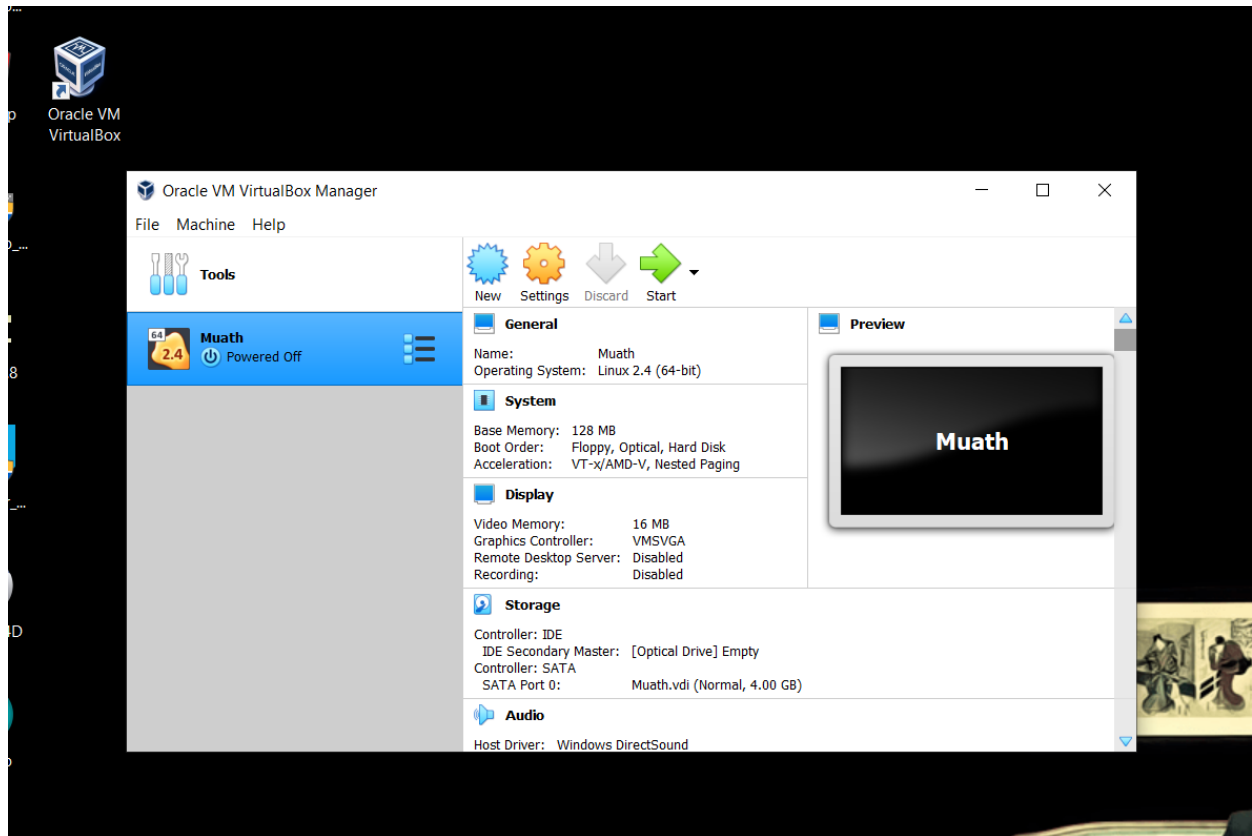
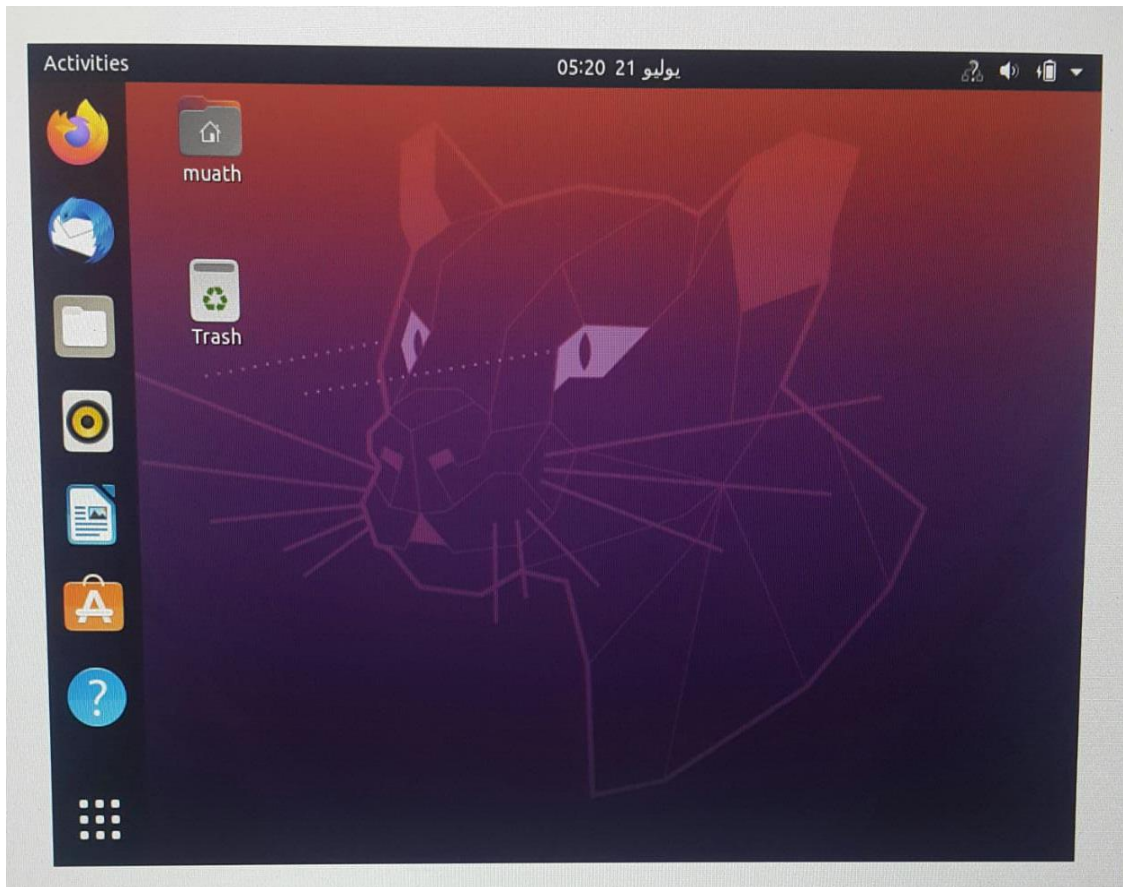
