

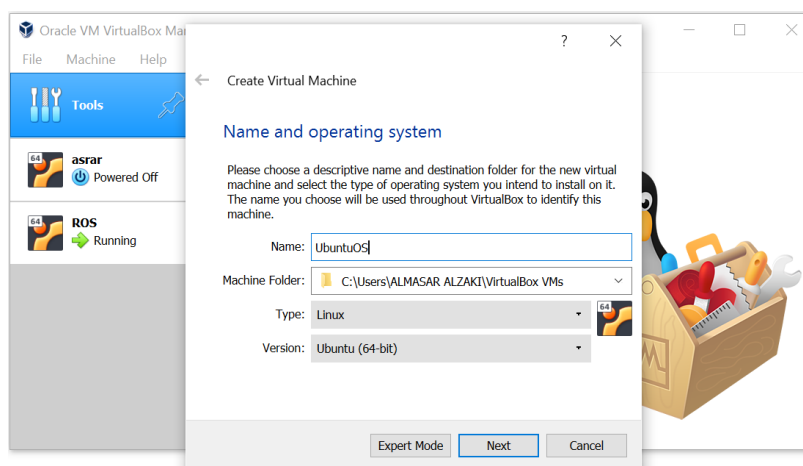
How to install ROS on your device

Download Virtualbox to your device to install Ubuntu from this link

<https://www.virtualbox.org/wiki/Downloads>



Download Ubuntu from <https://ubuntu.com/download/desktop> and then from virtualbox choose new and choose the type of operating system linux as shown in the picture



Choose the memory size, then click Next

The screenshot shows the 'Create Virtual Machine' dialog box with the 'Memory size' step selected. The title bar includes a question mark and a close button. A back arrow and the text 'Create Virtual Machine' are at the top left. The section title 'Memory size' is in blue. Below it, instructions state: 'Select the amount of memory (RAM) in megabytes to be allocated to the virtual machine.' and 'The recommended memory size is **1024 MB**.' A horizontal slider is shown with a blue handle positioned at 1024 MB. The slider's range is from 4 MB to 8192 MB. To the right of the slider is a text box containing '1024' and a 'MB' unit label. At the bottom right, there are 'Next' and 'Cancel' buttons.

Choose the create a virtual hard disk now, then click Create

The screenshot shows the 'Create Virtual Machine' dialog box with the 'Hard disk' step selected. The title bar includes a question mark and a close button. A back arrow and the text 'Create Virtual Machine' are at the top left. The section title 'Hard disk' is in blue. Below it, instructions state: 'If you wish you can add a virtual hard disk to the new machine. You can either create a new hard disk file or select one from the list or from another location using the folder icon.' and 'If you need a more complex storage set-up you can skip this step and make the changes to the machine settings once the machine is created.' The recommended size is 'The recommended size of the hard disk is **10.00 GB**.' Three radio buttons are present: 'Do not add a virtual hard disk', 'Create a virtual hard disk now' (which is selected), and 'Use an existing virtual hard disk file'. Below the radio buttons is a text box containing 'ROS.vdi (Normal, 30.00 GB)' and a folder icon. At the bottom right, there are 'Create' and 'Cancel' buttons.

Choose the VID, then click Next

? ×

← Create Virtual Hard Disk

Hard disk file type

Please choose the type of file that you would like to use for the new virtual hard disk. If you do not need to use it with other virtualization software you can leave this setting unchanged.

☒ VDI (VirtualBox Disk Image)

☐ VHD (Virtual Hard Disk)

☐ VMDK (Virtual Machine Disk)

Expert Mode Next Cancel

Choose the Dynamically allocated, then click Next

? ×

← Create Virtual Hard Disk

Storage on physical hard disk

Please choose whether the new virtual hard disk file should grow as it is used (dynamically allocated) or if it should be created at its maximum size (fixed size).

A **dynamically allocated** hard disk file will only use space on your physical hard disk as it fills up (up to a maximum **fixed size**), although it will not shrink again automatically when space on it is freed.

