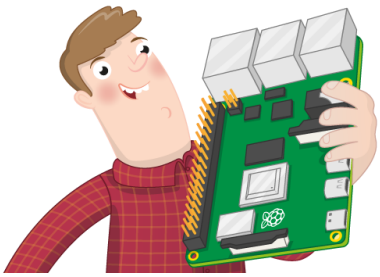
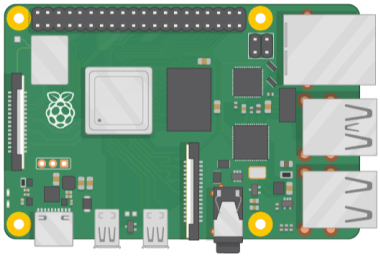
Setting up your Raspberry Pi

How to set up and start your Raspberry Pi for the first time



Step 1 Introduction

Here you'll learn about your Raspberry Pi, what things you need to use it, and how to set it up.



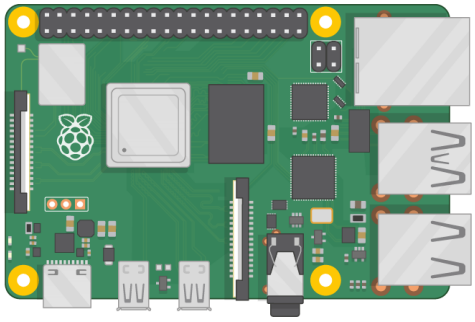
If you need to print this project, please use the **printer-friendly version** (https://projects.raspberrypi.org/en/projects/raspberry-pi-setting-up/print).

Step 2 What you will need

Which Raspberry Pi?

There are several **models of Raspberry Pi** (https://www.raspberrypi.org/products/), and for most people Raspberry Pi 4 Model B is the one to choose. Raspberry Pi 4 Model B is the newest, fastest, and easiest to use.

Raspberry Pi 4 comes with either 1GB, 2GB, or 4GB of RAM. For most educational purposes and many hobbyist projects, 1GB is enough; for use as a desktop computer, we recommend 2GB.

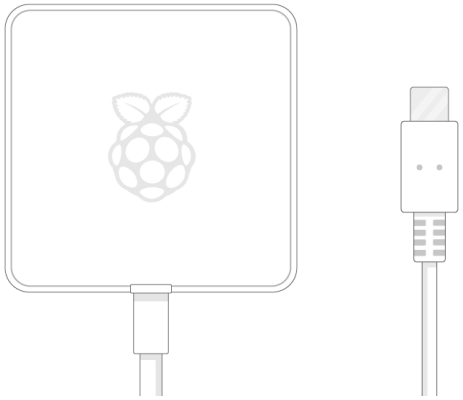


Raspberry Pi Zero and Zero W are smaller and require less power, so they're useful for portable projects such as robots. It's generally easier to start a project with Raspberry Pi 4, and to move to Pi Zero when you have a working prototype that a smaller Pi would be useful for.

If you want to buy a Raspberry Pi, head to **rpf.io/products** (https://rpf.io/products).

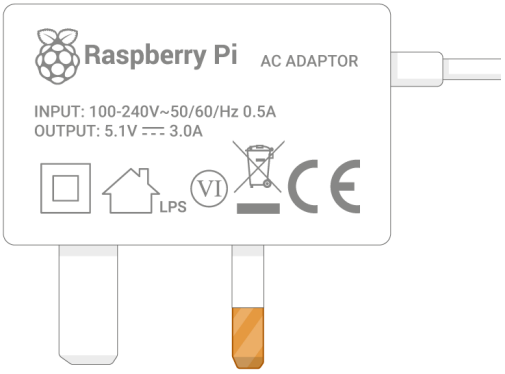
A power supply

To connect to a power socket, all Raspberry Pi models have a USB port (the same found on many mobile phones): either USB-C for Raspberry Pi 4, or micro USB for Raspberry Pi 3, 2 and 1.



