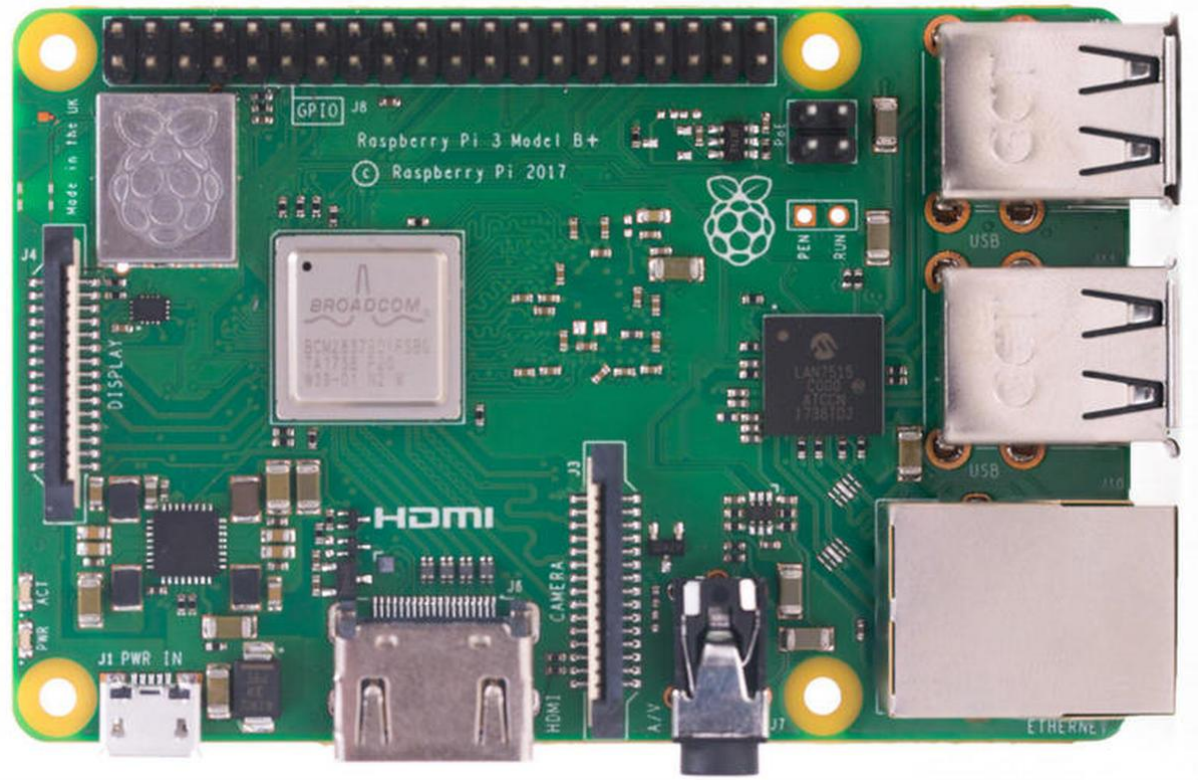
Raspberry Pi



Specifications

Processor:	Broadcom BCM2837B0, Cortex-A53 64-bit SoC @ 1.4GHz
Memory:	1GB LPDDR2 SDRAM
Connectivity:	2.4GHz and 5GHz IEEE 802.11.b/g/n/ac wireless LAN, Bluetooth 4.2, BLE Gigabit Ethernet over USB 2.0 (maximum throughput 300Mbps) 4 × USB 2.0 ports
Input power:	5V/2.5A DC via micro USB connector 5V DC via GPIO header Power over Ethernet (PoE)–enabled (requires separate PoE HAT)

Installing OS

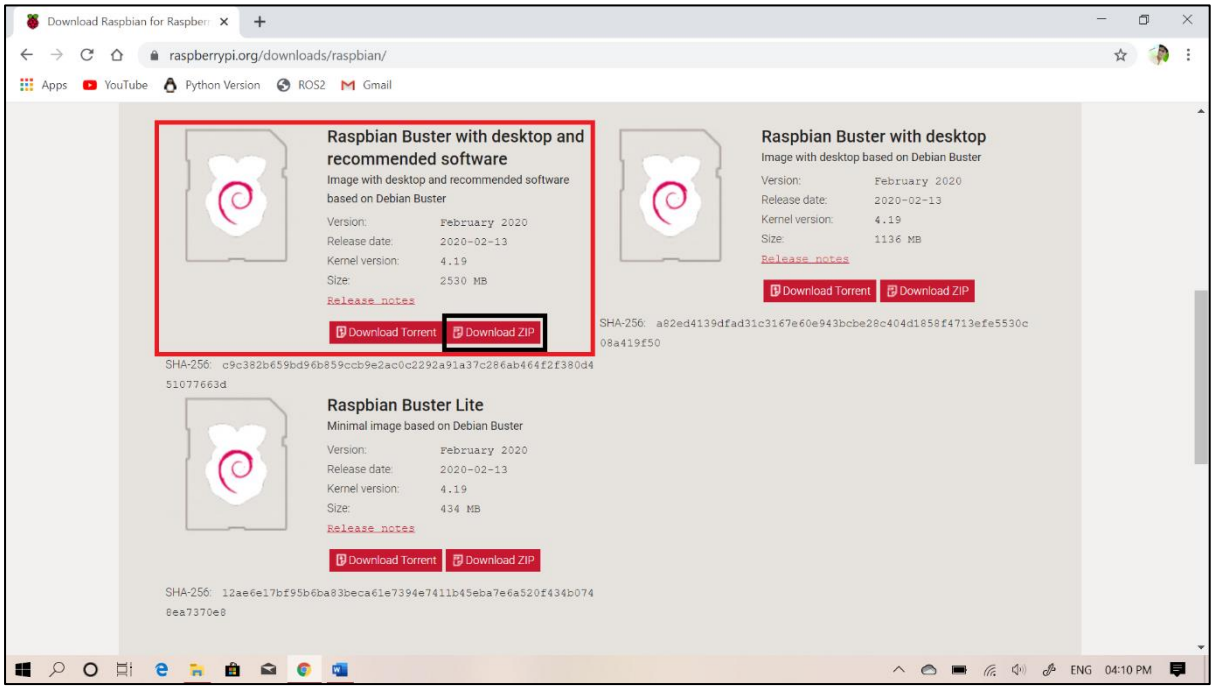
We can have two option for Operating System. So we can install OS according to our requirement.

1. Ubuntu Mate
2. Raspbian

Raspbian

Raspbian is Ubuntu based OS which official made for Raspberry pi only. Here some advantage and disadvantages of Raspbian.

Which you can download from here.
https://www.raspberrypi.org/downloads/raspbian/



Advantage

- So many packages are already installed
- Directly access the display after installation, not requirement of Monitor.
- Lite-weight OS compare to others.
- Getting more technical support.

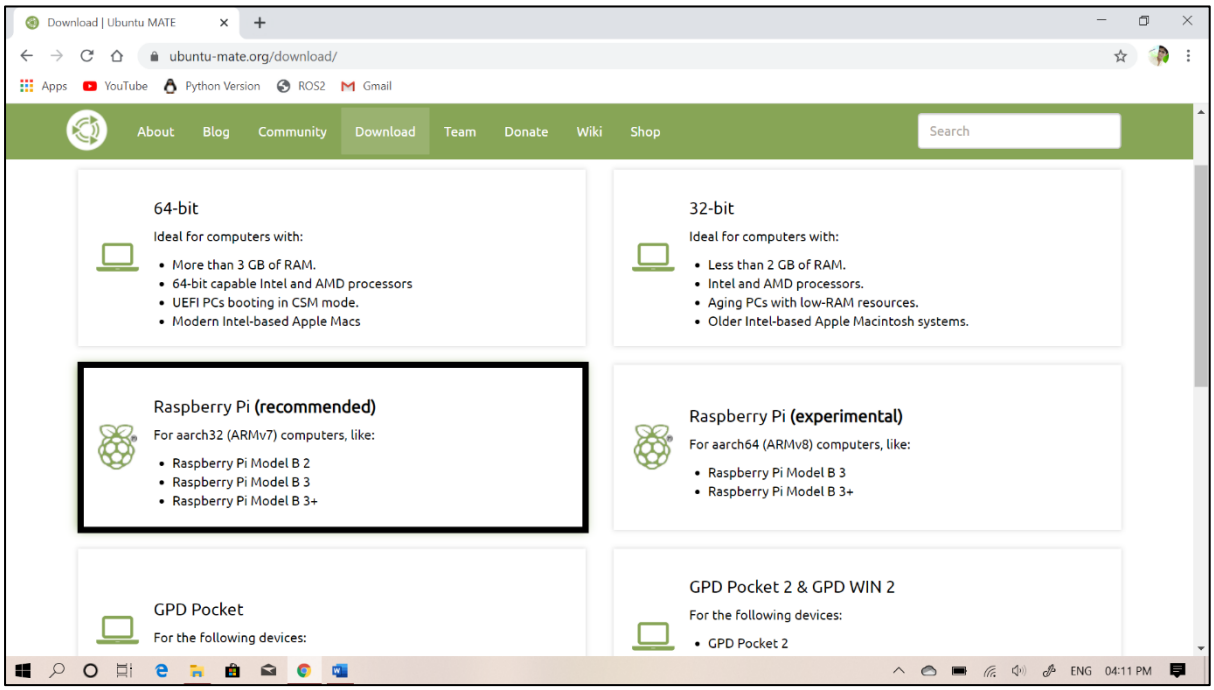
Disadvantage

- ROS not supported in Raspbian OS so we can only use for video streaming like stuff.

Ubuntu Mate

Ubuntu mate is also Ubuntu based OS. We support the raspberry pi architecture. Here some advantage and disadvantage of Ubuntu Mate.

Which you can download from here.
https://ubuntu-mate.org/raspberry-pi/



Advantages

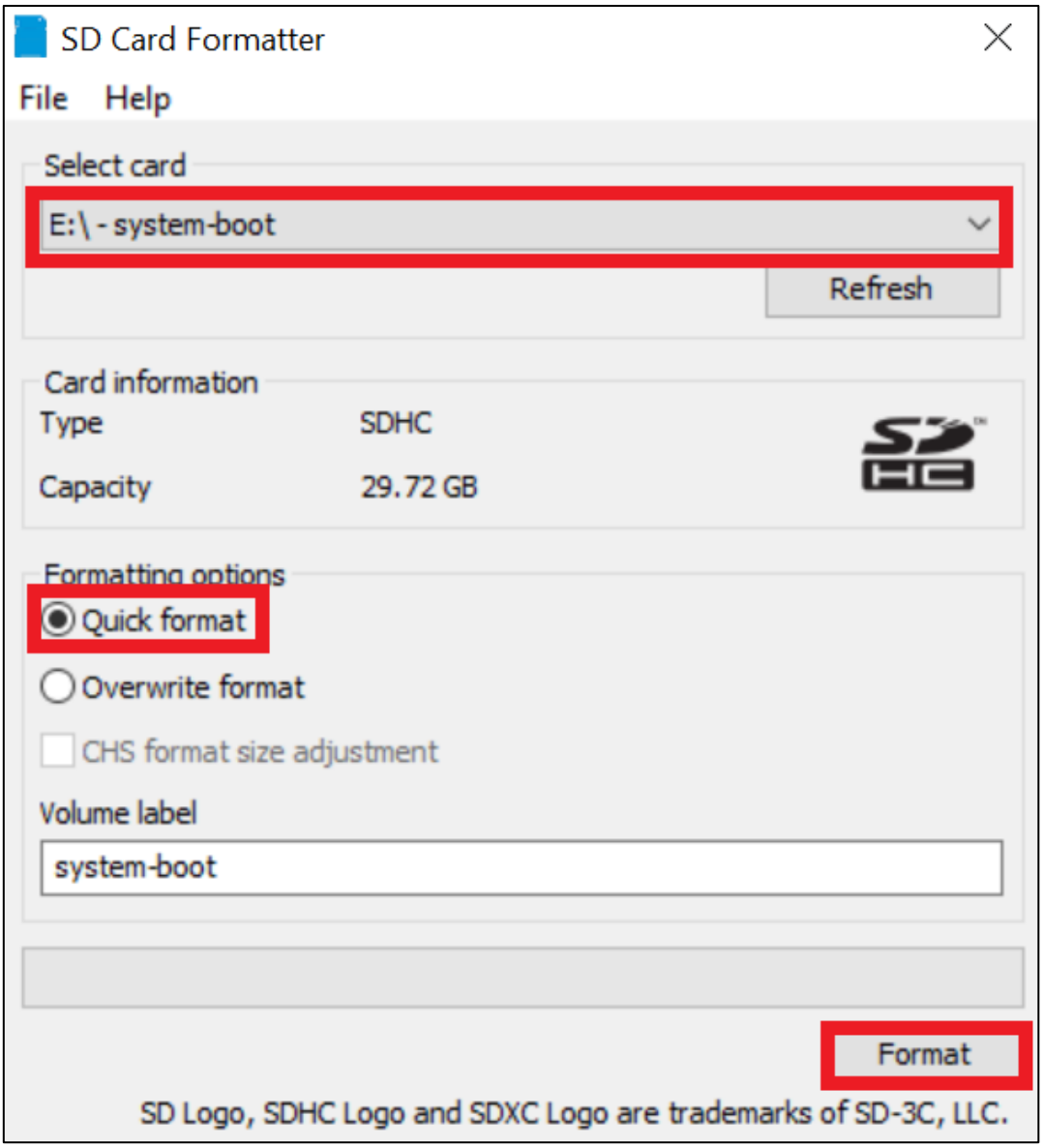
- ROS support the Ubuntu Mate.

Disadvantage

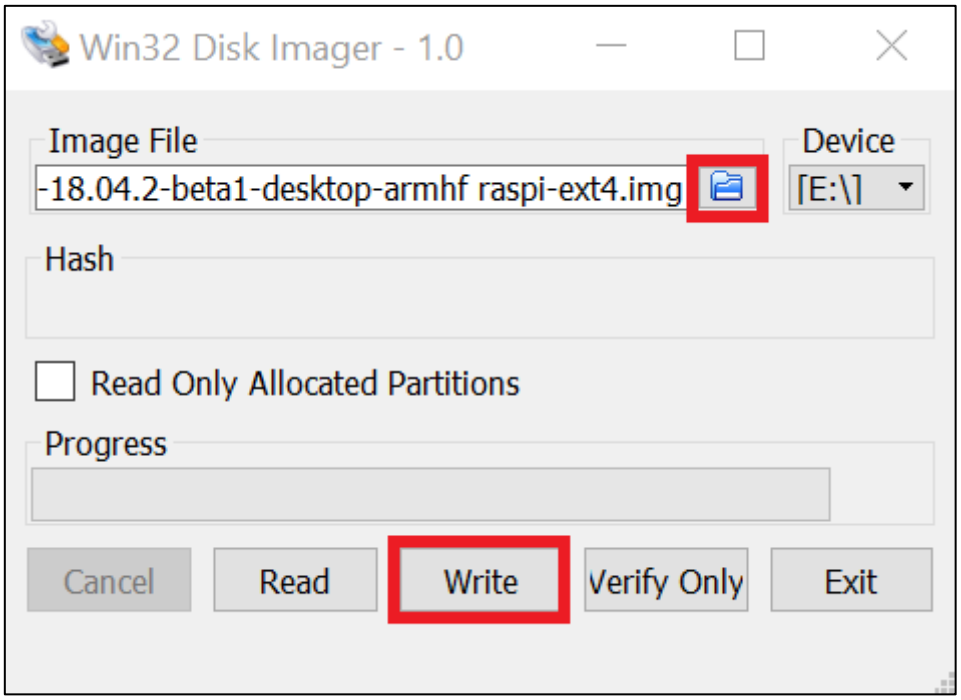
- Requirement of HDMI display for configuration after installation.

Setting Up the Raspberry Pi 3

1. Download the OS according to your choice.
2. Download SD card Formatter from here https://www.sdcard.org/downloads/formatter_4/eula_windows/index.html
3. Download win32diskimager from here https://sourceforge.net/projects/win32diskimager/
4. Download putty from here https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html
5. Mount the SD card into the card reader and insert it to computer. Open SD card formatter and select the card and click “format” button. (Recommend to use memory card of class 10 or A and size 32gb or more than 32gb for batter performance)



6. Now extract the Downloaded OS and get .img file
7. Open win32diskimager and browse for the extracted .img file and set the destination device for the SD card and click “write” button.

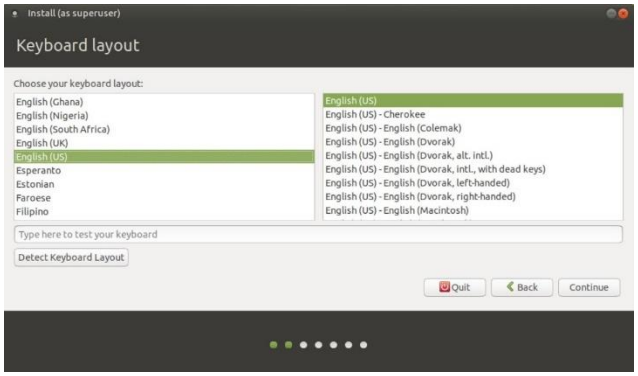


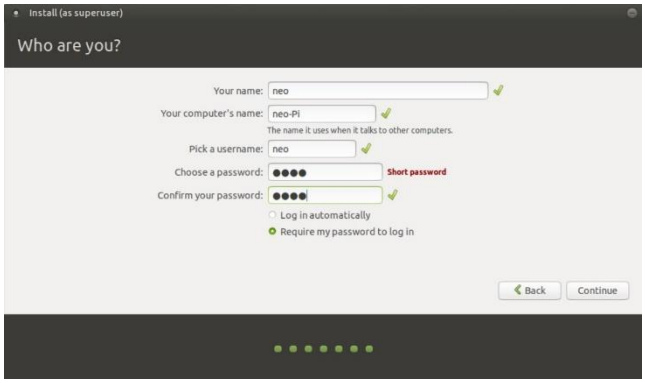
For Raspbian OS

8. Now open windows command prompt and type the following command
   echo>E:\ssh
   here E = drive for SD card (in my case, this can be different for different users). This creates a ssh file in the SD card. If we don’t do this would get an error while using it from putty later on
9. Eject the SD card and insert it into the Raspberry pi.