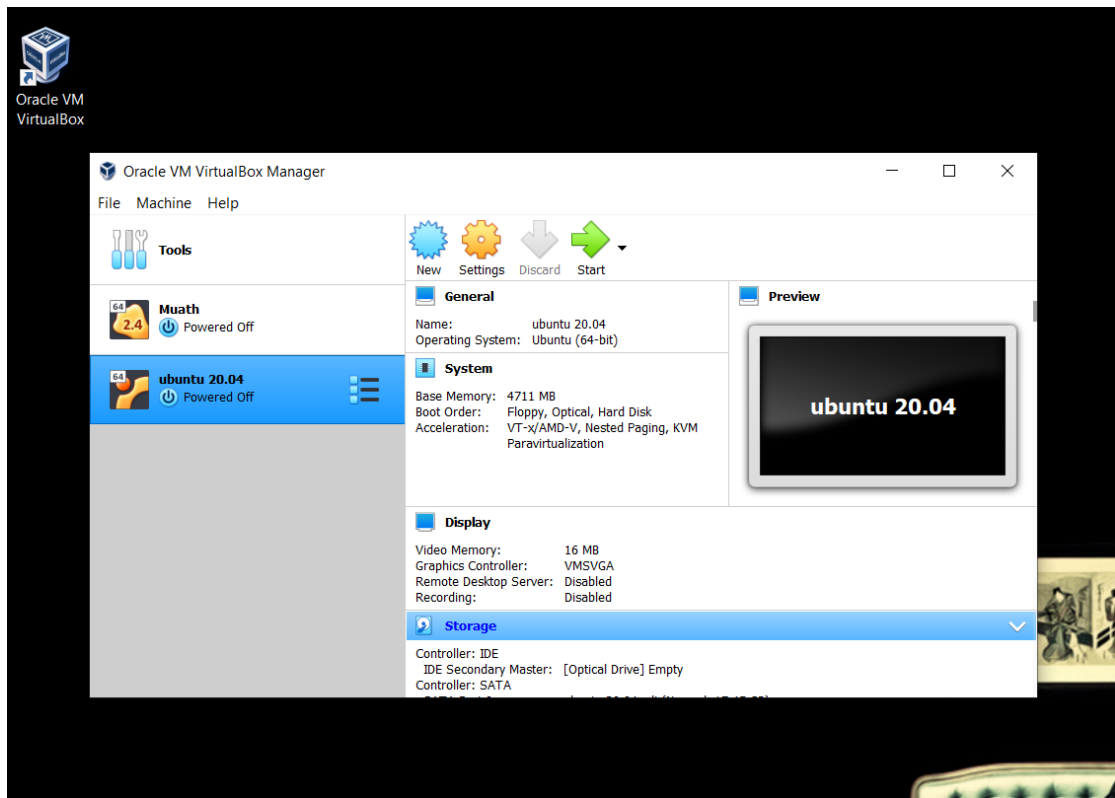