You need a power supply that provides:

- At least 3.0 amps for Raspberry Pi 4

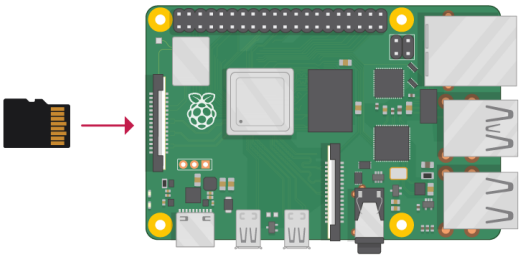


- At least 2.5 amps for Raspberry Pi 3

We recommend using **our official Universal Power Supply** [(https://www.raspberrypi.org/products/raspberry-pi-universal-power-supply/)](https://www.raspberrypi.org/products/raspberry-pi-universal-power-supply/).

A microSD card

Your Raspberry Pi needs an SD card to store all its files and the Raspbian operating system.



You need a microSD card with a capacity of **at least 8 GB**.

Many sellers supply SD cards for Raspberry Pi that are already set up with Raspbian and ready to go.

A keyboard and a mouse

To start using your Raspberry Pi, you need a USB keyboard and a USB mouse.

Once you've set your Pi up, you can use a Bluetooth keyboard and mouse, but you'll need a USB keyboard and mouse for the first setup.

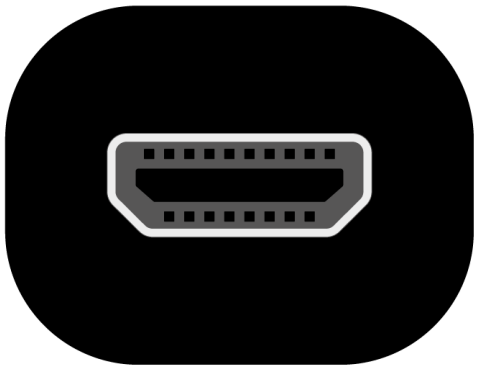
A TV or computer screen

To view the Raspbian desktop environment, you need a screen, and a cable to link the screen and the Pi. The screen can be a TV or a computer monitor. If the screen has built-in speakers, the Pi is able to use these to play sound.

HDMI

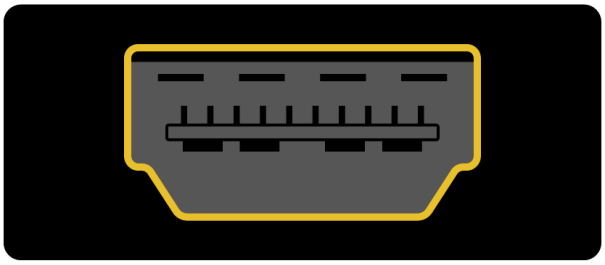
The Raspberry Pi has a HDMI output port that is compatible with the HDMI port of most modern TVs and computer monitors. Many computer monitors may also have DVI or VGA ports.

Raspberry Pi 4 has two micro HDMI ports, allowing you to connect two separate monitors.



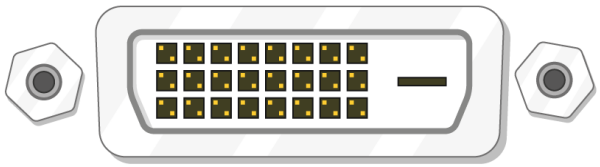
You need either a micro HDMI-to-HDMI cable, or a standard HDMI-to-HDMI cable plus a micro HDMI-to-HDMI adapter, to connect Raspberry Pi 4 to a screen.

Raspberry Pi 1, 2 and 3 have a single full-size HDMI port, so you can connect them to a screen using a standard HDMI-to-HDMI cable.



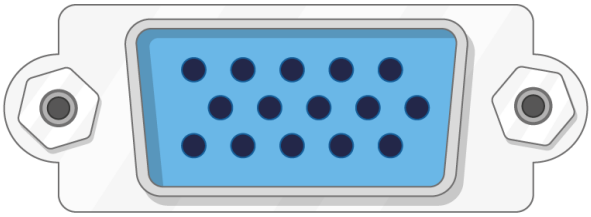
DVI

If your screen has a DVI port, you can connect the Pi to it using a HDMI-to-DVI cable.