Ubuntu Mate

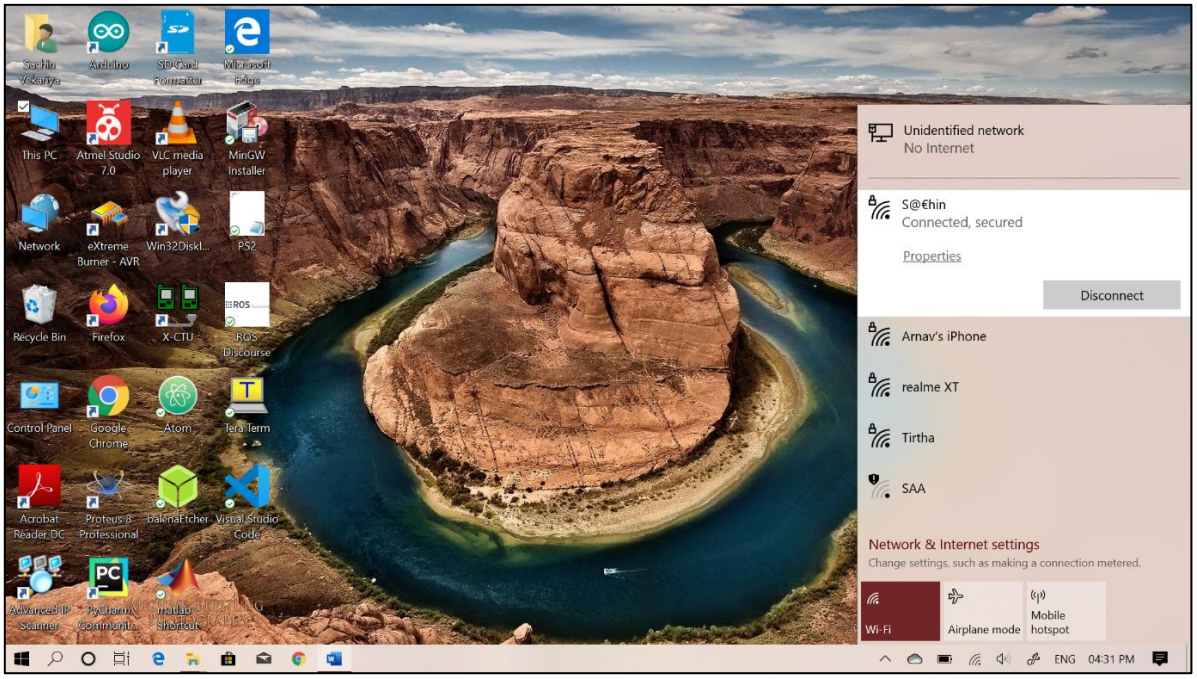
10. Eject the memory card Insert the in raspberry pi and power on the raspberry pi.
11. Connect the Monitor using HDMI cable and mouse and keyboard.
12. Configure the Ubuntu mate OS like language, Country, username and password like things.



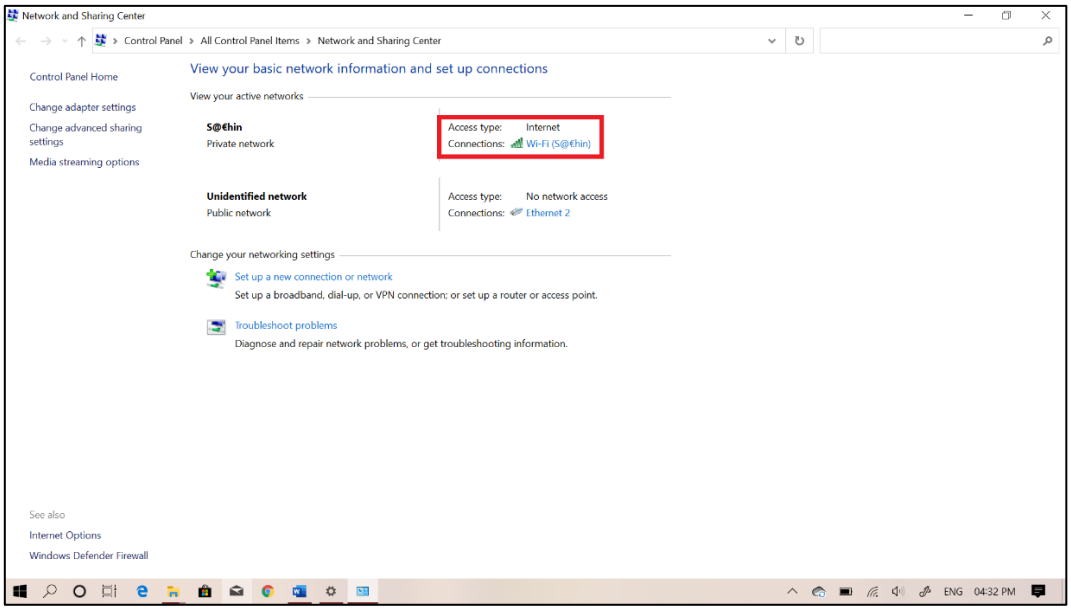


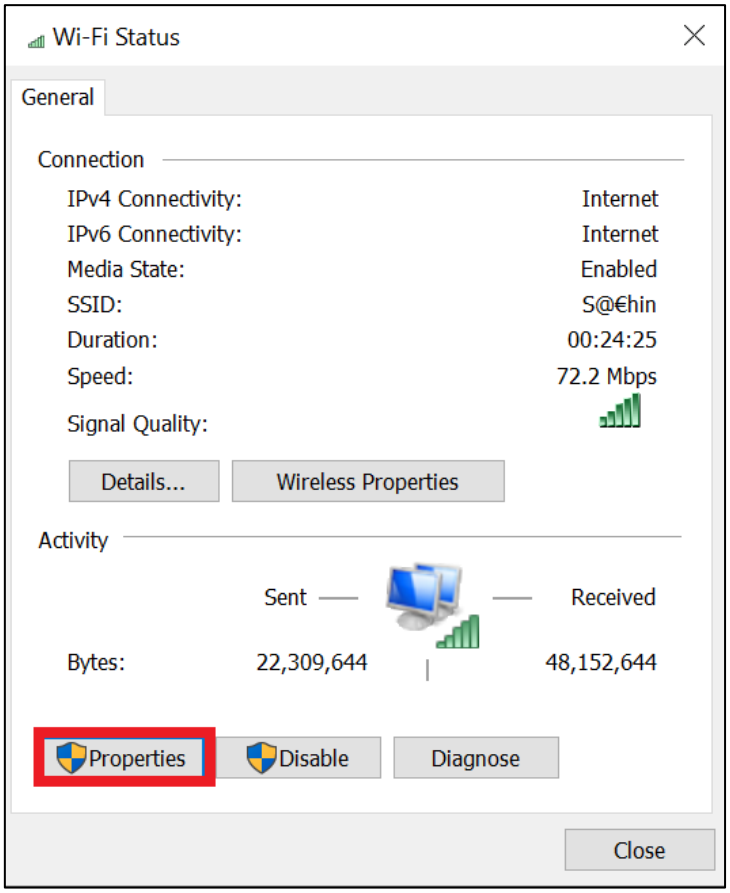
13. Power off the Raspberry pi.

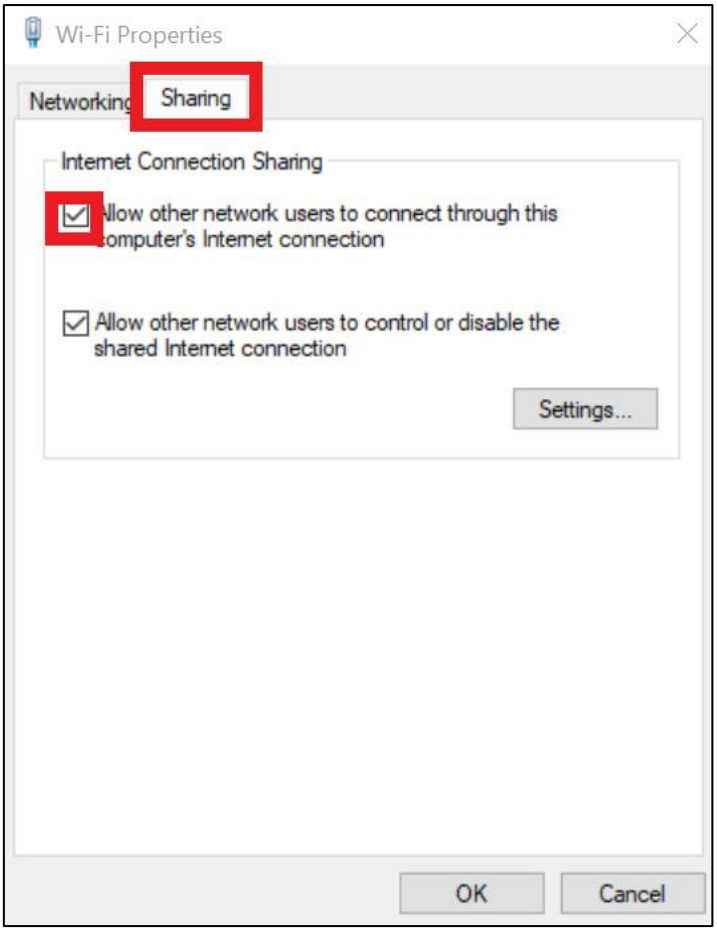
14. Connect your pc with WIFI with any connection.



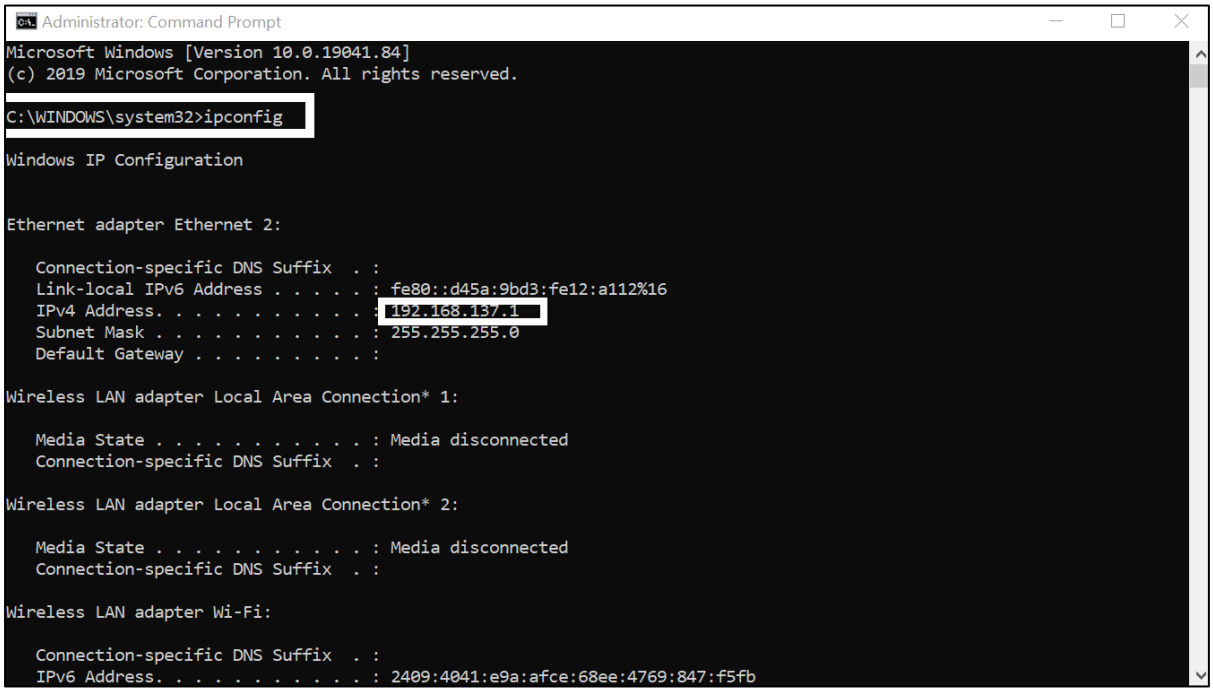
15. Connect the raspberry pi with your pc through LAN cable and then power on the Raspberry pi.
16. Go to network and sharing centre and click on your wifi name. Open the properties tab and go on Sharing option and enable the “Allow other network users to connect through this computer’s internet Connection” and if is there any option of Home networking connection then select the Ethernet.



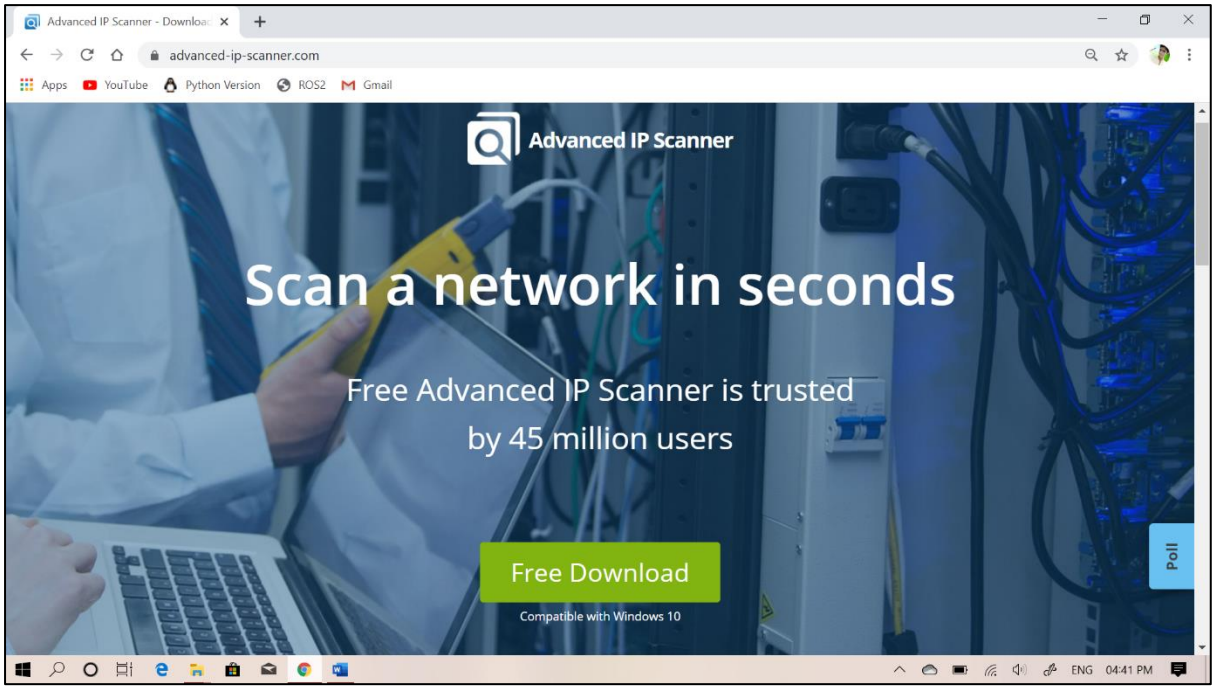




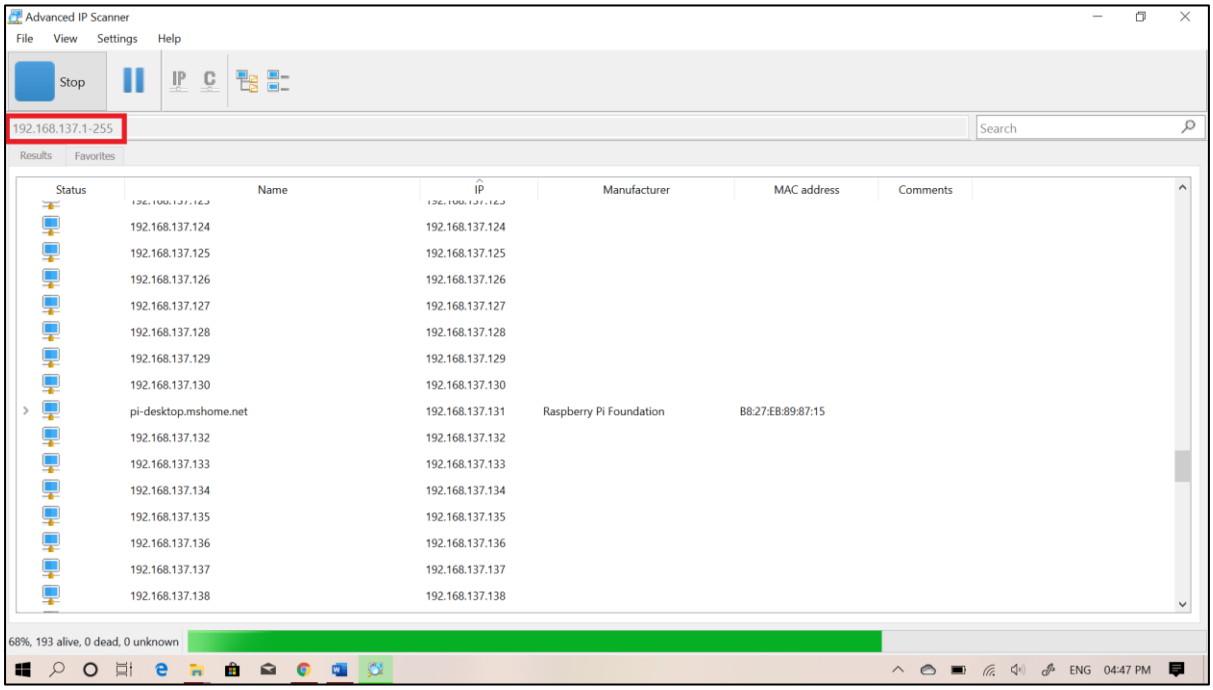
17. Open command prompt and write “ipconfig” which show the IP of Ethernet port. (Example. 192.168.137.1)



18. Download and install the Advance Ip Scanner
    https://www.advanced-ip-scanner.com/



19. Open the Advance Ip scanner and search for the range 192.168.137.1-255. It shows the live and dead IP between this range. And get the IP of Raspberry pi.