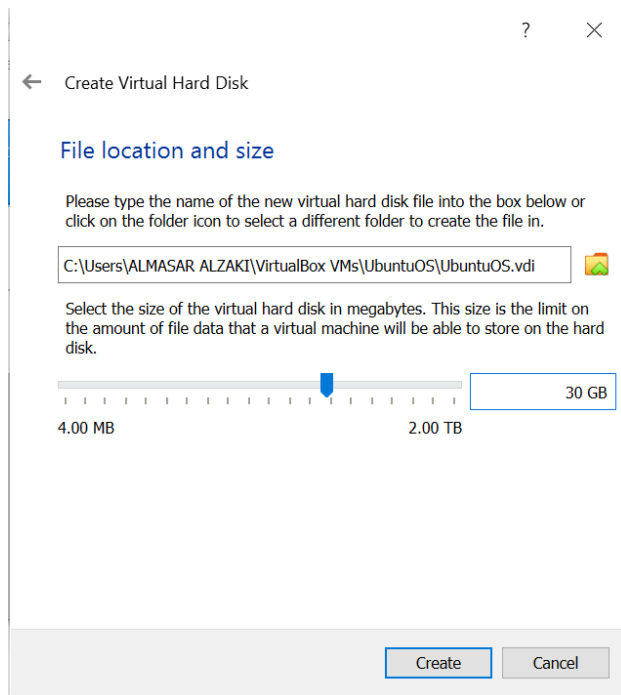
A **fixed size** hard disk file may take longer to create on some systems but is often faster to use.