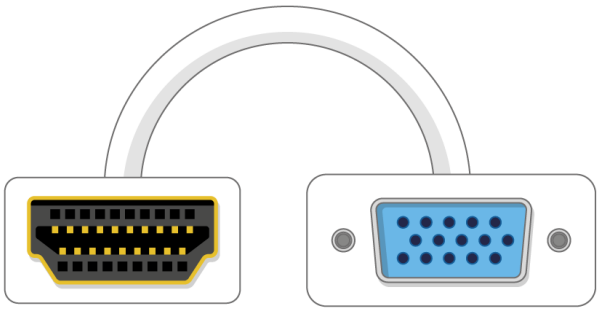


VGA

Some screens only have a VGA port.



To connect your Pi to such a screen, you can use a HDMI-to-VGA adapter.



Optional extras

A case

You may want to put your Raspberry Pi in a case. This is not essential, but it will provide protection for your Raspberry Pi. If you'd like, you can use the official case for **Raspberry Pi 4** (https://www.raspberrypi.org/products/raspberry-pi-4-case/) or **Pi Zero or Zero W** (https://www.raspberrypi.org/products/raspberry-pi-zero-case/).

Headphones or speakers

The large Raspberry Pi models (but not Pi Zero/Zero W) have a standard audio port like the one on your smart phone or MP3 player. If you want to, you can connect your headphones or speakers so that your Raspberry Pi can play sound. If the screen you're connecting your Raspberry Pi to has built-in speakers, Raspberry Pi can play sound through these.

An Ethernet cable

The large Raspberry Pi models (but not Pi Zero/Zero W) have a standard Ethernet port to connect them to the internet; to connect Pi Zero to the internet, you need a USB-to-Ethernet adaptor.

Raspberry Pi 4, 3, and Pi Zero W can also be wirelessly connected to the internet.

Step 3 Set up your SD card

If you have an SD card that doesn't have the Raspbian operating system on it yet, or if you want to reset your Raspberry Pi, you can easily install Raspbian yourself. To do so, you need a computer that has an SD card port — most laptop and desktop computers have one.

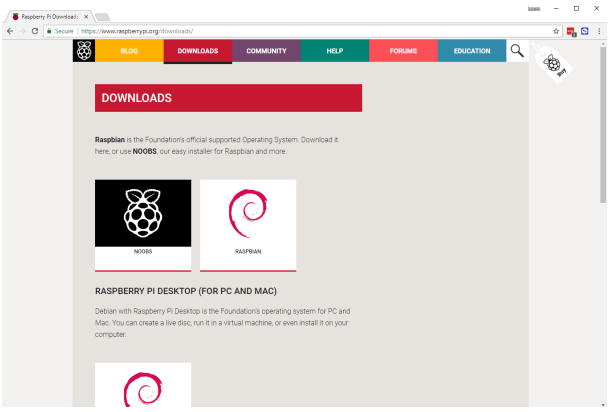
The Raspbian operating system via NOOBS

Using the NOOBS software is the easiest way to install Raspbian on your SD card.

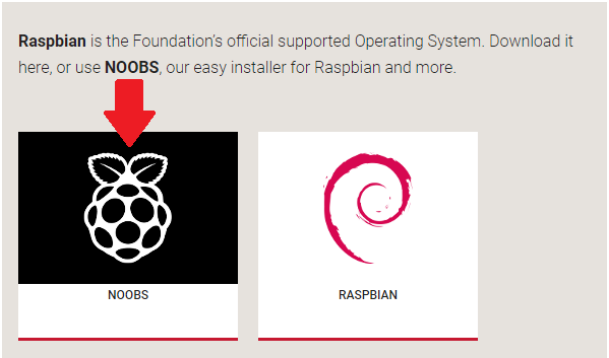
Note: more advanced users looking to install a particular operating system should use this guide to **installing operating system images** (https://www.raspberrypi.org/documentation/installation/installing-images/README.md).