In this report, I am going to explain the steps that I followed in order to install **ROS** in my computer.

First, **ROS** can only install in **Linux** based **Ubuntu** operating system and run it on top of Windows, so I downloaded **VirtualBox** to be able to install **ROS**. I downloaded **VirtualBox** from this website. <https://www.virtualbox.org/wiki/Downloads>



After installation **VirtualBox**, I downloaded **Ubuntu 20.04** from the following website; <https://ubuntu.com/download/desktop> and after that I created a new virtual machine which for **Ubuntu 20.04** by clicking the new icon to download it. After that, you will choose the name, type (which is **Linux**), and the version (which is 64-bit). Also, you will choose the RAM and size of the **VirtualBox** hard disk. After finishing, now after clicking start for the **Ubuntu** I choose the hard disk, erase the disk, install **Ubuntu**. What's next is very simple; it is about to choose the time zone, keyboard layout and make a username and password. After all of this, now **Ubuntu** is available and ready to use.



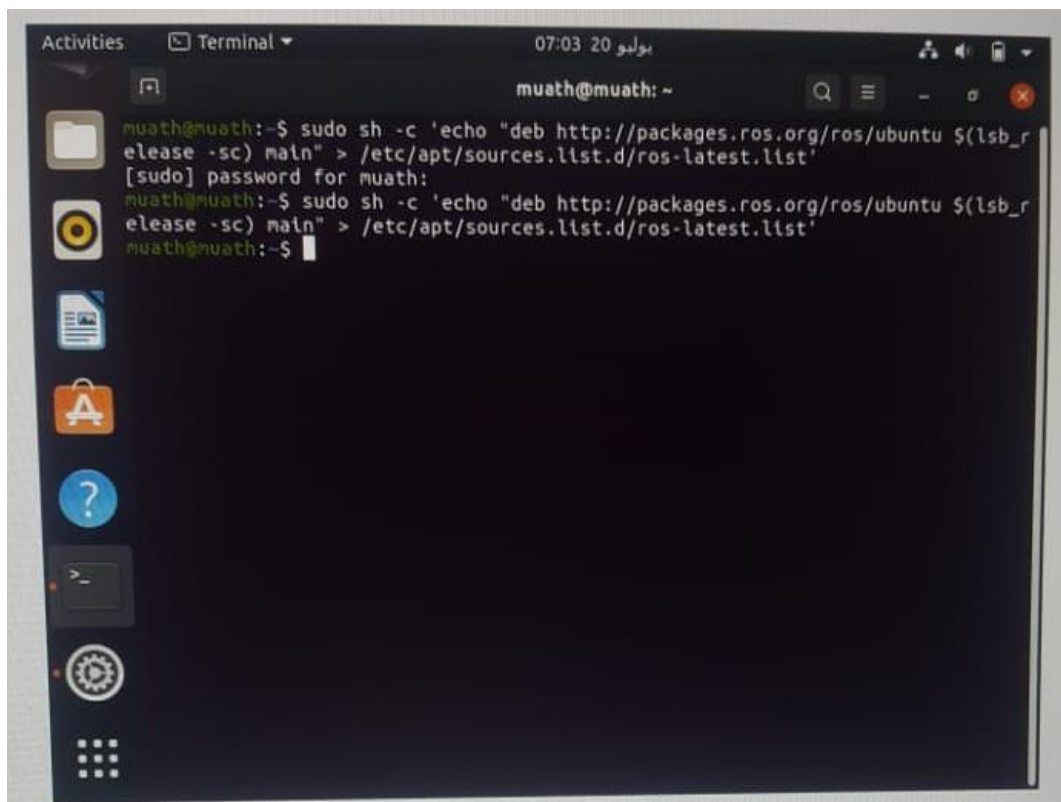
After installing **Ubuntu** now, it is time to install **ROS**.

