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1 Introducing Android Phones

Smartphones using the Android operating system are the most used phones worldwide. This chapter gives an overview of Android on a smartphone. It also looks at creating a Google Account for using Google services on your Android phone.

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About Android

Android is essentially a mobile computing operating system – i.e. one for mobile devices such as smartphones and tablets.

Android is based on the flexible and robust Linux operating system and shares many similarities with it.

Android is an open source operating system, which means that the source code is made available to hardware manufacturers and developers so that they can design their devices and apps in conjunction with Android. This has created a large community of Android developers, and also means that Android is not tied to one specific device; individual manufacturers can use it (as long as they meet certain specific criteria), which has led to Android being available on a variety of different devices.

Android Inc. was founded in 2003, and the eponymous operating system was initially developed for mobile devices. Google quickly saw this as an opportunity to enter the smartphone and tablet market and bought Android in 2005. The first Android-powered smartphone appeared in 2008 and since then has gone from strength to strength. Android-based smartphones have a majority of the worldwide market, and it is used by numerous manufacturers on their handsets.

The main differences between the Android mobile operating system and desktop- or laptop-based ones such as Windows or macOS are:

- **No file structure**. There is no default built-in file manager structure for storing and managing files. All content is saved within the app in which it is created.
- **Self-contained apps**. Because there is no file structure, apps are generally self-contained and do not communicate with each other, unless required.
- **Numerous Home screens**. There are numerous Home screens on an Android phone, and they can be used to store and access apps.
- **Generally, content is saved automatically as it is created**. Apps save content as it is created, so there is no Save or Save As function within many apps.

The New icon pictured above indicates a new or enhanced feature introduced with Android phones using Android 10.

About Android Phones

Android has been used on smartphones since 2008. Initially adoption was fairly slow, but this has now accelerated to the point where Android is the most widely used operating system on smartphones.

Combinations of Android phones

Since Android can be used by different manufacturers, this means that a range of the latest smartphones always run on Android. In addition, since not all older phones are designed to be upgraded to the latest version of Android, there are phones running several different versions of Android – for instance, the Google Pixel 6 runs the latest version of Android (at the time of printing, Android 12), while some models of older phones may still only be able to run Android 6.0 Marshmallow. As a result, there are hundreds of combinations in terms of smartphone models and versions of Android on the market. Some are the expensive flagship models, which will run a relatively new version of Android (although not necessarily the very latest version) compared with cheaper models that can only run an older version of Android.

Checking for versions of Android

When buying an Android phone, look at the version of Android in the phone's specification. Ideally, it should be a relatively new version, in order to enable it to be upgraded to the latest version when it becomes available. Some models of Android phones reach a point where they do not have the required hardware to update to the next version of Android and are therefore stuck with the current version that they are using. This may also limit the phone's ability to download and use the latest apps that are available.

Android phone differences

Despite the variations in versions of Android, the user experience is generally the same on different Android phones. However, one area of difference is in the hardware used by manufacturers. For instance, some newer Android phones have fingerprint sensors for unlocking the phone, and others have more sophisticated cameras.

Updated versions of Android were historically named alphabetically after items of confectionery but are now named numerically.

Due to the range of versions of Android on smartphones, it is not feasible to cover all possibilities across different manufacturers. Therefore, this book will focus on the standard functionality of Android that is available through all versions of the operating system. It will feature Android version 10, which is the version of Android most widely adopted on Android phones (at the time of printing). The examples will also be from a Samsung phone, one of the most widely used brands of smartphone on the market.

Updating Android

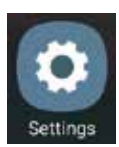
Since Android is open source and can be used on a variety of different devices, this can sometimes cause delays in updating the operating system on the full range of eligible Android devices. This is because it has to be tailored specifically for each different device; it is not a case of "one size fits all". This can lead to delays in the latest version being rolled out to all compatible devices. The product cycle for new versions is usually six to nine months.

Much of the general functionality of the Android operating system is the same, regardless of the version being used.

