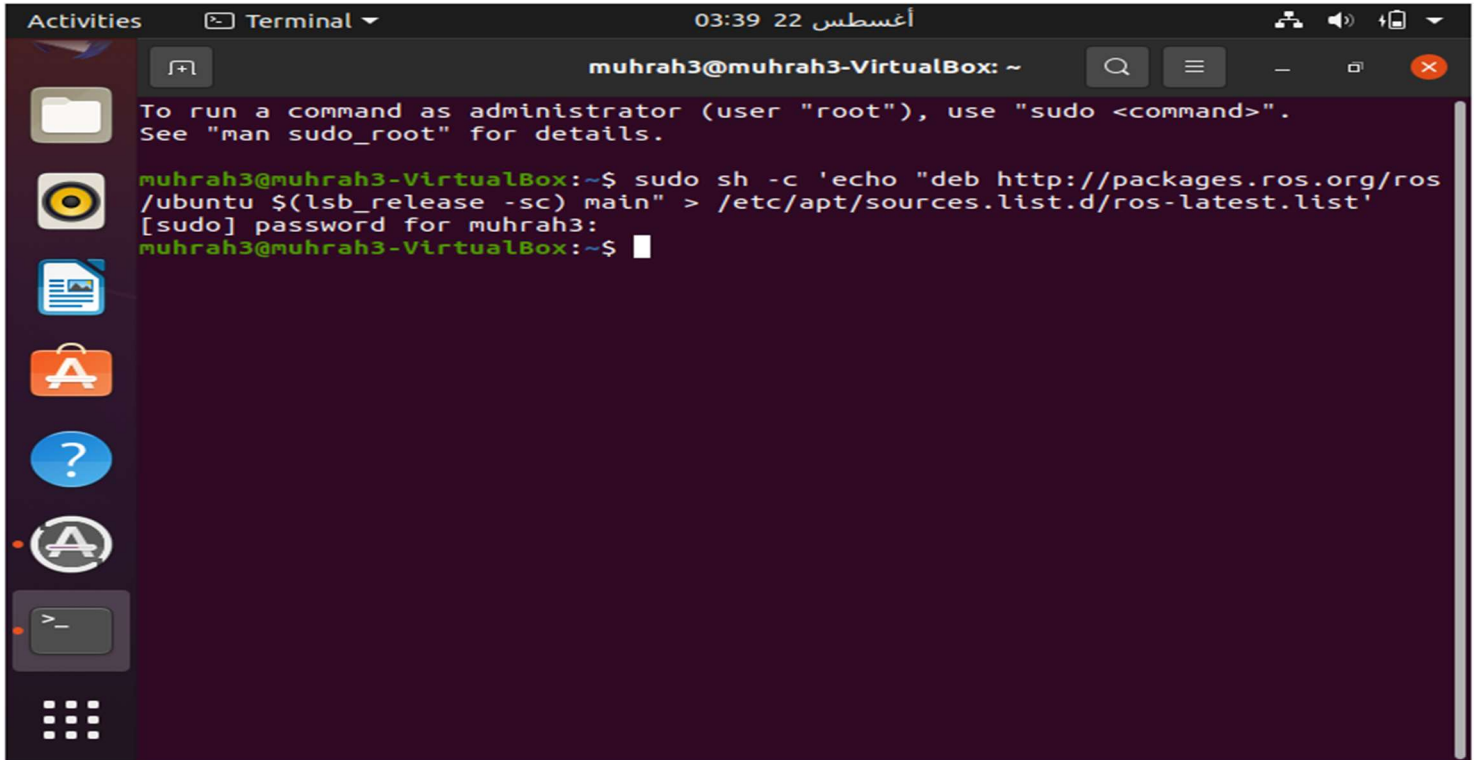


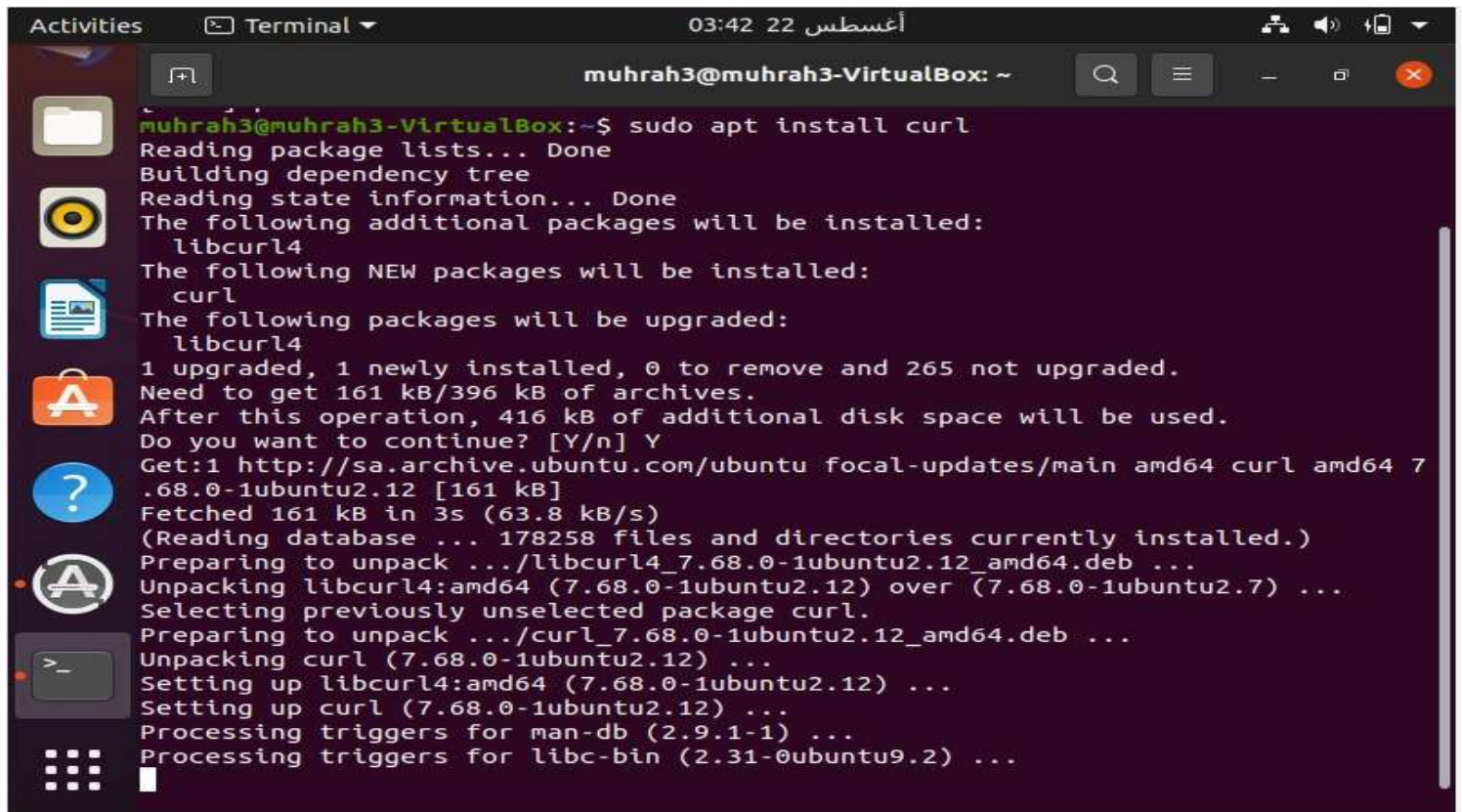
Install ROS

1-



```
Activities Terminal 03:39 22 أغسطس
muhrah3@muhrah3-VirtualBox: ~
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
muhrah3@muhrah3-VirtualBox:~$ sudo sh -c 'echo "deb http://packages.ros.org/ros
/ubuntu $(lsb_release -sc) main" > /etc/apt/sources.list.d/ros-latest.list'
[sudo] password for muhrah3:
muhrah3@muhrah3-VirtualBox:~$
```

