

How To install VirtualBox, linux(ubuntu) & ROS on MAC

1-install VirtualBox

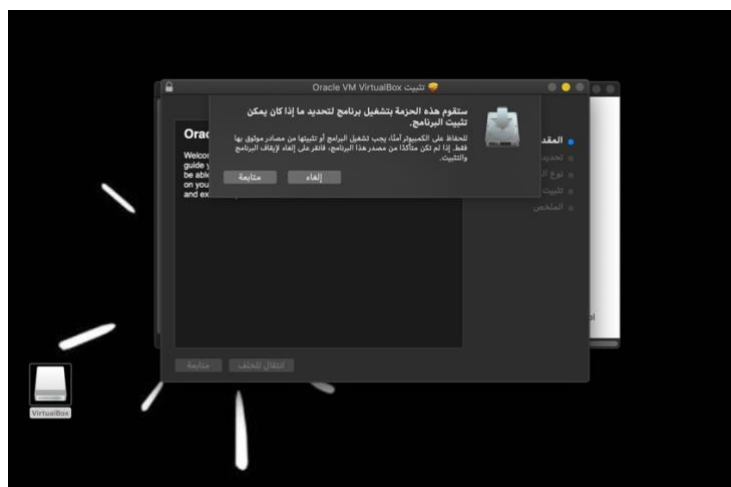
-chose OS X hosts

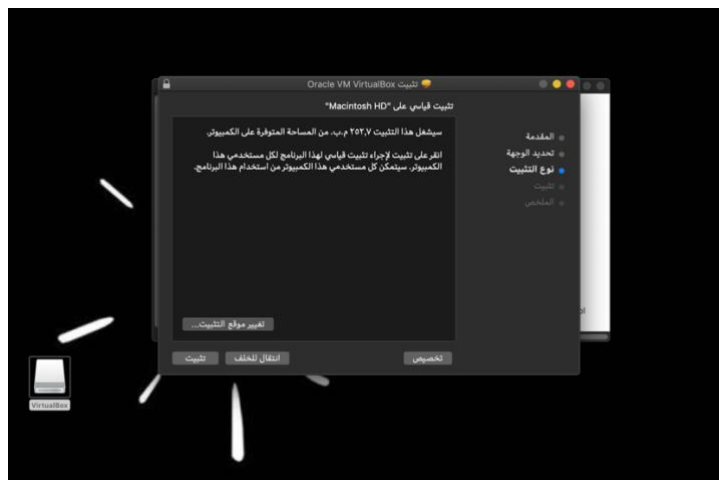
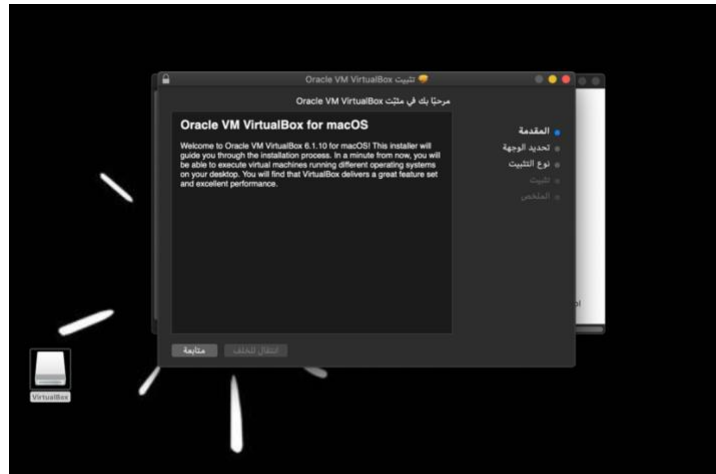