As Android is a Google product, Google's own devices are usually the first ones to run the latest version of the software. Therefore, the Google Pixel 6 was the first phone to run the latest version of Android, 12, while others are still running previous versions, such as 6.0 Marshmallow, 7.0 Nougat, 8.0 Oreo and 9, 10 and 11. For recently released phones, an upgrade to the latest version of Android will be scheduled into the update calendar or it might be already available to install. However, for some older Android phones the latest version of the software is not always made available. This can be because of hardware limitations, but there have also been suggestions that it is a move by hardware manufacturers designed to ensure that consumers upgrade to the latest products.

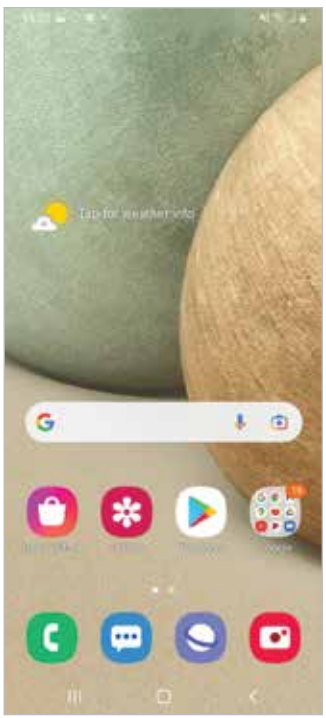
For more details about Android settings, see Chapter 3.

The version of the Android operating system that is being used on your phone can be viewed from within the **Software update** section of the **Settings** app. This is where details of the current version of Android can be viewed.



Android Overlays

Because Android is an open source operating system, it means that manufacturers can amend it, to a certain extent, when they add it to their phone models. This keeps the core Android operating system, but the user interface can be adapted so that it becomes specific to each manufacturer. This is known as an "overlay" and means that the appearance of Android will be different on, for instance, a Samsung phone and an HTC one. However, the operation of Android will still be the same on different brands of phones and, in most cases, the appearance of the user interface will be very similar and still recognizable as Android.



If you are familiar with one brand of Android phone and then switch to another, it may take a little while to get used to the overlay of the new phone. However, the underlying functionality should be the same.

In addition to overlays, manufacturers can also add their own apps to their brand of Android phone and, in some cases, have their own app store for downloading more apps.

The one phone that does not have any kind of overlay is the Google Pixel 6: since Google own Android, they use the operating system in its purest form on their phones.

Features of Android 10

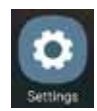
Although Android 11 and 12 are both newer versions than 10, they are only available on a limited number of Android phones, and version 10 has a higher adoption rate. The majority of features are the same as for earlier versions of Android. However, there are also some new Android 10 features.

The features on these two pages are all updates from previous versions of Android.

Gestures navigation

This can be applied to use gestures on the screen for certain operations, rather than just using the controls and the buttons on the device. To use gestures:

1. Tap on the **Settings** app



2. Tap on the **Display** option

3. Tap on the **Navigation bar** option

4. Tap **On** the **Swipe gestures** button

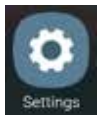
5. The navigation bar is displayed at the bottom of the screen. Use this to apply gestures – e.g. swipe up on it to return to the Home screen from any app

If **Swipe gestures** is turned **On**, the control buttons at the bottom of the Android phone will not be available.

Dark Mode

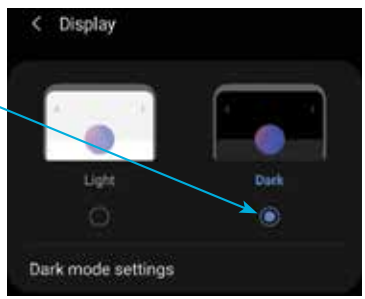
This enables the screen colors to be changed so that they are dark, with the other elements becoming light; essentially, the screen colors are inverted. To use Dark Mode:

1. Tap on the **Settings** app



2. Tap on the **Display** tab

3. In the Display settings, tap on the **Dark** button to activate Dark Mode on the Android phone



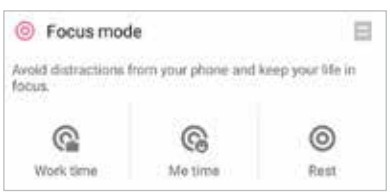
Focus mode

This can be used to turn off specific apps and notifications so that you can concentrate on tasks without being interrupted. To use Focus mode:

1. Tap on the **Settings** app

2. Tap on the **Digital Wellbeing and parental controls** tab

3. Tap on one of the **Focus mode** options to set the required specifics for the Focus – i.e. which apps are allowed and how notifications are dealt with



For more details about using the **Digital Wellbeing and parental controls** settings, see pages 182-185.