☒ Dynamically allocated

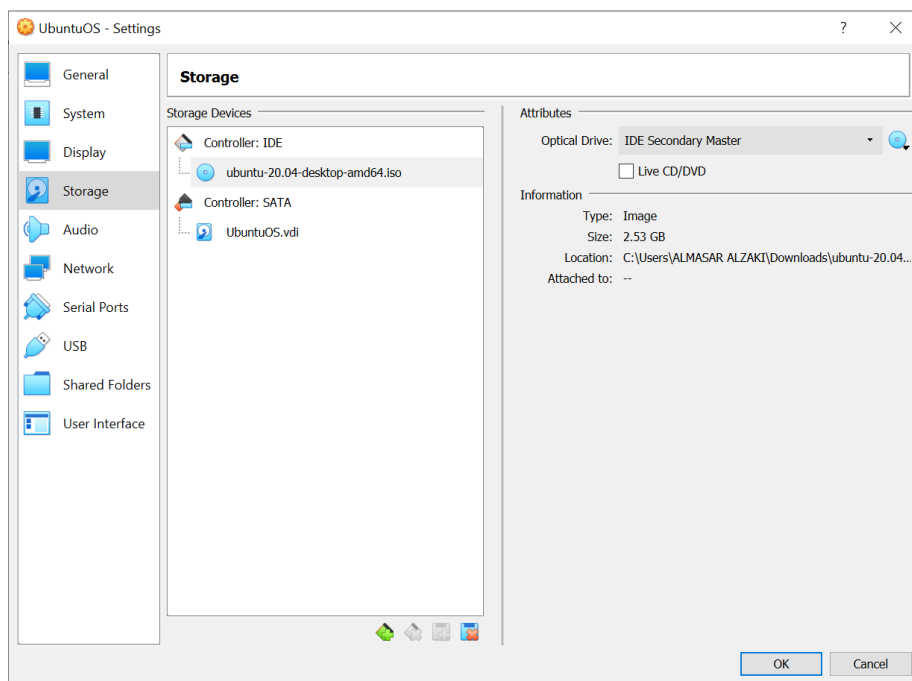
☐ Fixed size

Next Cancel

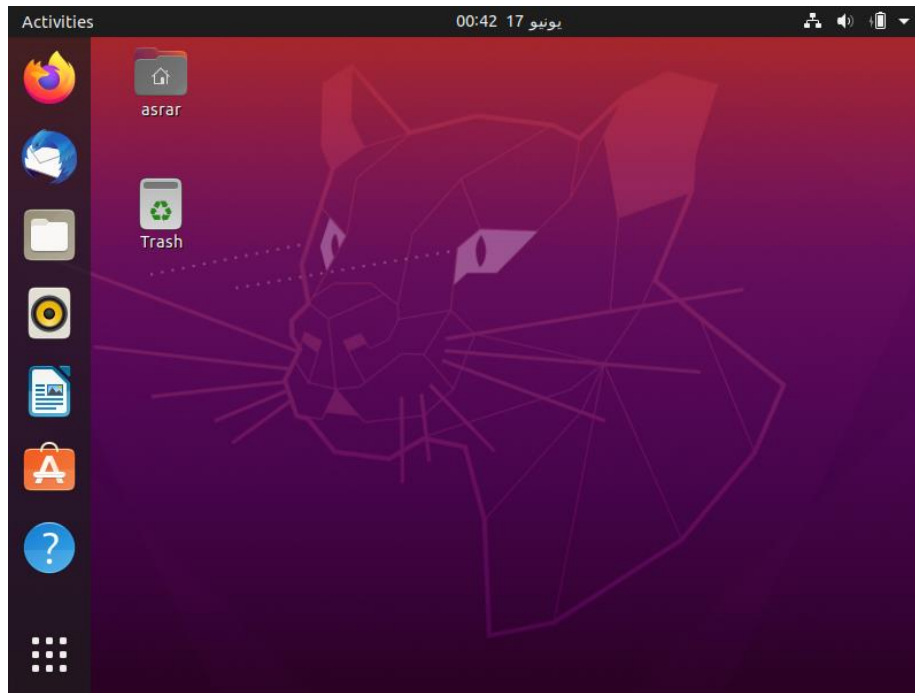
Choose 30 GB, then click Create



Then choose setting and then choose storage and then locate the ubuntu you have loaded on your device



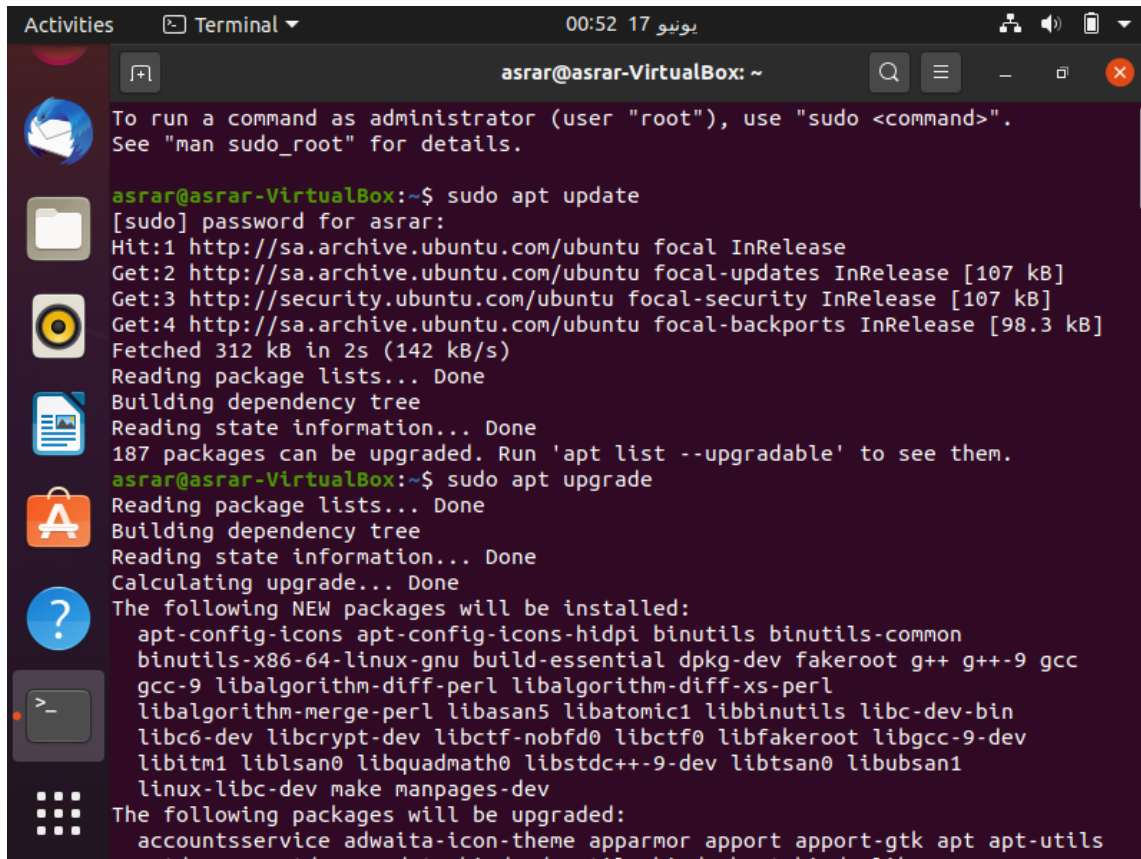
Then open the system that you made and download the Ubuntu and select the language and then choose in the type of download Erase disk and install ubuntu and finally put your name and a special password in you for the operating system and then wait for it to bear and open with you as in the picture



