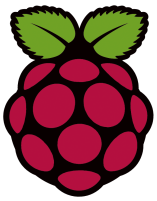


Raspberry Pi

(User Manual)

Overview

1.1 Abstraction

Introduction

The Raspberry Pi is a credit card sized computer that plugs into your computer monitor or TV and a keyboard. It's a micro-computer system built onto a tiny circuit board and measuring approximately 9cm x 5.5cm.

History

The Raspberry Pi is the work of the Raspberry Pi Foundation, a charitable organisation. Created by Eben Upton and UK registered charity (No. 1129409), May 2009.

Features

1. Ultra low-cost
2. Ultra low-power
3. Credit-card sized, fanless, instant start-up
4. Complete easy-to-program computer
5. Operating system a bootable SD card (Raspbian, Windows 10 IOT Core, Fedora, Debian, Arch Linux)

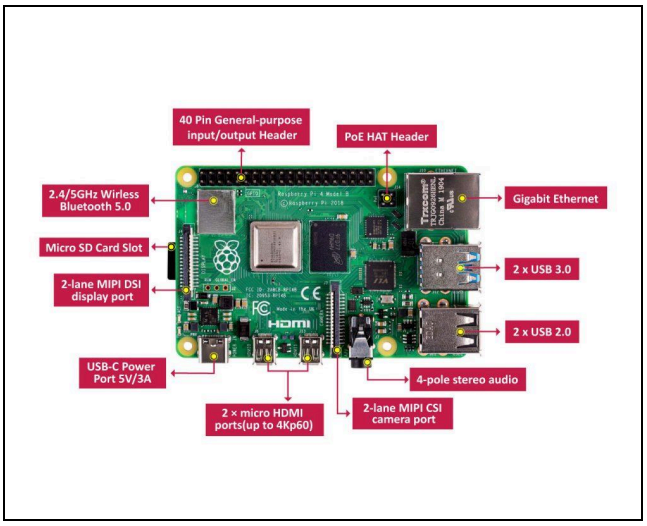
Getting Started

2.1 Hardware Components

Specifications

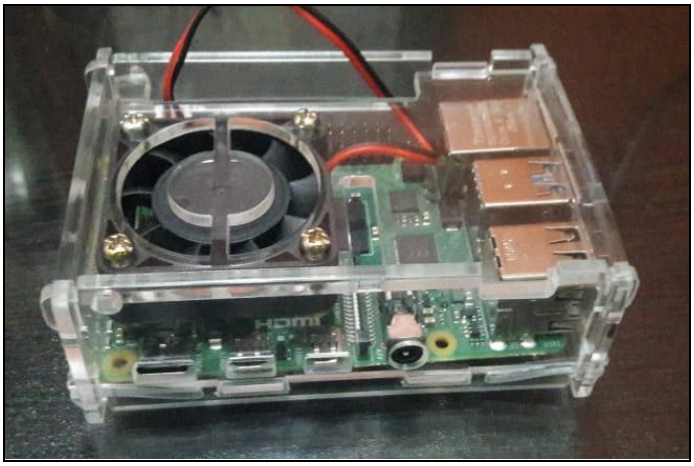
1. 10/100 BaseT Ethernet socket
2. HDMI socket
3. USB 2.0 socket
4. RCA video socket
5. SD card socket
6. Powered from microUSB socket
7. 3.5mm audio out jack
8. Header footprint for camera connection

How to make it work!



➔ **Watch this video:**

[A guide to setting up your Raspberry Pi Case]



2.2 Software

Tools Requirement

- ❏ Raspberry Pi OS

Install or download the image Raspberry Pi OS *(previously called Raspbian)* is the Foundation's official supported operating system.

- ❏ SD Card Formatter

It is strongly recommended to use the SD Memory Card Formatter to format SD/SDHC/SDXC Cards rather than using formatting tools provided with individual operating systems.

- ❏ balenaEtcher

Etcher can flash directly Raspberry Pi devices that support usb boot. Use for .iso and .img files, as well as zipped folders to create live SD cards and USB flash drives.

- ❏ Advanced IP Scanner

Advanced IP Scanner shows all network devices, gives you access to shared folders, and can even remotely switch computers off.

- ❏ Putty

PuTTY is an SSH and telnet client, developed for the Windows platform. You can download PuTTY here.

- ❏ VNC Viewer or Remote Desktop Connection

In computing, Virtual Network Computing (VNC) is a graphical desktop-sharing system that uses the Remote FrameBuffer protocol (RFB) to remotely control another computer.

OR

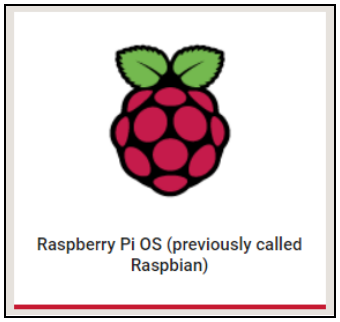
Remote Desktop Connection (RDC, also called Remote Desktop) is the client application for RDS. It allows a user to remotely log into a networked computer running the terminal services server. You can watch the tutorial how to connect Remote Desktop from Windows 10 to Raspberry Pi here

2.3 Installation

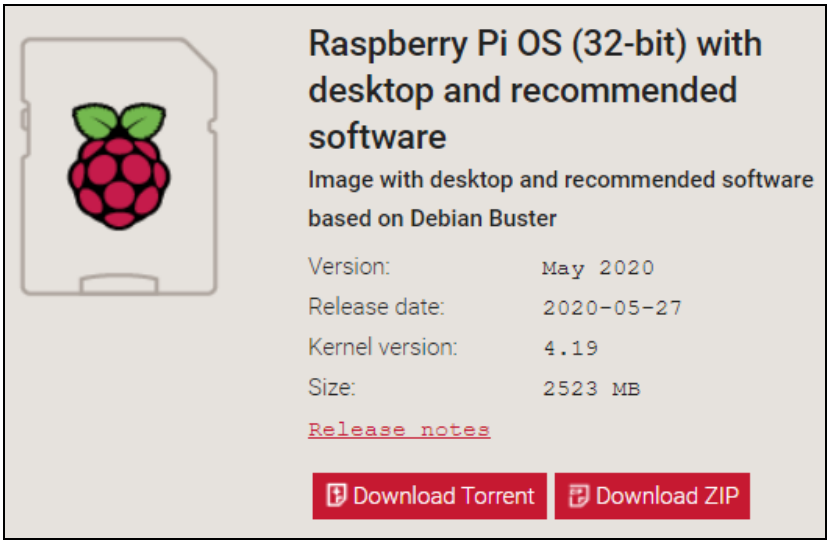
Downloading operating system images

This steps explains how to install a Raspberry Pi operating system image on an SD card.

- **Step 1:** Go to https://www.raspberrypi.org/downloads/
- **Step 2:** Choose → Raspberry Pi OS (previously called Raspbian) option



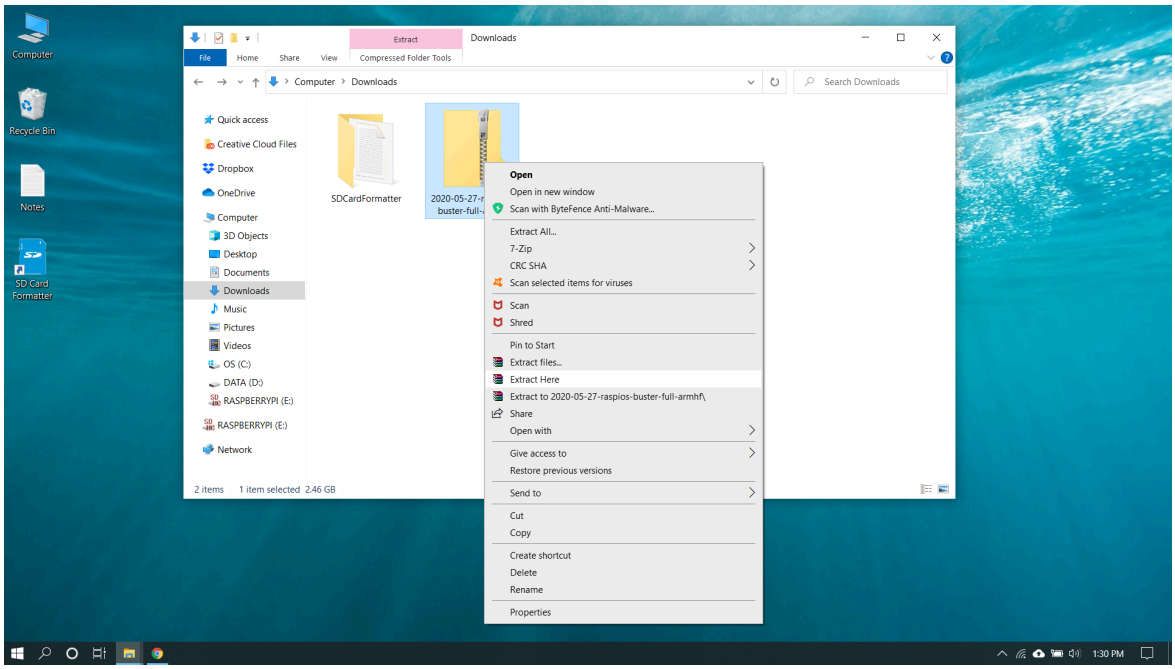
- **Step 3:** Select → Raspberry Pi OS (32-bit) with desktop and recommended software download the latest version of Raspberry Pi Imager for Windows and install it.



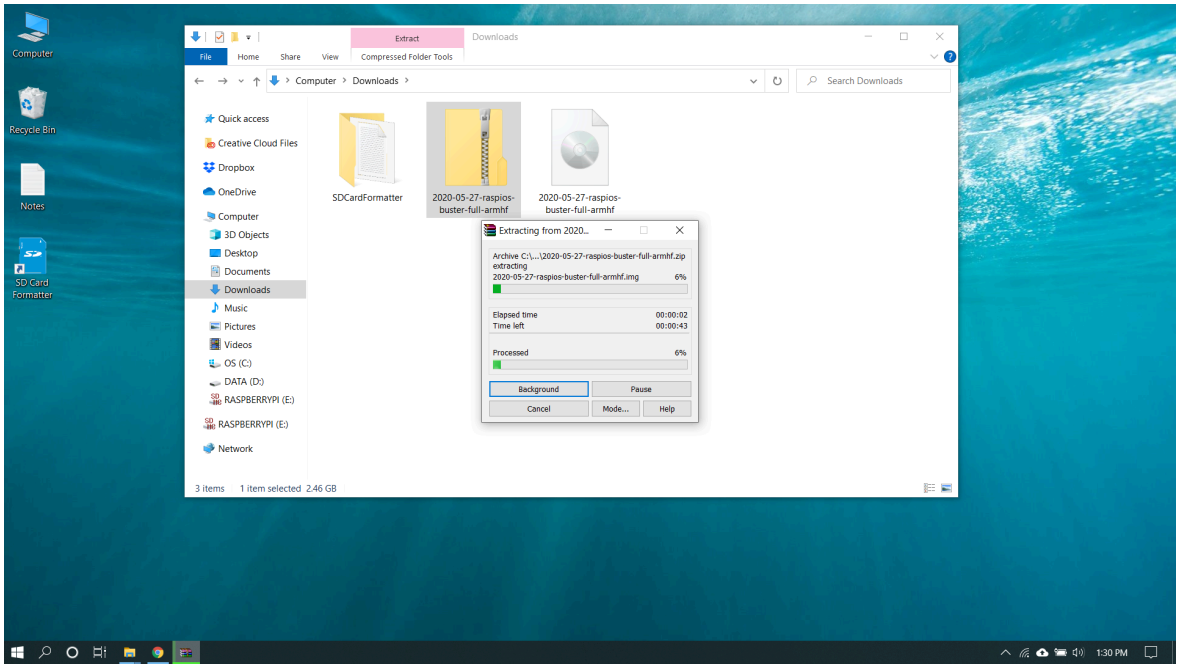
- **Step 4:** Click on → Download ZIP

Note:
The Raspbian disc image is compressed, so you'll need to unzip it. Download 7-Zip.

- **Step 5:** Go to folder → Right click → Select Extract Here



- **Step 6:** The entire folder is getting unzipping.