Features of Android Phones

The button for turning a phone on and off is located on the side of the body of the device in most cases, as are the other buttons and ports that can be used for various functions on your phone.

On/Off button

This can also be used to put the phone into Sleep mode. Press and hold for a couple of seconds to turn on the phone. Press once to put it to sleep or wake it up from sleep.

If the Android operating system is updated on a phone, it will probably restart before the update takes effect.

Turning off

To turn off an Android phone, press and hold on the **On/Off** button until the **Power off** button appears on the screen. Tap on this to turn the phone off. Tap on **Restart** to shut down the phone and then start it again.

Volume button

This is either a single button on the opposite side to the **On/Off** button or two separate buttons. Press the buttons to adjust the volume.

Cameras

There is the main, rear-facing camera (on the back of the phone) for taking pictures. Most phones also have a front-facing camera (on the screen side of the phone), which is usually a lower resolution and is useful for making video calls or taking "selfies", as the user can view the screen at the same time as using the camera.

"Selfies" are photos taken of yourself, using the front-facing camera (on the screen of the phone).

Headphone jack

This is used to connect a headphone cable, and is usually at the top or bottom of the phone.

Micro USB port

This can be used to attach the phone to an adapter for charging the phone, or to a computer for charging or to download content from (or upload to) the phone, using the supplied USB cable. Once the phone is connected to a computer it will show up as a removable drive in the file manager, in the same way as an item such as a flashdrive.

microSD cards

These can be inserted into the appropriate slot on the body of the phone to increase the amount of storage for items such as photos and music.

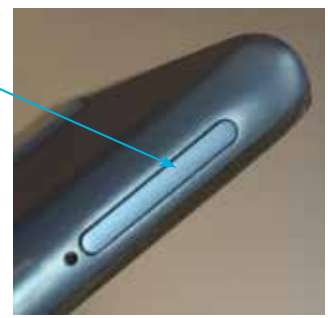
An increasing number of phones, particularly the higher-end models, have a fingerprint sensor on the body of the phone that can be used to unlock the phone with a unique fingerprint. Fingerprint sensors have to be set up by using the applicable item (usually in the **Settings** app) and then pressing on the sensor several times so that it can identify your unique fingerprint. More than one fingerprint can usually be set up for use with the sensor.

SIM Cards

The SIM card for your Android phone will be provided by your mobile carrier – i.e. the company that provides your cellular phone and data services. Without this, you would still be able to communicate using your phone, but only via Wi-Fi and compatible services. A SIM card gives you access to a mobile network too. Newer Android phones have a slot on the side (a SIM tray) for inserting a SIM card. To insert a SIM card into the side SIM tray:

SIM cards usually use 3G, 4G or 5G networks for providing cellular phone and data services – e.g. texting and messaging. 5G is the fastest, but is not currently as widely available as 3G and 4G. The G in the name stands for Generation.

1. The SIM tray is located on the side of the phone, with a small hole at the end of it



2. Use the SIM tool (which should be provided with the phone) to open the SIM tray, by pressing firmly into the hole shown in Step 1

3. Pull out the SIM tray and remove it fully from the phone

4. Insert the SIM card into the SIM tray and return it into the slot in the phone. (Some SIM trays have compartments for different sizes of SIM cards)

Some Android phones, particularly older models, have the SIM tray located inside the phone, and this can be accessed by removing the back panel of the phone. The battery can also be located here in Android phones where the SIM is accessed in this way.