Download NOOBS

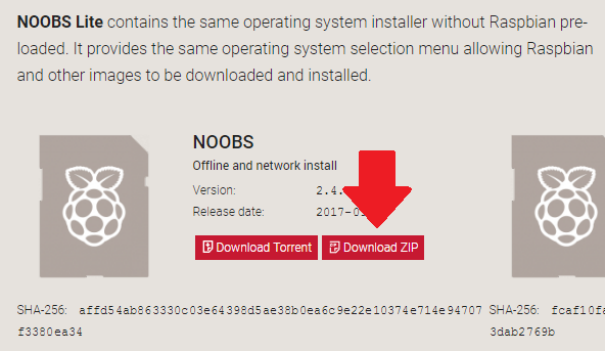
- Visit the **Raspberry Pi downloads page** (https://www.raspberrypi.org/downloads).



- You should see a box linking to the NOOBS files. Click on the box.



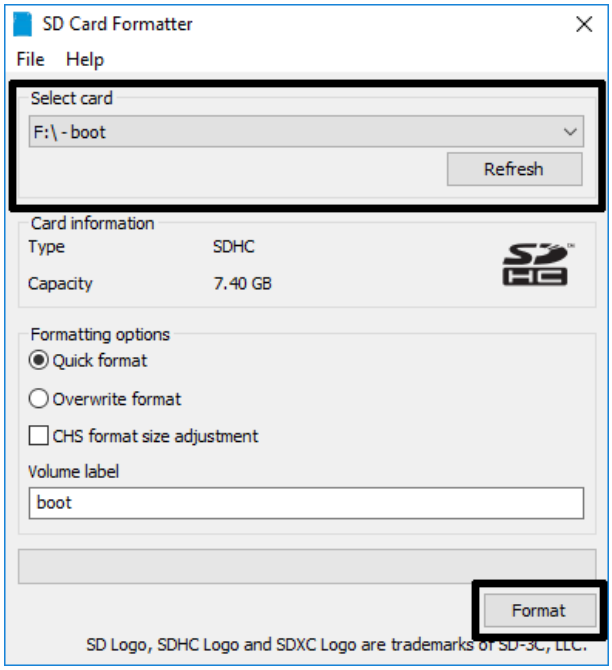
- The simplest option is to download the zip archive of the files. Make sure to pay attention to where you save the archive, so that you can find it again quickly.

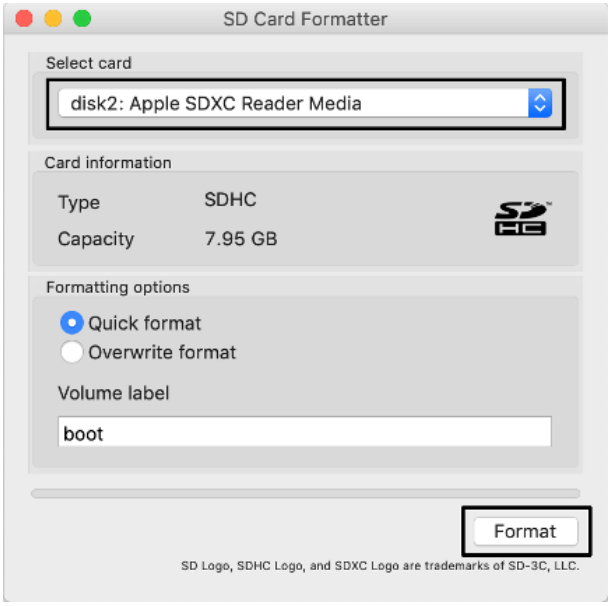


Format the SD card

Anything that's stored on the SD card will be overwritten during formatting. So if the SD card on which you want to install Raspbian currently has any files on it, e.g. from an older version of Raspbian, you may wish to back these files up first to not lose them permanently.