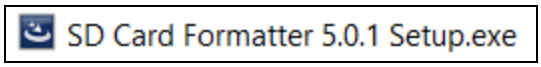
Write the disc image to your microSD card

Next, pop your microSD card into your computer and write the disc image to it. You'll need a specific program to do this:

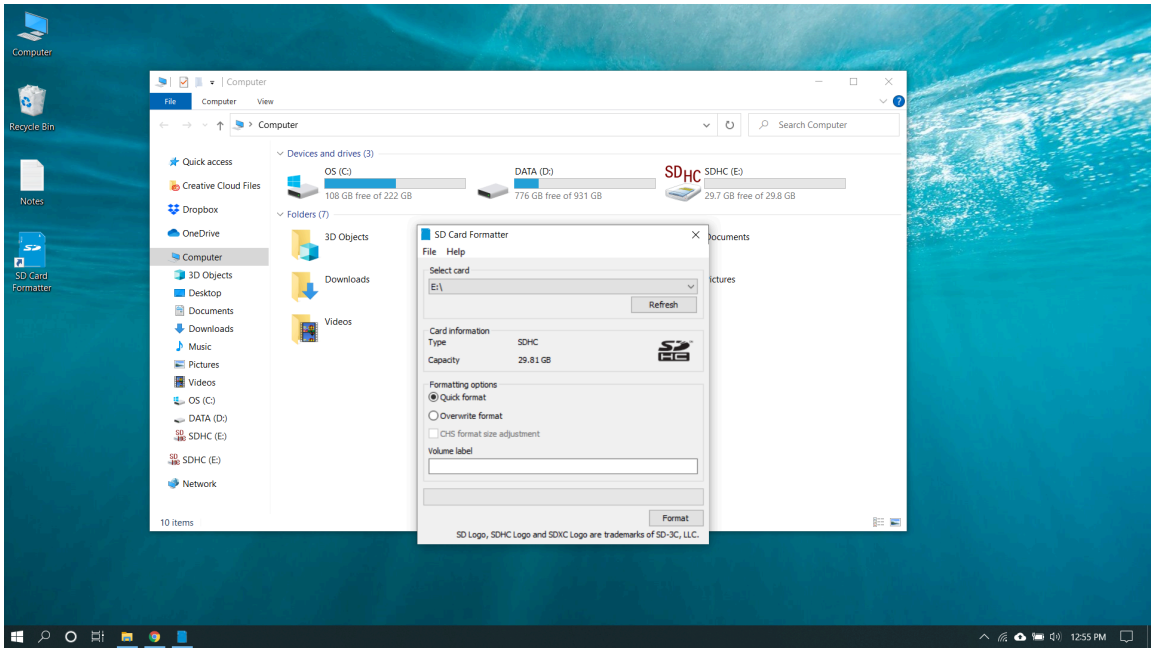
- **Step 1:** Insert SD Card and Go to https://www.sdcard.org/downloads/formatter/
- **Step 2:** Scroll below and choose the download → For Windows

- **Step 3:** Scroll and Click on → Accept Button

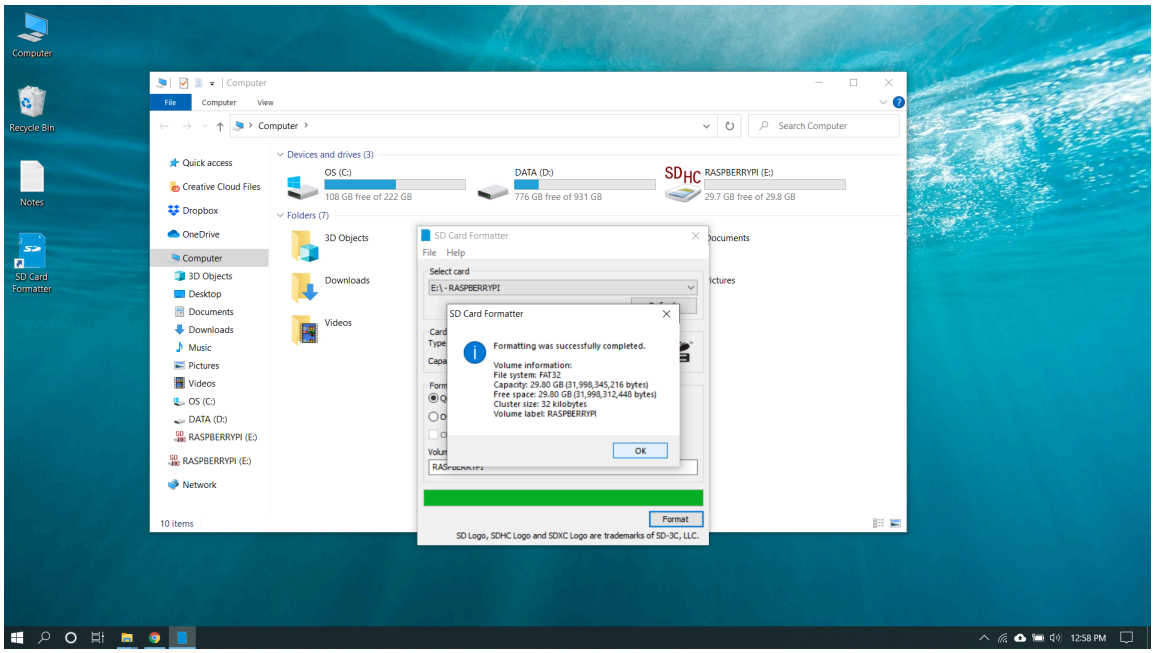
- **Step 4:** Ahead over to the folder extract files, *So now you see the setup.*



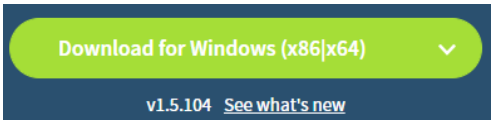
  Right click → Run as administrator then click on → Run and it is just the normal procedure of an installation.
- **Step 5:** So this SD card formatter and the default options are fine make sure that you select the memory card drive and *not the other drive*. So I have a 32GB SD card and am selecting a Quick format and clicking on → Format.



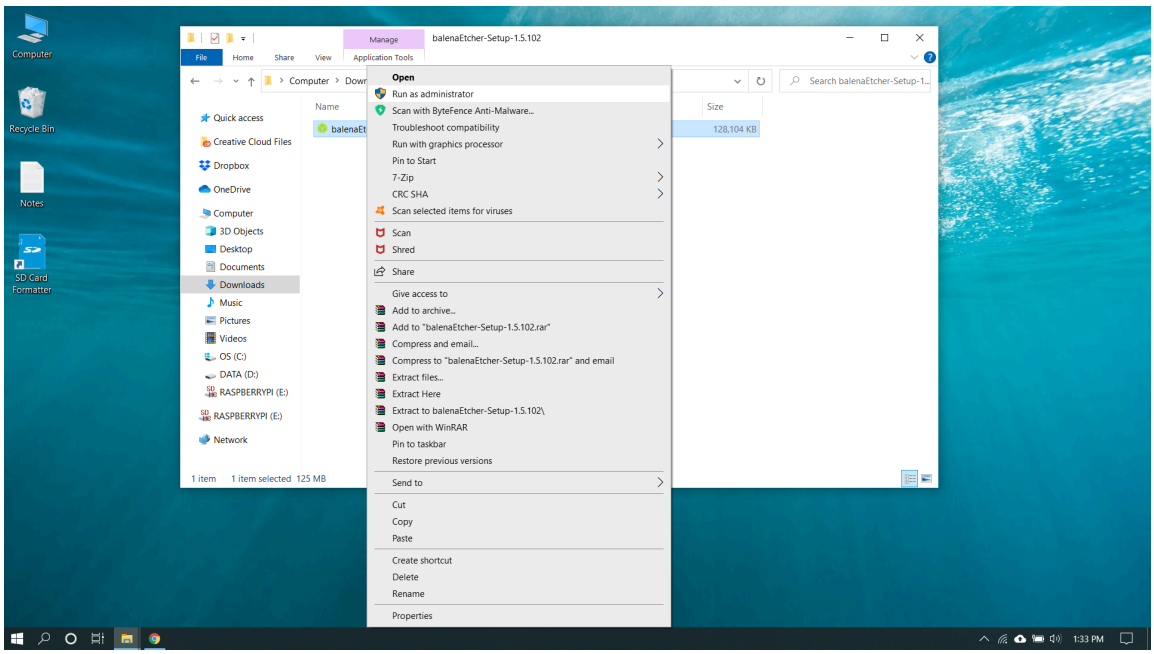
- **Step 6:** So our memory card is ready, Let burn the Operating system into our memory card.

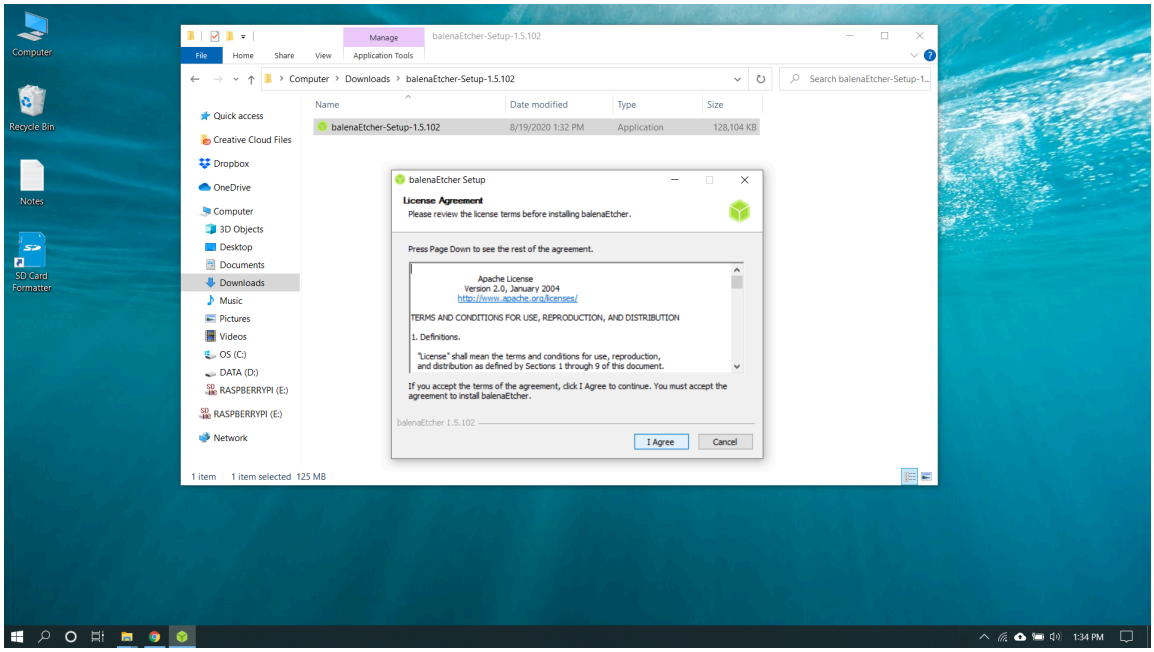


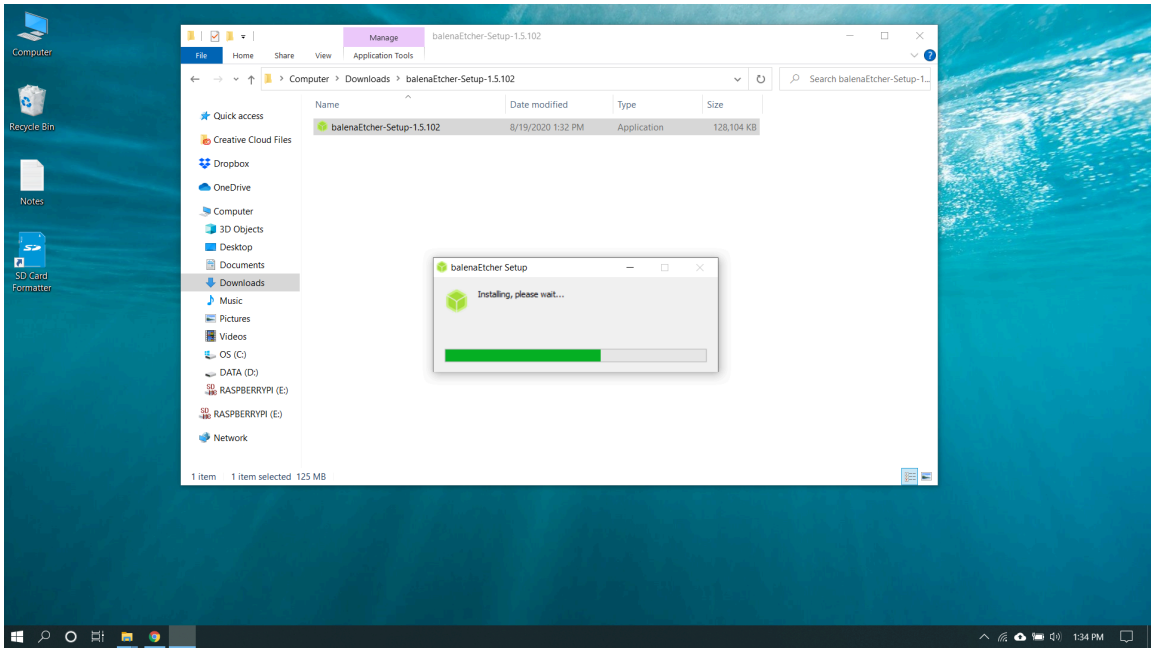
- **Step 7:** Download the balenaEtcher from https://www.balena.io/etcher/ click on → Download for Windows(x86/x64)

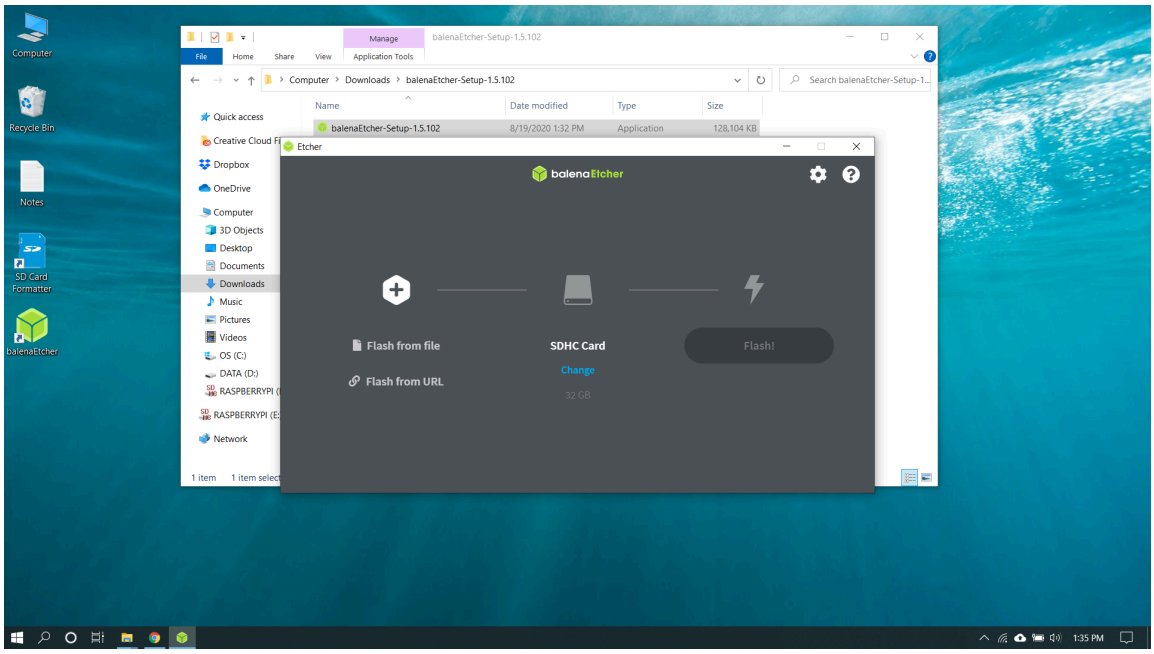


- **Step 8:** Open the folder and Right click on → balenaEtcher icon then select → Run as administrator and start installing.