-click on the icon virtualbox.pkg

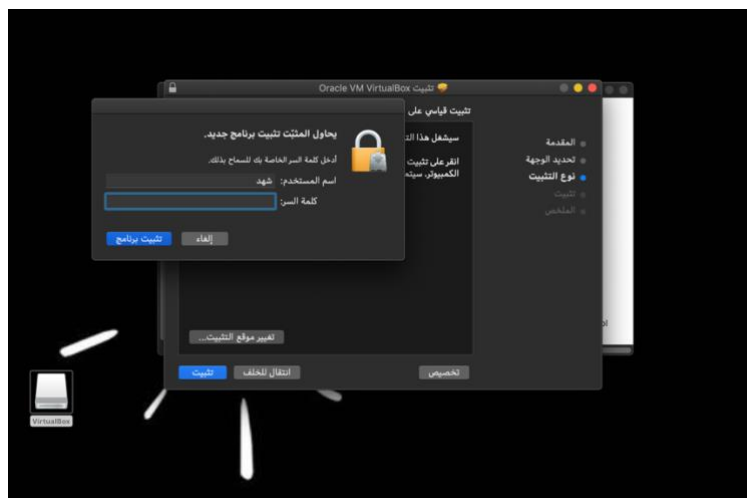


-contuno with the steps





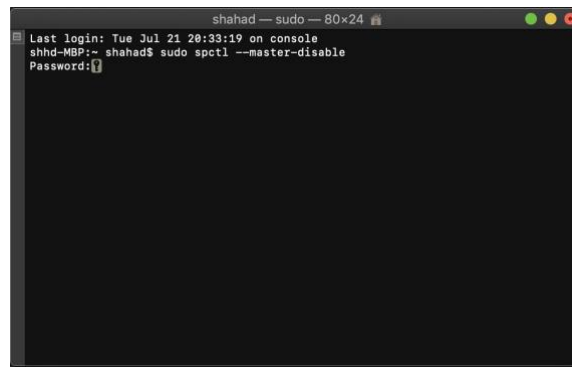
-enter the password



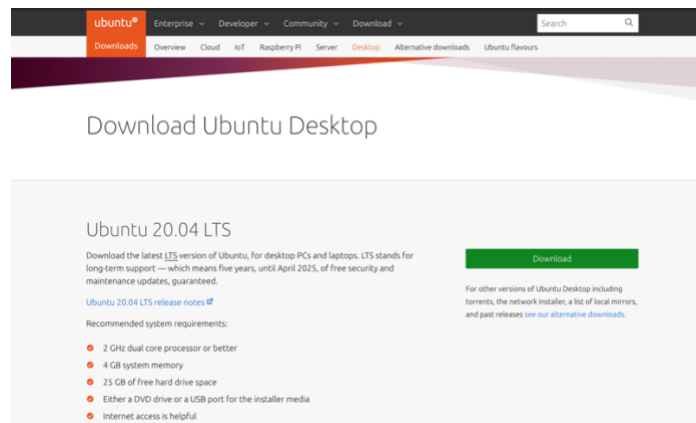
Now the installation done successfully.

In some devices we must do some step before we install the VirtualBox:

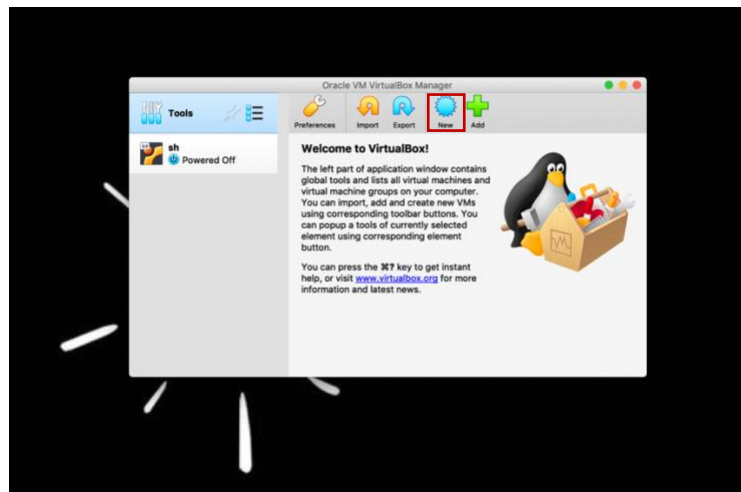
-write this command `sudo spctl --master-disable` in the Terminal to open last faild



