding an area of the home screen absent of shortcuts or widgets will give you more options with the pages of your home screen. You'll be able to add additional pages as well as delete pages (except for the first page). You'll also be able to embed widgets or remove widgets from a page, and quickly change the wallpaper.

## Top Menu

---



At the very top of the home page (and present over some apps as well) you should see a number of small icons, often including the time and a battery. This is the top menu, also known as the notifications bar. The top menu contains notifications from your device, as well as quick access to important settings. It can be expanded at almost any time by swiping down from the top of the screen.

Notifications are alerts from the apps on your device, such as text messages, phone calls, news alerts, emails, available updates and so on. You are able to configure or silence these apps by tapping and holding them, or by accessing your settings. Modifying notifications will establish app specific rules, it won't apply for just the specific notification you tapped. You can clear notifications by swiping individual notifications off the screen, or by tapping the clear button, usually at the bottom of the notification list.

In addition to notifications you'll find quick settings in the top menu. You may need to swipe down an additional time to access them, or tap a settings icon (a gear usually) to access them depending on your device. Common quick settings include:

- **Wi-Fi:** Toggles the device's ability to connect to Wi-Fi on or off. It is good practice to keep this off when you aren't using a trusted Wi-Fi signal, as this consumes battery and can be a security vulnerability.
- **Volume:** Access to volume controls. Volume can be raised and lowered to different individual levels for the system, notifications, ringtone, and media. Furthermore, sound can be set to vibration only or completely silent.
- **Blue Tooth:** Toggles the device's ability to connect to Blue Tooth devices, like headphones and earpieces, on or off.
- **Data:** Toggles the device's ability to connect to signals like 3G, 4G, 5G and so on, on or off. More secure than Wi-Fi, so it is safer to leave on and often needed for basic phone operations like phone calls and text messages.
- **Airplane Mode:** Toggles all wireless signals, like data and Wi-Fi on or off.

## Navigation Buttons

---

Most devices will feature all three navigation buttons at the bottom of the screen. Unfortunately, the order and shape of these buttons will vary by device.

- **Home:** This will bring you back to home screen from an app, or back to the first page of your home screen if on another page. Note that this will not close an app.
- **Back:** This button allows you to go back to a previous section, or undo an action depending on the context. It can also be used to exit an app (but this does not always close the app).
- **Recent:** This button will open up recently used or still running apps. This can be used to quickly shift from one app to another, but be aware that having multiple open apps at one time can drain your battery. You can close apps by swiping them off of the screen.

Navigation buttons are often always present, but should be accessible by swiping up from the bottom of your screen if hidden in an app.

## Apps

---



An app is short for “application” and doesn’t really differ all that much from applications on a computer. Apps run the gamut from exploring the internet, to writing notes, to playing music and playing games. Your device will come with several and you likely won’t be able to uninstall a few of them.

Shortcuts for apps will be present on the home screen, but only if you place them there. To access your full list of apps you’ll usually need to swipe up from the bottom of the screen while on your home screen (this like many other things will vary depending on your device).

Once on your list of apps you can tap one to open it, or tap and hold for additional options, like uninstalling the app or selecting it along with others to add to a folder of apps. To add an app to your home screen tap and hold it to select it, then drag the app to the top of your screen. It should change to the home screen, where you can place the app shortcut. You can do the same to a shortcut on your home screen to move or remove it.

Android devices usually get their apps from the Google Play Store app, however there exist other app stores, usually provided by your device manufacturer. Apps can be free or cost money, just like computer programs. They also need to install some data on your device’s hard drive, but can be uninstalled from the play store app. You can also update your apps from the play store app, and you’ll usually receive notifications when updates are ready.



## Pictures and Files

---

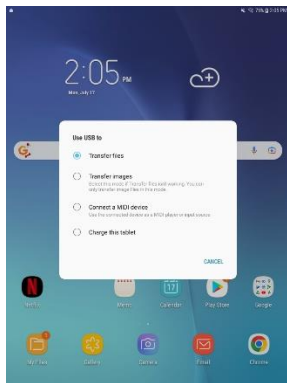
Depending on how you save them, your pictures can be stored in one or two places: the device and the cloud (it is possible to store copies in both, one usually does this by allowing device files to be backed up to the cloud). The “cloud” is server based storage, so if you are saving to a cloud you aren’t saving to your device but to a device shared by others on a network (which is likely Google on an Android device).