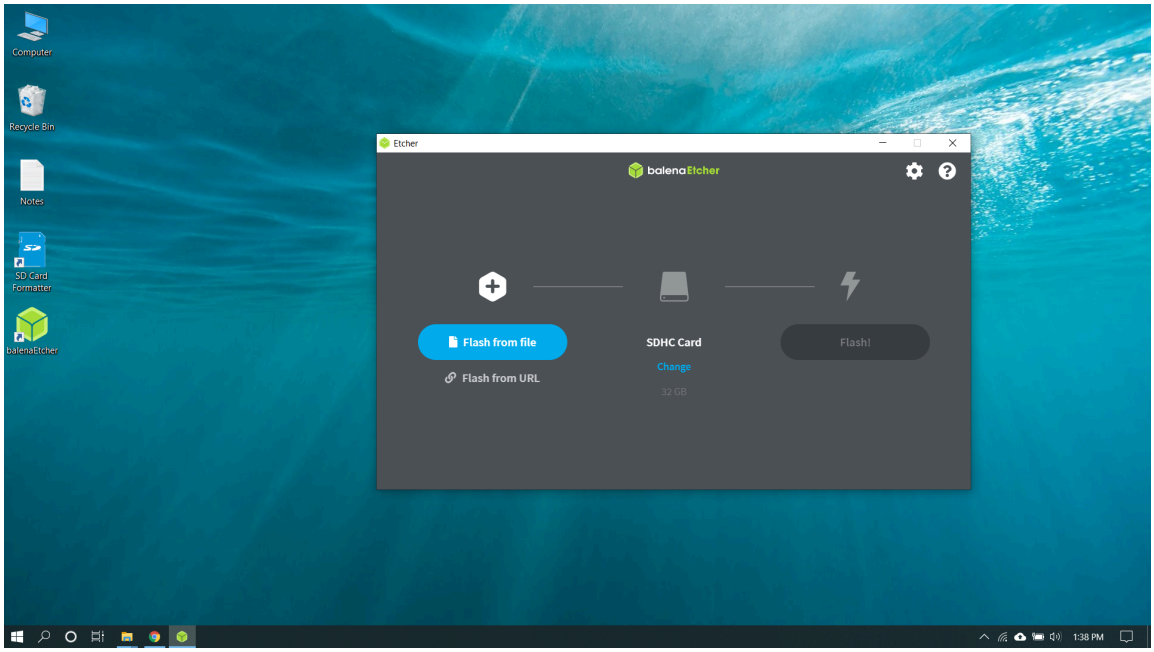



balenaEtcher Setup
License Agreement
Please review the license terms before installing balenaEtcher.
Press Page Down to see the rest of the agreement.
Apache License
Version 2.0, January 2004
http://www.apache.org/licenses/
TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION
1. Definitions.
"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.
If you accept the terms of the agreement, click I Agree to continue. You must accept the agreement to install balenaEtcher.
I Agree
Cancel

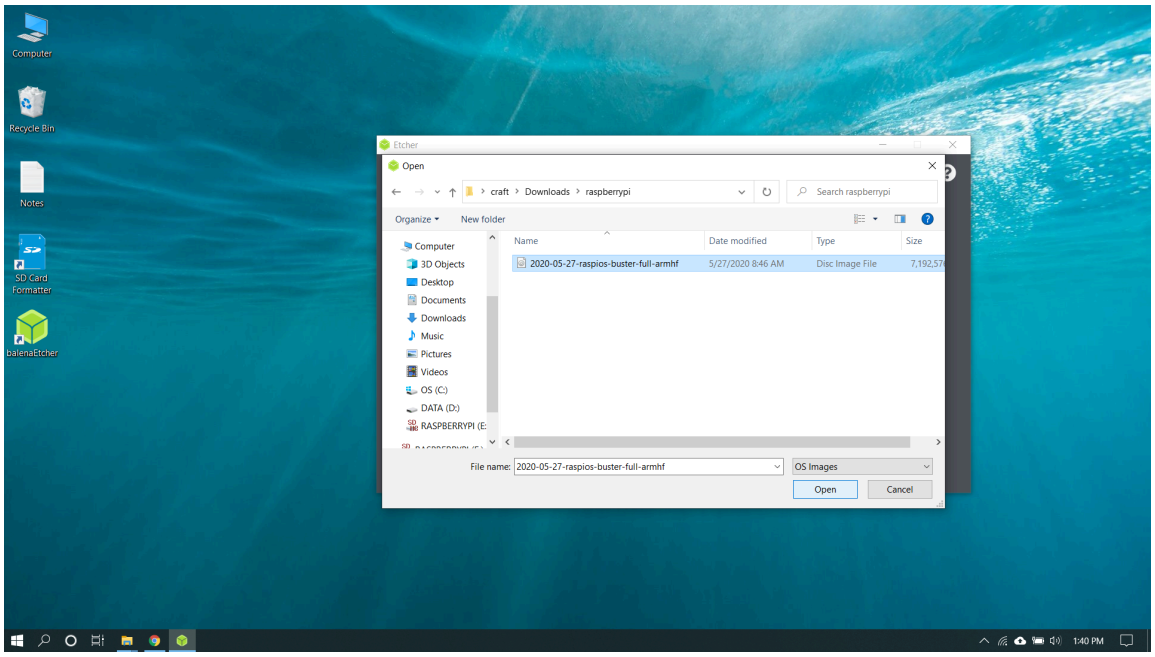

balenaEtcher Setup
Installing, please wait...



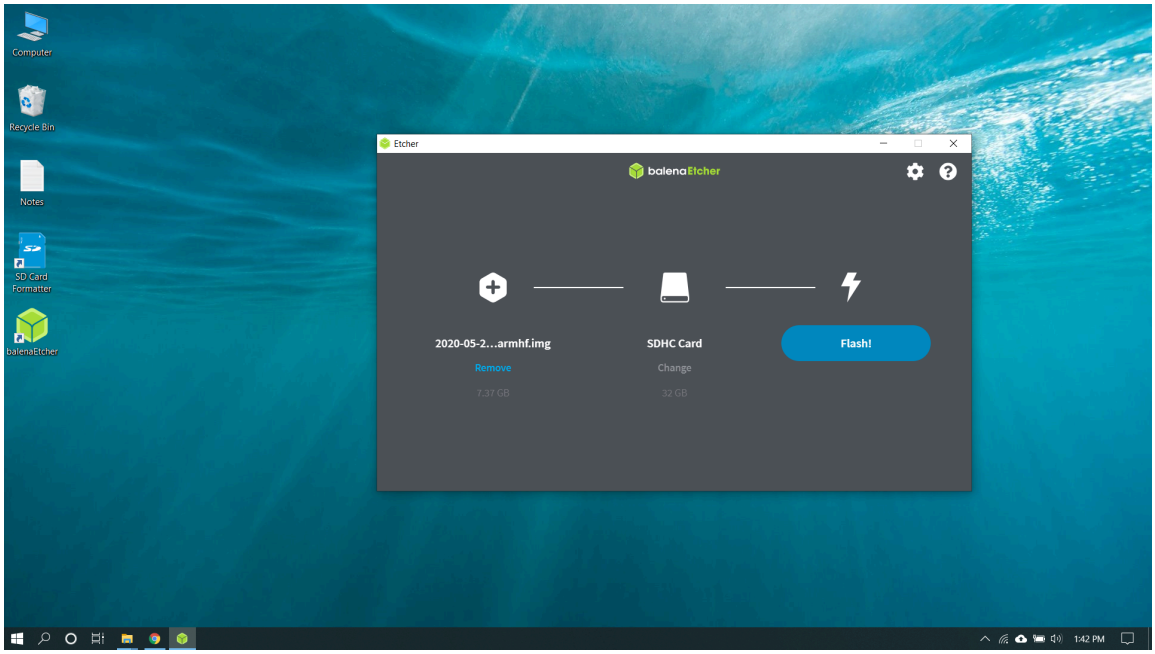
- **Step 9:** So etcher is open now the first thing you need to select the file which we have downloaded.



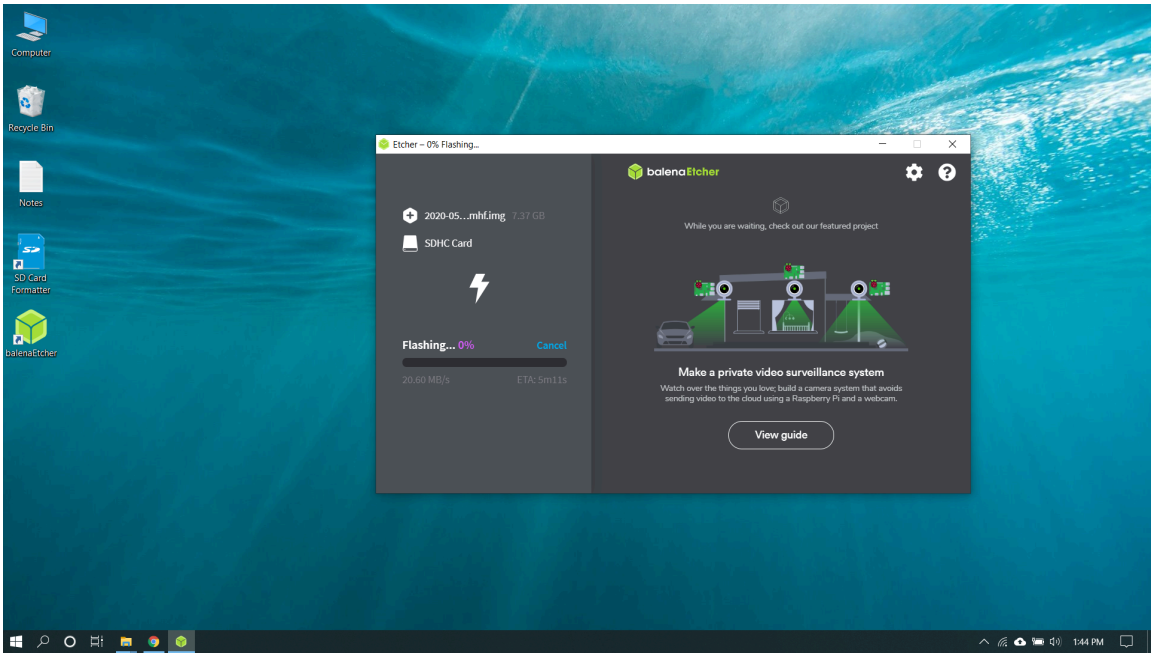
- **Step 10:** Go to folder and select balenaEtcher-Setup-1.5.102.exe and click on open button

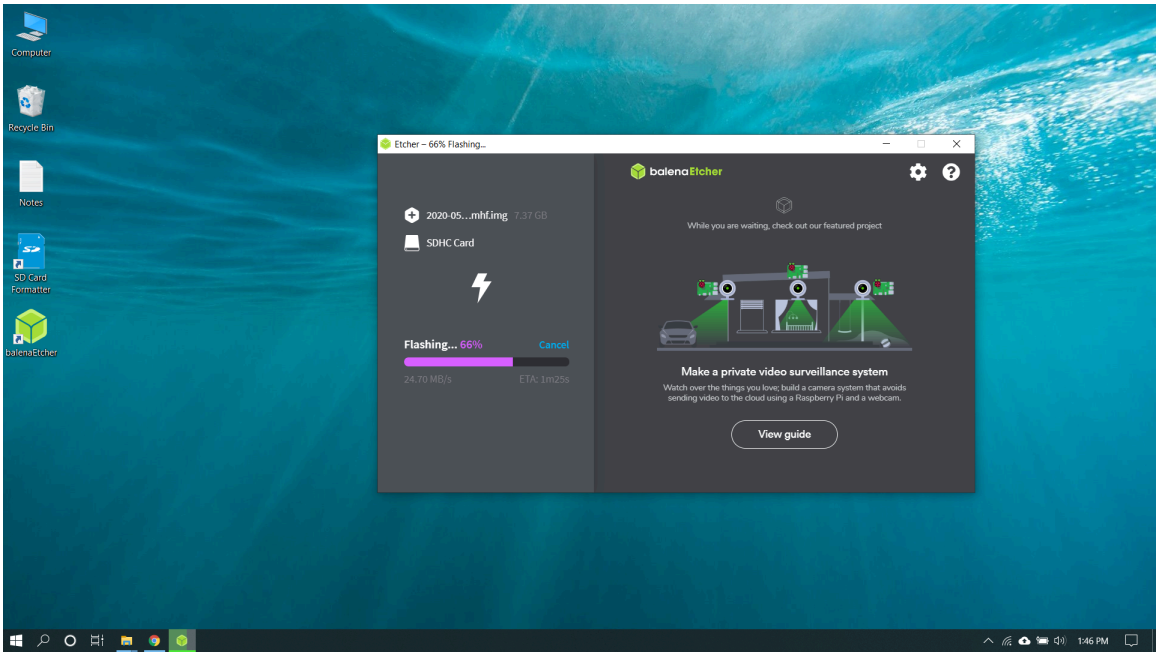


- **Step 11:** It automatically detected the 32GB SD card I had plugged in. So click on → Flash! Button.