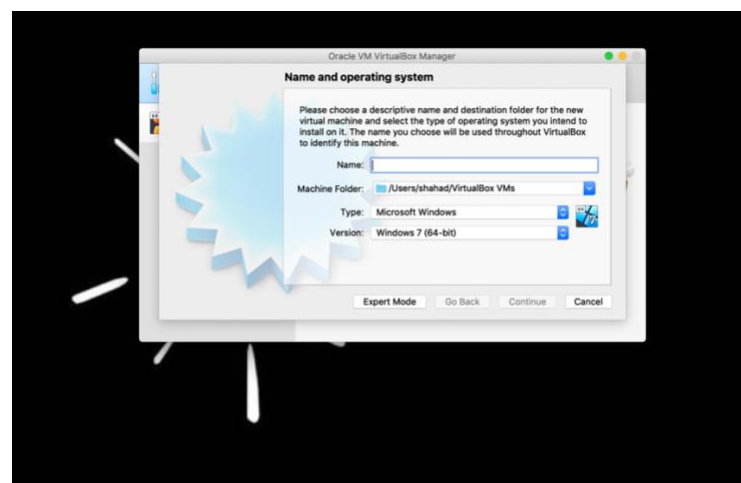
2-install ubuntu

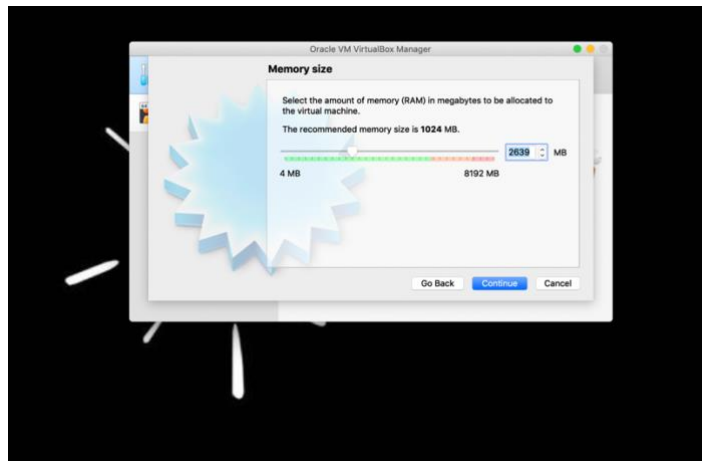
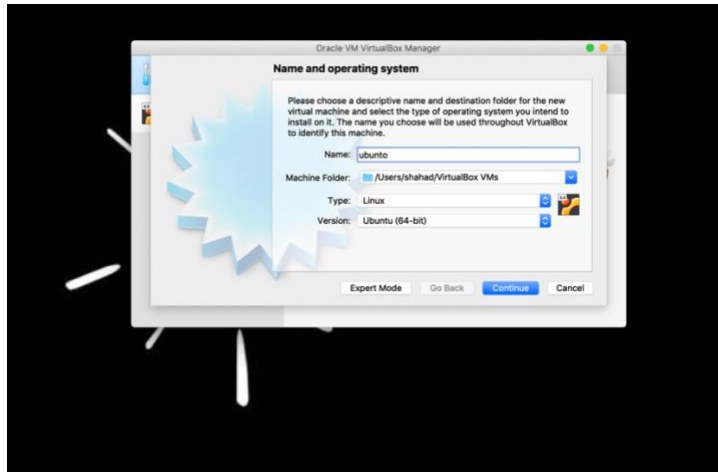


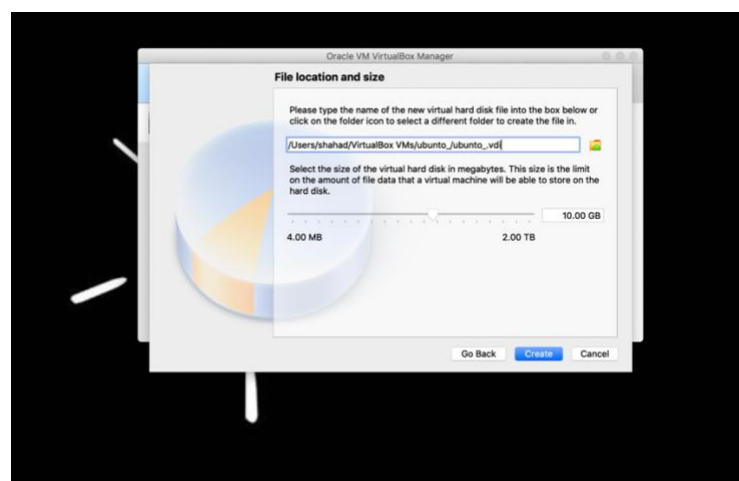
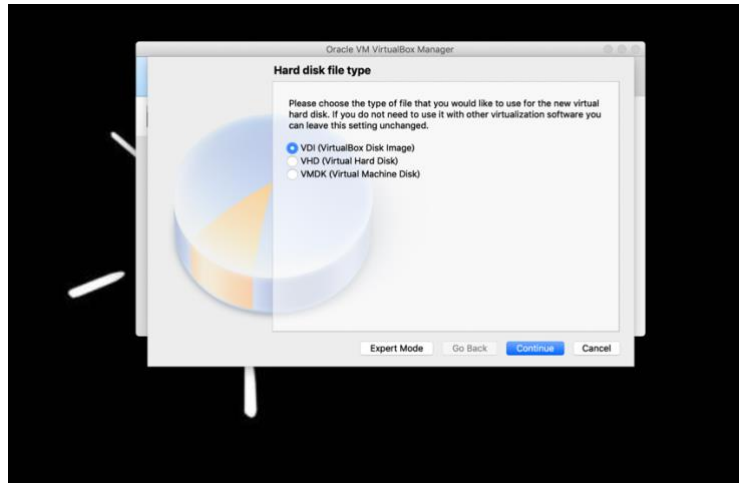
-After we install the ubuntu we will go to the VirtualBox and click on New

