



# Getting Started with Raspberry Pi

This workshop booklet will help you get your Raspberry Pi up and running.

*Difficulty: Introductory workshop*

## Contents

1	What equipment you'll need	2
2	Installing NOOBS	2
3	Booting the Pi	3
4	Tutorial Resources	4

The notes include a number of guides to help you get your own Raspberry Pi up and running. You should:

- **Read section 1** if you're unsure if you have everything you need to run a Raspberry Pi.
- **Read section 2** if you want to set up a blank SD card for the Raspberry Pi.
- **Read section 3** to troubleshoot common problems when booting your Pi.
- **Read section 4** for a collection of Raspberry Pi resource sites, where you'll find magazines, tutorials and project ideas.

## About these booklets

These workshop booklets were created using  $\text{\LaTeX}$ , an advanced typesetting system that is widely used for several sorts of books, academic reports and letters.

To allow modification and redistribution of these booklets, they are distributed under the CC BY-SA 4.0 License. LaTeX source documents are available at <http://github.com/McrRaspJam/booklet-workshops>

All of our workshop resources are available to download from a Google Drive at <http://bit.ly/mcrraspjam>. There, you can find a PDF copy of this booklet, as well as template and completed program files for each workshop.

## Questions?

If you get stuck with any of the instructions, find errors or have feedback about these booklets, email: [jam@jackjkelly.com](mailto:jam@jackjkelly.com)

# 1 What equipment you'll need

The Raspberry Pi is a full personal computer on a single board, so we can think of it as a replacement for an old tower-style desktop machine.

To get the Raspberry Pi working then, we need to add the same peripherals as we would with a desktop machine:

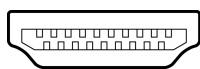
- A TV/computer **monitor**, to output to.
- A **keyboard** and **mouse** for input.

In addition, the Raspberry Pi also requires:

- A **Micro USB power supply**, the type used to charge most Smartphones and Tablets.
- An 8GB or larger **MicroSD card**.

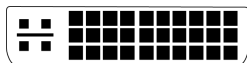
## Monitor

The Raspberry Pi uses HDMI for display output. Most modern TVs and monitors will have a HDMI port. You'll need a standard HDMI cable to connect them.



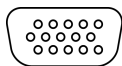
A HDMI connector

If you're using a computer monitor that is a few years old, it may only have a DVI port. In this case, you can use a DVI-HDMI cable to connect to the Raspberry Pi, which can be cheaply purchased.



A typical DVI connector

If possible, avoid using VGA connections. They require an (expensive) active adaptor, and are an analogue connector, so produce poorer image quality.



A VGA connector

## Keyboard and mouse

You can use any standard USB keyboard and mouse.

The Linux Operating System that the Raspberry Pi runs also has great compatibility with most wireless peripherals that use a USB dongle, or for Pi 3 the built-in Bluetooth.

## Power Supply

Most phone chargers will boot a Pi, but if you're using add-on boards or multiple USB peripherals, you may run into power issues.

Check the rating on your power supply, [raspberrypi.org](http://raspberrypi.org) recommends an output rating of 5V 1.2A for a Gen1 Pi, and 5V 2.5A for a Pi 3.

## MicroSD Card

The Raspberry Pi does not have a built in "Hard drive" like a desktop tower, so the operating system and files are all stored on a MicroSD card.

Your card will need to be **at least 8GB**, and is recommended to have a speed class of SDHC **class 10**, denoted by either the "C10" logo or a "U" logo of any number.



SDHC Class 10 & UHS Class 1

# 2 Installing NOOBS

On most Raspberry Pis, we usually run an operating system called Raspbian, which is a variant of the GNU/Linux operating system.

Raspbian can be quite tricky to install on an SD card, so a piece of software called NOOBS is provided to do most of the work for us.

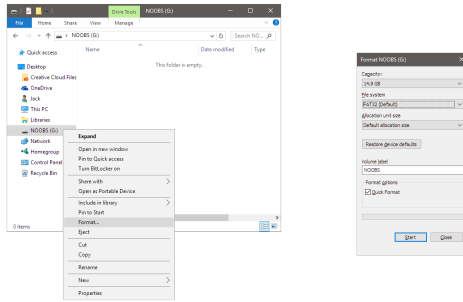
Many Raspberry Pi retailers sell SD cards with NOOBS pre-installed, but if you have chosen to use or purchase a blank MicroSD card, installing NOOBS yourself is straightforward.

## 2.1 Download and Install

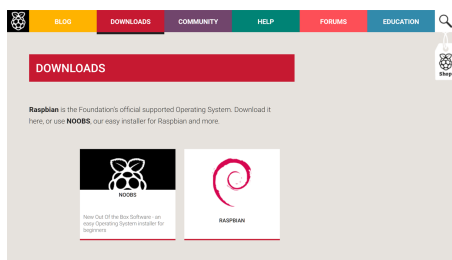
The following instructions are for Windows 10, but should be fairly similar to most operating systems, including other versions of Windows, and MacOS.