2-



A terminal window titled "muhrah3@muhrah3-VirtualBox: ~" showing the command `sudo apt install curl` and its output. The output indicates that `libcurl4` will be installed along with `curl`. It shows the disk space requirements and the progress of downloading and installing the packages.

```
muhrah3@muhrah3-VirtualBox:~$ sudo apt install curl
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libcurl4
The following NEW packages will be installed:
  curl
The following packages will be upgraded:
  libcurl4
1 upgraded, 1 newly installed, 0 to remove and 265 not upgraded.
Need to get 161 kB/396 kB of archives.
After this operation, 416 kB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://sa.archive.ubuntu.com/ubuntu focal-updates/main amd64 curl amd64 7.68.0-1ubuntu2.12 [161 kB]
Fetched 161 kB in 3s (63.8 kB/s)
(Reading database ... 178258 files and directories currently installed.)
Preparing to unpack .../libcurl4_7.68.0-1ubuntu2.12_amd64.deb ...
Unpacking libcurl4:amd64 (7.68.0-1ubuntu2.12) over (7.68.0-1ubuntu2.7) ...
Selecting previously unselected package curl.
Preparing to unpack .../curl_7.68.0-1ubuntu2.12_amd64.deb ...
Unpacking curl (7.68.0-1ubuntu2.12) ...
Setting up libcurl4:amd64 (7.68.0-1ubuntu2.12) ...
Setting up curl (7.68.0-1ubuntu2.12) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for libc-bin (2.31-0ubuntu9.2) ...
```

3-



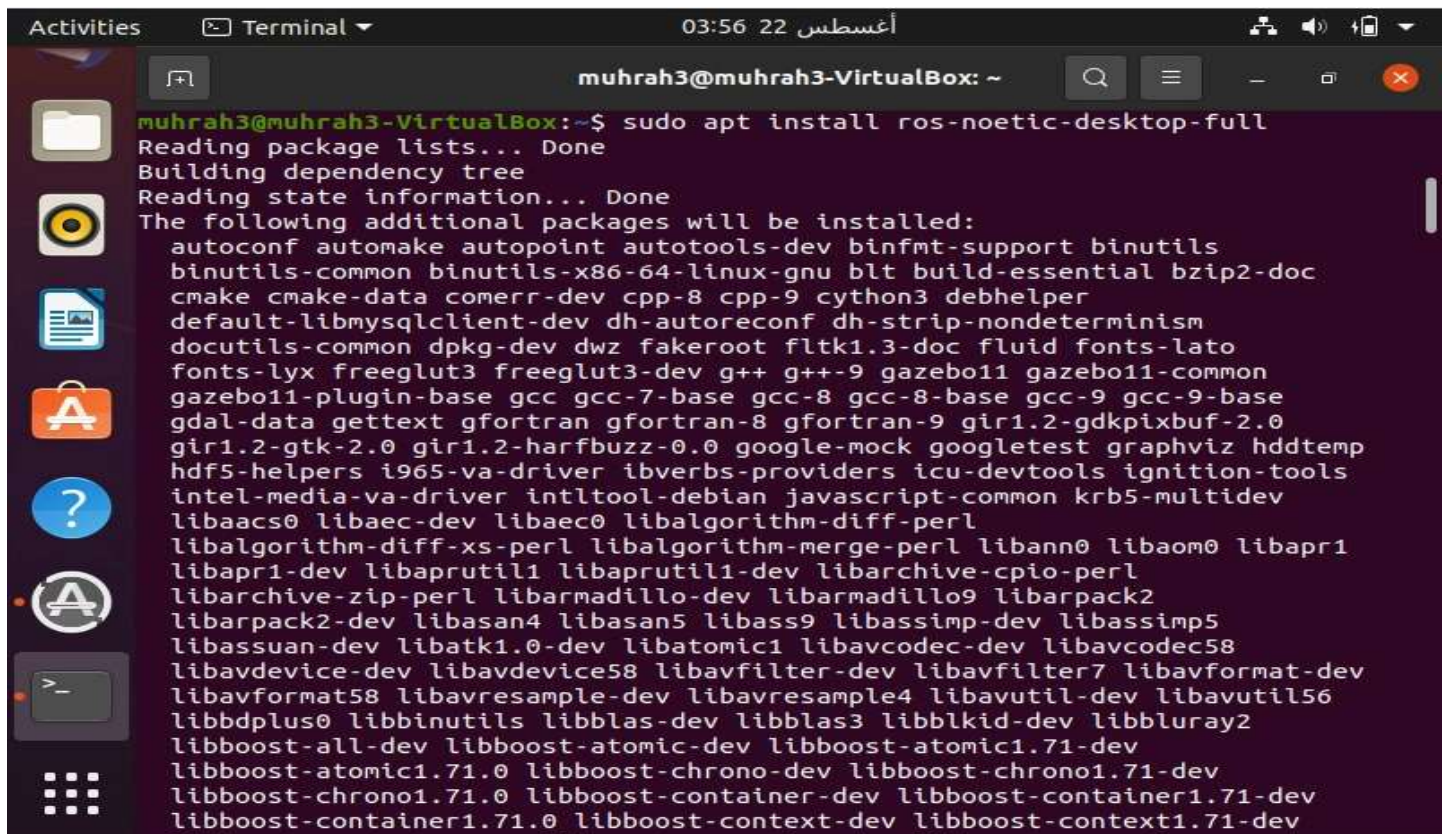
A terminal window showing the command `curl -s https://raw.githubusercontent.com/ros/rosdistro/master/ros.asc | sudo apt-key add -` and its output, which is "OK".

```
muhrah3@muhrah3-VirtualBox:~$ curl -s https://raw.githubusercontent.com/ros/rosdistro/master/ros.asc | sudo apt-key add -
OK
muhrah3@muhrah3-VirtualBox:~$
```