20. Open the Putty

    Set parameter

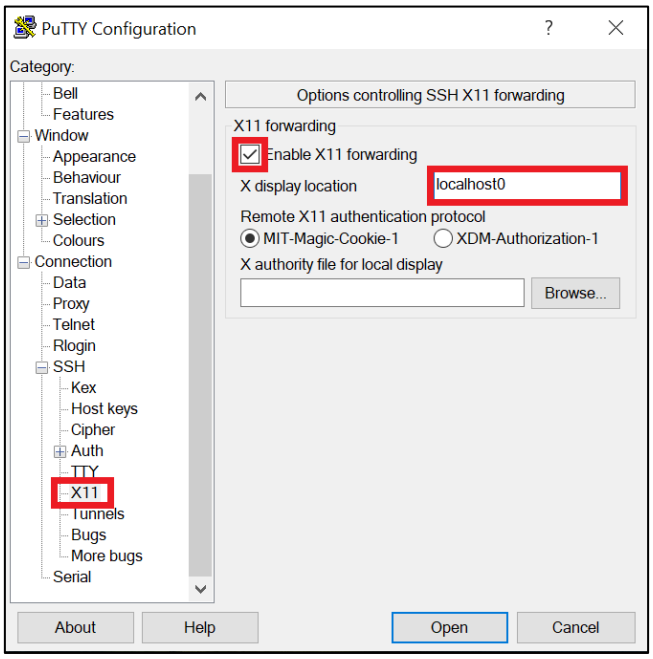
    I. Hostname = Provide the IP of Raspberry Pi

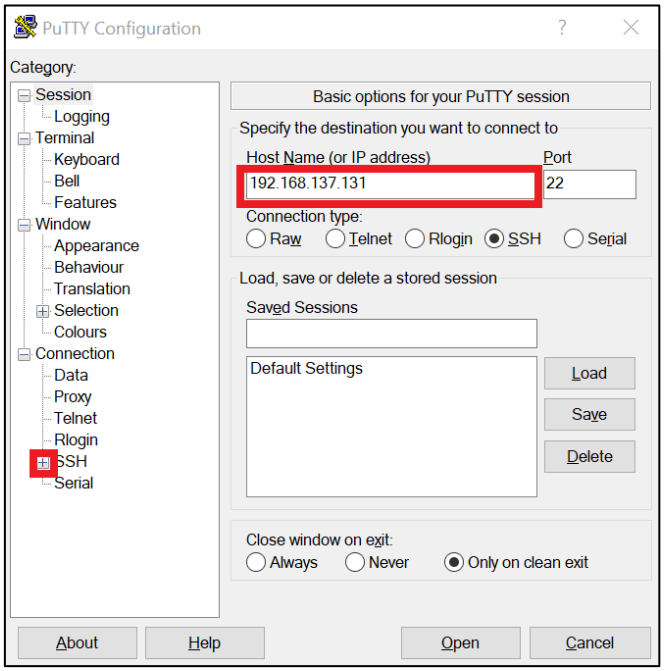
    II. SSH -> X11

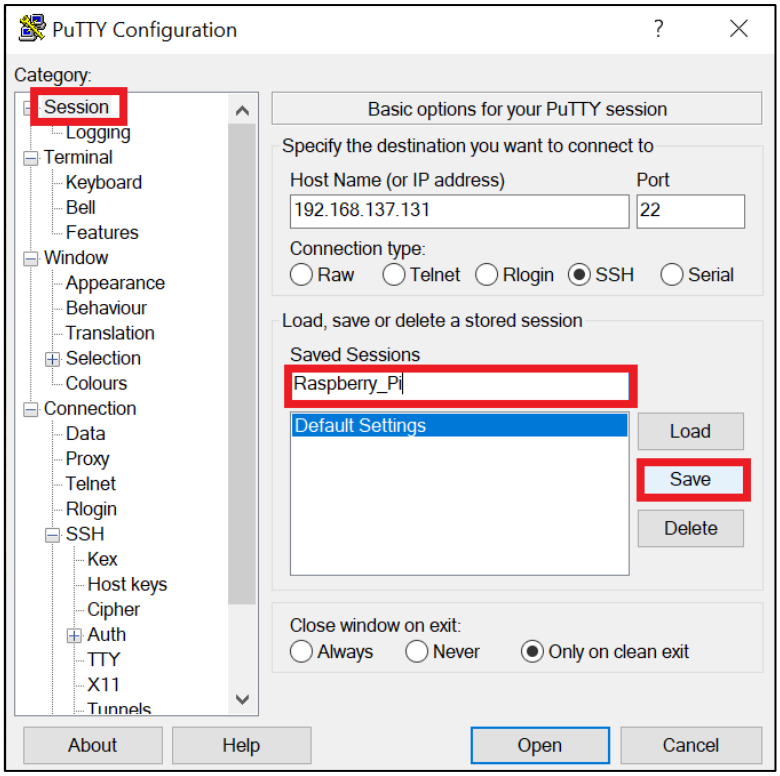
        Check the enable X11 forwarding

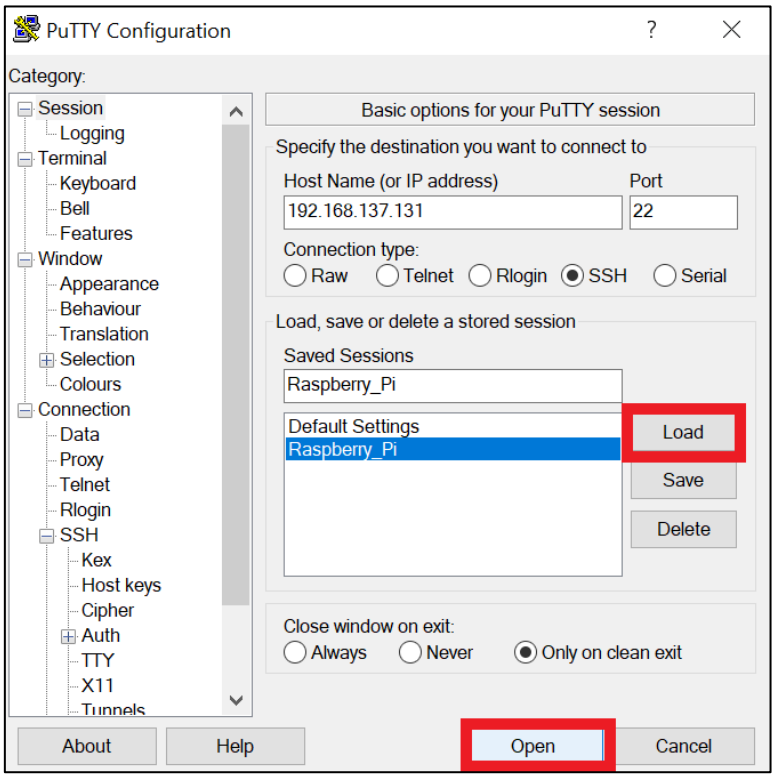
        X display location = localhost0

    Press Open Button.






PuTTY Configuration
Category:
Session
Logging
Terminal
Keyboard
Bell
Features
Window
Appearance
Behaviour
Translation
Selection
Colours
Connection
Data
Proxy
Telnet
Rlogin
SSH
Kex
Host keys
Cipher
Auth
TTY
X11
Tunnels
Basic options for your PuTTY session
Specify the destination you want to connect to
Host Name (or IP address)
Port
192.168.137.131
22
Connection type:
Raw
Telnet
Rlogin
SSH
Serial
Load, save or delete a stored session
Saved Sessions
Raspberry_Pi
Default Settings
Load
Save
Delete
Close window on exit:
Always
Never
Only on clean exit
About
Help
Open
Cancel


PuTTY Configuration
Category:
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Logging
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Features
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Save
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About
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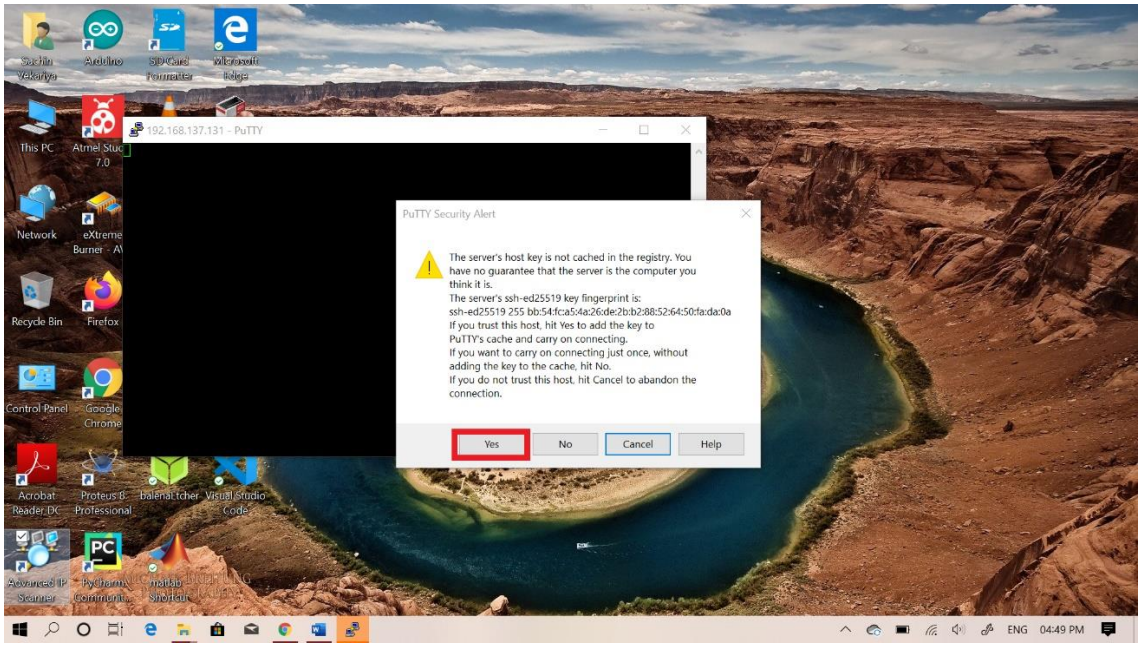
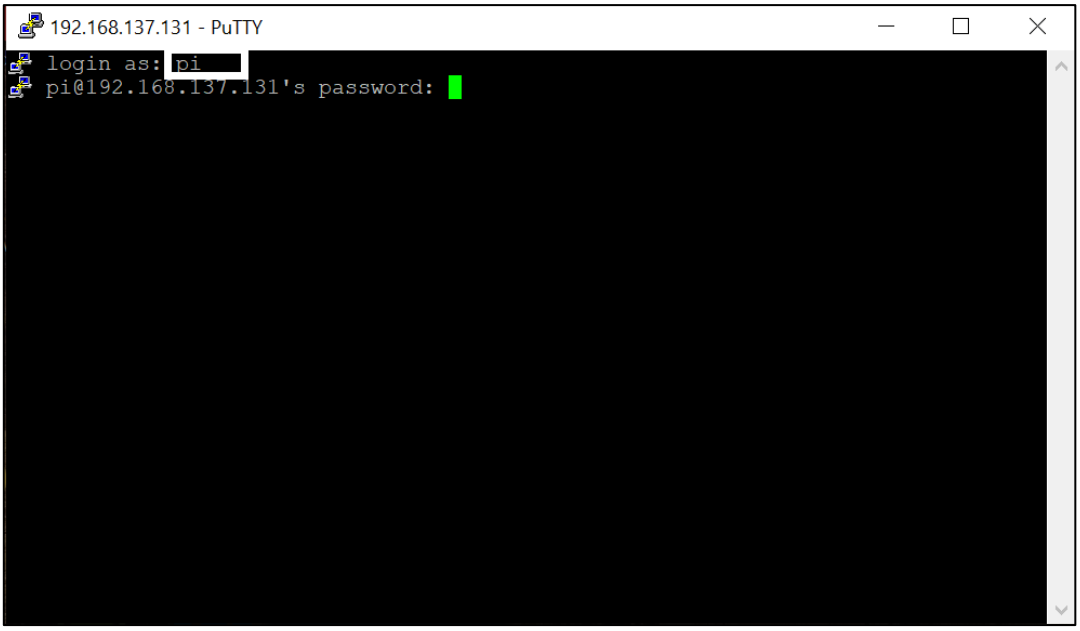
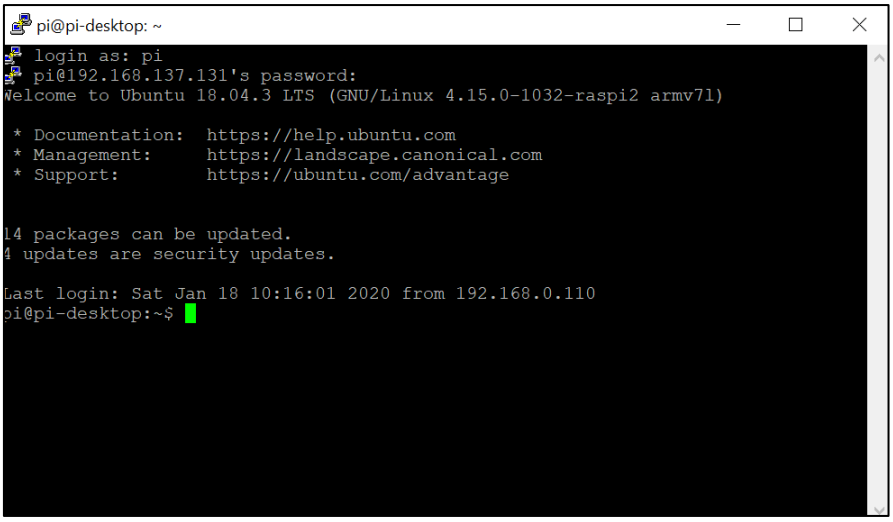


21. After that the putty session will be opened. Provide username and password which you created in case of Ubuntu mate and default username and password for Raspbian is pi and raspberry respectively.