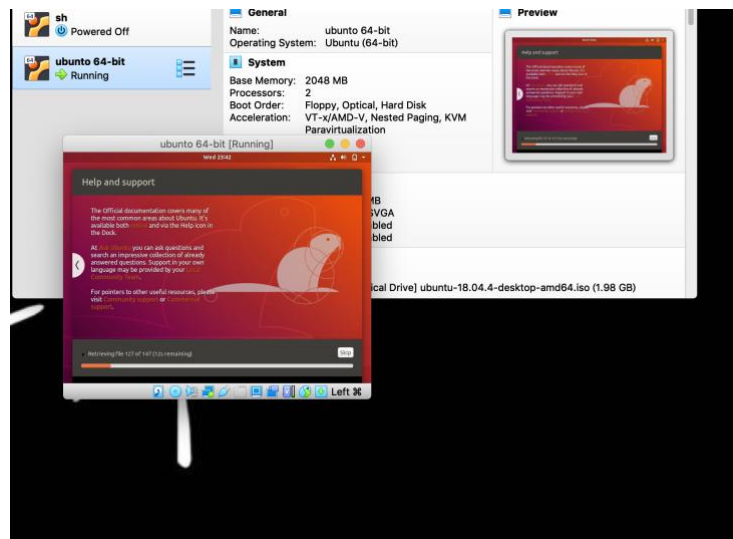
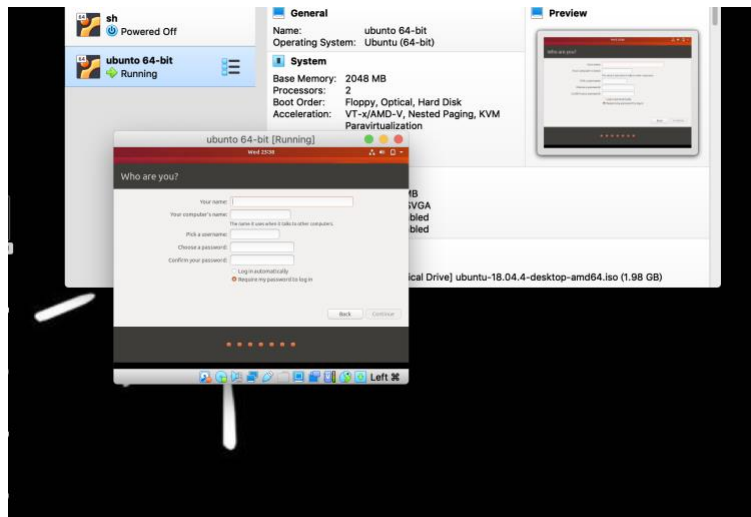
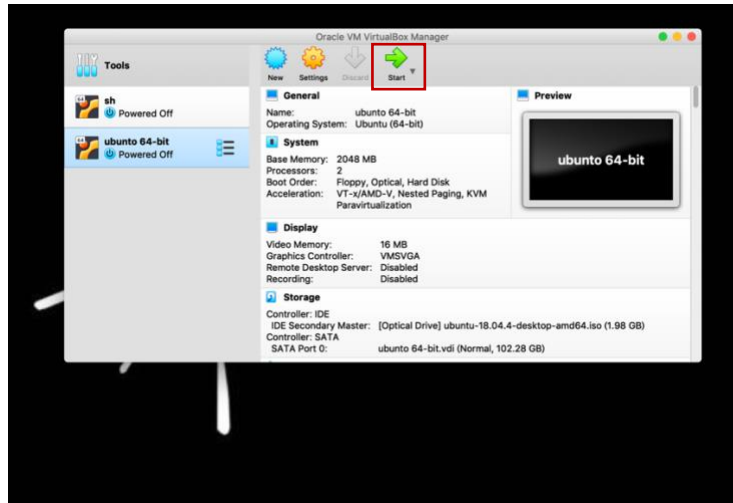


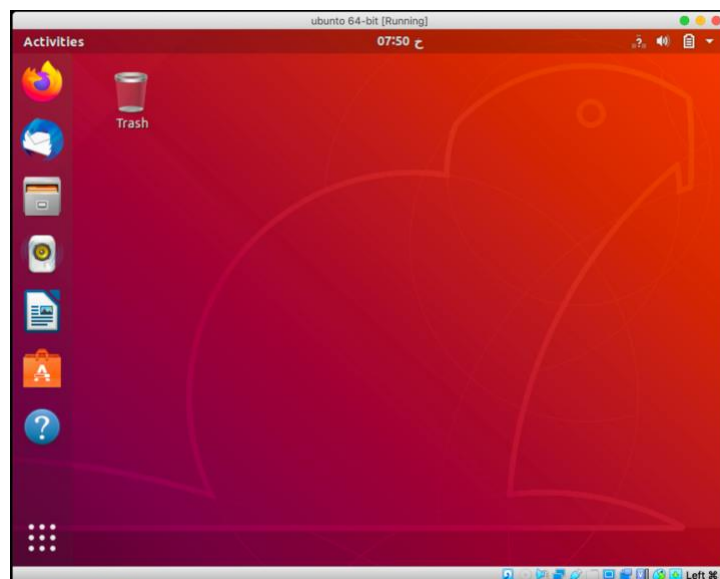
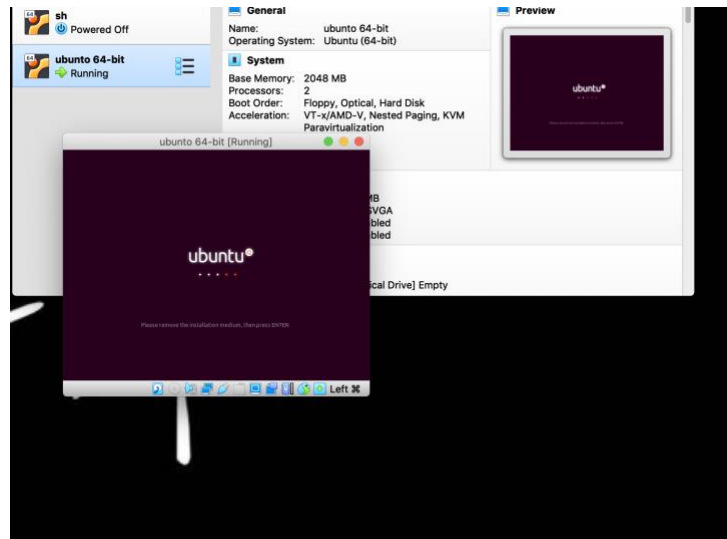
-continue with the steps