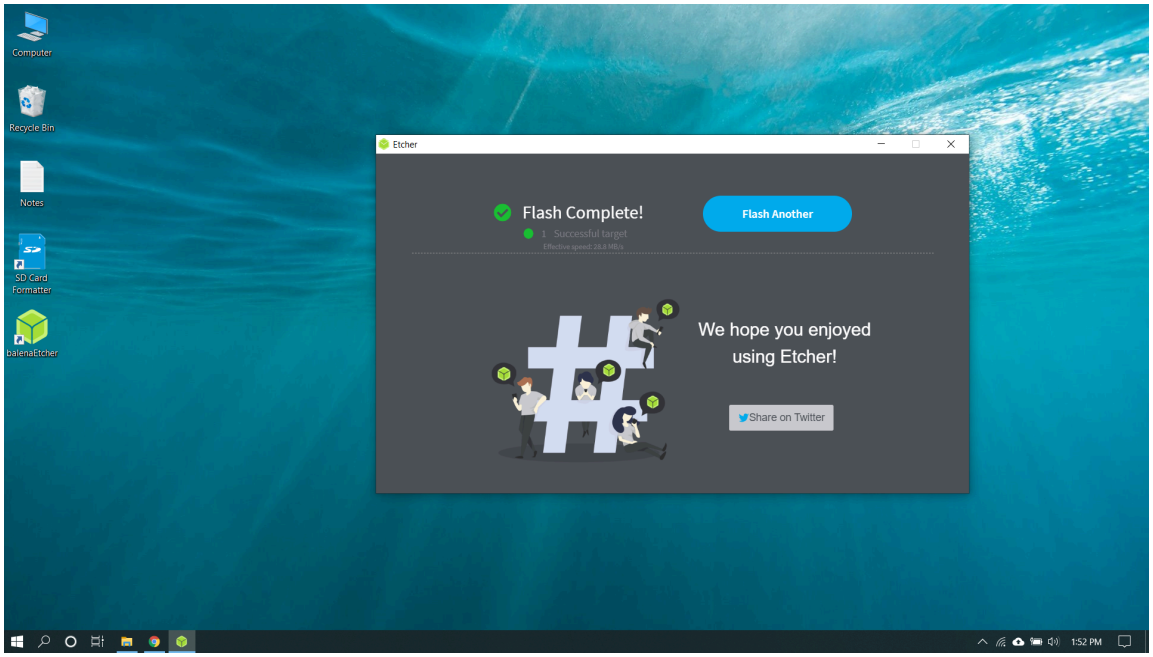


- **Step 12:** It might take 20 to 15 minutes so be calm :)



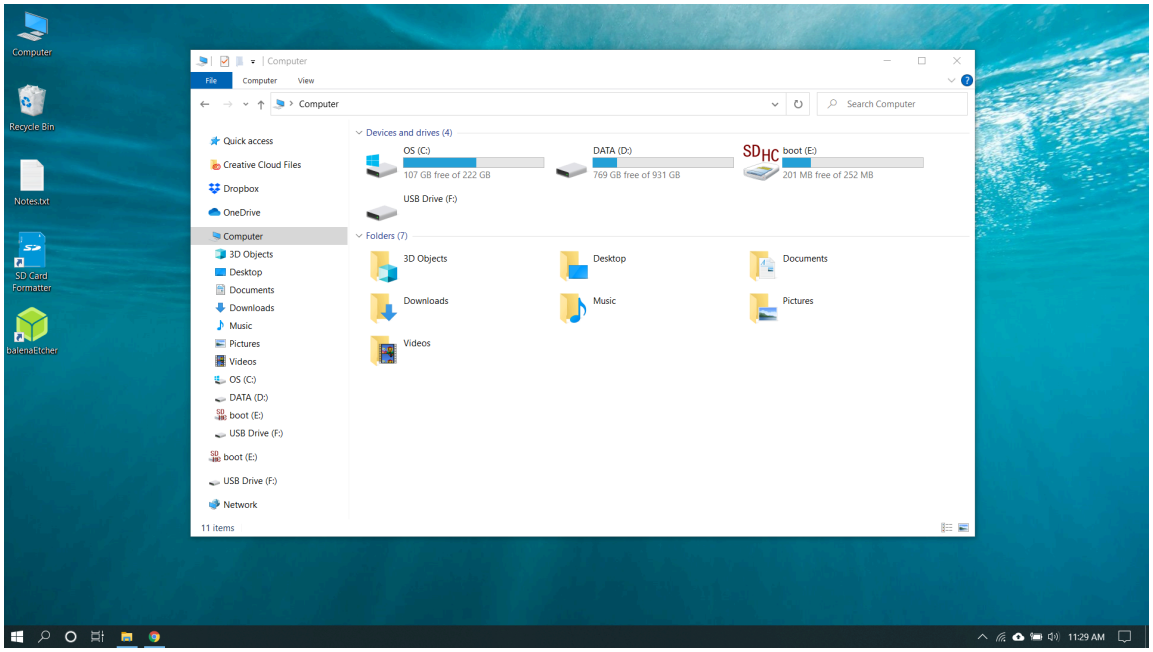


- **Step 13:** Etcher flashed our Operating system into our memory card and you might see the dialog box click on the cancel.

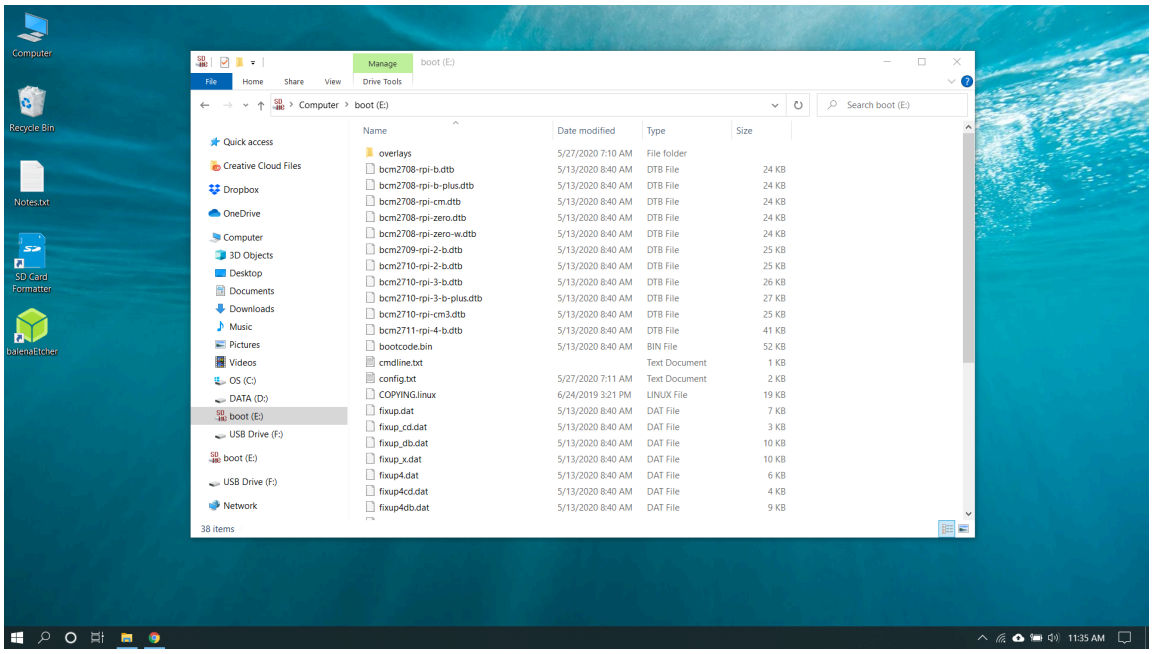


- **Step 14:** There are two things you have to head over to Computer in case you won't find an SD card: just re-plug it and you might see the boot partition over there.

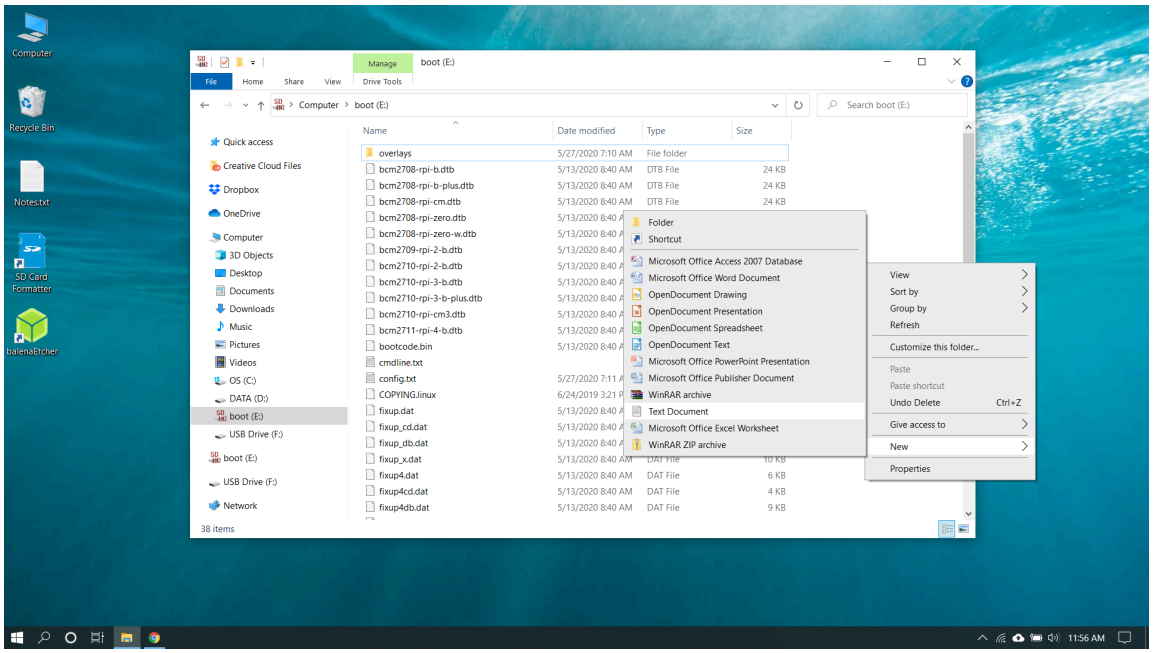
Select **Computer** → goto **boot (E:) drive**



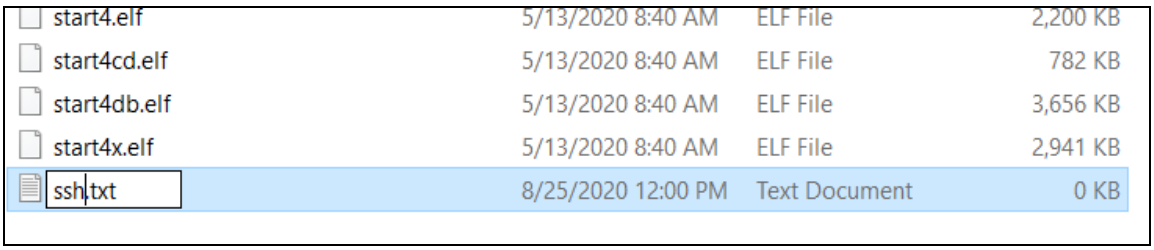
- **Step 15:** Double click on boot partition → **boot (E:) drive** to open.