- Visit the SD Association's website and download **SD Formatter** [(https://www.sdcard.org/downloads/formatter_4/index.html)](https://www.sdcard.org/downloads/formatter_4/index.html) for Windows or Mac.
- Follow the instructions to install the software.
- Insert your SD card into the computer or laptop's SD card slot.
- In SD Formatter, select your SD card, and the format the card.





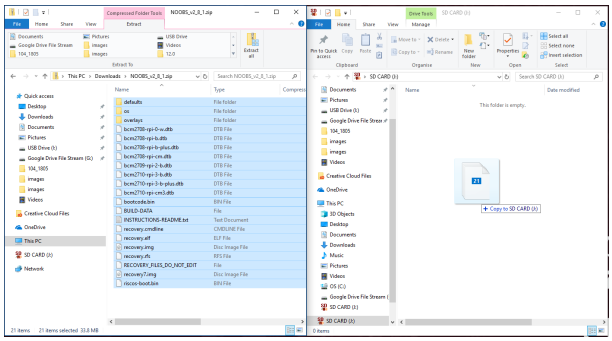
Extract NOOBS from the zip archive

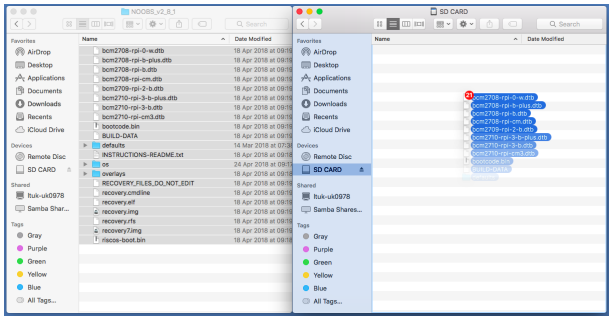
Next, you will need to extract the files from the NOOBS zip archive you downloaded from the Raspberry Pi website.

- Find the downloaded archive — by default, it should be in your `Downloads` folder.
- Double-click on it to extract the files, and keep the resulting Explorer/Finder window open.

Copy the files

- Now open another Explorer/Finder window and navigate to the SD card. It's best to position the two windows side by side.
- Select all the files in the `NOOBS` folder and drag them into the SD card window to copy them to the card.

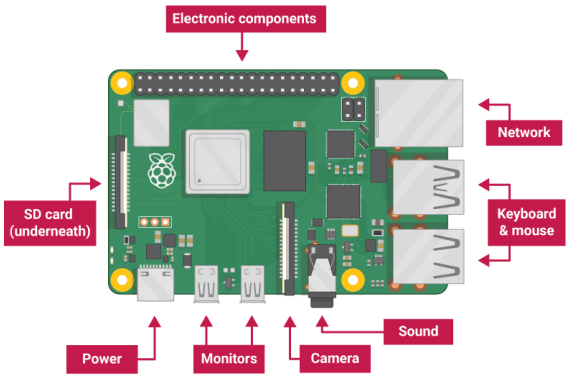




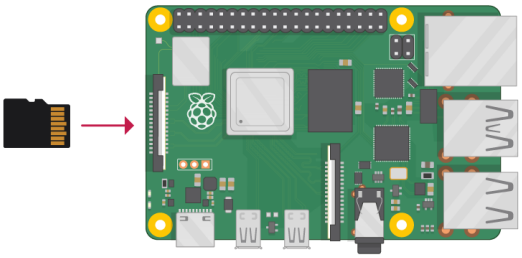
- Once the files have all been copied over, you can eject the SD card.

Step 4 Connect your Raspberry Pi

Now get everything connected to your Raspberry Pi. It's important to do this in the right order, so that all your components are safe.

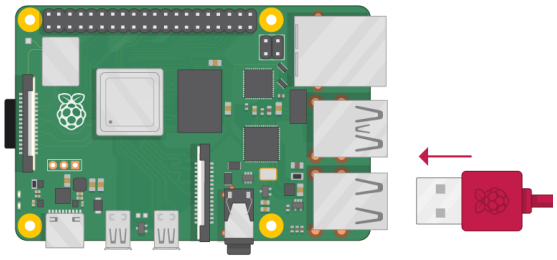


- Insert the SD card you've set up with Raspbian (via NOOBS) into the microSD card slot on the underside of your Raspberry Pi.