4-

```
muhrah3@muhrah3-VirtualBox:~$ sudo apt update
Hit:1 http://sa.archive.ubuntu.com/ubuntu focal InRelease
Get:2 http://sa.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:3 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:4 http://packages.ros.org/ros/ubuntu focal InRelease [4676 B]
Get:5 http://security.ubuntu.com/ubuntu focal-security/main amd64 DEP-11 Metadata [40.7 kB]
Get:6 http://sa.archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:7 http://security.ubuntu.com/ubuntu focal-security/universe amd64 DEP-11 Metadata [77.2 kB]
Get:8 http://packages.ros.org/ros/ubuntu focal/main i386 Packages [21.5 kB]
Get:9 http://sa.archive.ubuntu.com/ubuntu focal-updates/main amd64 DEP-11 Metadata [278 kB]
Get:10 http://security.ubuntu.com/ubuntu focal-security/multiverse amd64 DEP-11 Metadata [2464 B]
Get:11 http://sa.archive.ubuntu.com/ubuntu focal-updates/universe amd64 DEP-11 Metadata [391 kB]
Get:12 http://packages.ros.org/ros/ubuntu focal/main amd64 Packages [702 kB]
Get:13 http://sa.archive.ubuntu.com/ubuntu focal-updates/multiverse amd64 DEP-11 Metadata [940 B]
Get:14 http://sa.archive.ubuntu.com/ubuntu focal-backports/main amd64 DEP-11 Metadata [7968 B]
Get:15 http://sa.archive.ubuntu.com/ubuntu focal-backports/universe amd64 DEP-11 Metadata [30.6 kB]
Fetched 1892 kB in 5s (353 kB/s)
Reading package lists... 28%
```