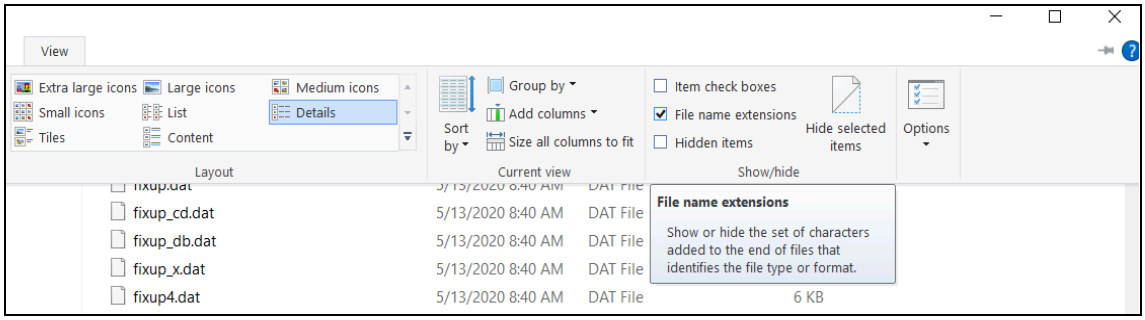
- **Step 16:** Create ssh file; **Right click** → **New** → Select **Text Document**



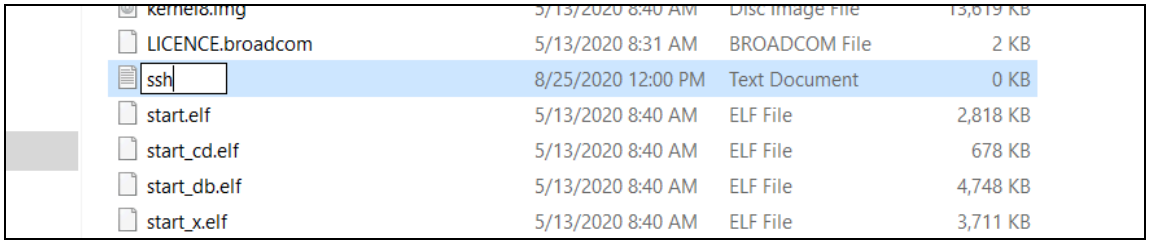
- **Step 17:** Rename to SSH file; Right click → Select **Rename** → Type **ssh** press **Enter**



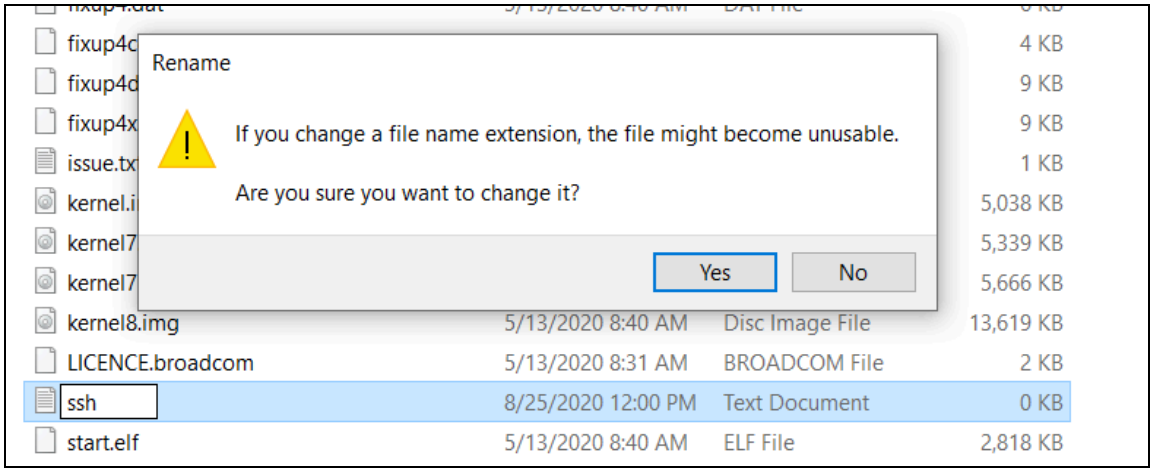
- **Step 18:** File name extensions; Go to **View** → Tick on **Checkbox**



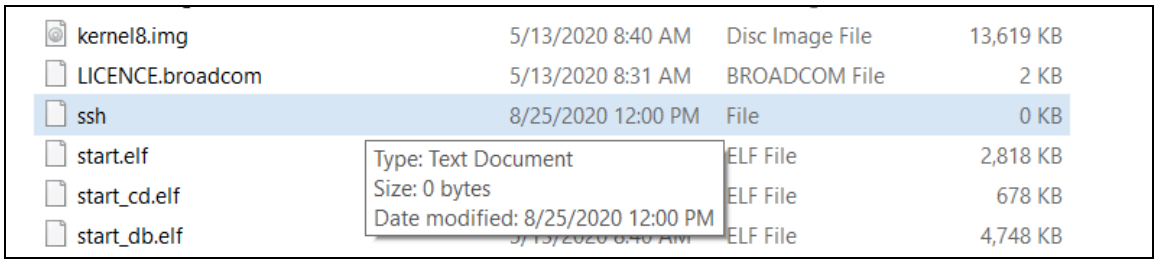
- **Step 19:** Remove **.txt** ; Right click → Select **Rename** → Remove **.txt** press **Enter**



- **Step 20:** Click on **Yes** button



- **Step 21:** Have made an SSH file.



❖ Summary:

SSH file setup: Goto boot partition now right click New and select Text Document Now just rename it to ssh if you won't see .txt click over to and tick on checkbox file name extensions. So you need to remove these extensions.

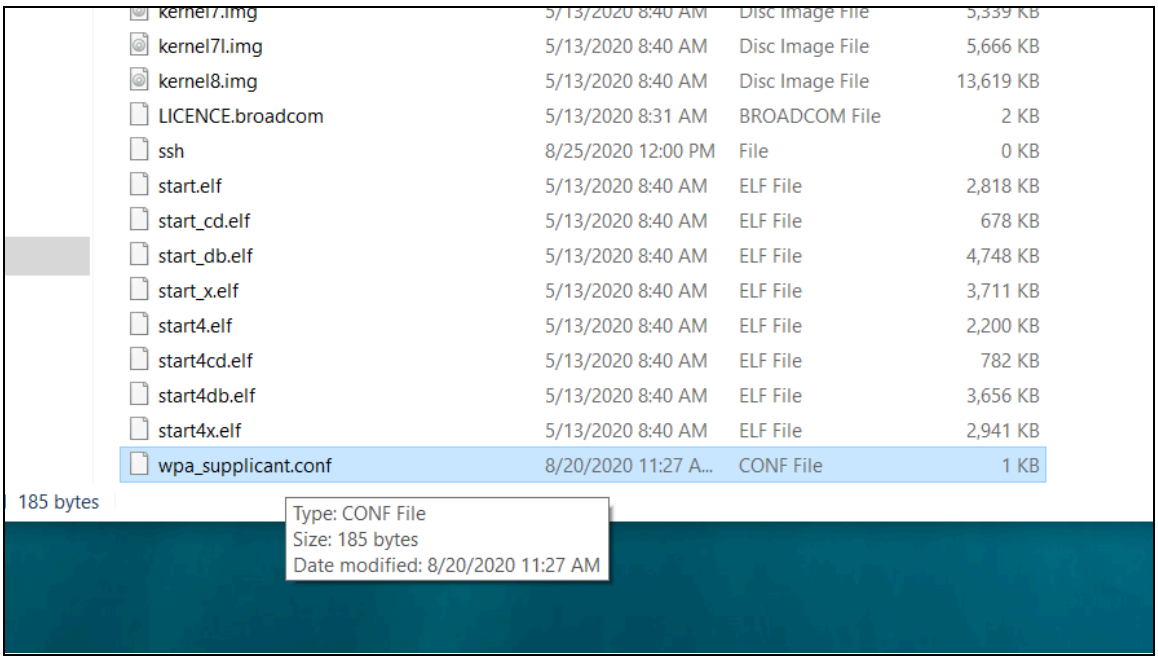
- **Step 22:** Adding the network (Wi-fi) details to the Raspberry Pi

  Right click → **New** → Select **Text Document** → Double click to **Open** → Copy and past **Script** → Save file as **wpa_supplicant.conf**

Script:

```
country=IN
ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev
update_config=1
network={
        ssid="Wifi Hotspot Name"
        psk="Wifi Hotspot Password"
        key_mgmt=WPA-PSK
    }
```

Note: *Add your Wifi Hotspot Name and Password*



Wpa_supplicant.conf the file as been created

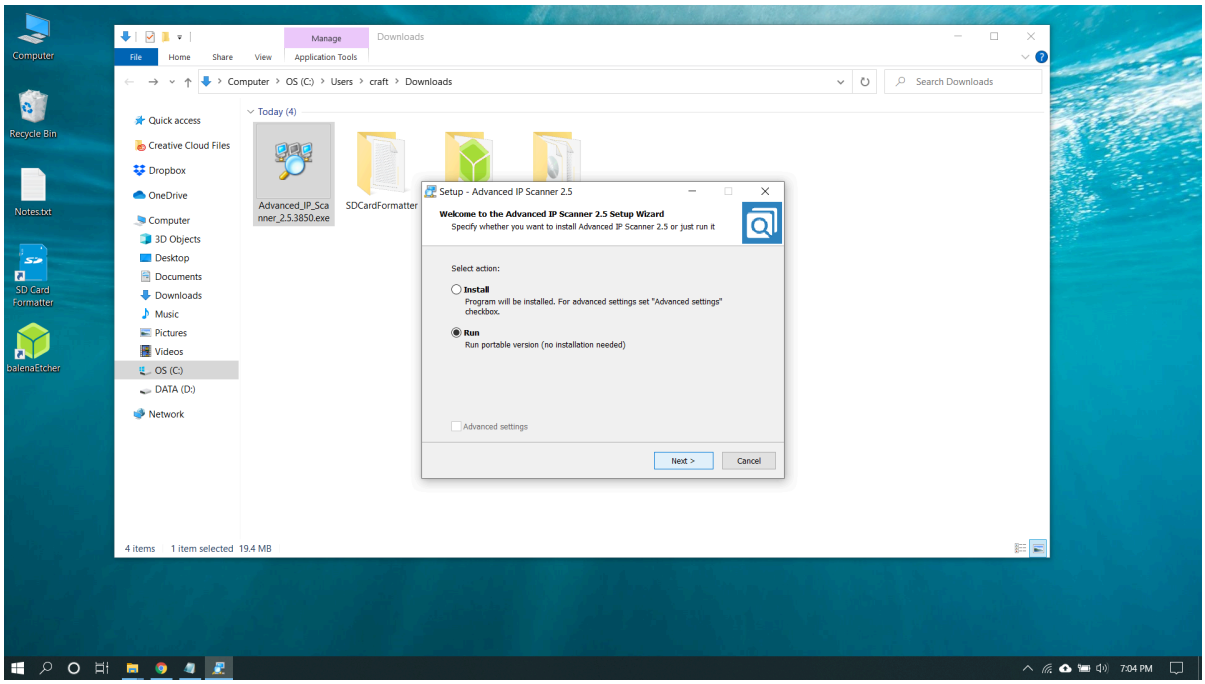
- **Step 23:** Put the SD card in your Pi and boot up

  Once the disc image has been written to the SD card, you're ready to go!

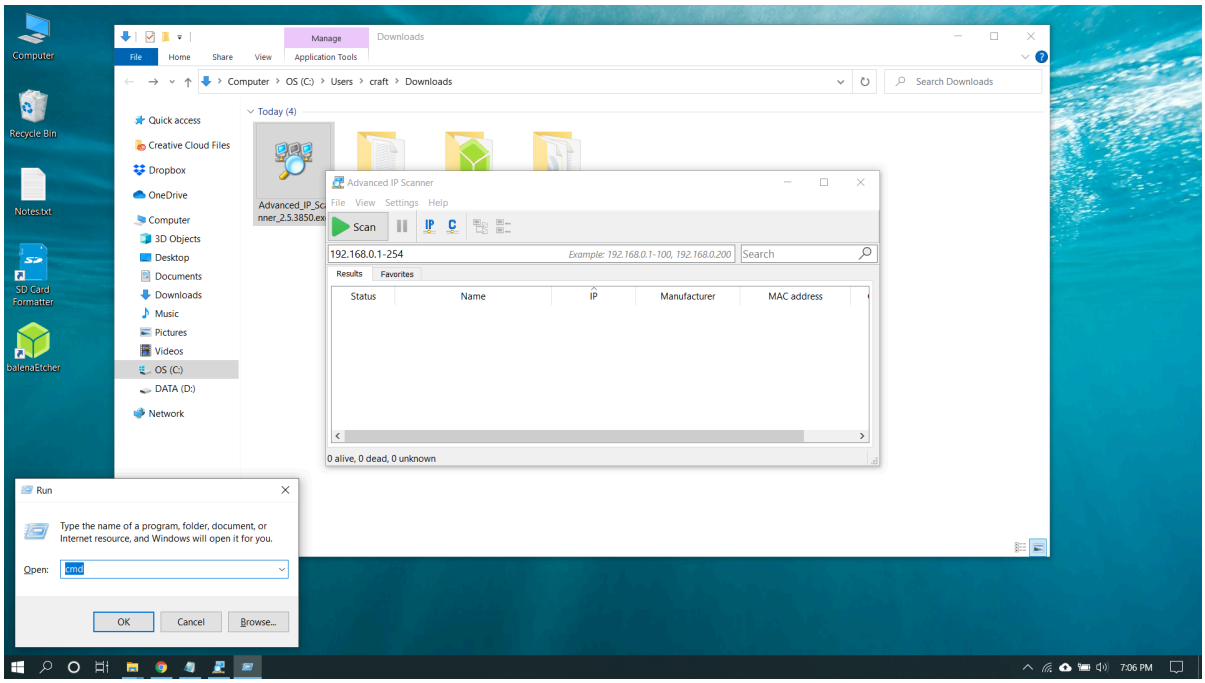
Connect Raspberry Pi to Laptop without LAN cable