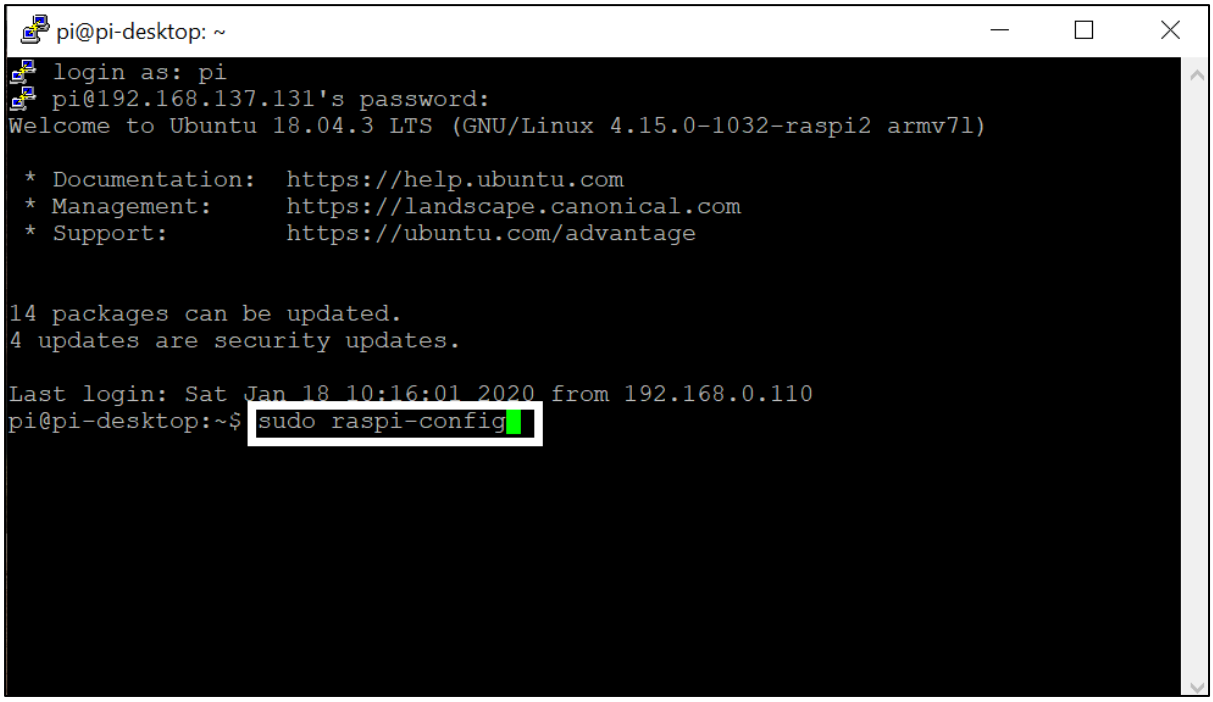


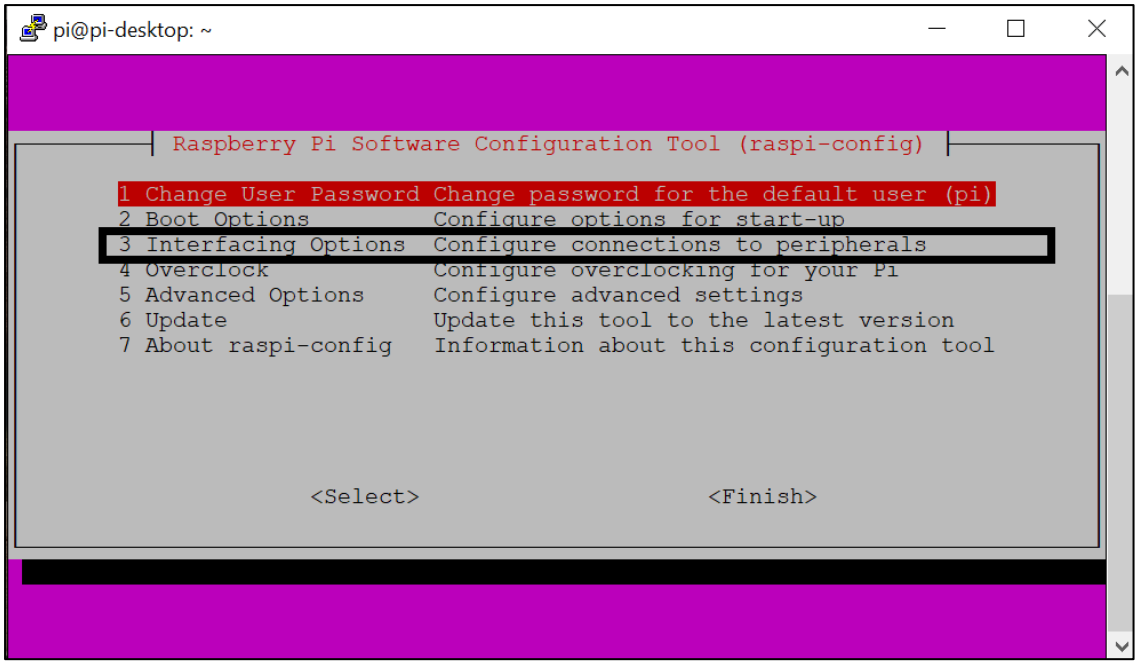
22. Where putty provide only terminal access of raspberry pi. If we want to access GUI (Desktop view), we need to install VNCServer (VNC) or xrdp (RDP) .
23. We need to enable VNC in raspberry pi (If case of Raspbian). For that open Putty and write cmd.

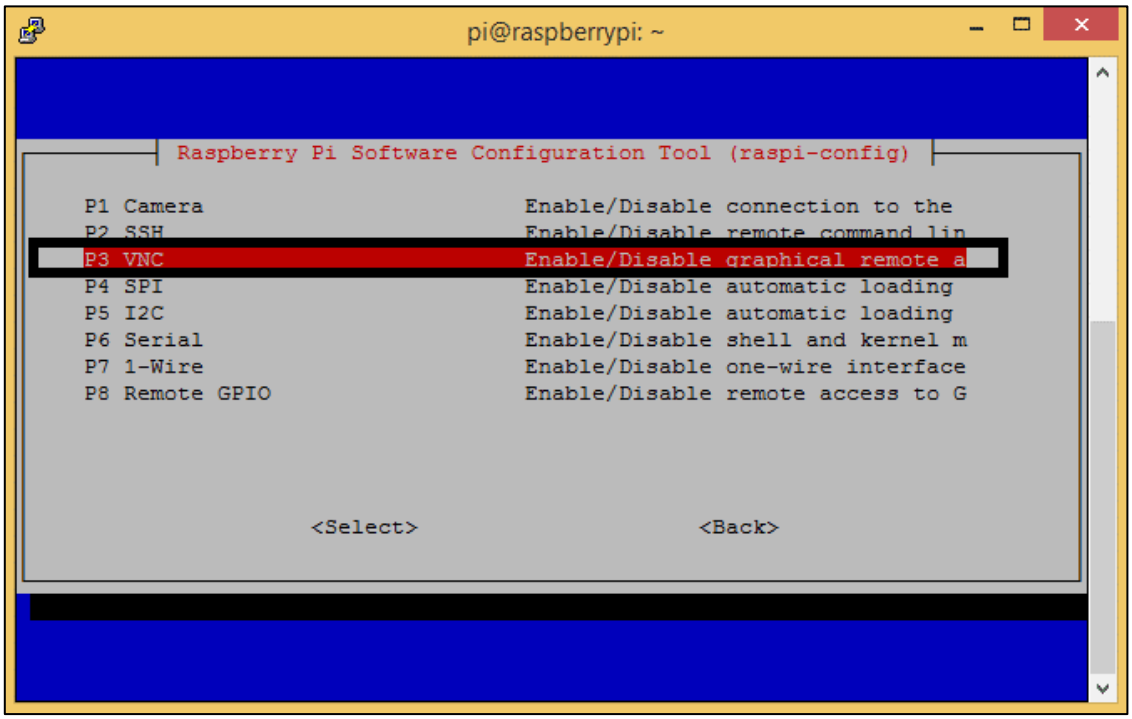
sudo raspi-config

Select Interfacing Options

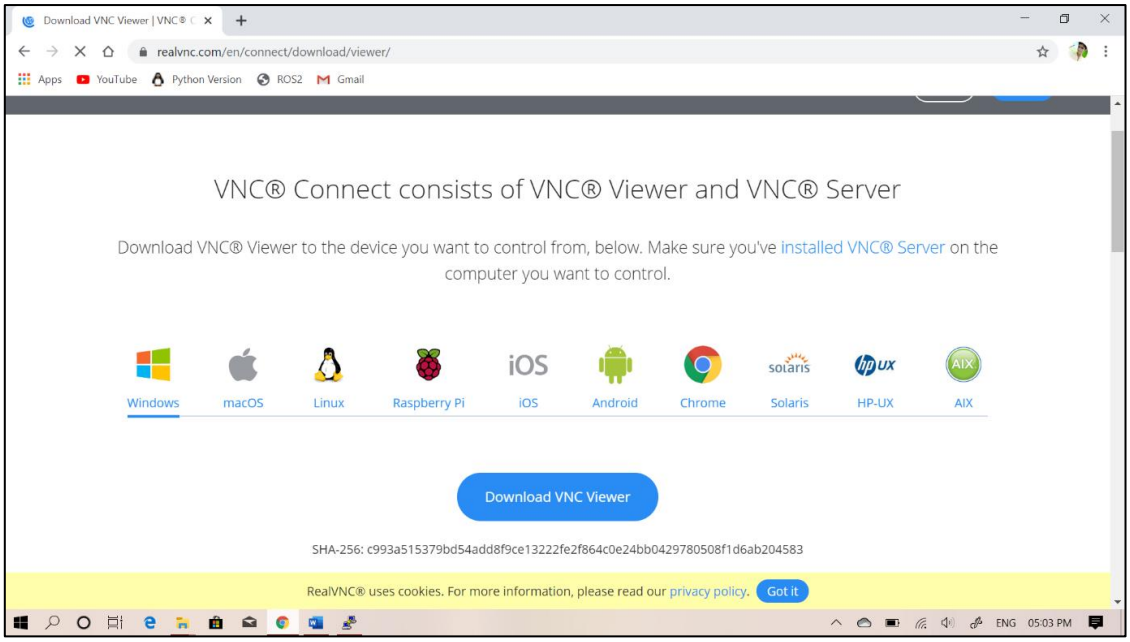
Select VNC



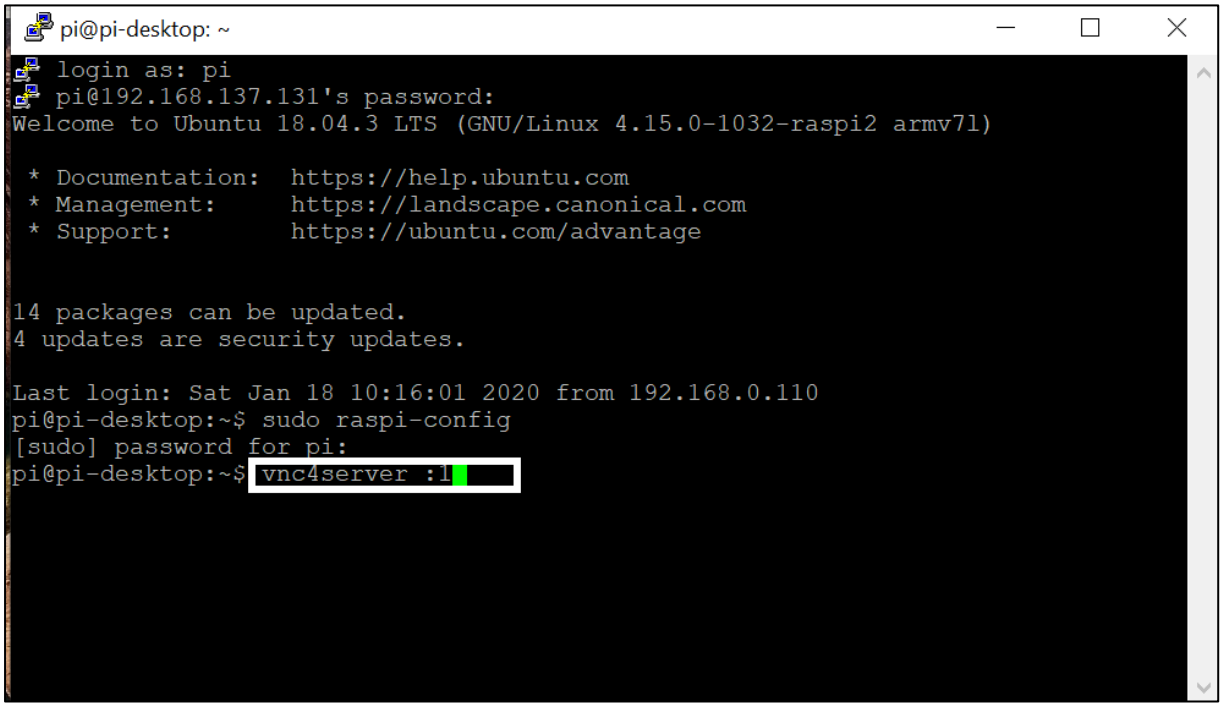


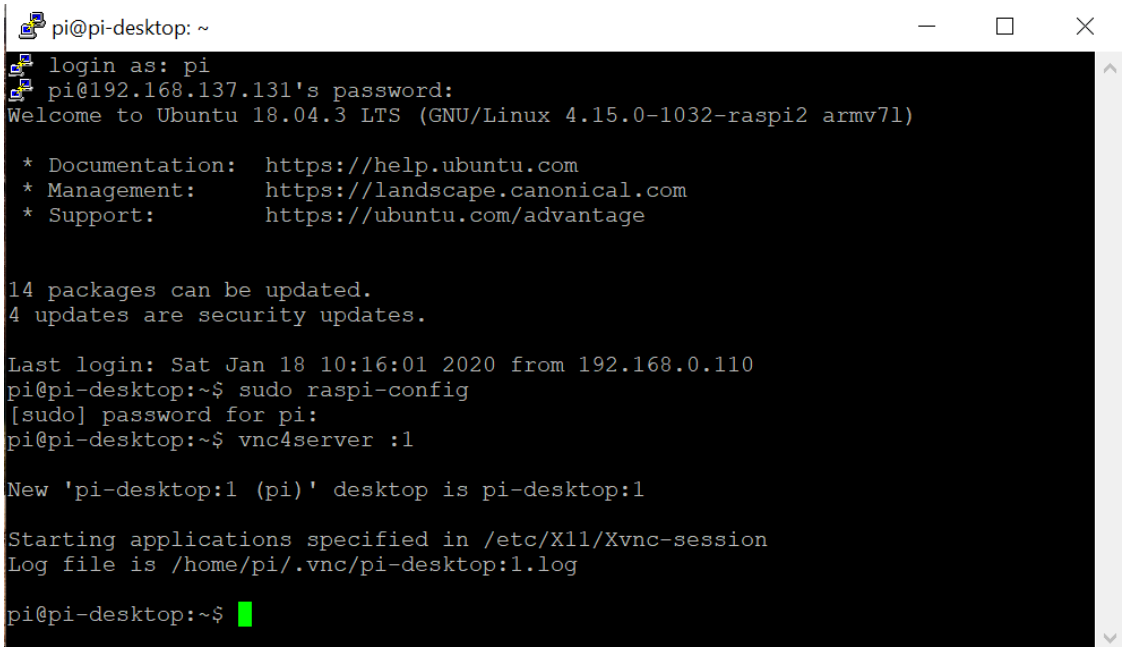


24. In Raspbian OS VNCServer is already installed and In case of ubuntu mate we need to install it.
    Follow the link for Installing VNC in raspberry pi
    https://www.raspberrypi.org/documentation/remote-access/vnc/
25. Download and Install VNC Viewer in Windows
    https://www.realvnc.com/en/connect/download/viewer/