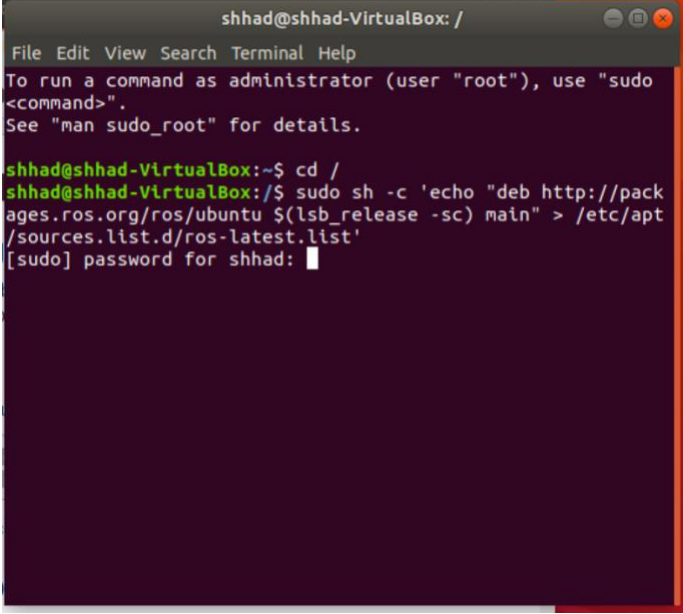
Now the installation done successfully.

3-install ROS

-open the Terminal on linux and follow the steps:

1.Setup your sources.list, Setup your computer to accept software from packages.ros.org. ,by witing the command

```
sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu $(lsb_release -sc) main" > /etc/apt/sources.list.d/ros-latest.list'
```

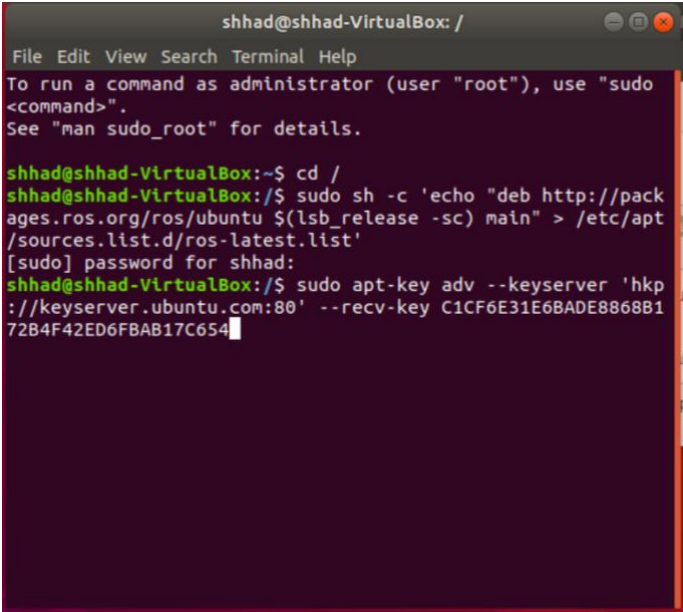
A terminal window titled 'shhad@shhad-VirtualBox: /' with a menu bar (File, Edit, View, Search, Terminal, Help). It displays instructions for using 'sudo' and then the command to add the ROS repository to the sources.list. The command is executed successfully, and the terminal prompts for a password.

```
shhad@shhad-VirtualBox: /
File Edit View Search Terminal Help
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

shhad@shhad-VirtualBox:~$ cd /
shhad@shhad-VirtualBox:/$ sudo sh -c 'echo "deb http://pack
ages.ros.org/ros/ubuntu $(lsb_release -sc) main" > /etc/apt
/sources.list.d/ros-latest.list'
[sudo] password for shhad: 
```

2. Set up your keys, by writing the command

```
sudo apt-key adv --keyserver 'hkp://keyserver.ubuntu.com:80' --recv-key C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654
```

A terminal window titled 'shhad@shhad-VirtualBox: /' with a menu bar (File, Edit, View, Search, Terminal, Help). It shows the same initial steps as the previous screenshot, followed by the command to add the ROS key to the apt keyring. The command is executed successfully, and the terminal prompts for a password.

```
shhad@shhad-VirtualBox: /
File Edit View Search Terminal Help
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

shhad@shhad-VirtualBox:~$ cd /
shhad@shhad-VirtualBox:/$ sudo sh -c 'echo "deb http://pack
ages.ros.org/ros/ubuntu $(lsb_release -sc) main" > /etc/apt
/sources.list.d/ros-latest.list'
[sudo] password for shhad:
shhad@shhad-VirtualBox:/$ sudo apt-key adv --keyserver 'hkp
://keyserver.ubuntu.com:80' --recv-key C1CF6E31E6BADE8868B1
72B4F42ED6FBAB17C654
[sudo] password for shhad: 
```