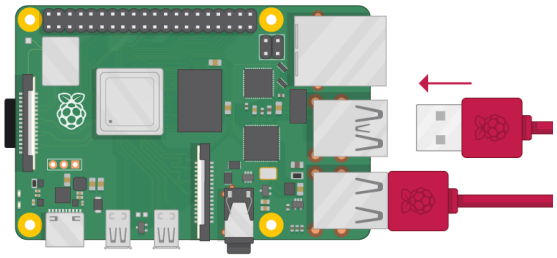


Note: Many microSD cards come inside a larger adapter — you can slide the smaller card out using the lip at the bottom.

- Find the USB connector end of your mouse's cable, and connect the mouse to a USB port on Raspberry Pi (it doesn't matter which port you use).



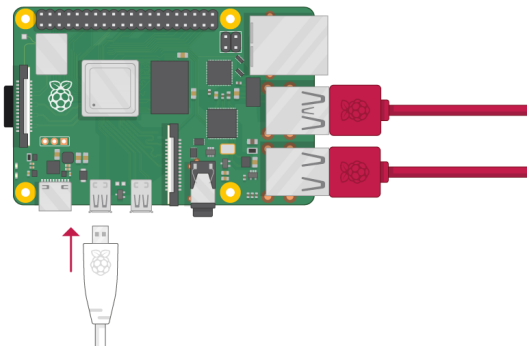
- Connect the keyboard in the same way.



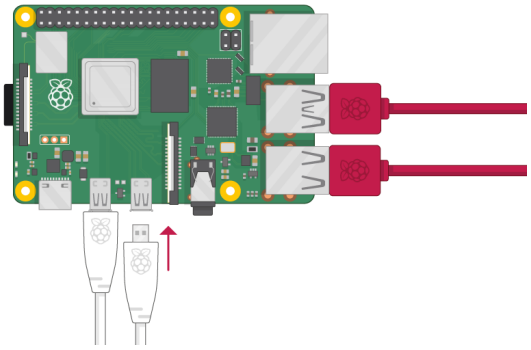
- Make sure your screen is plugged into a wall socket and switched on.
- Look at the HDMI port(s) on the Raspberry Pi — notice that they have a flat side on top.
- Use a cable to connect the screen to Raspberry Pi's HDMI port — use an adapter if necessary.

  Raspberry Pi 4

  Connect your screen to the first of Raspberry Pi 4's HDMI ports, labelled **HDMI0**.

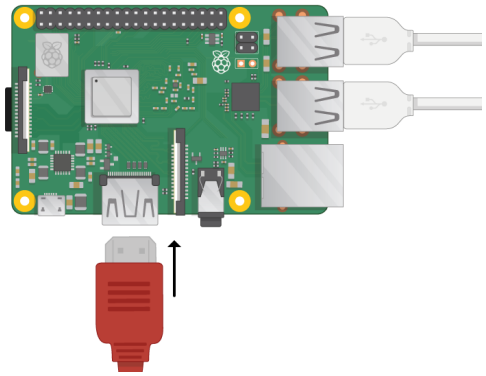


  You can connect an optional second screen in the same way.



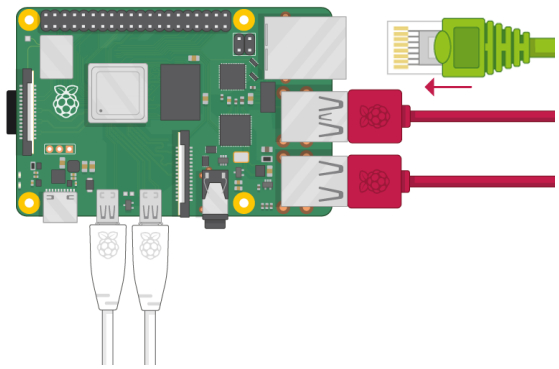
Raspberry Pi 1, 2, 3

Connect your screen to the single HDMI port.