First, I went to the following website, <http://wiki.ros.org/ROS/Installation>

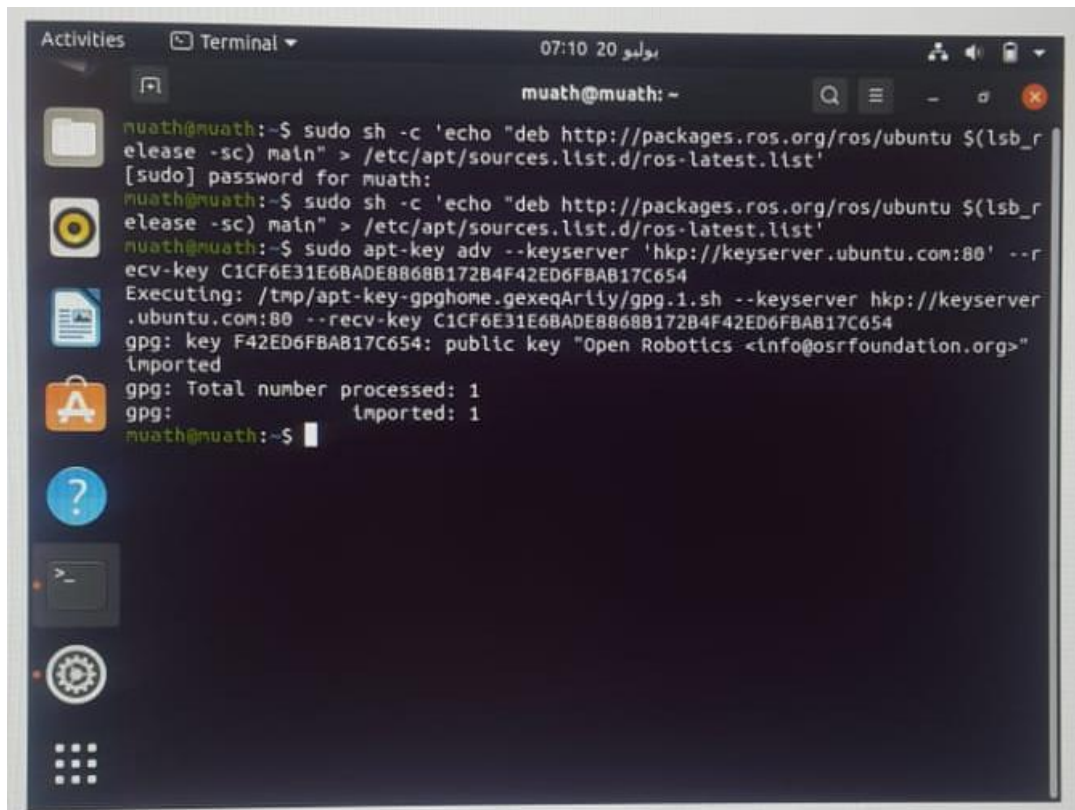


In this website, I chose the suitable version according to my Linux distribution and version. I already install **Ubuntu** 20.04 version, so I chose **ROS Noetic Ninjemys** and complete the process of setup and install **ROS**.