Setting Up Your Phone

When you first turn on your phone (by pressing and holding the **On/Off** button) you will be taken through the setup process. This only has to be done once, and some of the steps can be completed or amended at a later time, usually within the **Settings** app. Some of the elements that can be applied during the setup process include:

- **Language**. This option lets you select the language to use for your phone. Whichever language is selected will affect all of the system text on the phone, and it will also apply to all user accounts on the phone.
- **Wi-Fi**. This can be used to set up your Wi-Fi so that you can access web and online services. In the **Select Wi-Fi** window, tap on the name of your router. Enter the password for your router and tap on the **Connect** button.
- **Google Account**. At this stage, you can create a Google Account or sign in with an existing one. Once you have done this, you will have full access to the Google Account services and you will not have to enter your login details again. (A Google Account can also be set up at a later time; see pages 20-21.)
- **Google services**. This includes options for which of the Google services you want to use, including backing up your phone, using location services, and sending feedback to Google.
- **Date and time**. This can be used to set the date and time, either manually or automatically.
- **Method of screen lock**. This can be used to set a lock for the phone, using a fingerprint, PIN code, pattern or a password.
- **Screen layout**. This can be used to create a larger interface on the phone's screen, by changing the size of the items on it and the font size.

Most routers require a password when they are accessed for the first time by a new device. This is a security measure to ensure that other people cannot gain unauthorized access to your router and Wi-Fi.

The Wi-Fi has to be connected in order for a Google Account to be created or signed in to during the setting up of the phone.

Since Android is owned by Google, much of its functionality is provided through a Google Account.

Android and Google

Most phones are linked to specific companies for the provision of their services and selection of apps: Apple for the iPhone and Google for phones using Android, as well as the phone's manufacturer (e.g. Samsung). As with the other phones, for Android phones you must have a linked account to get the most out of your phone. This is a Google Account, and is created free of charge with a Google email address (Gmail) and a password. Once it has been created, your Google Account will give you access to a number of built-in Android apps and also additional services such as backing up and storing your content online.

When you first set up your phone, you can enter your Google Account details or select to create a new account. You can also do this at any time by accessing one of the apps that requires access to a Google Account. These include:

- **Play Store**, for obtaining more apps.
- **Google TV**, for obtaining movies and TV shows.
- **Play Books**, for obtaining books.
- **Google News** app for displaying news stories.

When you access one of these apps you will be prompted to create a Google Account. You do not have to do so at this point, but it will give you access to the full range of Google Account services.

Other apps such as the **Photos** app for storing and viewing photos can be used on their own, but if a Google Account has been set up, the content can be backed up automatically.

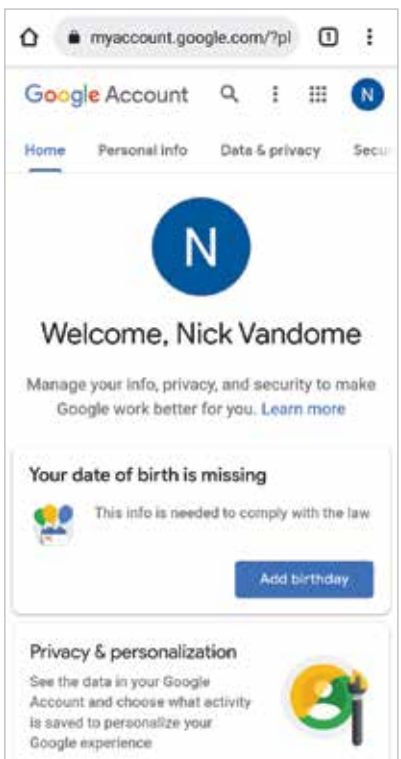
If you already have a Gmail Account, this will also serve as your Google Account, and the login details (email address and password) can be used for both.

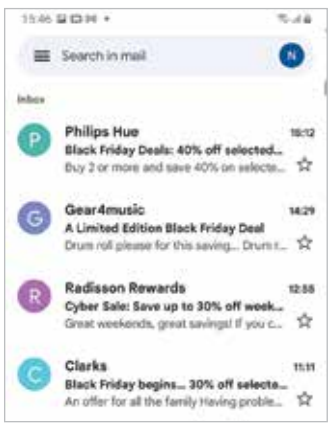
Google TV is a new feature with Android 10.

When you buy anything through your Google Account, such as music, apps or movies, you will have to enter your credit or debit card details (unless you are downloading a free app), which will be used for future purchases through your Google Account.

Some of the benefits of a Google Account include:

- Access from any computer or mobile device with web access, from the **accounts.google.com/** page. Once you have entered your account details you can access online Google services, including Calendar, Gmail and the Play Store.
- Keep your content synchronized and backed up. With a Google Account, all of your linked data will be automatically synchronized so that it is available for all web-enabled devices, and it will also be backed up by the Google servers.