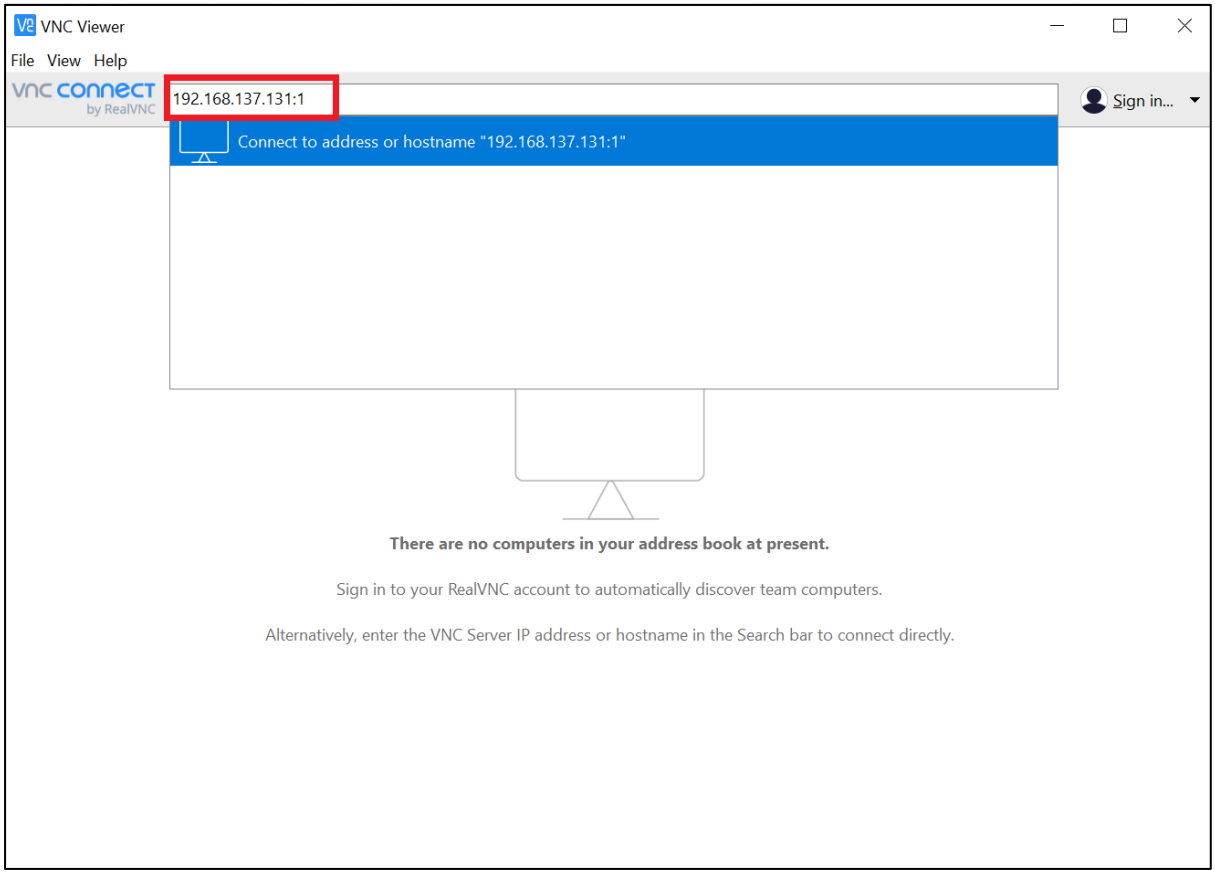


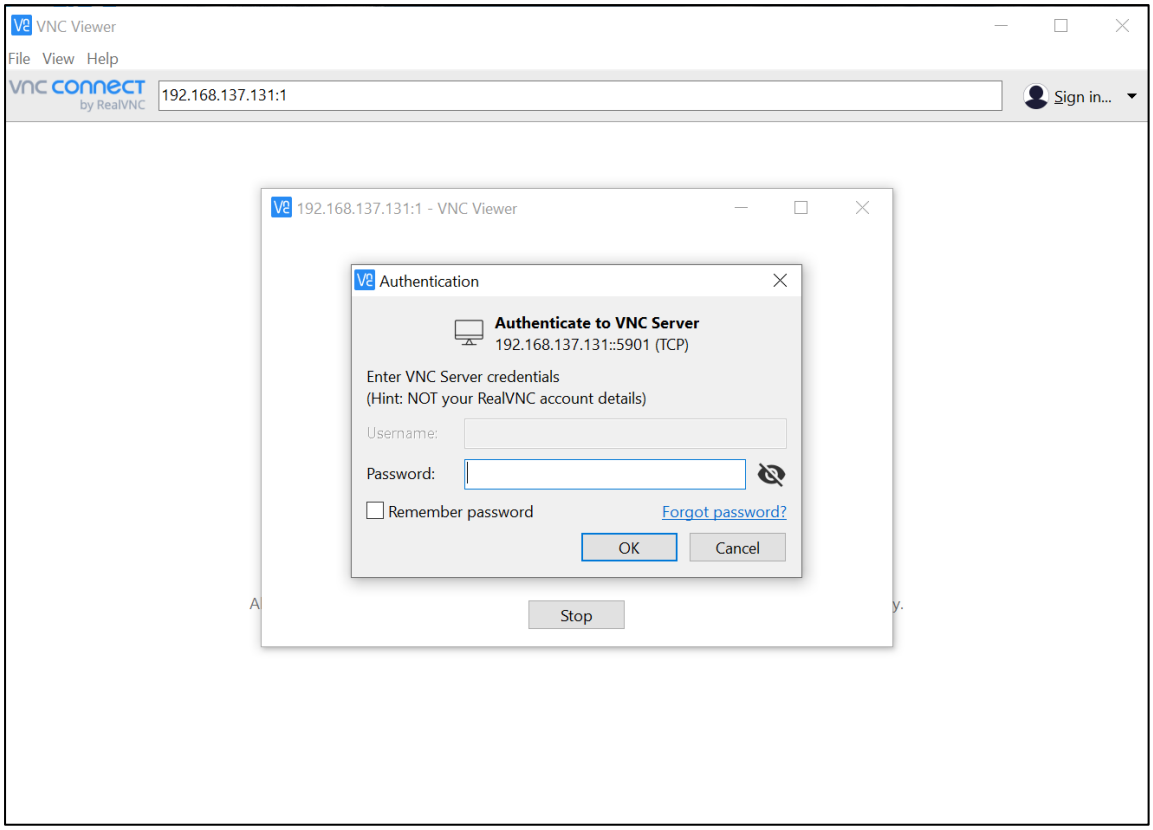
26. Open putty and write cmd
    vncserver :1





27. Open VNC viewer and Enter IP address as = <Raspberry_pi_IP>: 1. And password.

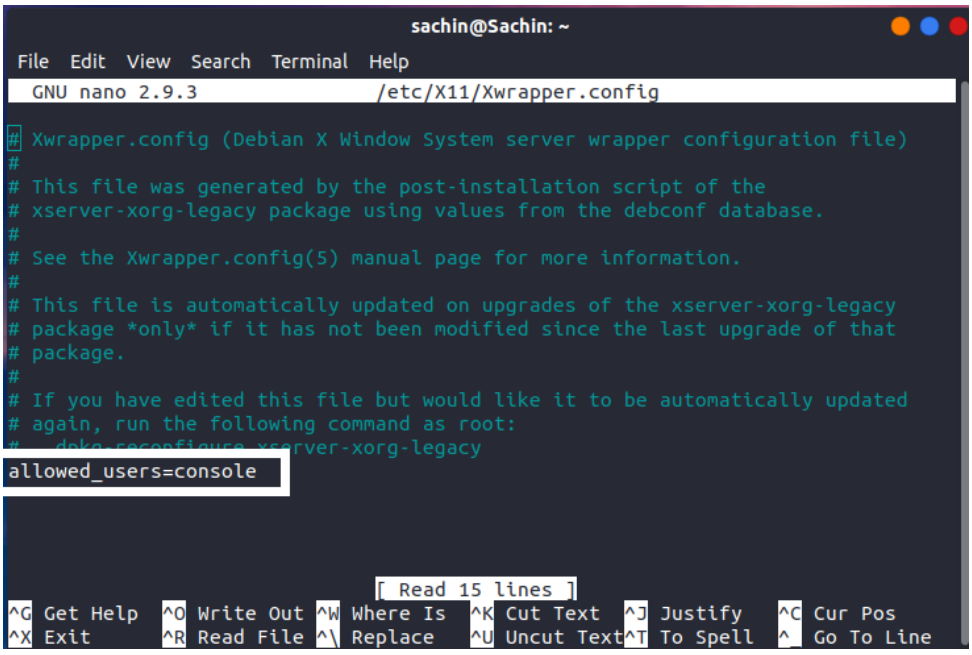


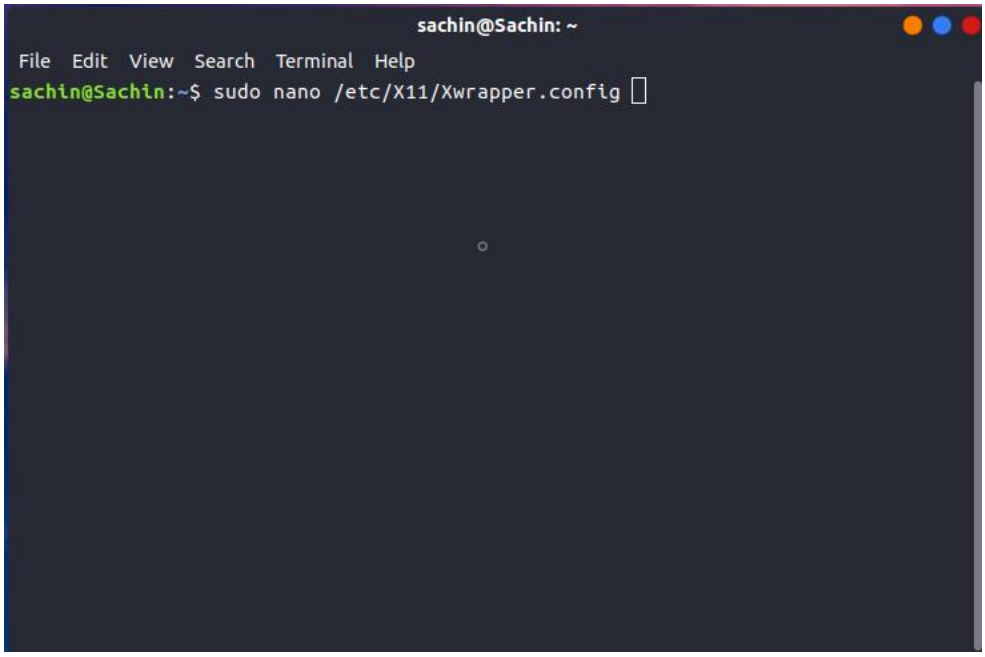

VNC Viewer
File View Help
vnc connect by RealVNC
192.168.137.131:1
Sign in...
192.168.137.131:1 - VNC Viewer
Authentication
Authenticate to VNC Server
192.168.137.131::5901 (TCP)
Enter VNC Server credentials
(Hint: NOT your RealVNC account details)
Username:
Password:
Remember password
Forgot password?
OK
Cancel
Stop

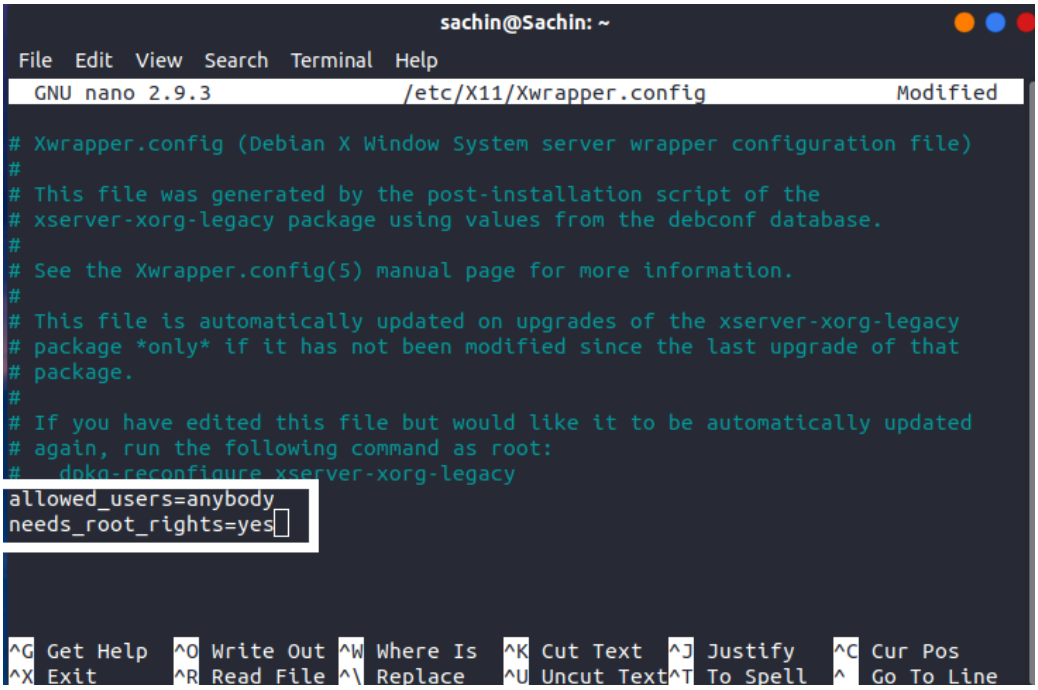

192.168.137.131:1 (pi-desktop:1 (pi)) - VNC Viewer

Setup Raspberry Pi in Ubuntu 18.04

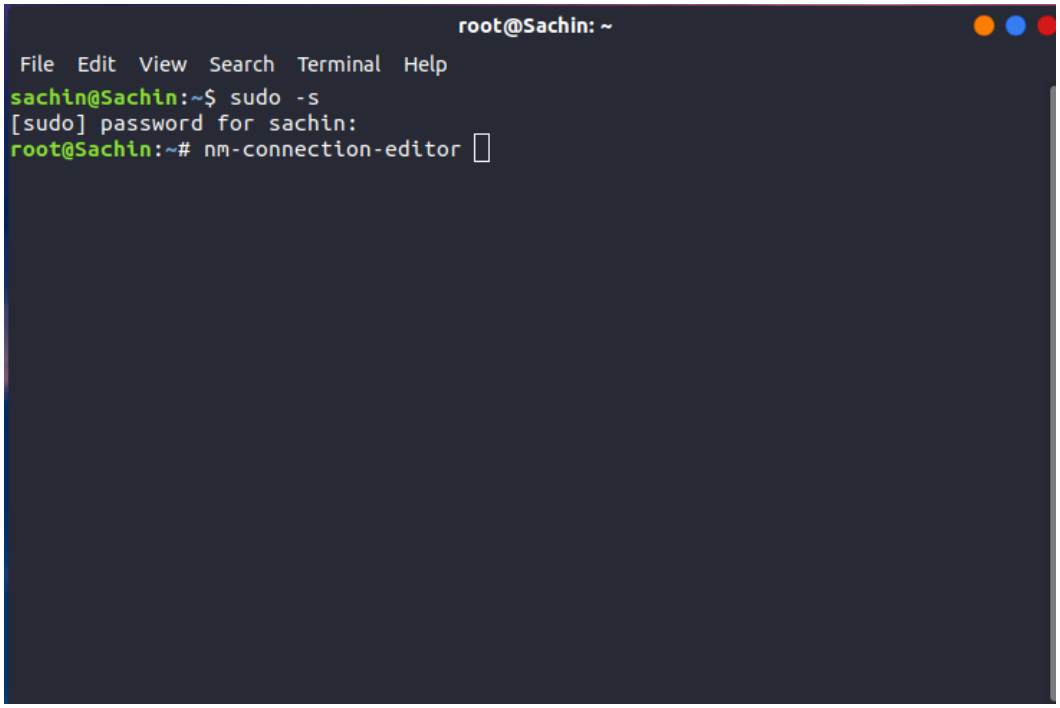
1. Insert already burned memory card in raspberry pi.
2. Power on the raspberry pi and connect raspberry pi to laptop with Ethernet Cable.
3. Configure the Xwrapper.config file.