Here, I added the source list to the system.

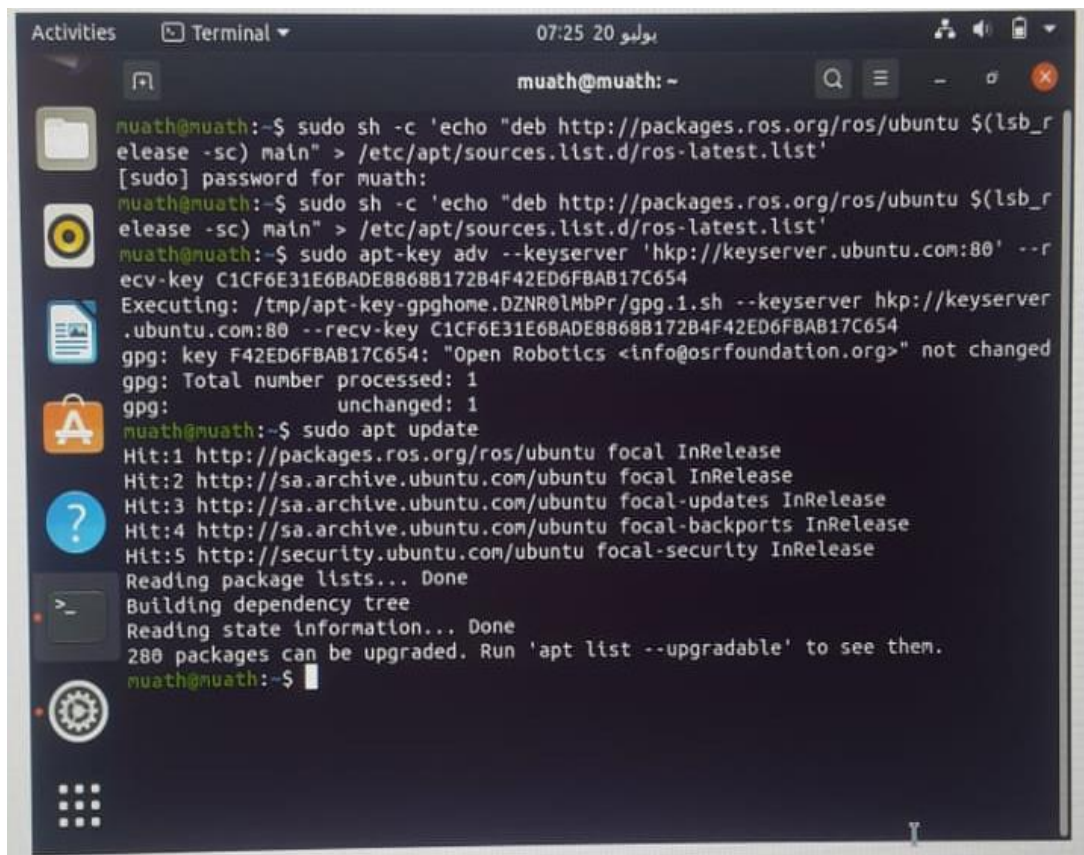


Here, I added the key of the ROS's server to the system.

A terminal window titled 'Terminal' with the user 'muath@muath: ~'. The terminal shows the following commands and output:

```
muath@muath:~$ sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu $(lsb_release -sc) main" > /etc/apt/sources.list.d/ros-latest.list'
[sudo] password for muath:
muath@muath:~$ sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu $(lsb_release -sc) main" > /etc/apt/sources.list.d/ros-latest.list'
muath@muath:~$ sudo apt-key adv --keyserver 'hkp://keyserver.ubuntu.com:80' --recv-key C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654
Executing: /tmp/apt-key-gpghome.gexeArIly/gpg.1.sh --keyserver hkp://keyserver.ubuntu.com:80 --recv-key C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654
gpg: key F42ED6FBAB17C654: public key "Open Robotics <info@osrfoundation.org>" imported
gpg: Total number processed: 1
gpg:          imported: 1
muath@muath:~$
```

Also, I check if the system is up to date.