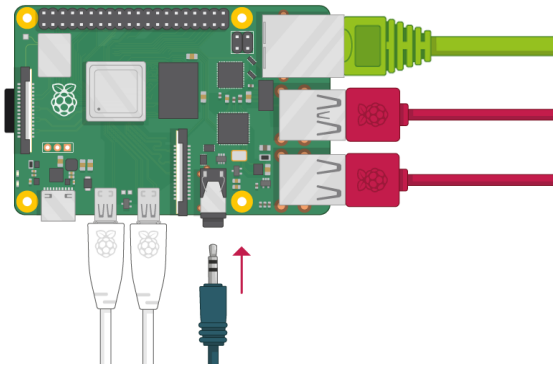


Note: nothing will display on the screen, because your Raspberry Pi is not running yet.

- If you want to connect your Raspberry Pi to the internet via Ethernet, use an Ethernet cable to connect the Ethernet port on Raspberry Pi to an Ethernet socket on the wall or on your internet router. You don't need to do this if you want to use wireless connectivity, or if you don't want to connect to the internet.



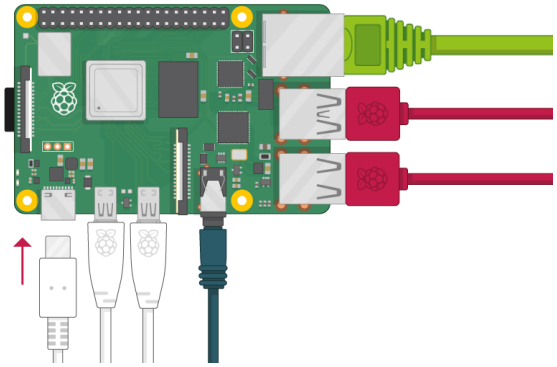
- If the screen you are using has speakers, sound will play through those. Alternatively, connect headphones or speakers to the audio port if you prefer.



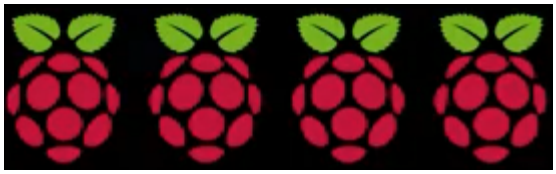
Step 5 Start up your Raspberry Pi

Your Raspberry Pi doesn't have a power switch: as soon as you connect it to a power outlet, it will turn on.

- Plug the USB power supply into a socket and connect it to your Raspberry Pi's power port.



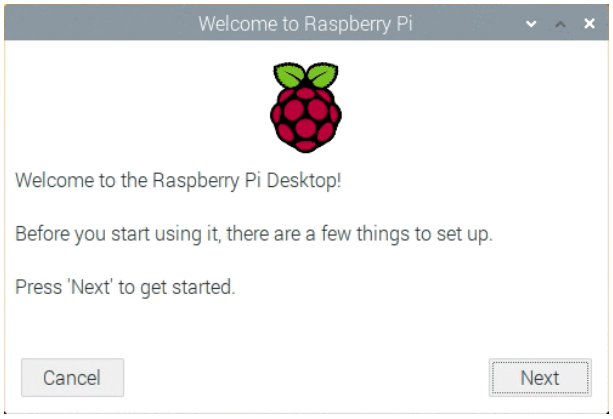
You should see a red LED light up on the Raspberry Pi, which indicates that Raspberry Pi is connected to power. As it starts up (this is also called **booting**), you will see raspberries appear in the top left-hand corner of your screen.



After a few seconds the Raspbian Desktop will appear.