3. to make sure your Debian package index is up-to-date `sudo apt update`

```
shhad@shhad-VirtualBox: /
File Edit View Search Terminal Help
To run a command as administrator (user "root"), use "sudo
<command>".
See "man sudo_root" for details.

shhad@shhad-VirtualBox:~$ cd /
shhad@shhad-VirtualBox:/$ sudo sh -c 'echo "deb http://pack
ages.ros.org/ros/ubuntu $(lsb_release -sc) main" > /etc/apt
/sources.list.d/ros-latest.list'
[sudo] password for shhad:
shhad@shhad-VirtualBox:/$ sudo apt-key adv --keyserver 'hkp
://keyserver.ubuntu.com:80' --recv-key C1CF6E31E6BADE8868B1
72B4F42ED6FBAB17C654
Executing: /tmp/apt-key-gpghome.q5ywSRBGLj/gpg.1.sh --keyse
rver hkp://keyserver.ubuntu.com:80 --recv-key C1CF6E31E6BAD
E8868B172B4F42ED6FBAB17C654
gpg: key F42ED6FBAB17C654: public key "Open Robotics <info@
osrfoundation.org>" imported
gpg: Total number processed: 1
gpg:         imported: 1
shhad@shhad-VirtualBox:/$ sudo apt update
```

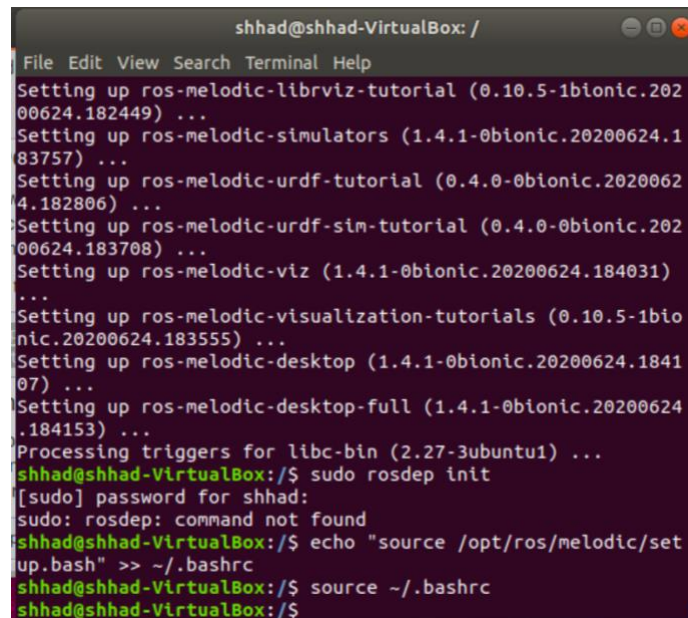
4. Desktop-Full Install: (Recommended) : ROS, `rqt`, `rviz`, robot-generic libraries, 2D/3D simulators and 2D/3D perception `sudo apt install ros-melodic-desktop-full`

```
shhad@shhad-VirtualBox: /
File Edit View Search Terminal Help
Get:36 http://sa.archive.ubuntu.com/ubuntu bionic-updates/m
ultiverse Translation-en [4864 B]
Get:37 http://sa.archive.ubuntu.com/ubuntu bionic-updates/m
ultiverse amd64 DEP-11 Metadata [2464 B]
Get:38 http://sa.archive.ubuntu.com/ubuntu bionic-backports
/universe amd64 Packages [7736 B]
Get:39 http://sa.archive.ubuntu.com/ubuntu bionic-backports
/universe i386 Packages [7724 B]
Get:40 http://sa.archive.ubuntu.com/ubuntu bionic-backports
/universe Translation-en [4588 B]
Get:41 http://sa.archive.ubuntu.com/ubuntu bionic-backports
/universe amd64 DEP-11 Metadata [9292 B]
Get:42 http://sa.archive.ubuntu.com/ubuntu bionic-backports
/universe DEP-11 48x48 Icons [2809 B]
Get:43 http://sa.archive.ubuntu.com/ubuntu bionic-backports
/universe DEP-11 64x64 Icons [3943 B]
Fetched 9612 kB in 17s (557 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
261 packages can be upgraded. Run 'apt list --upgradable' t
o see them.
shhad@shhad-VirtualBox:/$ sudo apt install ros-melodic-desk
top-full
```