Pug-in our memory card to the Raspberry Pi and power on the Raspberry Pi with the USB cable

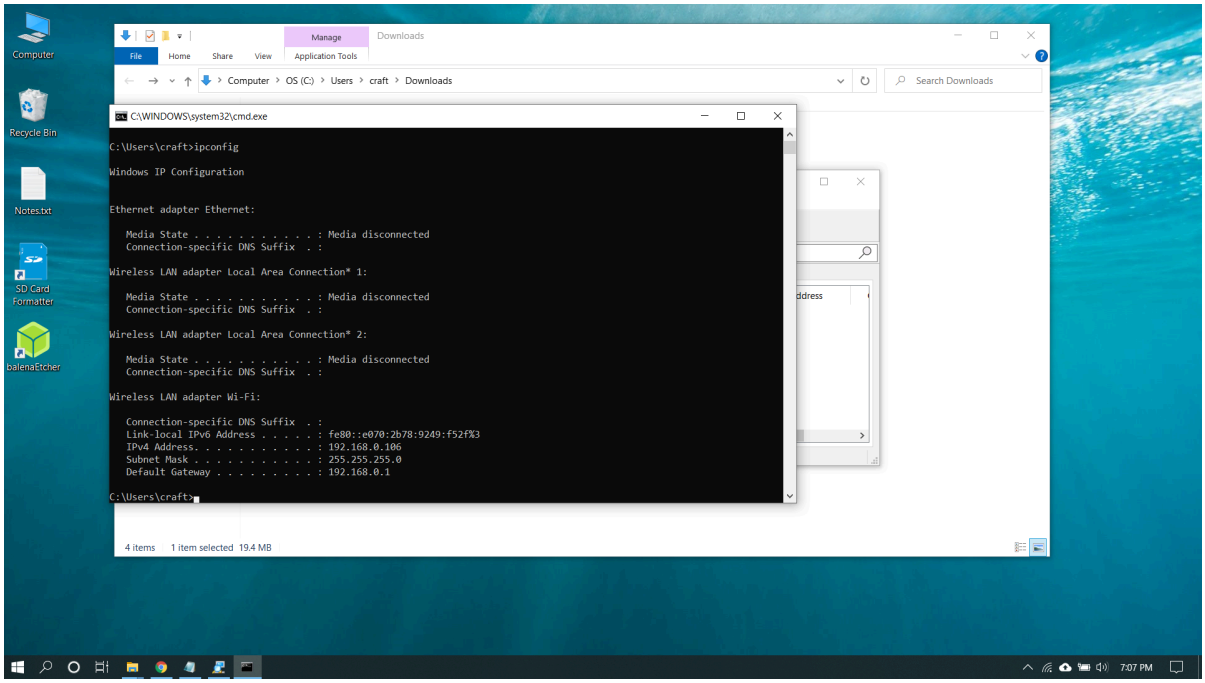
- **Step 1:** Find IP Address of your Raspberry Pi using Advanced IP Scanner tool
  Right click → **Run as administrator** → Select **Run** → Click on **Run** button



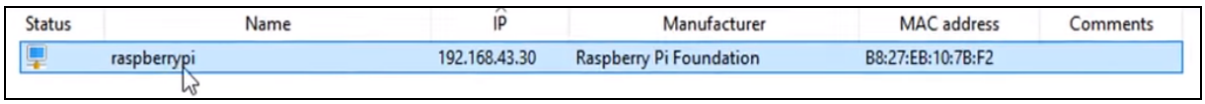
- **Step 2:** Get your base address; Goto → **Run command** → Enter **cmd**



- **Step 3:** Open command prompt → Type **ipconfig**
  After you type ipconfig in the command prompt you see the ip address allotted to this laptop. So note it down. IPv4 Address. . . . . : 192.168.0.106

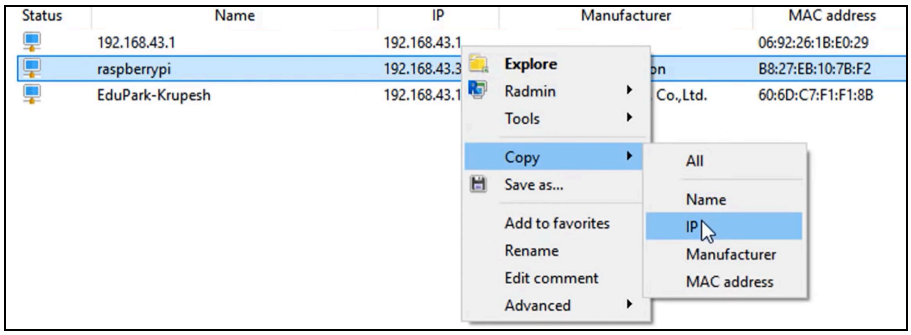


- **Step 4:** Copy your → **ip address (*192.168.0.106*)** and Past in → **Advanced IP Scanner** → Change in the place of last bits **192.168.0.106** retype for example: **192.168.0.1-254** → Click on **Scan** button.

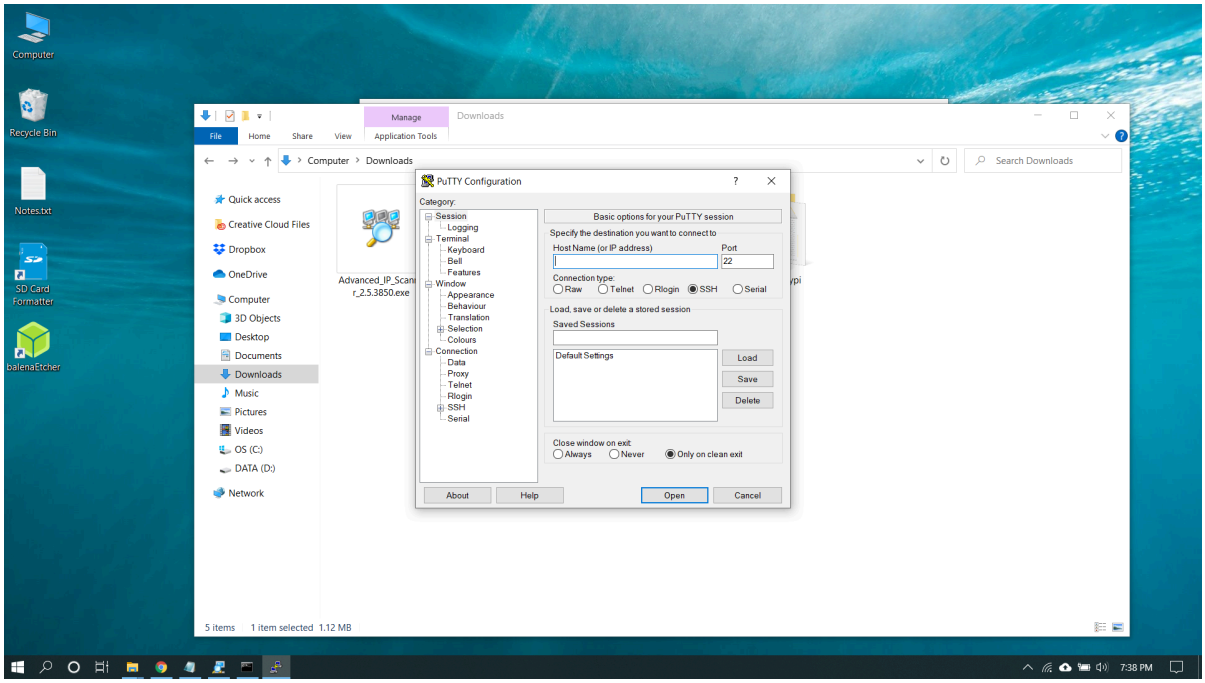


So now hopefully we got the Raspberry Pi ip address and just copy the Pi ip address

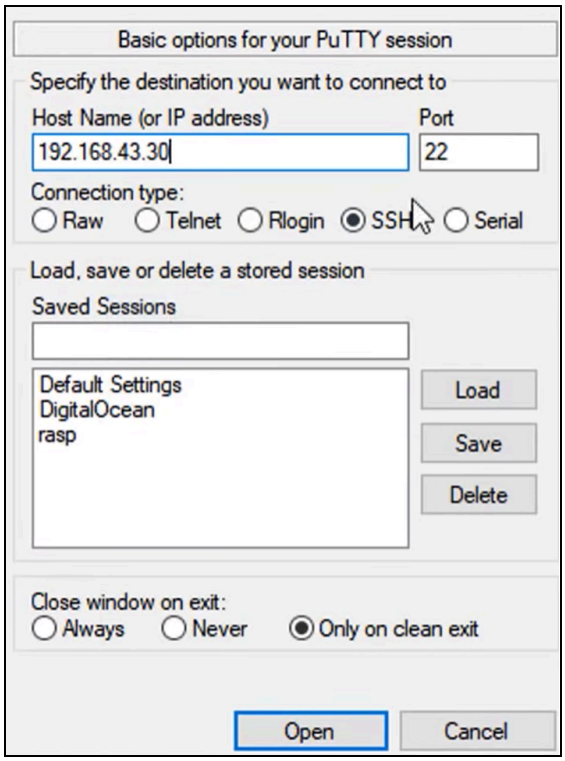
- **Step 5:** Right click → Goto **Copy** → click on **IP**



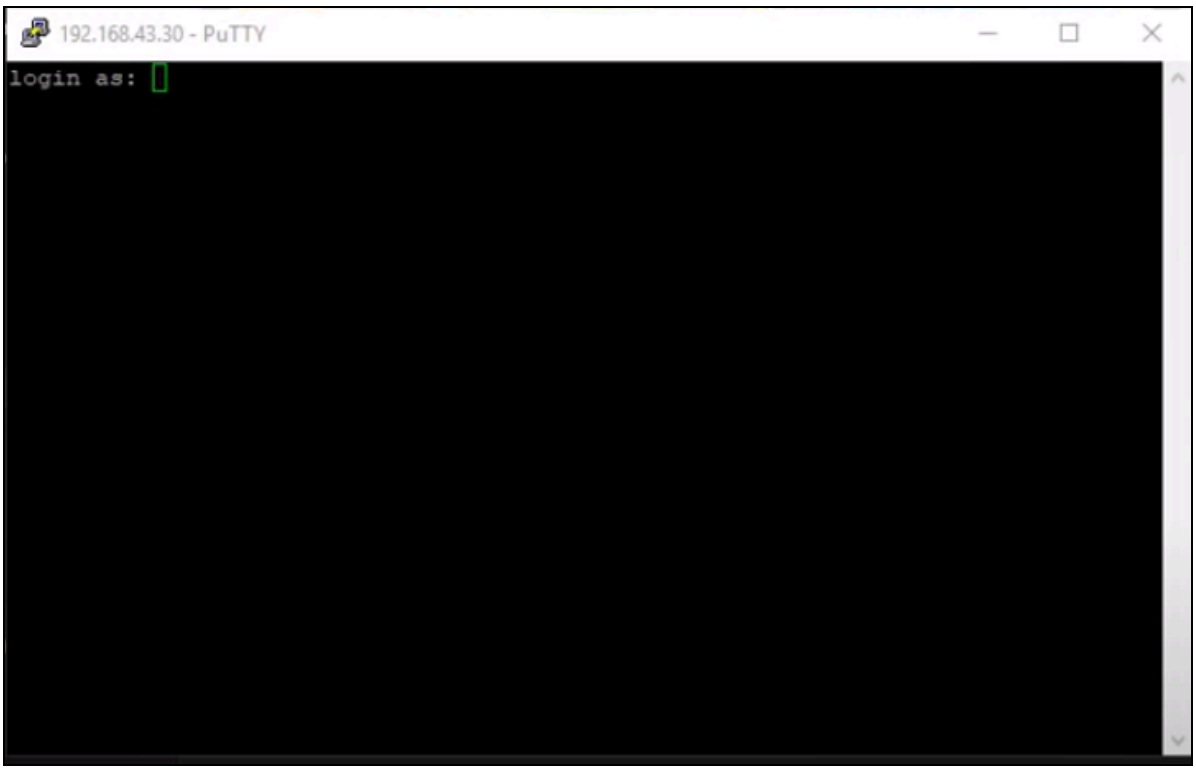
- **Step 6:** Open **putty.exe**



And paste the ip address → **192.168.43.30** in Host Name and set the port → **22** Click on → **SSH** → Click on → **Only on clean and exit** → Click **Open**