- Peace of mind that your content is protected. There is a **Security** section on your Google Account web page where you can apply various security settings and alerts.

If you buy items from the Play Store through your Google Account on the web, they will also be available on your Android phone.

A new Google Account can also be created within **Settings** > **Accounts and backup** > **Accounts** on your phone. Tap on the **Add account** button and tap on the **Google** button. Then, enter the required details for the new Google Account (see pages 20-21).

Creating a Google Account

A new Google Account can be created in the following different ways:

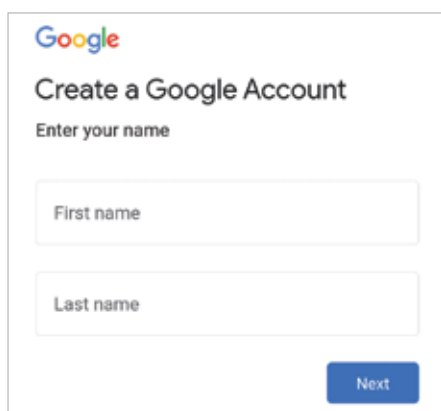
- During the initial setup of your Android phone.
- When you first access one of the relevant apps, as explained on page 18.
- From the **Settings** app, by selecting **Accounts and backup** > **Accounts** > **Add account**.

For each of the above, the process for creating a Google Account is the same.

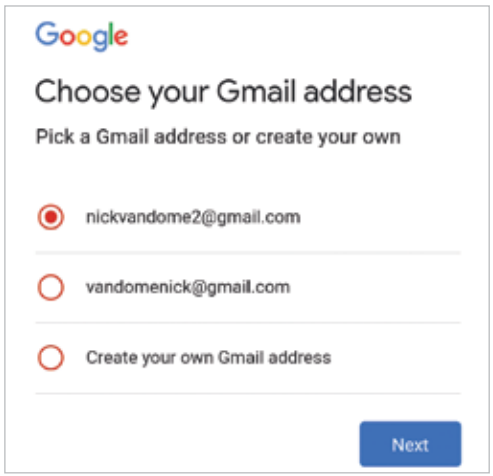
During the account setup process there is also a screen for account recovery, where you can add an answer to a question so that your account details can be retrieved by Google if you forget them.

1 If you already have an account, enter your sign-in details, or tap on the **Create account** option

2 Enter the first and last name for the new account user, then tap on the **Next** button



3 Enter a username (this will also become your Gmail address), then tap on the **Next** button at the bottom of the screen

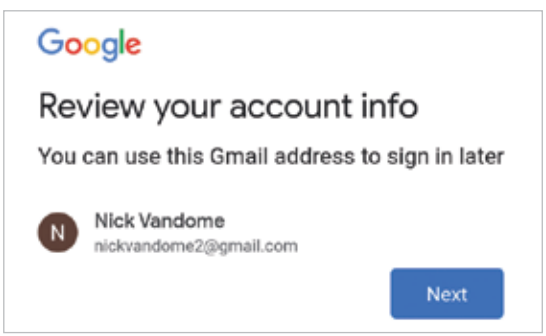


A username for a Google Account is a unique name created by the user, which is suffixed by *@gmail.com*.

4 Create a password for the account and then re-enter it for confirmation. Tap on the **Next** button at the bottom of the screen

If your chosen username has already been taken, you will be prompted to amend it. This can usually be done by adding a sequence of numbers to the end of it, but make sure you remember the sequence correctly.

5 The account details are displayed. Tap on the **Next** button to sign in with your new account



Using a Touchscreen

The traditional method of interacting with a computer is by using a mouse and a keyboard as the input devices. However, this has all changed with smartphones; they are much more tactile devices that are controlled by tapping and swiping on the touchscreen. This activates and controls the apps and settings on the phone, and enables you to add content with the virtual keyboard that appears at appropriate times.