This allows you to access cloud files from different devices, share them with others, and doesn’t require you to use any of your device’s storage.

Android devices run on an operating system made by Google. You would have been asked to log into or create a google account when you first set up your device, and this account has access to Google cloud resources like Google Drive (all cloud files) and Google Photos (for images). You’ll have access to files saved to these locations whenever logging into your Google profile, be that on a computer or a different mobile device. This can also expedite the process of replacing an Android device as the new device will instantly have access to cloud data.

You can access files saved directly to the device through an app (the name of the app will depend on the device, but they are often named “Files” or “My Files”. If there is a folder of apps from the device manufacturer it may be in there). Files saved on your device will use your device’s storage space, so these apps are handy in allowing you to delete files and free up space (though apps tend to take up the most storage space).



Files saved to your device can be accessed from a computer by connecting your device with a USB cable. Often you’ll be prompted to give your computer permission to access files on your device, or options like restricting the exchange to just charging your device. Your computer will recognize your mobile device like a flash drive, assigning it a letter and making it accessible in your file explorer. Photos will be stored in a folder called DCIM (which stands for “Digital Camera Image Media”). Files can be transferred to or from your device through file explorer.

## Settings: Security, Privacy, and Data

---

Settings are accessible from the top menu or your app list. These allow you to configure your network connectivity, notification preferences, and device security. Mobile devices can contain sensitive private information. It is never a good idea to leave a device unprotected without a lock, much like leaving your house for the day. Android provides a few lock options.

- **Swipe:** Swipe your finger to unlock the screen. Only a lock in the way that having to turn the handle to a door before it opens can be considered a lock. No security.
- **PIN:** A numeric code. Provides a decent amount of security.
- **Pattern:** A drawn pattern. Slightly easier to crack than a PIN but may be easier to remember.
- **Password:** A phrase consisting of letters, numbers, and special characters. Offers the strongest protection, but the least convenience.

Some devices also support biometrics security, security that uses your own body as a key. This is in the form of fingerprints and face scans. Face scans are not without their issues, and have been known to be fooled by simple photographs or cutouts in the past. Fingerprints are pretty reliable, especially with how sensitive touch screens have become.

Your device is loaded with tools that may compromise your privacy if used irresponsibly. In particular, this is in regards to your **camera**, your **microphone**, your **files and pictures**, and your **location**. Apps have the ability to access these categories, but they need to ask permission first. When they do you'll be able to allow them to access it all the time, only when the app is running, or not at all (furthermore, you can make it ask each time). Some apps will need to have permission to do their basic function, like Instagram needing access to your camera and pictures, or Google Maps needing access to your location. If an app is asking permission for seemingly no reason, like if an eBook app wants access to your location and microphone, err on the side of caution and say no.

Your privacy tools in system settings will allow you to review and edit permissions given to apps. You can also disallow all apps from accessing privacy categories even if they were given permission in the past.

Wi-Fi and 3-5G are both radio signals capable of delivering data back and forth from a device; a wireless internet signal. The key difference is that a Wi-Fi signal goes between a mobile device and a device called a router, which is connected to a network, usually a cabled network, but it is possible to set up a router connected to 3-5G data (a hotspot). 3-5G signals connect to radio towers that are connected to satellites in orbit around the earth, allowing for more expansive coverage.

Using untrusted Wi-Fi is risky, because a malicious device can be set up to serve the role of a router and intercept data transferred to and from a device (a man in the middle attack). Because of the nature of 3-5G it is much harder to set up this kind of a malicious agent.

3-5G data use is metered in bytes transmitting to and from a device. You may have a limit on your use or be responsible for overages if you exceed them. Wi-Fi is not metered in this way, so using a trusted signal is a good way to use your device without compromising that quota.