A terminal window titled 'Terminal' with the user 'muath@muath: ~'. The terminal shows the following commands and output:

```
muath@muath:~$ sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu $(lsb_release -sc) main" > /etc/apt/sources.list.d/ros-latest.list'
[sudo] password for muath:
muath@muath:~$ sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu $(lsb_release -sc) main" > /etc/apt/sources.list.d/ros-latest.list'
muath@muath:~$ sudo apt-key adv --keyserver 'hkp://keyserver.ubuntu.com:80' --recv-key C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654
Executing: /tmp/apt-key-gpghome.DZNR0lMbPr/gpg.1.sh --keyserver hkp://keyserver.ubuntu.com:80 --recv-key C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654
gpg: key F42ED6FBAB17C654: "Open Robotics <info@osrfoundation.org>" not changed
gpg: Total number processed: 1
gpg:          unchanged: 1
muath@muath:~$ sudo apt update
Hit:1 http://packages.ros.org/ros/ubuntu focal InRelease
Hit:2 http://sa.archive.ubuntu.com/ubuntu focal InRelease
Hit:3 http://sa.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:4 http://sa.archive.ubuntu.com/ubuntu focal-backports InRelease
Hit:5 http://security.ubuntu.com/ubuntu focal-security InRelease
Reading package lists... Done
Building dependency tree
Reading state information... Done
280 packages can be upgraded. Run 'apt list --upgradable' to see them.
muath@muath:~$
```



The next step is to Install the full desktop package.

[illegible]

To setup the working environments, I did the following commands.

Activities Terminal 08:07 20 يوليو

```

Setting up ros-noetic-rqt-robot-dashboard (0.5.8-1focal.20200613.043602) ...
Setting up ros-noetic-visualization-tutorials (0.11.0-1focal.20200624.175600) ...
..
Setting up ros-noetic-ros-core (1.5.0-1focal.20200529.064752) ...
Setting up ros-noetic-geometry (1.13.2-1focal.20200612.011155) ...
Setting up ros-noetic-rqt-srv (0.4.8-1focal.20200613.043637) ...
Setting up ros-noetic-rqt-action (0.4.9-1focal.20200613.043629) ...
Setting up ros-noetic-urdf-sim-tutorial (0.5.1-1focal.20200706.135445) ...
Setting up ros-noetic-gazebo-plugins (2.9.1-1focal.20200612.011329) ...
Setting up ros-noetic-rqt-launch (0.4.8-1focal.20200613.043540) ...
Setting up ros-noetic-gazebo-ros-pkgs (2.9.1-1focal.20200612.013402) ...
Setting up ros-noetic-laser-pipeline (1.6.4-1focal.20200612.011901) ...
Setting up ros-noetic-ros-base (1.5.0-1focal.20200529.065007) ...
Setting up ros-noetic-rqt-robot-plugins (0.5.8-1focal.20200624.173714) ...
Setting up ros-noetic-robot (1.5.0-1focal.20200706.134615) ...
Setting up ros-noetic-rqt-common-plugins (0.4.9-1focal.20200615.143035) ...
Setting up ros-noetic-perception (1.5.0-1focal.20200612.013104) ...
Setting up ros-noetic-viz (1.5.0-1focal.20200624.175541) ...
Setting up ros-noetic-desktop (1.5.0-1focal.20200706.135250) ...
Setting up ros-noetic-simulators (1.5.0-1focal.20200706.134944) ...
Setting up ros-noetic-desktop-full (1.5.0-1focal.20200706.135526) ...
Processing triggers for libc-bin (2.31-0ubuntu9) ...
muath@muath:~$ echo "source /opt/ros/noetic/setup.bash" >> ~/.bashrc source ~/.bashrc
muath@muath:~$ echo "source /opt/ros/noetic/setup.bash" >> ~/.bashrc source ~/.bashrc
muath@muath:~$ echo "source /opt/ros/noetic/setup.zsh" >> ~/.zshrc source ~/.zshrc
muath@muath:~$

```

Now **ROS** is available in my computer.