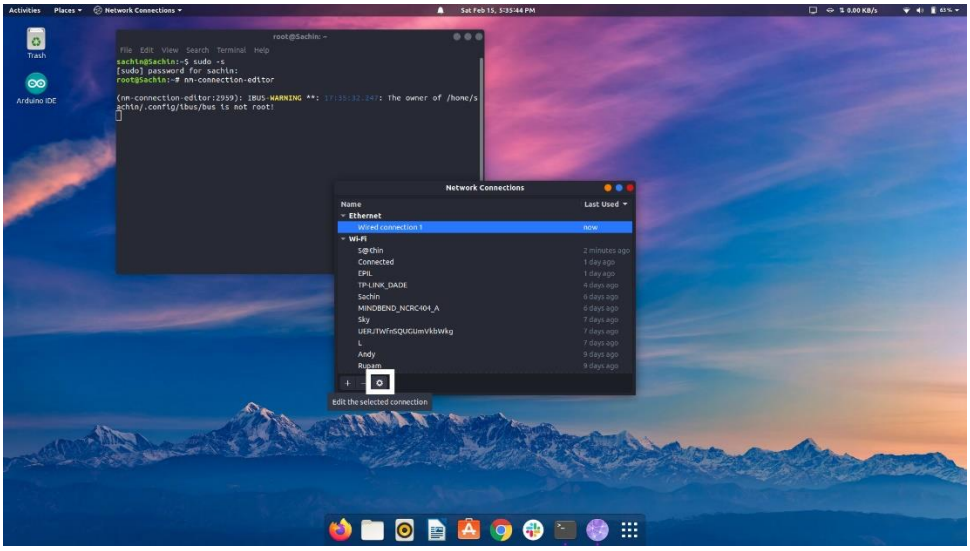


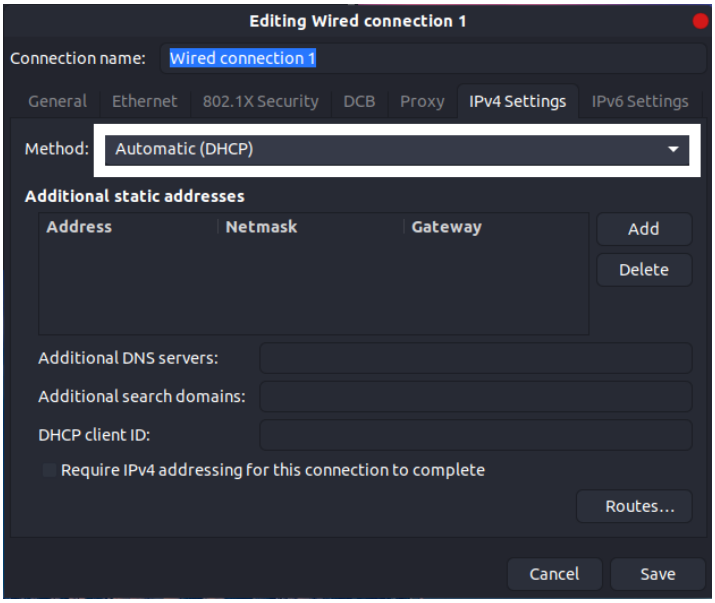


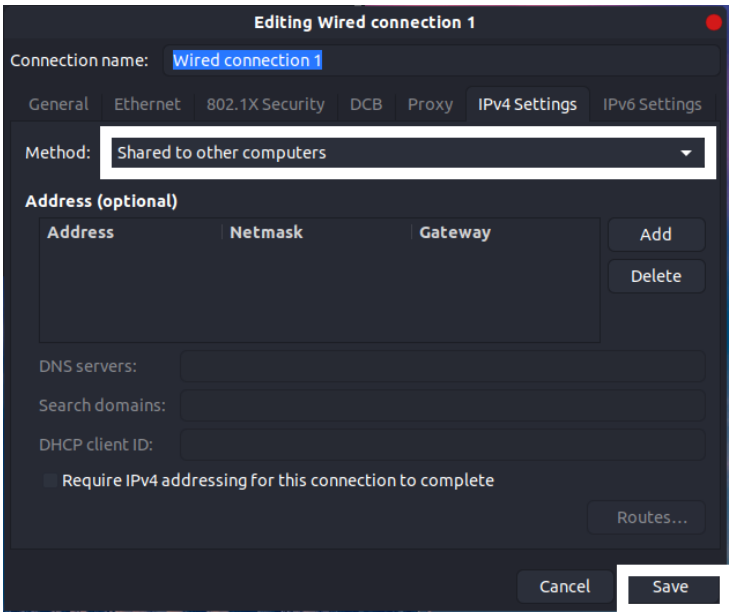


4. Turn On the Network sharing with other PC.

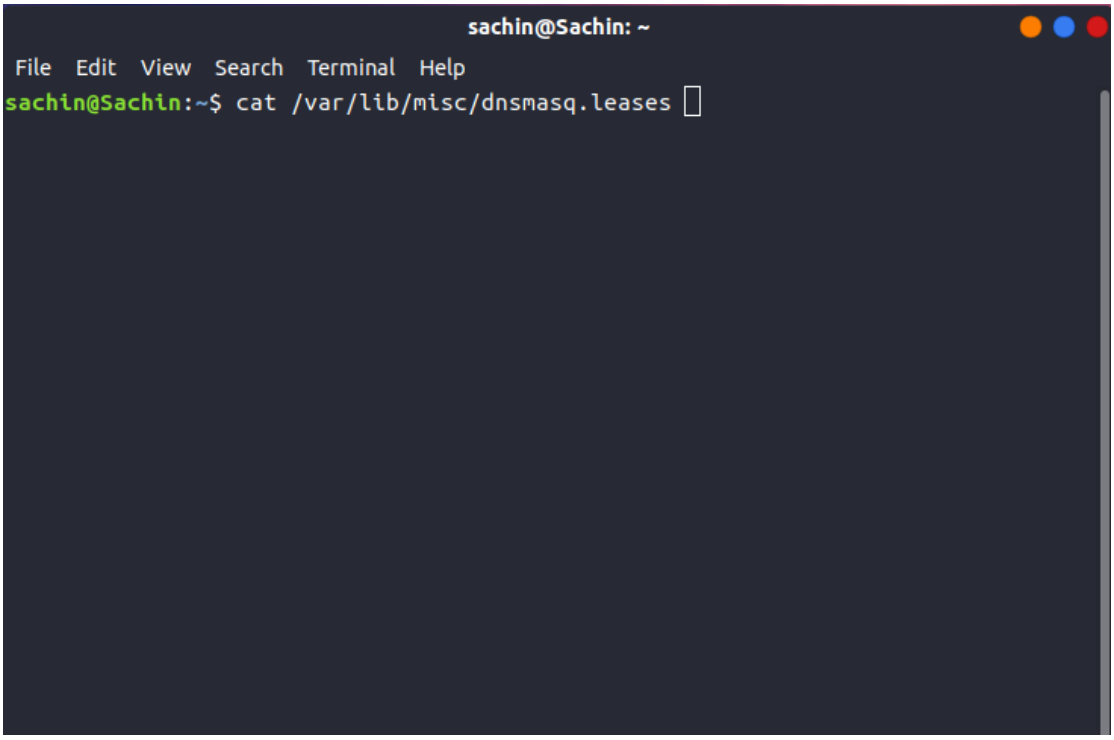


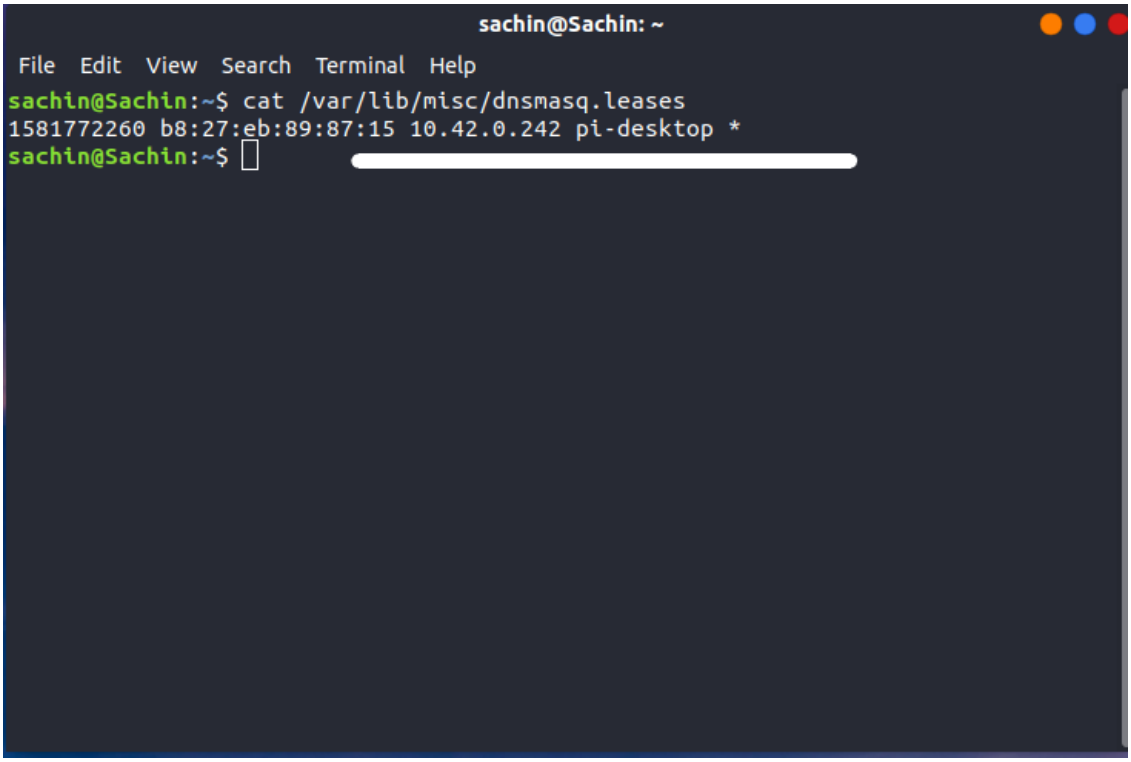

Activities
Places
Network Connections
Trash
Arduino IDE
root@Sachin: ~
File Edit View Search Terminal Help
sachin@Sachin:~$ sudo -s
[sudo] password for sachin:
root@Sachin:~# nm-connection-editor
(nm-connection-editor:2959): IBUS-WARNING **: 17:35:32.247: The owner of /home/sachin/.config/ibus/bus is not root!
Network Connections
Name
Last Used
Ethernet
Wired connection 1
now
Wi-Fi
S@chin
Connected
EPIL
TP-LINK_DADE
Sachin
MINDBEND_NCRC404_A
Sky
Andy
Rupam
Edit the selected connection


Editing Wired connection 1
Connection name:
Wired connection 1
General
Ethernet
802.1X Security
DCB
Proxy
IPv4 Settings
IPv6 Settings
Method:
Automatic (DHCP)
Additional static addresses
Address
Netmask
Gateway
Add
Delete
Additional DNS servers:
Additional search domains:
DHCP client ID:
Require IPv4 addressing for this connection to complete
Routes...
Cancel
Save

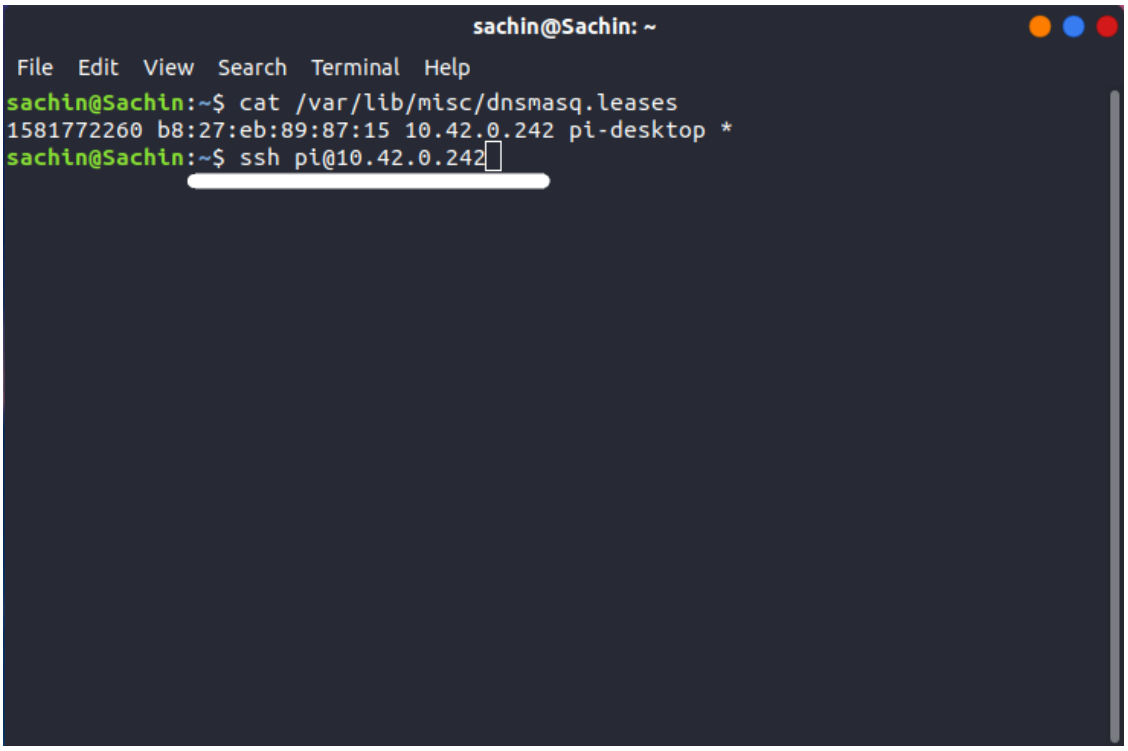

Editing Wired connection 1
Connection name:
Wired connection 1
General
Ethernet
802.1X Security
DCB
Proxy
IPv4 Settings
IPv6 Settings
Method:
Shared to other computers
Address (optional)
Address
Netmask
Gateway
Add
Delete
DNS servers:
Search domains:
DHCP client ID:
Require IPv4 addressing for this connection to complete
Routes...
Cancel
Save

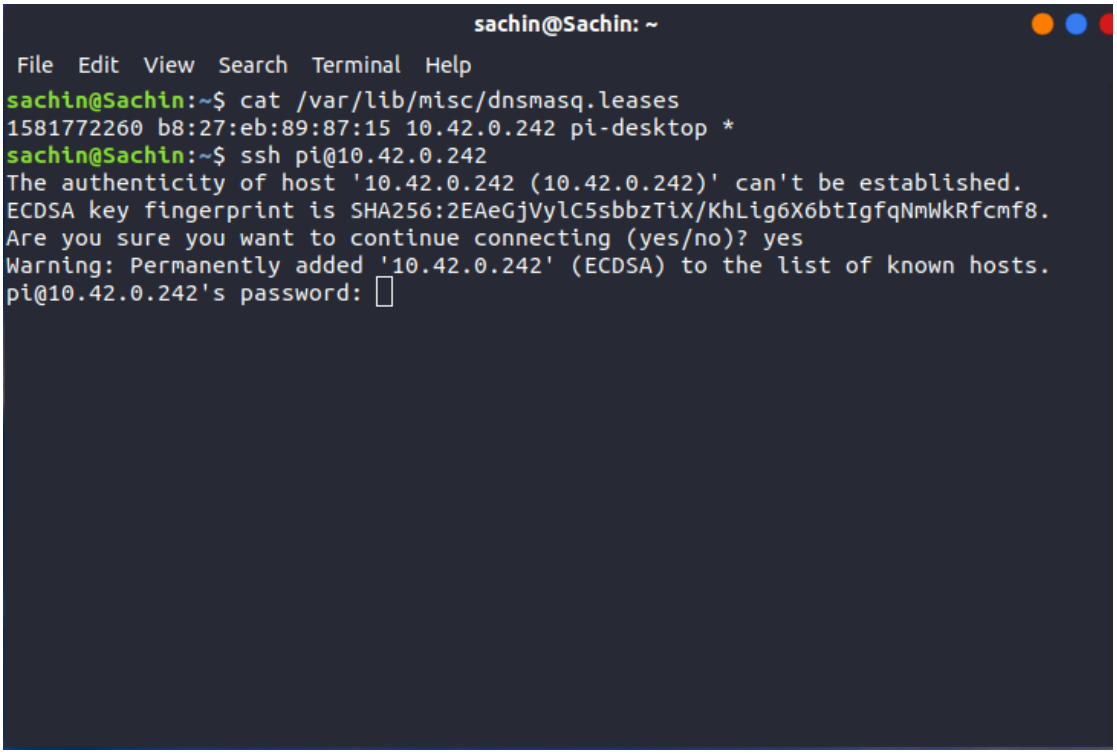
5. To get the IP of Raspberry Pi write the following cmd.

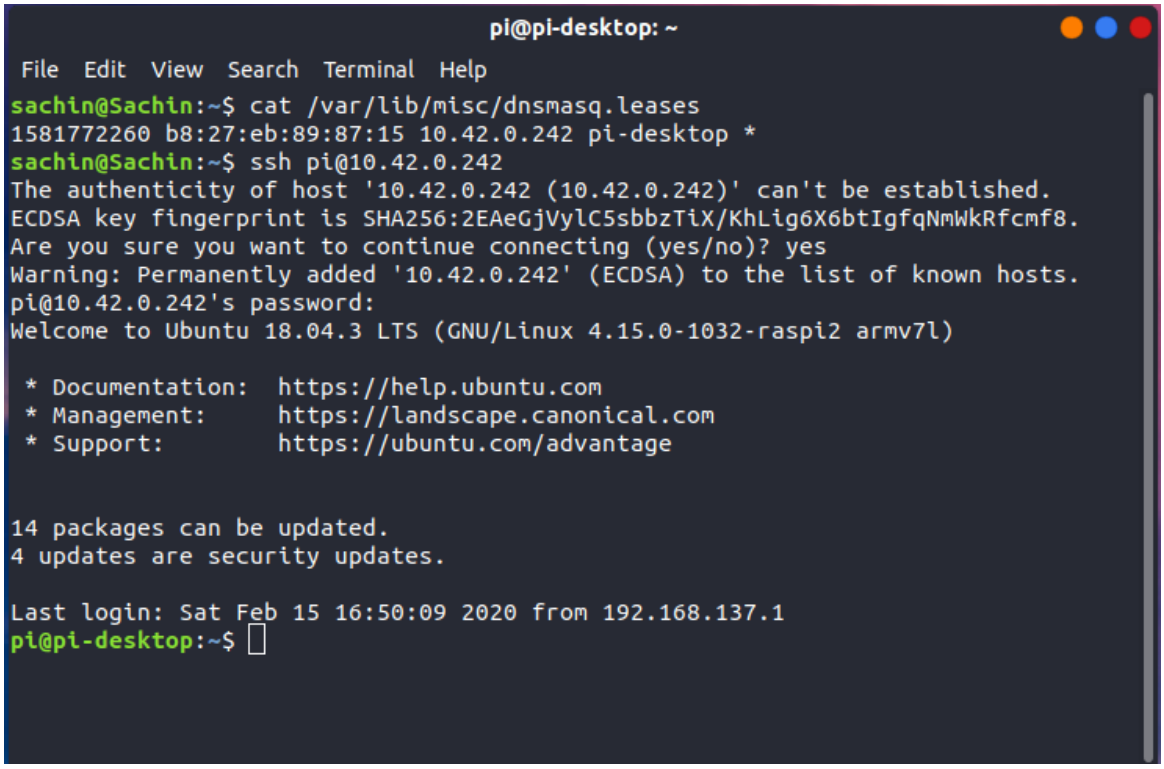




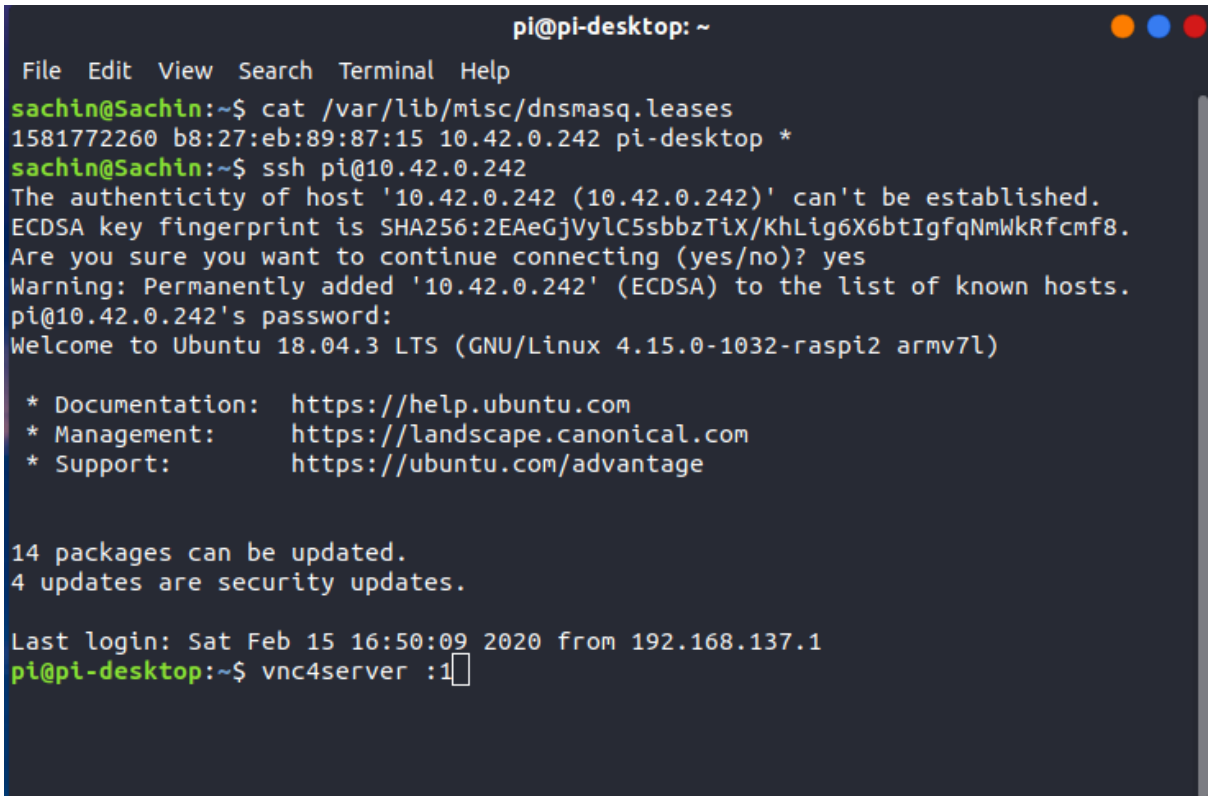
6. After getting the IP of Raspberry Pi , login through SSH cmd.