### 1. Format your MicroSD card as a FAT file system.

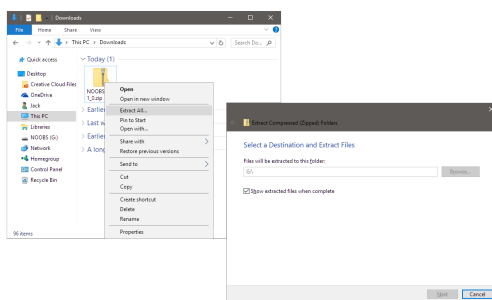
On windows, right click on the SD card in the file explorer, and click 'Format...'. Most settings can be left as normal, ensure the file systems is set to 'FAT32', then press Start.



2. Download the latest version of NOOBS from <https://www.raspberrypi.org/downloads/>  
Click the 'Download ZIP' button of NOOBS on the following page.



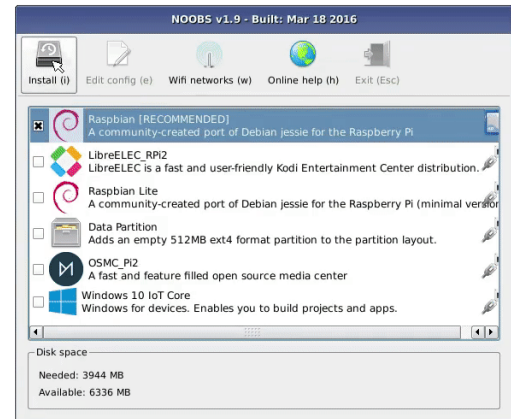
3. Extract the downloaded NOOBS ZIP file onto the SD card.  
On windows, you can right click and 'Extract All...' to the drive letter of your SD card e.g. 'G:\'.



Ensure the files are extracted to the top level of the SD card, and not inside a subfolder.

## 2.2 Booting and Installing Raspbian

Once you have a NOOBS card set up, you can boot your Pi with it. You should see a screen like the following.



Select Raspbian (which is the only option when offline) and click install. Follow through any prompts until you reach a loading screen.

The rest of the process is automatic – and very slow – so now is the time to find something to do for the next 20 minutes!

## 3 Booting the Pi

When booting the Pi, you should insert all of the connectors and the MicroSD card first, then insert the Micro USB power **last**, as this will cause the Pi to boot.

If all goes well, the Pi should boot automatically. If not, here are some tips on spotting problems with your connections and equipment.

### Power Issues

The tell-tale sign for power issues is that the Pi will get at least partway through the boot process, then reset to the beginning.

If nothing appears on the monitor, check other possible causes first.

### Display Issues

Monitors tend to be fiddly when picking up new input sources. For a sanity check it's a good idea to have another device that outputs HDMI so you can test the monitor is working, such as a laptop.

If your test device outputs correctly but your Pi does not, it is likely to be an SD card issue.

## SD Card Issues

If there is an issue with your SD card, the Pi will usually not boot at all. The best way to spot this is to watch the green CPU activity light on the Raspberry Pi board. During a normal boot this will flash on and off, so if it's stuck on, the SD card is likely faulty.

SD card issues can usually be fixed by formatting and reinstalling NOOBS. Use the official SD formatter tool from <https://www.sdcard.org/downloads/> to format your card if your OS's built in formatter did not work.

A small number of SD Cards do not work with the Raspberry Pi. A compatibility list of SD cards is maintained at [http://elinux.org/RPi\\_SD\\_cards](http://elinux.org/RPi_SD_cards), though it is not exhaustive.

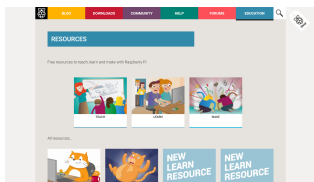
## 4 Tutorial Resources

Below are some top sources guides and tutorials for the Raspberry Pi

### 4.1 Raspberry Pi Tutorials

#### Raspberry Pi Resources

<https://www.raspberrypi.org/resources/>



The official Raspberry Pi website should be your first stop, it's chock full of introduction tutorials and project ideas for most of the software we've covered today.

#### The MagPi Magazine

<https://www.raspberrypi.org/magpi/>



The MagPi started as a community run print magazine for the Raspberry Pi, and has now become the official magazine of the Raspberry Pi.

Available in print (can be found in many supermarkets), or as a free download, each one is filled with articles, features and tutorials, all for the Raspberry Pi.

#### The Raspberry Pi Guy

<http://www.theraspberrypiguy.com/tutorials/>



Matt was one of the first people to start producing regular video content for the Raspberry Pi, he was only 12 when the Pi was first released!

Every few months, he produces a new video tutorial, showing off cool projects and uses for the Raspberry Pi, covering things as wide as Steam game streaming, robotics, or even building an electric skateboard.

### 4.2 Programming Language Tutorials

Ready to stretch your legs and try another programming language? Here are some places to look for quality programming language tutorials

#### Codecademy

<https://www.codecademy.com/>

Codecademy has tutorials for a large number of languages, we'd recommend **Java** for a great second language and introduction to object orientated programming, or **Javascript** if you'd like to learn some programming for web purposes. Confusingly, Java and Javascript are entirely separate languages.

*Codecademy offers paid features like multiple-choice quizzes, but these aren't necessary to learn the language, and none of the core content is paywalled.*

#### C and C++

<http://www.learn-c.org/>

<http://www.learncpp.com/>

If you're feeling brave, C and C++ are traditional programming languages that are widely used today. C++ was designed to follow on from C, so it makes sense to start with C.