Gently does it

Touchscreens are sensitive devices and only require a light touch to activate the required command. To get the best out of your touchscreen:

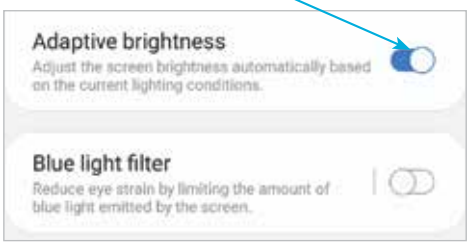
- Tap, swipe or press gently on the screen. Do not use excessive force and do not keep tapping with increasing pressure if something does not work in the way in which you expected. Instead, try performing another action and then returning to the original one.
- Tap with your fingertip rather than your fingernail. This will be more effective in terms of performing the required operation, and is better for the surface of the touchscreen.
- For the majority of touchscreen tasks, tap, press or swipe at one point on the screen. The exception to this is zooming in and out on certain items (such as web pages), which can be done by swiping outward and pinching inward with thumb and forefinger.
- Keep your touchscreen dry, and make sure that your fingers are also clean and free of moisture.
- Use a cover to protect the screen when not in use, particularly if you are carrying your phone in a jacket pocket or a bag.
- Use a screen cloth to keep the screen clean and free of fingerprints and smears. The touchscreen should still work if it has fingerprints and marks on it, but it will become harder to see clearly what is on the screen.

If you are using your phone in an area where there is likely to be moisture, such as in the kitchen if you are following a recipe, cover the touchscreen in some form of light plastic wrap to protect it from any spills or splashes.

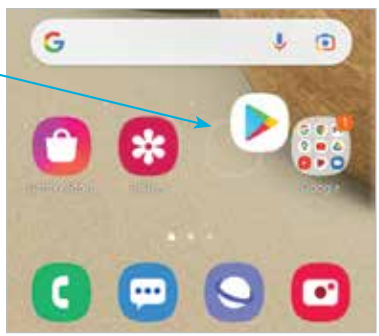
Touchscreen controls

Touchscreens can be controlled with three main types of actions. These are:

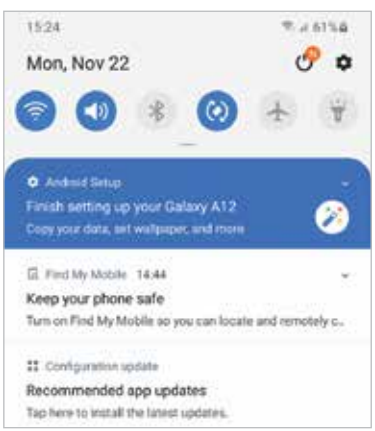
- **Tapping**. Tap once on an item such as an app to activate it. This can also be used for the main navigation control buttons at the bottom of the touchscreen, or for items such as **On/Off** buttons when applying settings for specific items.



- **Pressing**. Press and hold on an item on the Home screen to move its position or place it in the **Favorites Tray** at the bottom of the screen.



- **Swiping**. Swipe down from the top of the Home screen to access the **Notification panel** and the **Quick Settings**, and swipe left and right to view all of the available Home screens, or to scroll through photo albums.



For more information about working with apps on the Home screen and the Notification panel, see Chapter 4.

Using Apps

One of the great selling points for Android phones is the range of apps that are available for them. At the time of printing, there are at least 3.4 million Android apps in the Google Play Store, with others available from third-party developers. Some are free, while others are paid for.

The built-in apps are the ones that give the initial functionality to your phone, and include items such as email, a web browser, a calendar, a calculator and maps. They appear as icons on your phone's Home screen or in the **All Apps** area (see page 56), and are accessed by tapping on them once.

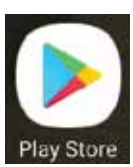
Managing apps

When you switch from one app to another you do not have to close down the original one that you were using. Android keeps it running in the background, but in a state of hibernation so that it is not using up any memory or processing power on your phone. To do this:

1. Tap on an app to open it and move through its screens as required. Tap on the **Home** button on the phone's Navigation bar at the bottom of the screen to return to the Home screen at any point. The app will remain open in the background

2. Tap on the app again. It will open up at the point at which you left it

You can also move back to the Home screen by tapping on the **Back** button. This takes you back through the screens that you have accessed within the app, until you reach the app's Home screen, at which point the next screen back will be the phone's Home screen.

If your phone is running low on memory it will automatically close any open apps to free up more memory. The ones that have been inactive for the longest period of time are closed first.

New apps for Android phones are available through the Play Store, or directly from the developer's website. They can be downloaded from there and will then appear on your phone. (See pages 130-135.)