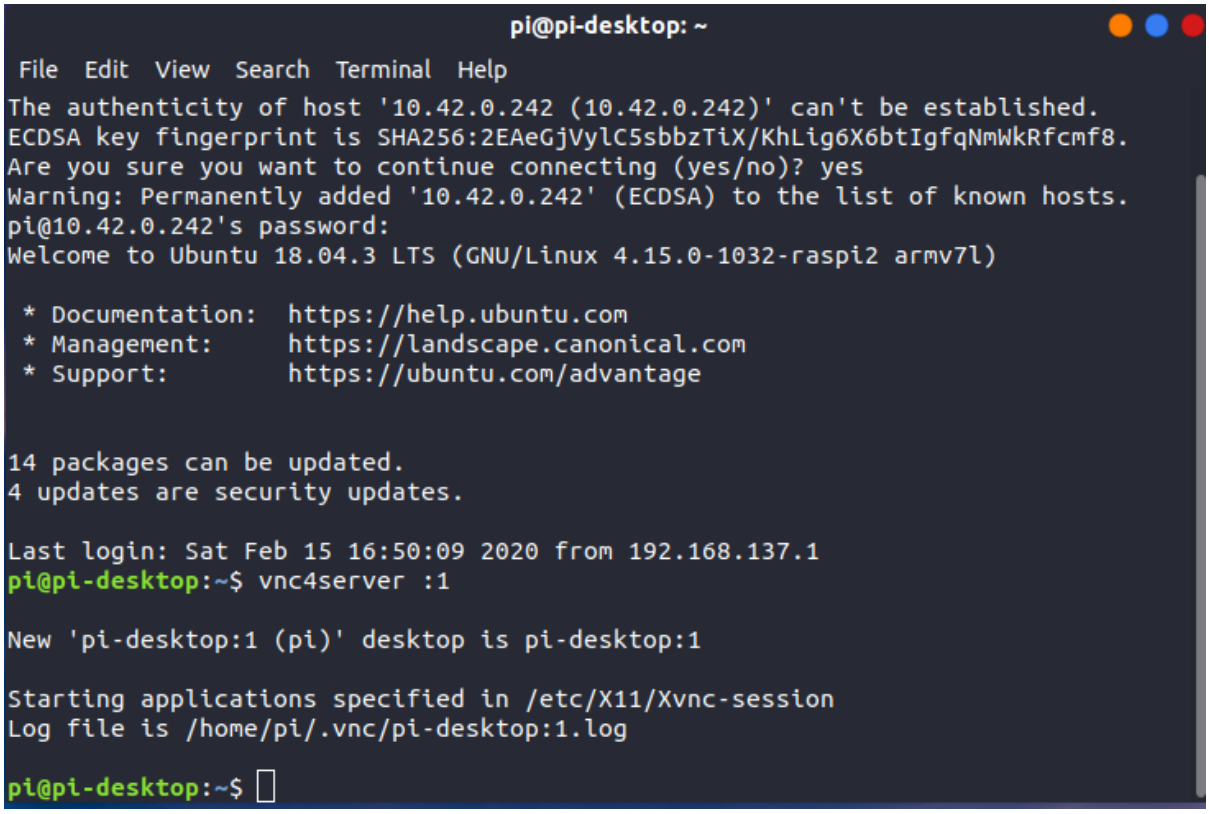




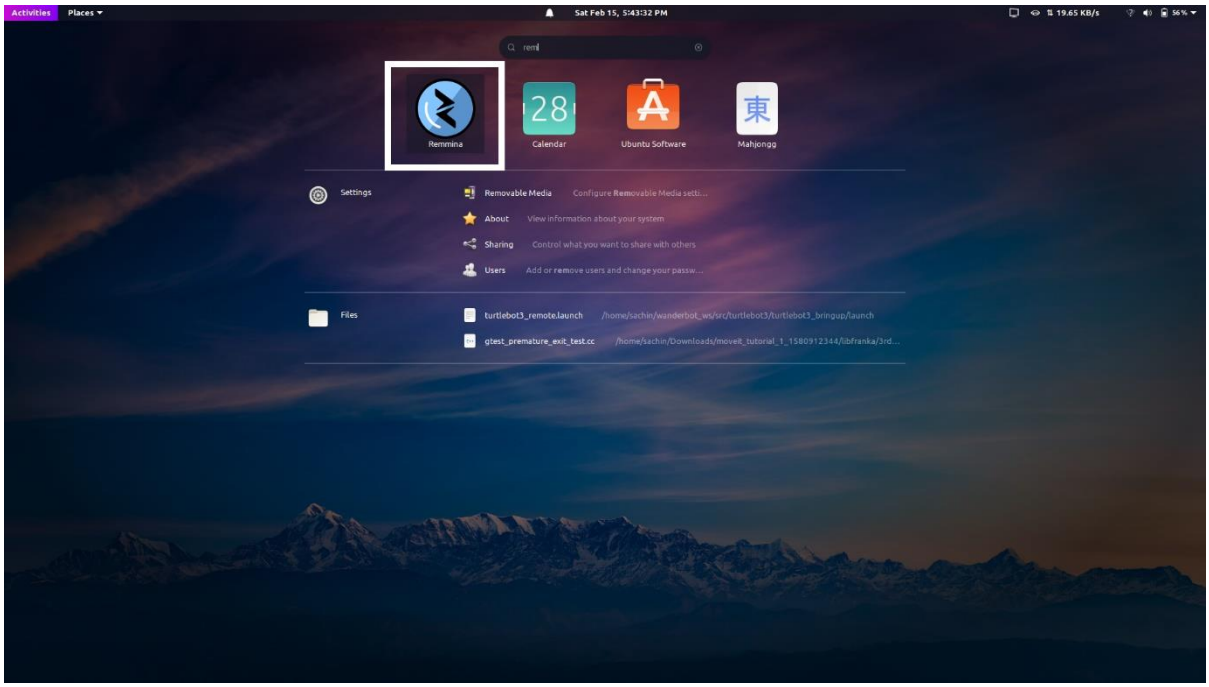


7. To excess of the Raspberry Pi's display, on the VNCSERVER in pi TERMINAL.

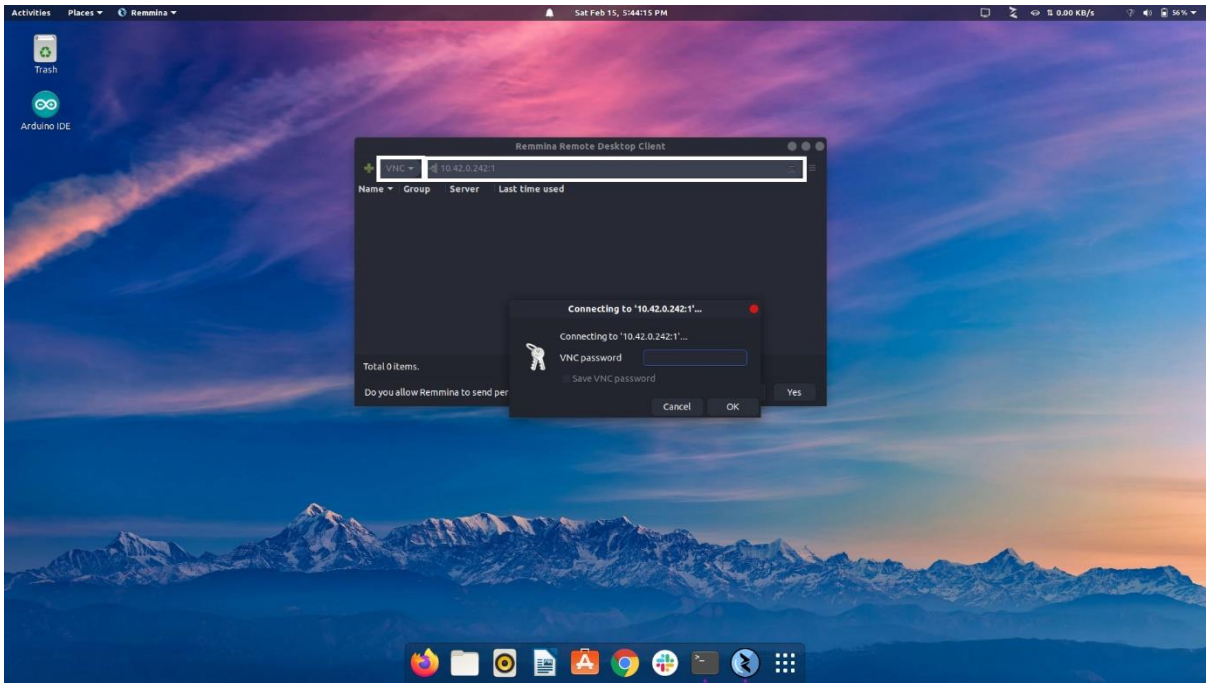


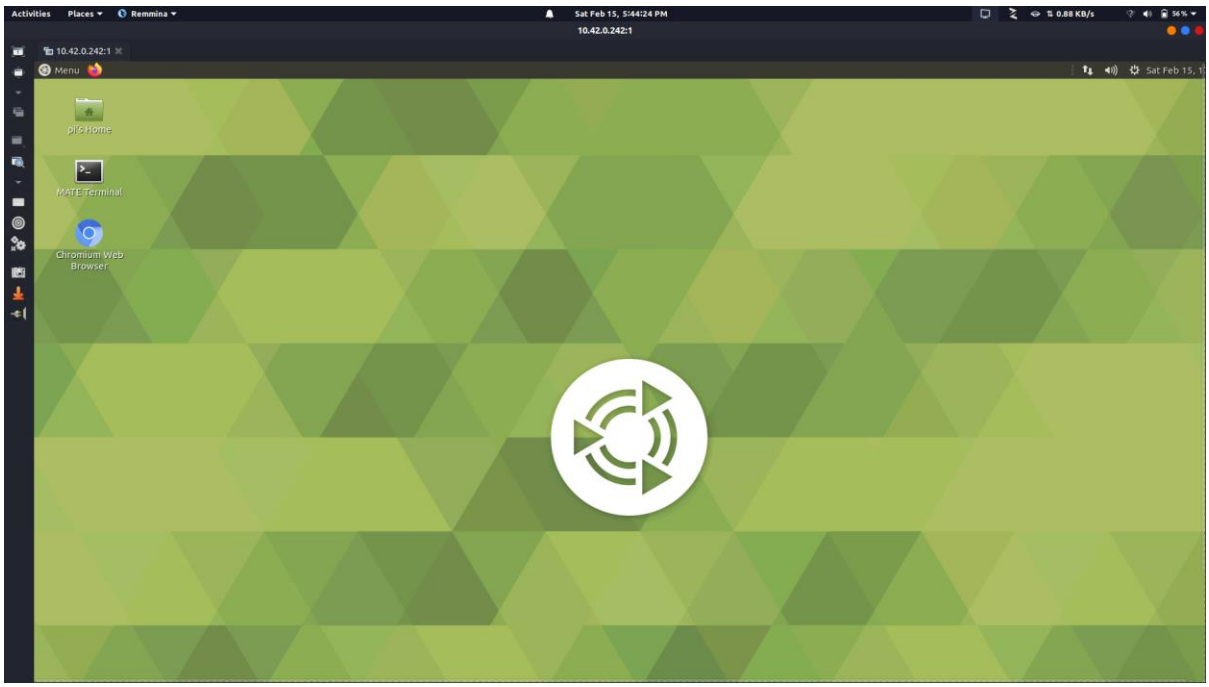


8. Search for Remmina and then open it.



9. Enter the IP of pi with :1.





Setting up wifi for ubuntu mate

Follow the steps listed in the link below:
https://gist.github.com/vfdev-5/10b9801db56e71ba17988683f863e84e

Setting up MJPG streamer in raspberry pi

Follow the steps in the link below:
https://github.com/cncjs/cncjs/wiki/Setup-Guide:-Raspberry-Pi-%7C-MJPEG-Streamer-Install-&-Setup-&-FFMpeg-Recording

Installing ROS (Melodic) in Ubuntu

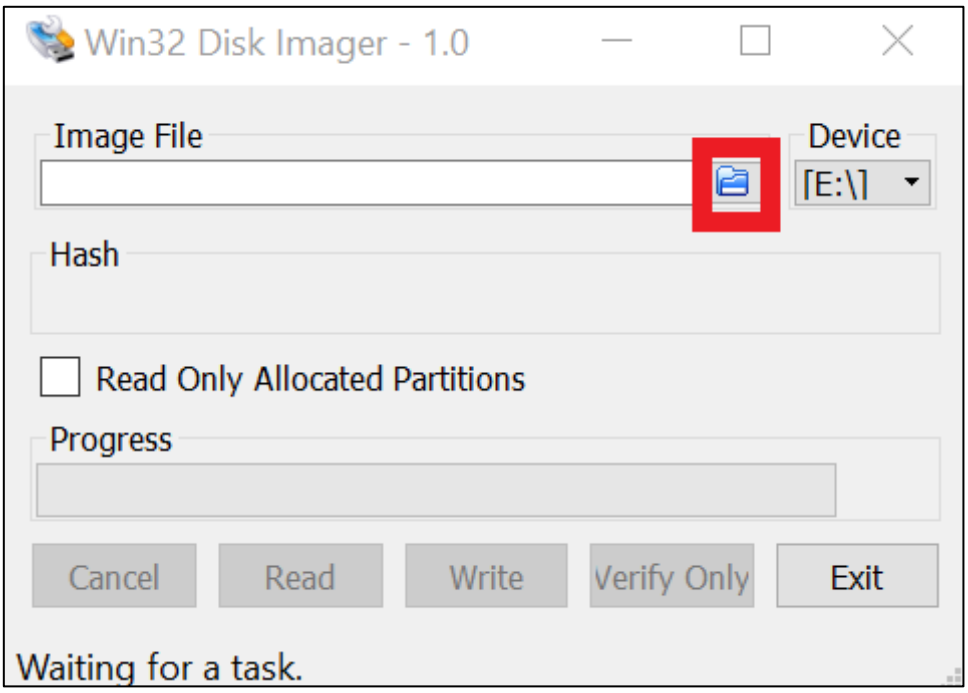
For installation of ROS follow the link given below.
http://wiki.ros.org/melodic/Installation/Ubuntu

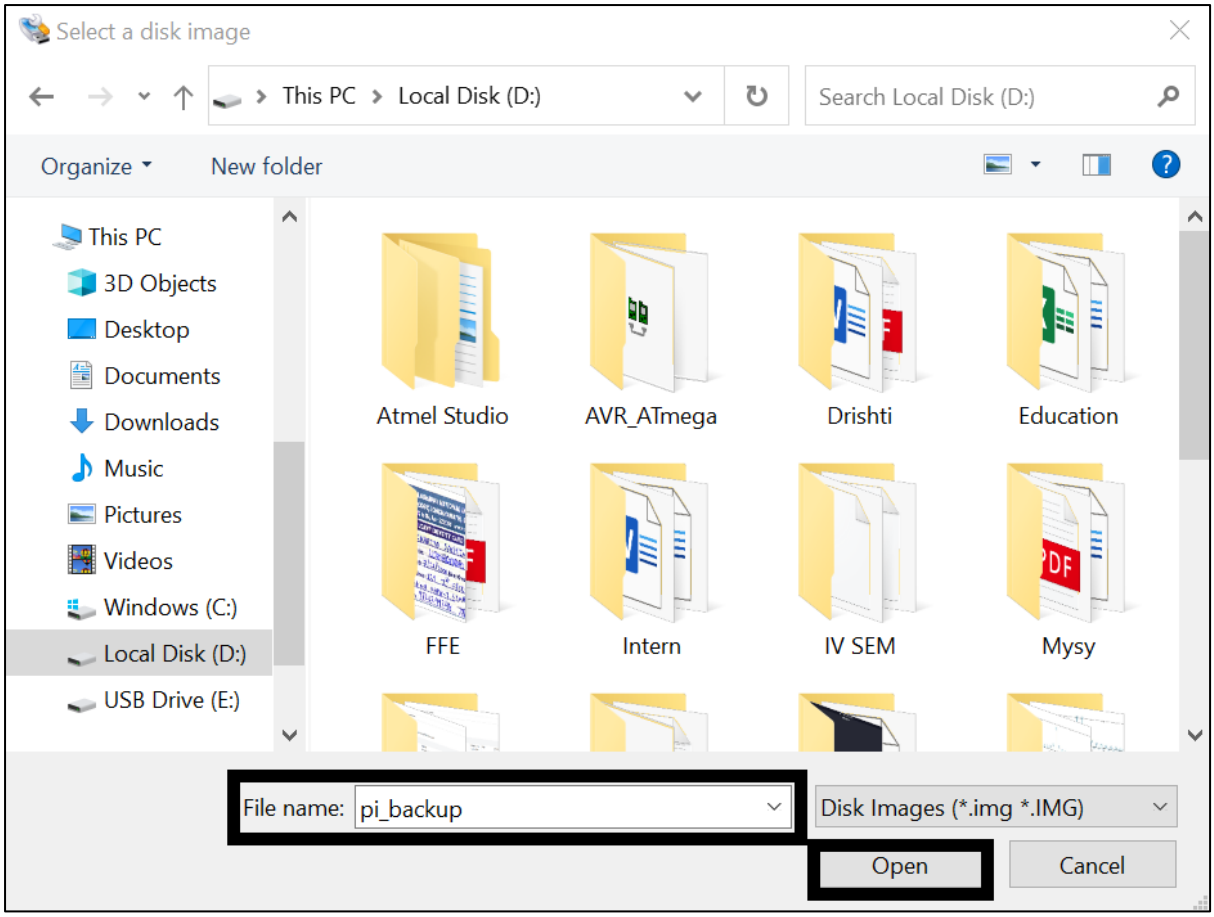
Problem: Getting lag in camera feed through raspberry pi.