5. Environment setup

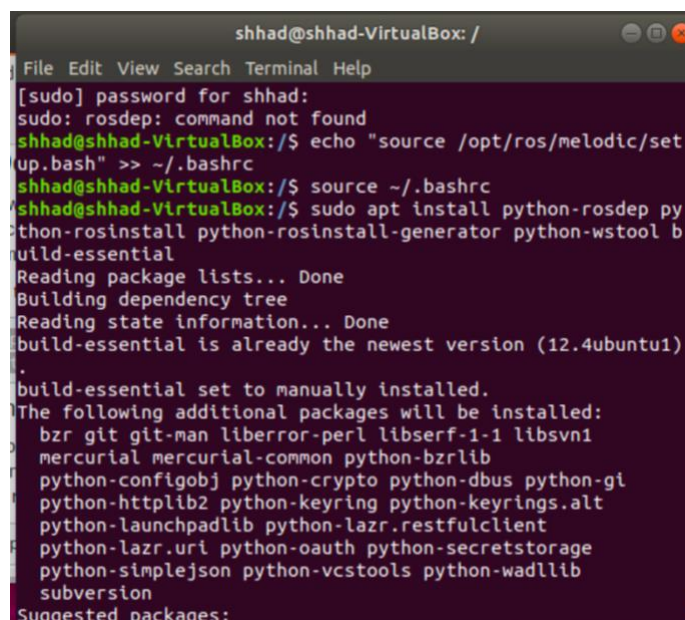
It's convenient if the ROS environment variables are automatically added to your bash session every time a new shell is launched, `echo "source /opt/ros/melodic/setup.bash" >> ~/.bashrc`

```
source ~/.bashrc
```

A terminal window titled 'shhad@shhad-VirtualBox: /' showing the installation of ROS Melodic dependencies. It lists the setup for various ROS packages like ros-melodic-librviz-tutorial, ros-melodic-simulators, ros-melodic-urdf-tutorial, etc. After the setup, the user runs 'sudo rosdep init', which prompts for a password and then reports 'command not found'. The user then adds the ROS setup command to their bashrc file using 'echo "source /opt/ros/melodic/setup.bash" >> ~/.bashrc' and sources it with 'source ~/.bashrc'.

```
shhad@shhad-VirtualBox: /
File Edit View Search Terminal Help
Setting up ros-melodic-librviz-tutorial (0.10.5-1bionic.202
00624.182449) ...
Setting up ros-melodic-simulators (1.4.1-0bionic.20200624.1
83757) ...
Setting up ros-melodic-urdf-tutorial (0.4.0-0bionic.2020062
4.182806) ...
Setting up ros-melodic-urdf-sim-tutorial (0.4.0-0bionic.202
00624.183708) ...
Setting up ros-melodic-viz (1.4.1-0bionic.20200624.184031)
...
Setting up ros-melodic-visualization-tutorials (0.10.5-1bio
nic.20200624.183555) ...
Setting up ros-melodic-desktop (1.4.1-0bionic.20200624.1841
07) ...
Setting up ros-melodic-desktop-full (1.4.1-0bionic.20200624
.184153) ...
Processing triggers for libc-bin (2.27-3ubuntu1) ...
shhad@shhad-VirtualBox:/$ sudo rosdep init
[sudo] password for shhad:
sudo: rosdep: command not found
shhad@shhad-VirtualBox:/$ echo "source /opt/ros/melodic/set
up.bash" >> ~/.bashrc
shhad@shhad-VirtualBox:/$ source ~/.bashrc
shhad@shhad-VirtualBox:/$
```

6. Dependencies for building packages, To install this tool and other dependencies for building ROS packages, run, `sudo apt install python-rosdep python-rosinstall python-rosinstall-generator python-wstool build-essential`

A terminal window titled 'shhad@shhad-VirtualBox: /' showing the installation of ROS dependencies. The user runs 'sudo apt install python-rosdep python-rosinstall python-rosinstall-generator python-wstool build-essential'. The terminal shows the progress of installing these packages, including reading package lists, building a dependency tree, and noting that build-essential is already the newest version. It also lists additional packages that will be installed along with the requested ones.

```
shhad@shhad-VirtualBox: /
File Edit View Search Terminal Help
[sudo] password for shhad:
sudo: rosdep: command not found
shhad@shhad-VirtualBox:/$ echo "source /opt/ros/melodic/set
up.bash" >> ~/.bashrc
shhad@shhad-VirtualBox:/$ source ~/.bashrc
shhad@shhad-VirtualBox:/$ sudo apt install python-rosdep py
thon-rosinstall python-rosinstall-generator python-wstool b
uild-essential
Reading package lists... Done
Building dependency tree
Reading state information... Done
build-essential is already the newest version (12.4ubuntu1)
.
build-essential set to manually installed.
The following additional packages will be installed:
bzip2 git git-man liberror-perl libserf-1-1 libsvn1
mercurial mercurial-common python-bzrlib
python-configobj python-crypto python-dbus python-gi
python-httplib2 python-keyring python-keyrings.alt
python-launchpadlib python-lazr.restfulclient
python-lazr.uri python-oauth python-secretstorage
python-simplejson python-vcs tools python-wadllib
subversion
Suggested packages:
```