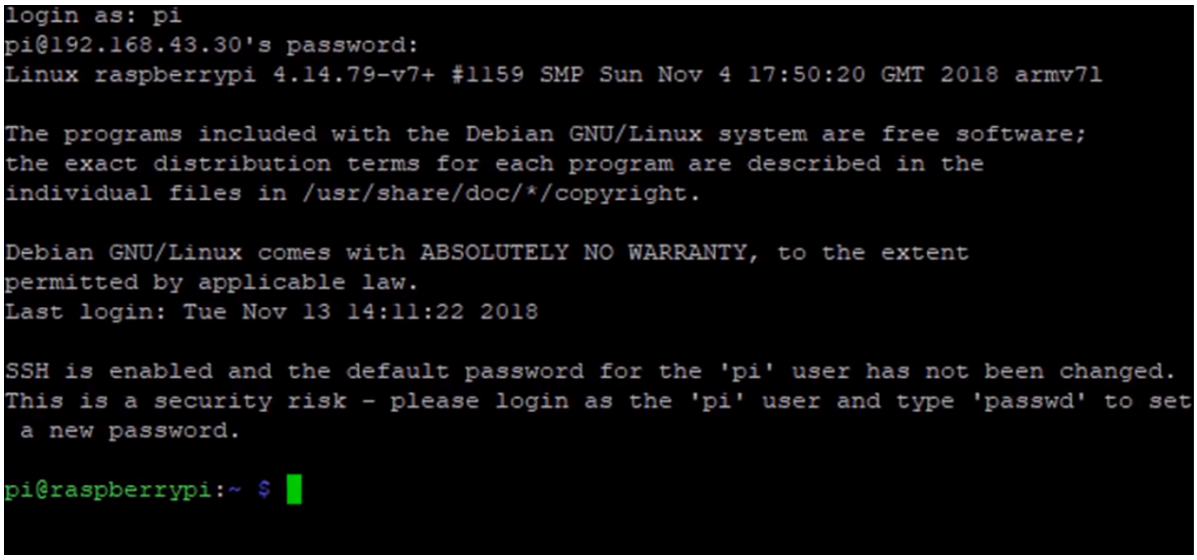


- **Step 7:** Opens Putty command prompt



Command:

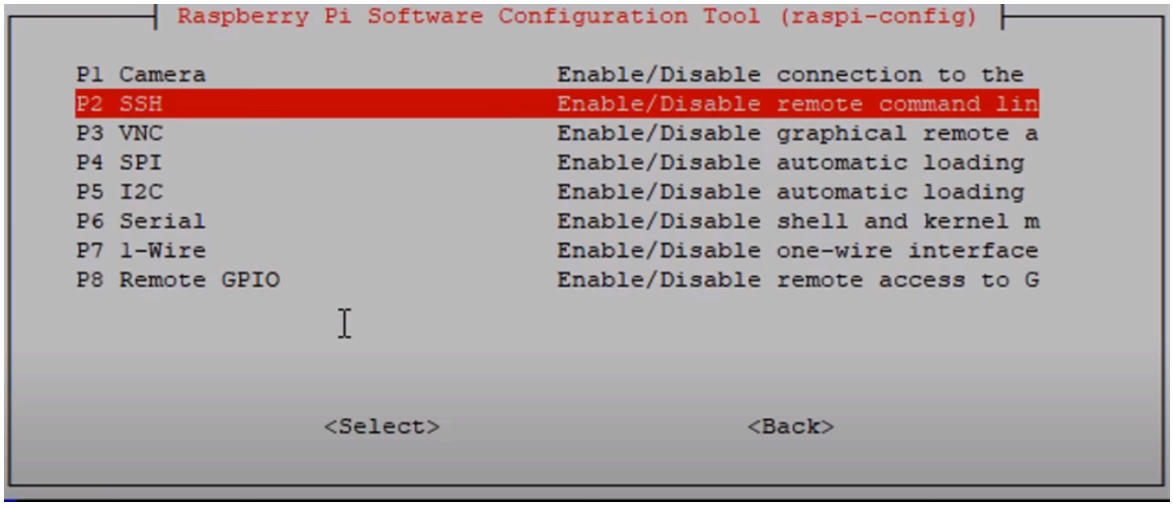
```
login as: pi
pi@192.168.43.30's password: raspberry
```



Command:

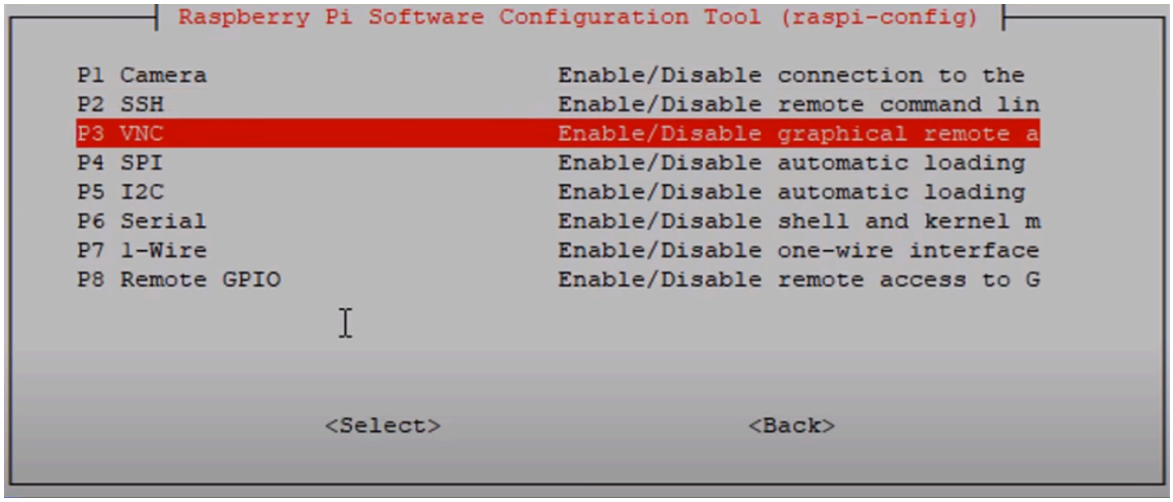
```
Sudo raspi-config
```

Now, Go to **Interfacing options** → Click on **SSH** → Click on **Yes** button → The SSH server is enabled → Click **Ok**



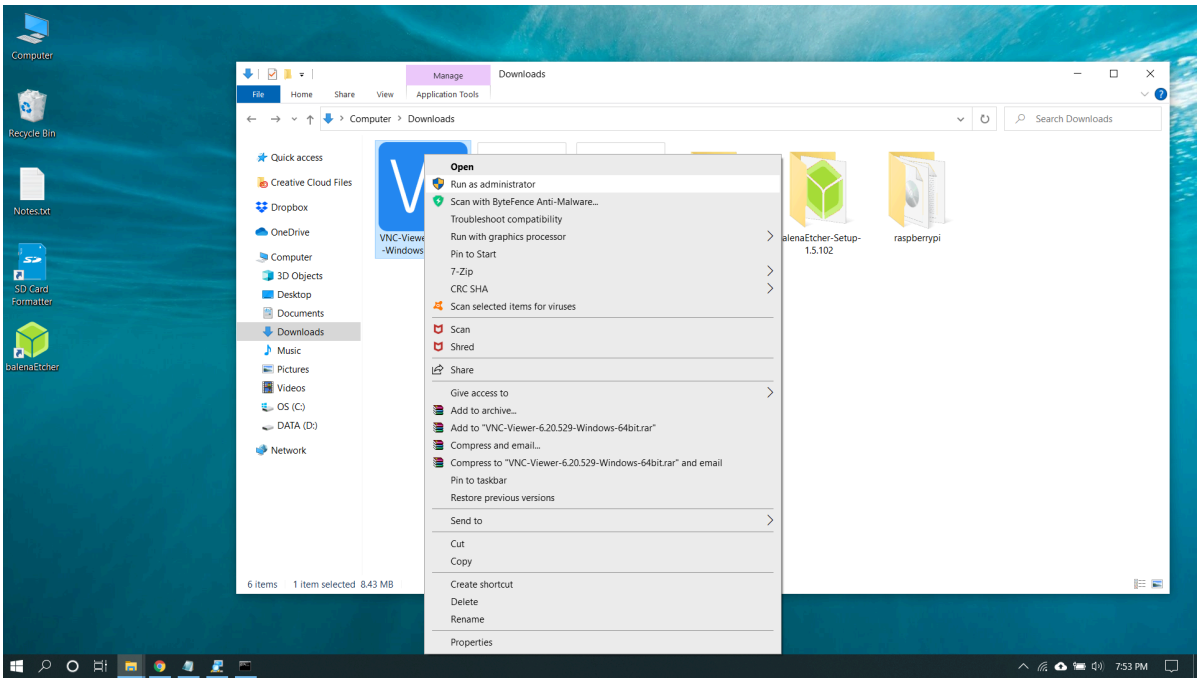
The one more thing you might want to do enabled VNC viewer

Goto **Interfacing options** → Click on **VNC** → Click on **Yes** button → The SSH server is enabled → Click **Ok** → Goto **Finish**