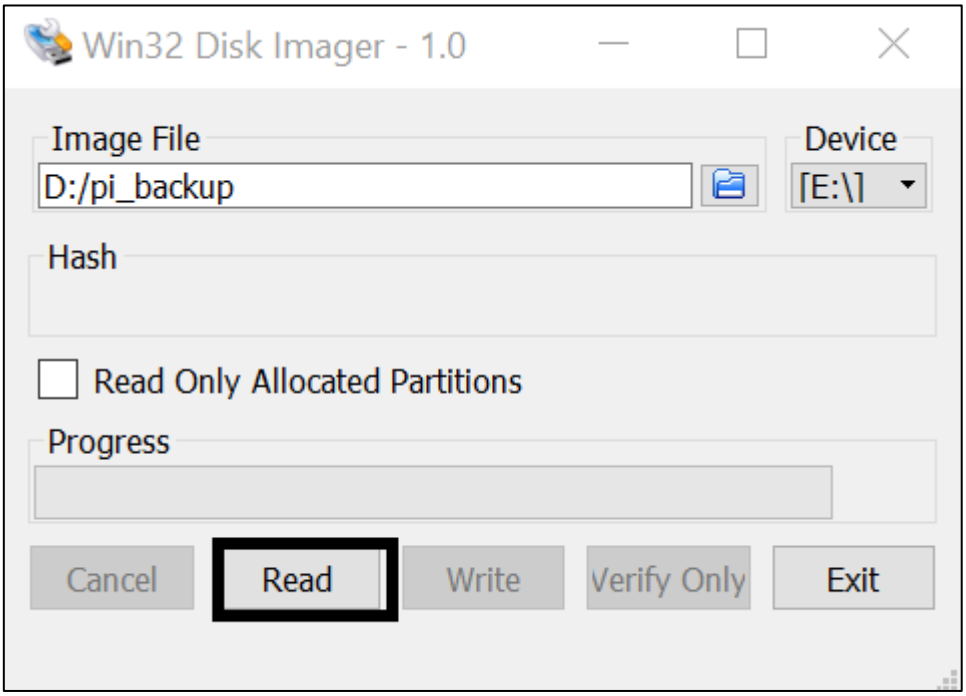
Solution: Reduce the fps 30 -> 20 ->15
Reduce resolution 1280x720 -> 640x480 -> 480x320

Problem : How to take backup of Raspberry Pi ?

Solution : Insert Raspberry Pi Memory card on Laptop. Open win32Disk Imager and open location icon and save file (It will occupy the storage of your memory card. It will also backup the free memory). And then press Read button.




Select a disk image
This PC
Local Disk (D:)
Search Local Disk (D:)
Organize
New folder
This PC
3D Objects
Desktop
Documents
Downloads
Music
Pictures
Videos
Windows (C:)
Local Disk (D:)
USB Drive (E:)
Atmel Studio
AVR_ATmega
Drishti
Education
FFE
Intern
IV SEM
Mysy
File name:
pi_backup
Disk Images (*.img *.IMG)
Open
Cancel


Win32 Disk Imager - 1.0
Image File
D:/pi_backup
Device
[E:\]
Hash
Read Only Allocated Partitions
Progress
Cancel
Read
Write
Verify Only
Exit

Problem: No space left on device.

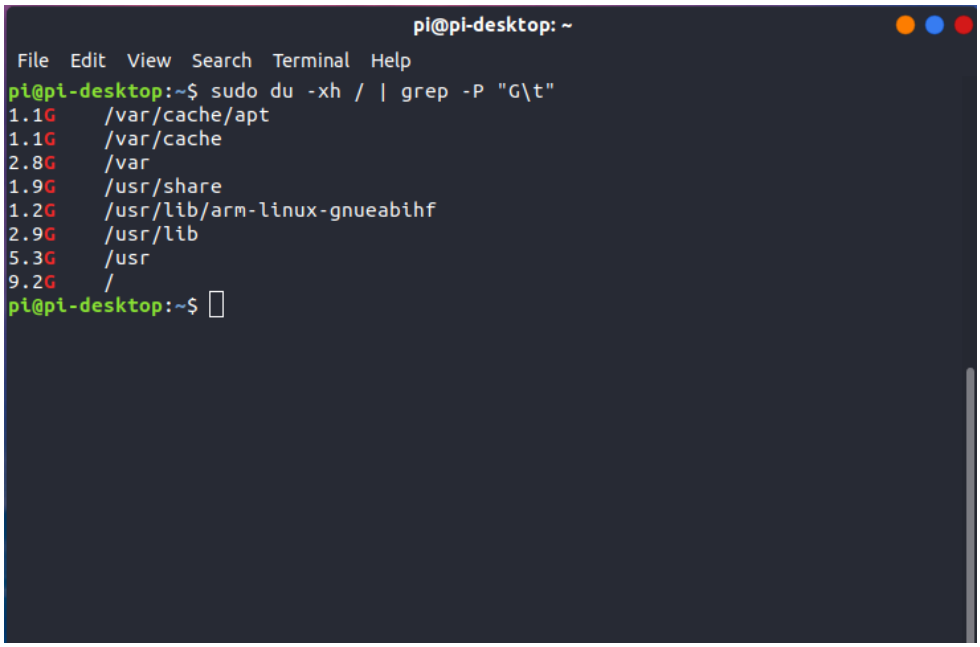
Solution: Installed motion package store the camera feed after several time storage getting full.

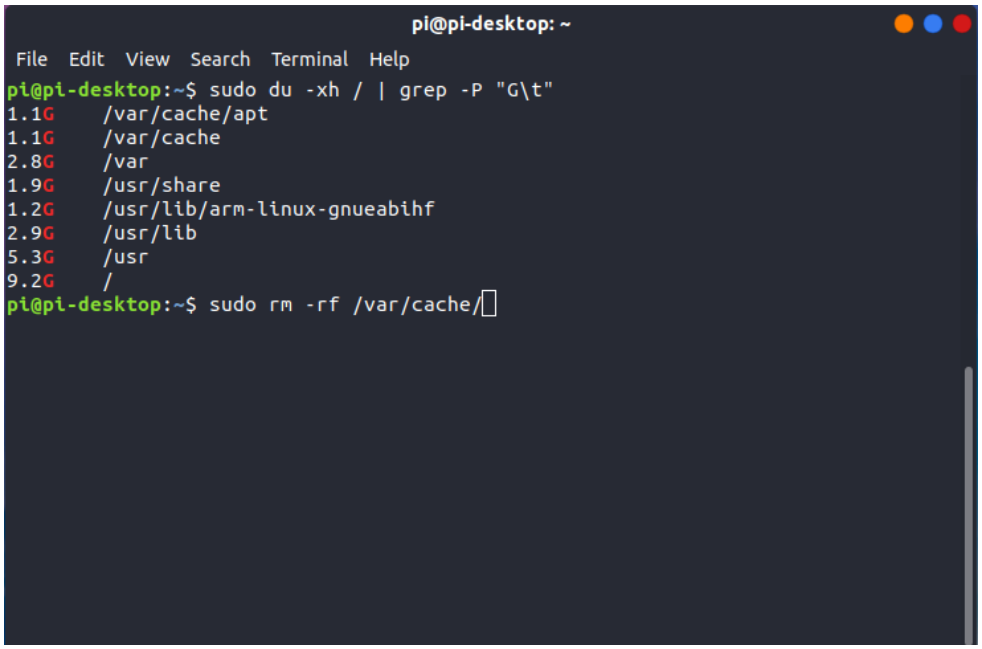
cmd : sudo du -xh / | grep -P "G\t" or df -h

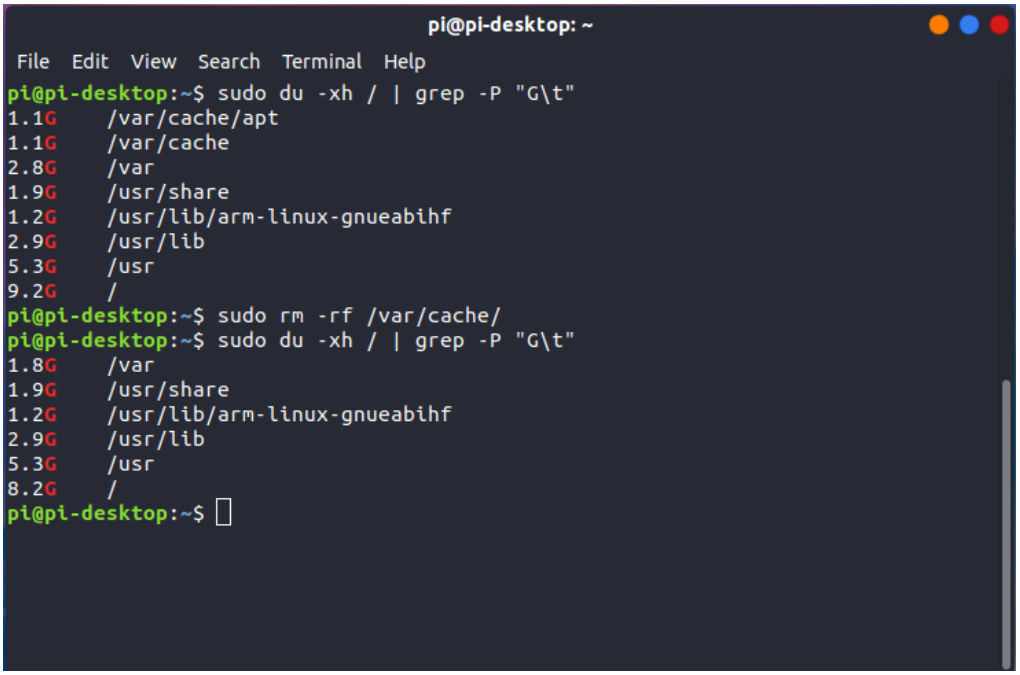
which show the directory which occupy the maximum space .

Ex. /usr/lib/motion 12.2 GB

sudo rm -rf /usr/lib/motion which remove the whole folder.







Uninstall motion completely

sudo apt-get remove motion
sudo apt-get remove –auto-remove motion
sudo apt-get purge motion
sudo apt-get purge purge –auto-remove motion

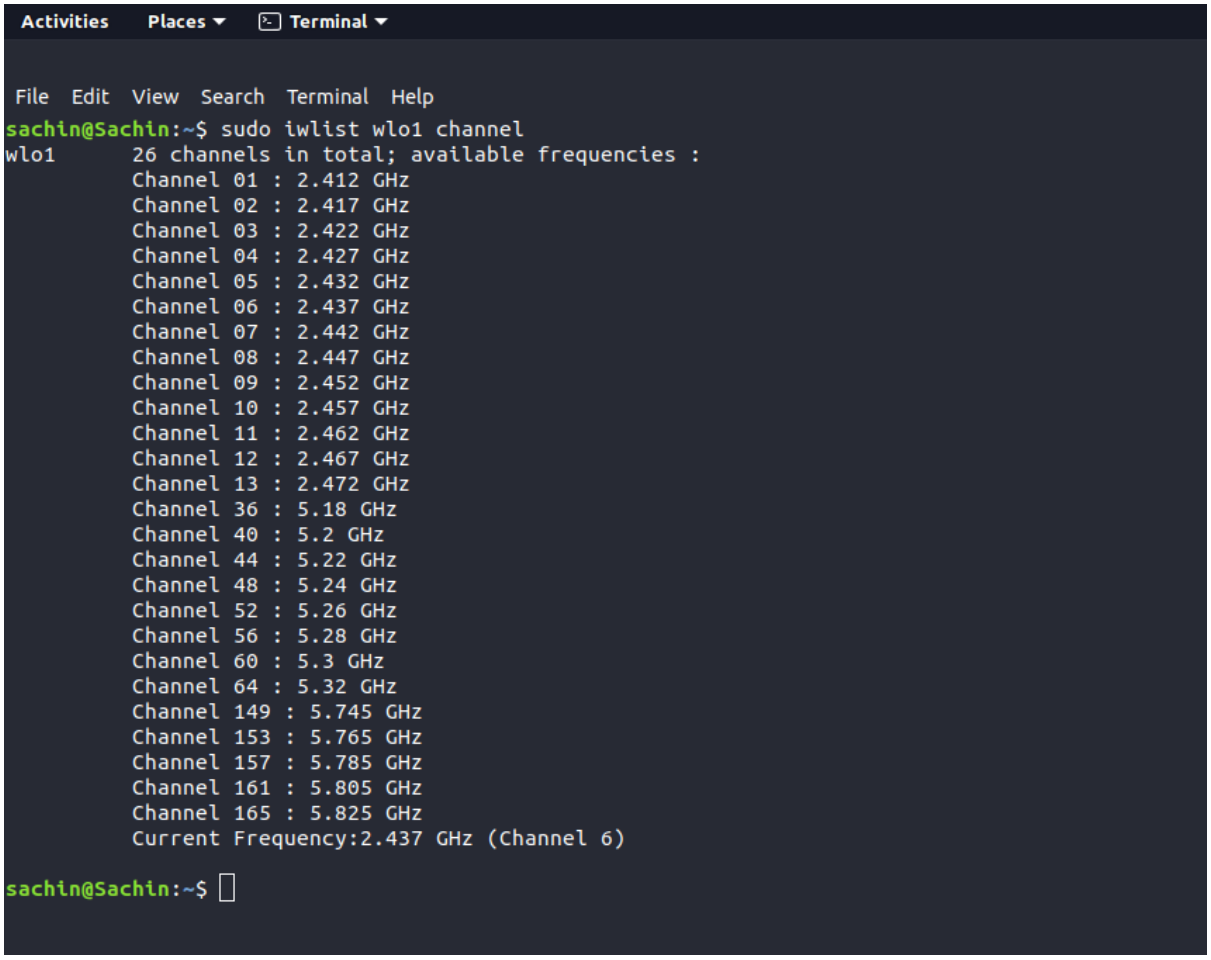
and we can remove prebuild package which came with OS.

sudo apt-get purge wolfram-engine libreoffice* scratch -y
sudo apt-get clean
sudo apt-get autoremove -y (Remove unused dependencies)

Problem: WIFI on channel 12 and 13 not connect

solution: In raspberry pi channel 12 and 13 is disable. And How to connect pi on channel 12 and 13 channel is still Mistry.

sudo iwlist wlan0 channel / sudo iwlist wlo1 channel (which shows the available channel in Ubuntu)
sudo apt install net-tools



Problem: Pi's getting lag

Solution: It may possible due to less power of power bank. Sometime it happens when power bank discharge more than 50%.

Problem: How to connect two raspberry pi through ethernet.

Solution: For that we need to connect one pi with WIFI and other pi connect to the first one through Ethernet cable.

For that connect first pi with WIFI and enable Network sharing with other pc.
For that cmds:

sudo -s
nm-connection-editor (Open the Network Manager window)
Editing the Ethernet connection IPV4Settings -> Method : Shared to other computers

Restart the pi and write the cmd in Raspberry pi terminal.

Cmd -> cat /var/lib/misc/dnsmasq.leases (which provide the ip of Another pi)
Then connect the another pi in 1st pi terminal using
Cmd : ssh <pi_ip_address>

Problem: WARNING : REMOTE HOST IDENTIFICATION HAS CHAGED!

Solution : Just edit ~/.ssh/known_hosts and delete line 12, as the message pointed you
Offending RSA key in /Users/isaacalves/.ssh/known_hosts:12
or use ssh-keygen to delete the invalid key
ssh-keygen -R "you server hostname or ip"

```
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
@    WARNING: REMOTE HOST IDENTIFICATION HAS CHANGED!     @
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
IT IS POSSIBLE THAT SOMEONE IS DOING SOMETHING NASTY!
Someone could be eavesdropping on you right now (man-in-the-middle attack)!
It is also possible that a host key has just been changed.
The fingerprint for the RSA key sent by the remote host is
51:82:00:1c:7e:6f:ac:ac:de:f1:53:08:1c:7d:55:68.
Please contact your system administrator.
Add correct host key in /Users/isaacalves/.ssh/known_hosts to get rid of this message.
Offending RSA key in /Users/isaacalves/.ssh/known_hosts:12
RSA host key for 104.131.16.158 has changed and you have requested strict checking.
Host key verification failed.
```

Since you updated your ssh key, getting the above message is normal.

Just edit ~/.ssh/known_hosts and delete line 12, as the message pointed you

```
Offending RSA key in /Users/isaacalves/.ssh/known_hosts:12
```

or use ssh-keygen to delete the invalid key

```
ssh-keygen -R "you server hostname or ip"
```