7. Initialize rosdep , Before you can use many ROS tools, you will need to initialize rosdep. rosdep enables you to easily install system dependencies for source you want to compile and is required to run some core components in ROS. If you have not yet installed rosdep, do so as follows, `sudo apt install python-rosdep`

```
shhad@shhad-VirtualBox: /
File Edit View Search Terminal Help
Creating config file /etc/mercurial/hgrc.d/hgext.rc with new version
Setting up libserf-1-1:amd64 (1.3.9-6) ...
Setting up python-rosdep (0.19.0-1) ...
Setting up python-lazr.uri (1.0.3-2build1) ...
Setting up libsvn1:amd64 (1.9.7-4ubuntu1) ...
Setting up python-oauth (1.0.1-5) ...
Setting up python-dbus (1.2.6-1) ...
Setting up git (1:2.17.1-1ubuntu0.7) ...
Setting up python-rosinstall-generator (0.1.22-1) ...
Setting up python-secretstorage (2.3.1-2) ...
Setting up python-keyring (10.6.0-1) ...
Setting up python-wadllib (1.3.2-3ubuntu0.18.04.1) ...
Setting up subversion (1.9.7-4ubuntu1) ...
Setting up python-lazr.restfulclient (0.13.5-1) ...
Setting up python-vcstools (0.1.42-1) ...
Setting up python-launchpadlib (1.10.6-1) ...
Setting up python-wstool (0.1.17-1) ...
Setting up python-rosinstall (0.7.8-1) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
Processing triggers for libc-bin (2.27-3ubuntu1) ...
shhad@shhad-VirtualBox:/$ sudo apt install python-rosdep
```

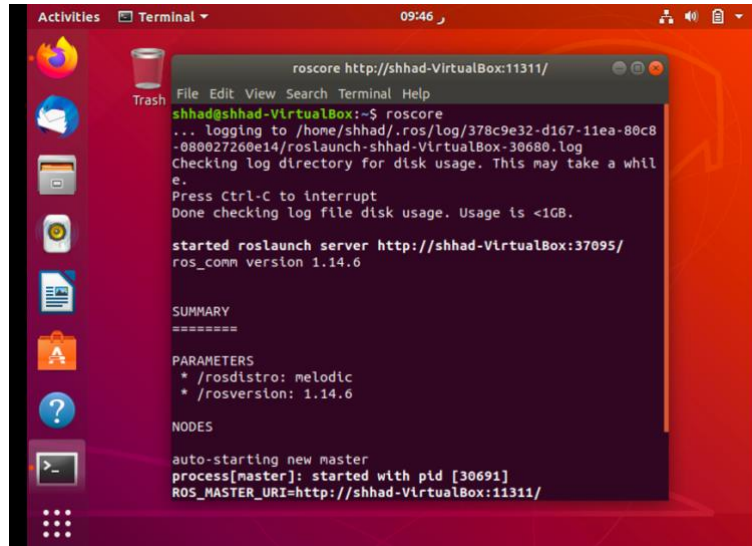
8. With the following, you can initialize rosdep, `sudo rosdep init`
`rosdep update`

```
shhad@shhad-VirtualBox: /
File Edit View Search Terminal Help
shhad@shhad-VirtualBox:/$ sudo rosdep init
Wrote /etc/ros/rosdep/sources.list.d/20-default.list
Recommended: please run

    rosdep update

shhad@shhad-VirtualBox:/$ rosdep update
reading in sources list data from /etc/ros/rosdep/sources.l
ist.d
Hit https://raw.githubusercontent.com/ros/rosdistro/master/
rosdep/osx-homebrew.yaml
Hit https://raw.githubusercontent.com/ros/rosdistro/master/
rosdep/base.yaml
Hit https://raw.githubusercontent.com/ros/rosdistro/master/
rosdep/python.yaml
Hit https://raw.githubusercontent.com/ros/rosdistro/master/
rosdep/ruby.yaml
Hit https://raw.githubusercontent.com/ros/rosdistro/master/
releases/fuerte.yaml
Query rosdistro index https://raw.githubusercontent.com/ros
/rosdistro/master/index-v4.yaml
Skip end-of-life distro "ardent"
Skip end-of-life distro "bouncy"
```


9. to insure that ROS is install , `roscore`

A screenshot of a Linux desktop environment with a red background. A terminal window is open, displaying the output of the 'roscore' command. The terminal title is 'roscore http://shhad-VirtualBox:11311/'. The output shows the process of logging to a specific directory, checking disk usage, and starting a roslaunch server. It also displays a summary of parameters and nodes.

```
roscore http://shhad-VirtualBox:11311/
File Edit View Search Terminal Help
shhad@shhad-VirtualBox:~$ roscore
... logging to /home/shhad/.ros/log/378c9e32-d167-11ea-80c8-080027260e14/roslaunch-shhad-VirtualBox-30680.log
Checking log directory for disk usage. This may take a while.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://shhad-VirtualBox:37095/
ros_comm version 1.14.6

SUMMARY
=====
PARAMETERS
* /rostdistro: melodic
* /rosversion: 1.14.6

NODES

auto-starting new master
process[master]: started with pid [30691]
ROS_MASTER_URI=http://shhad-VirtualBox:11311/
```

Now the installation done successfully.