5-



```
Activities  Terminal  03:56 22 أغسطس
muhrah3@muhrah3-VirtualBox: ~
muhrah3@muhrah3-VirtualBox:~$ sudo apt install ros-noetic-desktop-full
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  autoconf automake autopoint autotools-dev binfmt-support binutils
  binutils-common binutils-x86-64-linux-gnu blt build-essential bzip2-doc
  cmake cmake-data comerr-dev cpp-8 cpp-9 cython3 debhelper
  default-libmysqlclient-dev dh-autoreconf dh-strip-nondeterminism
  docutils-common dpkg-dev dwz fakeroot fltk1.3-doc fluid fonts-lato
  fonts-lyx freeglut3 freeglut3-dev g++ g++-9 gazebo11 gazebo11-common
  gazebo11-plugin-base gcc gcc-7-base gcc-8 gcc-8-base gcc-9 gcc-9-base
  gdal-data gettext gfortran gfortran-8 gfortran-9 gir1.2-gdkpixbuf-2.0
  gir1.2-gtk-2.0 gir1.2-harfbuzz-0.0 google-mock googletest graphviz hddtemp
  hdf5-helpers i965-va-driver ibverbs-providers icu-devtools ignition-tools
  intel-media-va-driver intltool-debian javascript-common krb5-multidev
  libaacs0 libaec-dev libaec0 libalgorithm-diff-perl
  libalgorithm-diff-xs-perl libalgorithm-merge-perl libann0 libaom0 libapri
  libapri-dev libaprutil1 libaprutil1-dev libarchive-cpio-perl
  libarchive-zip-perl libarmadillo-dev libarmadillo9 libarpack2
  libarpack2-dev libasan4 libasan5 libass9 libassimp-dev libassimp5
  libassuan-dev libatk1.0-dev libatomic1 libavcodec-dev libavcodec58
  libavdevice-dev libavdevice58 libavfilter-dev libavfilter7 libavformat-dev
  libavformat58 libavresample-dev libavresample4 libavutil-dev libavutil56
  libbdplus0 libbinutils libblas-dev libblas3 libblkid-dev libbluray2
  libboost-all-dev libboost-atomic-dev libboost-atomic1.71-dev
  libboost-atomic1.71.0 libboost-chrono-dev libboost-chrono1.71-dev
  libboost-chrono1.71.0 libboost-container-dev libboost-container1.71-dev
  libboost-container1.71.0 libboost-context-dev libboost-context1.71-dev
```


6-

```
muhrah3@muhrah3-VirtualBox:~$ echo "source /opt/ros/noetic/setup.bash" >> ~/.bashrc
muhrah3@muhrah3-VirtualBox:~$ source ~/.bashrc
muhrah3@muhrah3-VirtualBox:~$
```

7-

```
muhrah3@muhrah3-VirtualBox:~$ sudo apt install python3-rosdep python3-rosinstall
python3-rosinstall-generator python3-wstool build-essential
[sudo] password for muhrah3:
Reading package lists... Done
Building dependency tree
Reading state information... Done
build-essential is already the newest version (12.8ubuntu1.1).
build-essential set to manually installed.
The following additional packages will be installed:
  brz bzip2 git git-man liberror-perl libpython2-stdlib libpython2.7-minimal
  libpython2.7-stdlib libserf-1-1 libsvn1 libutf8proc2 mercurial
  mercurial-common python2 python2-minimal python2.7 python2.7-minimal
  python3-breezy python3-configobj python3-deprecated python3-dulwich
  python3-fastimport python3-github python3-gitlab python3-gpg
  python3-roscdistro python3-vcstools python3-wrapt subversion
Suggested packages:
  brz-doc python3-breezy.tests git-daemon-run | git-daemon-sysvinit git-doc
  mercurial-doc python2-doc python2.7-doc python3-dulwich-doc python3-gpg-doc
  python3-roscdistro-doc python3-vcstools-doc python3-wrapt-doc subversion-doc
```

8-

```
Processing triggers for gnome-menus (3.36.0-1ubuntu1) ...
muhrah3@muhrah3-VirtualBox:~$ sudo apt install python3-rosdep
Reading package lists... Done
Building dependency tree
Reading state information... Done
python3-rosdep is already the newest version (0.22.1-1).
0 upgraded, 0 newly installed, 0 to remove and 229 not upgraded.
muhrah3@muhrah3-VirtualBox:~$
```

9-

```
muhrah3@muhrah3-VirtualBox:~$ sudo rosdep init
Wrote /etc/ros/rosdep/sources.list.d/20-default.list
Recommended: please run

rosdep update

muhrah3@muhrah3-VirtualBox:~$
```

10-

```
muhrah3@muhrah3-VirtualBox:~$ roscore
... logging to /home/muhrah3/.ros/log/0cdc167e-21bd-11ed-94b9-7be689865d59/rosl
aunch-muhrah3-VirtualBox-33021.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://muhrah3-VirtualBox:33273/
ros_comm version 1.15.14

SUMMARY
=====

PARAMETERS
* /rostdistro: noetic
* /rosversion: 1.15.14

NODES

auto-starting new master
process[master]: started with pid [33031]
ROS_MASTER_URI=http://muhrah3-VirtualBox:11311/

setting /run_id to 0cdc167e-21bd-11ed-94b9-7be689865d59
process[rosout-1]: started with pid [33041]
started core service [/rosout]
```