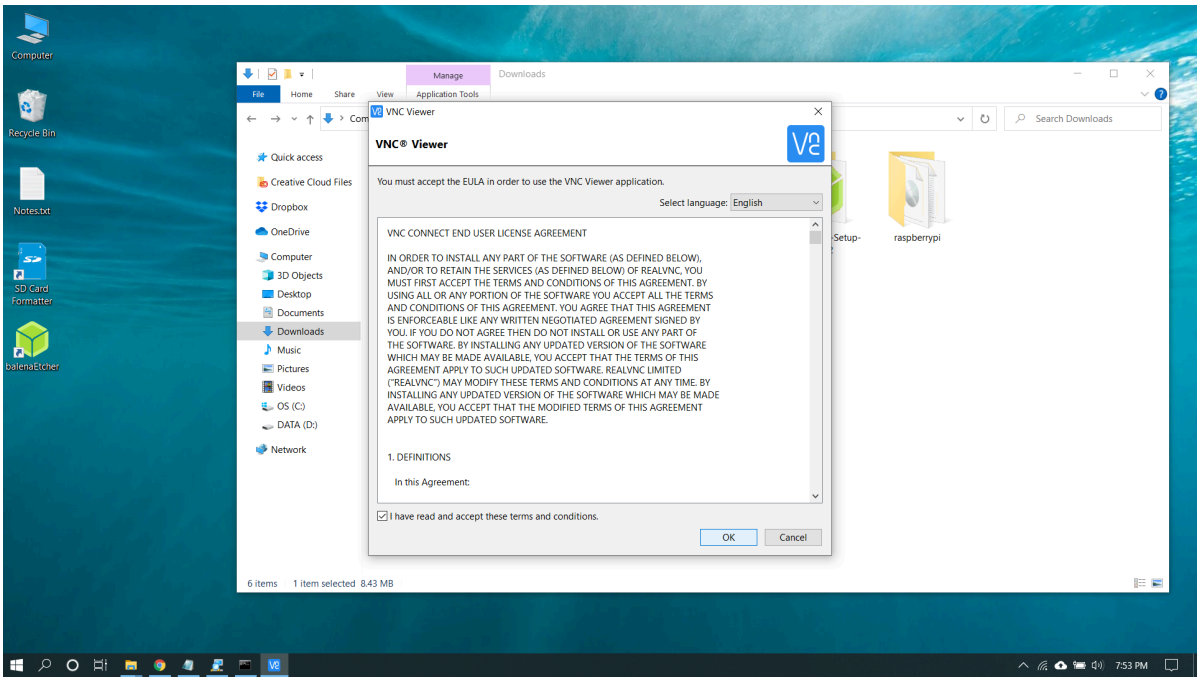


- **Step 8:** Lets Install VNC viewer since we have enabled VNC server

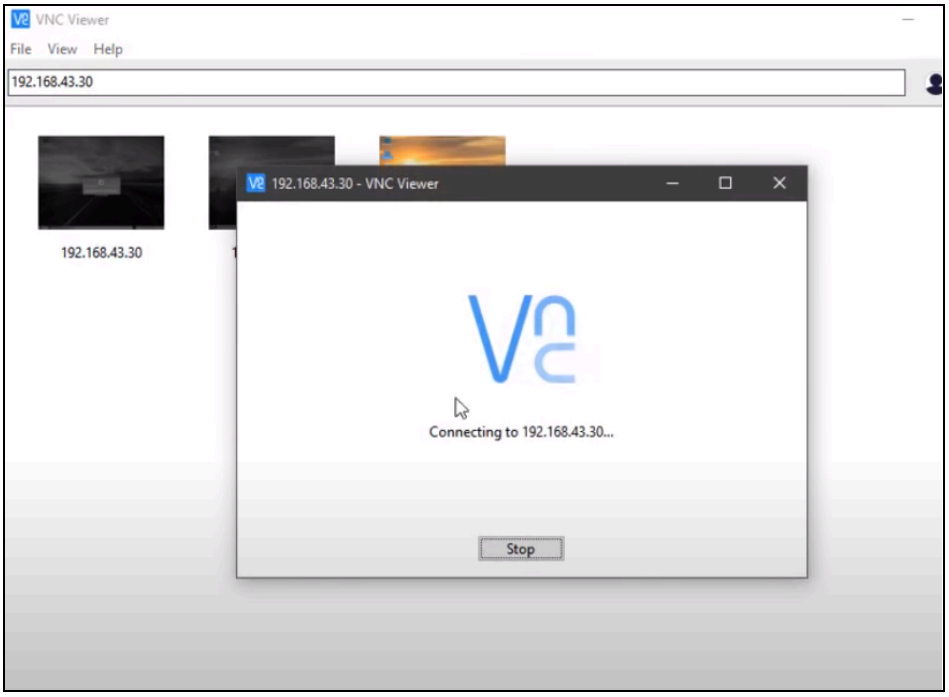
Right click → **Run as administrator**



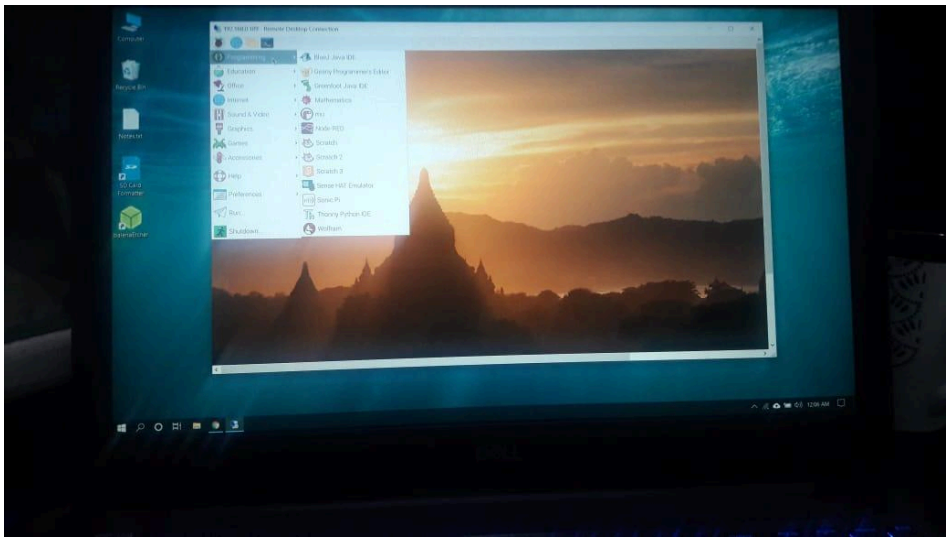
Click on **Checkbox** → Press **OK**



Goto → **VNC viewer** window → Paste ip address **192.168.43.30** of raspberry pi. (Got from Advanced IP Scanner and since we have enabled VNC server you will be able to connect to raspberry pi) → Click on **Continue** button.



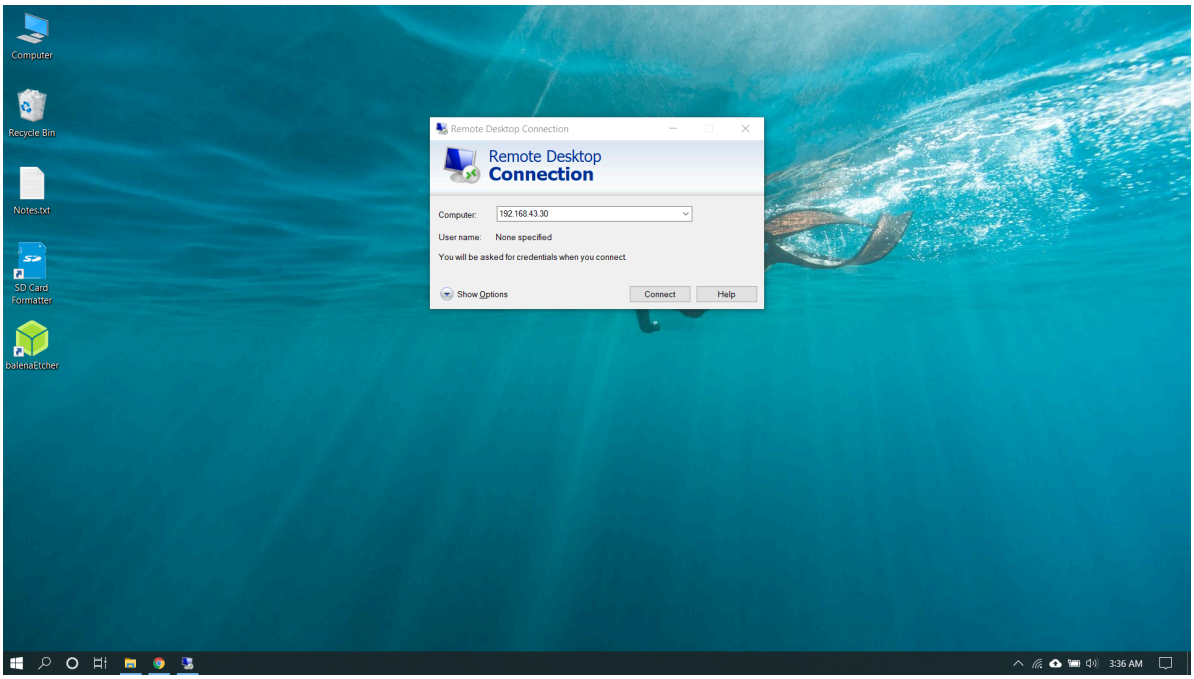
You got the Display screen of raspberry pi…:)



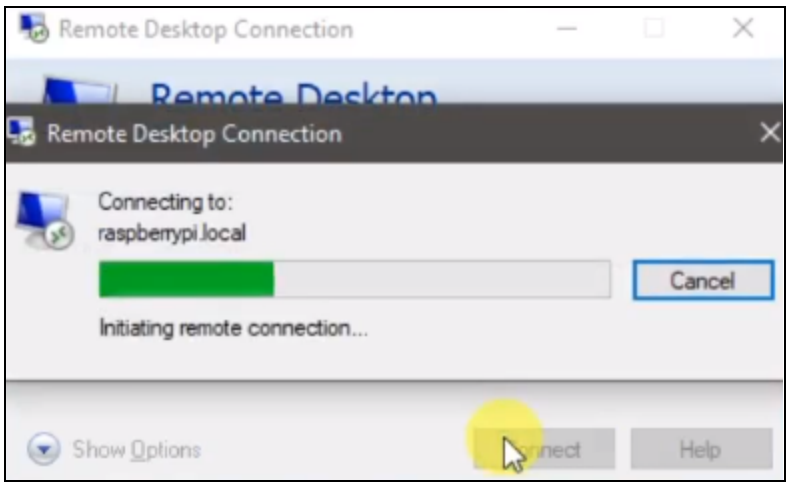
Optional:

In Windows 10 we just run the built-in Remote Desktop app.

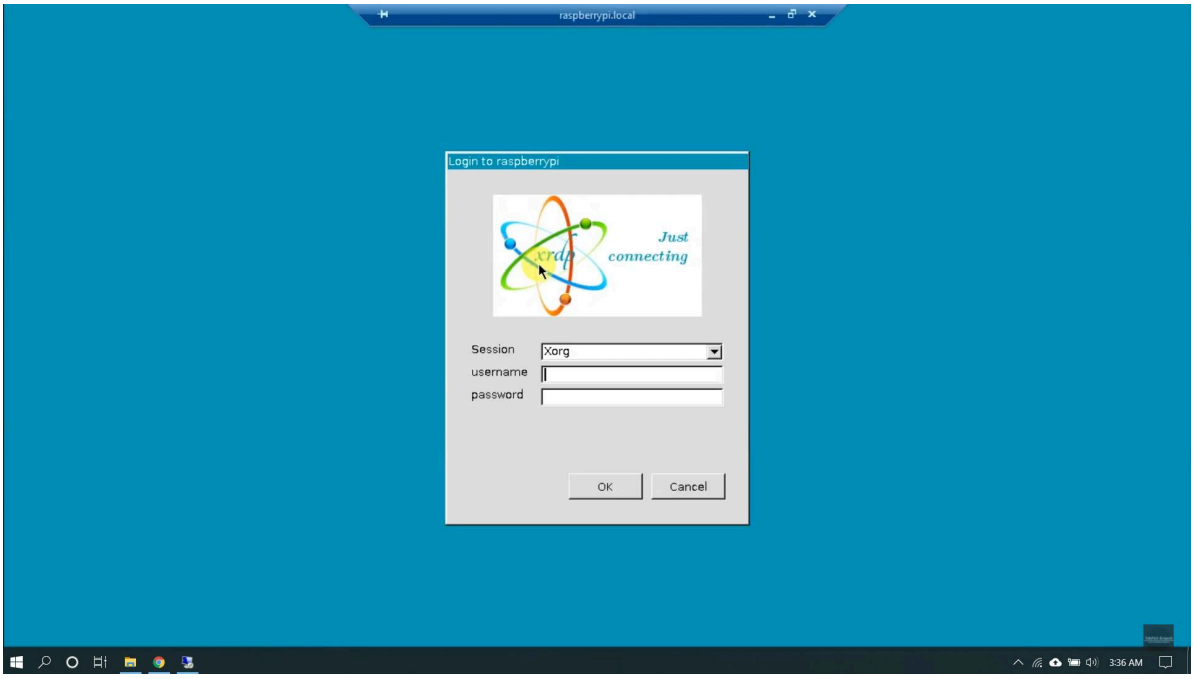
- **Step 1:** Go to **Search bar** → Type **Remote Desktop Connection**



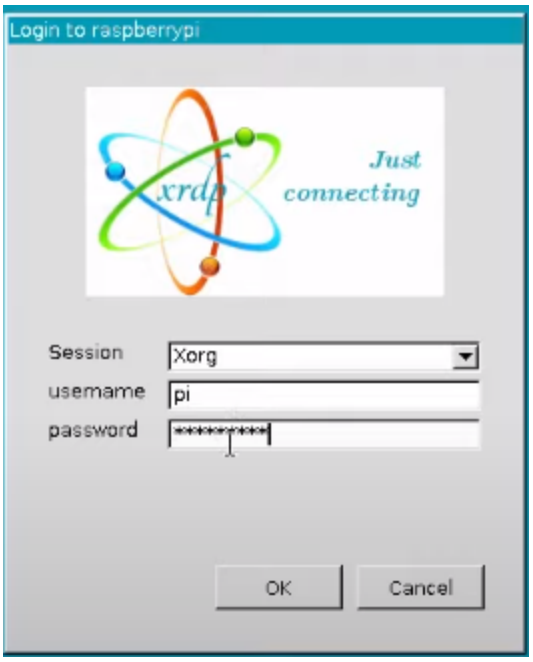
- **Step 2:** Enter ip address → **(192.168.43.30)** of the raspberry pi and Press → **Connect.**



- **Step 3:** Now we have connected to the raspberry pi.



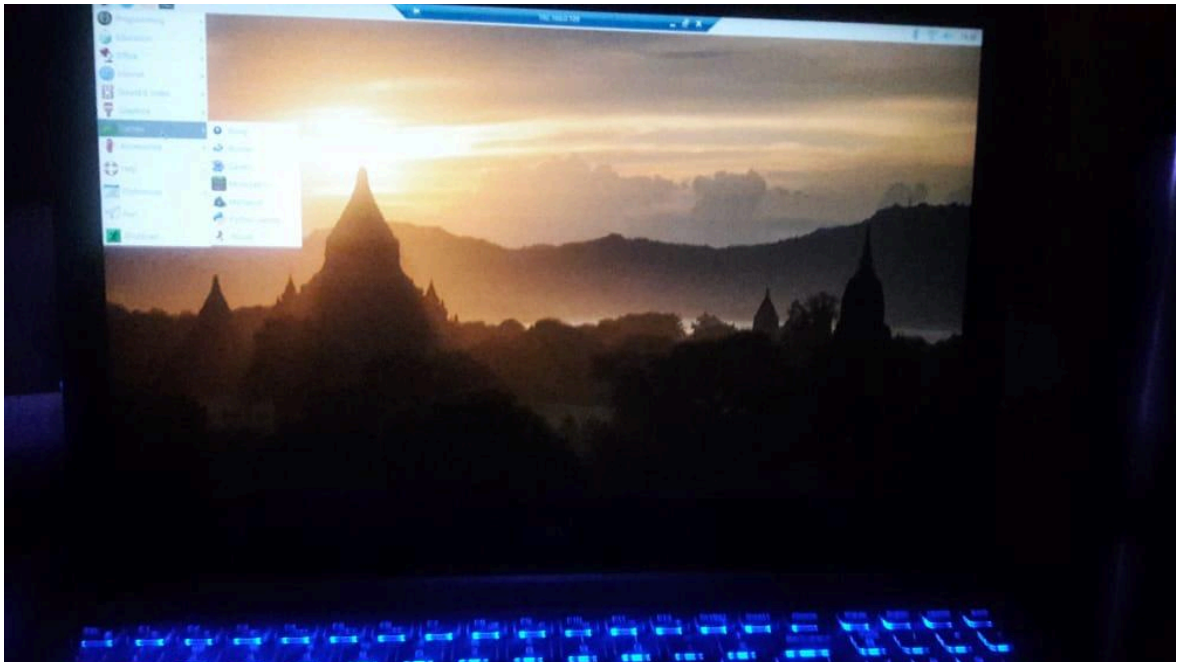
- **Step 4:** All we have to do now is to log into it and I am using the default username and password.



Type:

```
Session : Xorg
Username: pi
Password: raspberry
```

After a few seconds, the Raspberry Pi desktop appears! We can navigate around.



Linux - Raspberry Pi Documentation

- Explanation for Linux User's installation setup, and commands for getting around the Raspberry Pi. Read the doc

Resources

Rpi shop Raspberry pi 4 case Model B Acrylic case with Fan + heatsink NOT Included
Raspberry pi 4 model
Installing Raspberry Pi OS