Step 6 Finish the setup

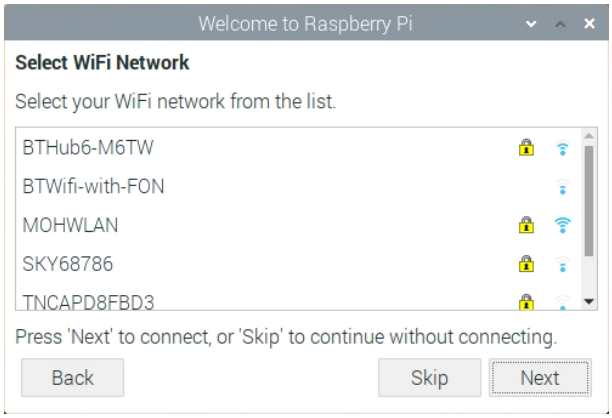
When you start your Raspberry Pi for the first time, the **Welcome to Raspberry Pi** application will pop up and guide you through the initial setup.



- Click **Next** to start the setup.
- Set your **Country**, **Language**, and **Timezone**, then click **Next** again.

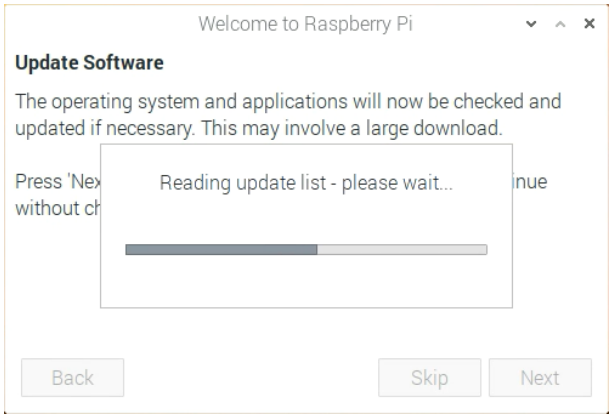
- Enter a new password for your Raspberry Pi and click **Next**.

- Connect to your WiFi network by selecting its name, entering the password, and clicking **Next**.



Note: if your Raspberry Pi model doesn't have wireless connectivity, you won't see this screen.

- Click **Next** let the wizard check for updates to Raspbian and install them (this might take a little while).



- Click **Done** or **Reboot** to finish the setup.

Note: you will only need to reboot if that's necessary to complete an update.

Step 7 Where to find help

If you're having problems with your Raspberry Pi, there are lots of places you can get help and advice:

- Check out the **help section** (https://www.raspberrypi.org/help/) and the **troubleshooting guide** (https://www.raspberrypi.org/learning/troubleshooting-guide/) on the Raspberry Pi website
- The **Raspberry Pi forum** (https://www.raspberrypi.org/forums), including the **Beginners** (https://www.raspberrypi.org/forums/viewforum.php?f=91) section, is a great place to ask questions and get support from the Raspberry Pi community
- Call out on **Twitter** (https://twitter.com) using the hashtag #rpilearn, or submit a question on the **Raspberry Pi Stack Exchange** (https://raspberrypi.stackexchange.com/)
- You could also attend a free **Raspberry Jam** (https://rpf.io/jam) community event to talk to people about their experiences and get some first-hand help from fellow Raspberry Pi users

Step 8 What next?

- Take a look at our **Using your Raspberry Pi** (https://projects.raspberrypi.org/en/projects/raspberry-pi-using) guide.

- Explore what you can do with your Raspberry Pi by creating some of our **digital making projects** (https://projects.raspberrypi.org), for example:

  - **Robot antenna** (https://projects.raspberrypi.org/en/projects/robot-antenna) — control a robot's antenna light with Raspberry Pi and code blocks
  - **Rock band** (https://projects.raspberrypi.org/en/projects/rock-band) — learn how to code your own musical instruments
  - **Turtle race** (https://projects.raspberrypi.org/en/projects/turtle-race) — race digital turtles against each other
  - **Push button stop-motion** (https://projects.raspberrypi.org/en/projects/push-button-stop-motion) — make your own stop-motion animation rig with a button and a **Raspberry Pi Camera Module** (https://www.raspberrypi.org/products/camera-module-v2/)

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