open the terminal and put the command line

Sudo apt update

Sudo apt upgrade



```
Activities Terminal 00:52 17 يونيو
asrar@asrar-VirtualBox: ~
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

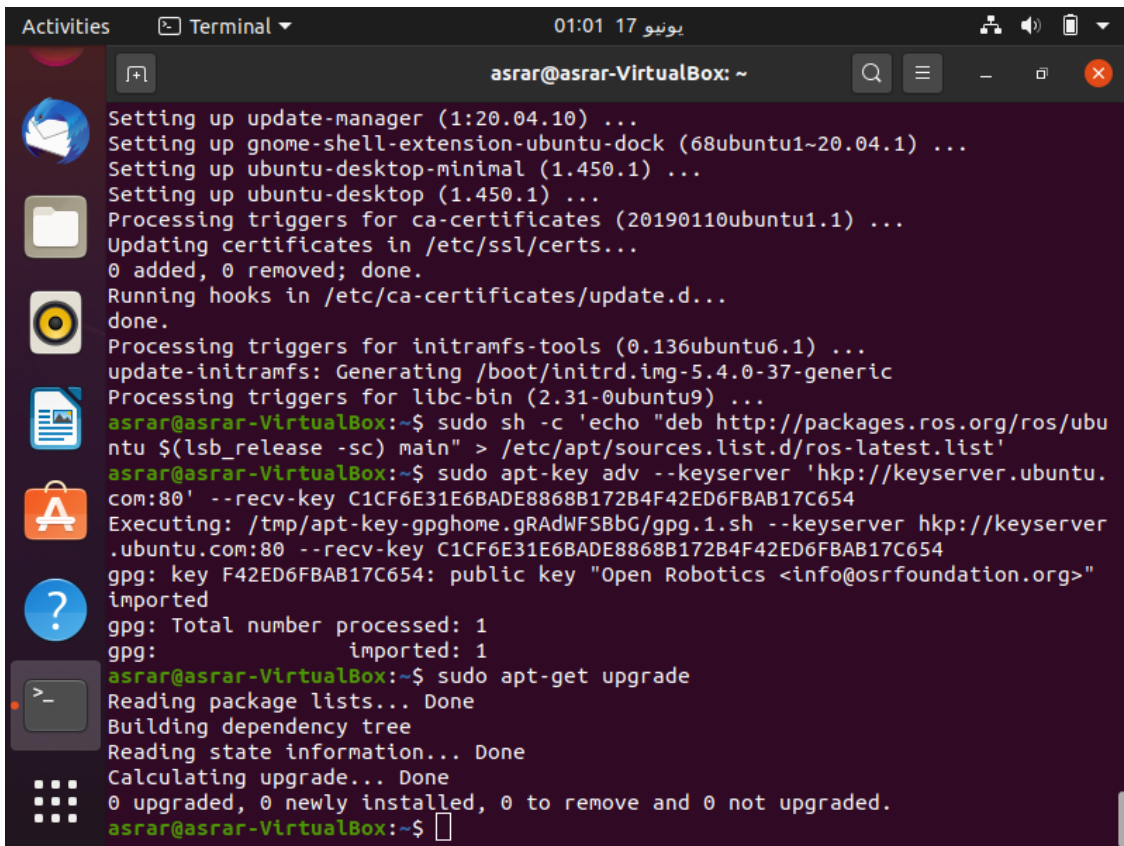
asrar@asrar-VirtualBox:~$ sudo apt update
[sudo] password for asrar:
Hit:1 http://sa.archive.ubuntu.com/ubuntu focal InRelease
Get:2 http://sa.archive.ubuntu.com/ubuntu focal-updates InRelease [107 kB]
Get:3 http://security.ubuntu.com/ubuntu focal-security InRelease [107 kB]
Get:4 http://sa.archive.ubuntu.com/ubuntu focal-backports InRelease [98.3 kB]
Fetched 312 kB in 2s (142 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
187 packages can be upgraded. Run 'apt list --upgradable' to see them.
asrar@asrar-VirtualBox:~$ sudo apt upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done
The following NEW packages will be installed:
  apt-config-icons apt-config-icons-hidpi binutils binutils-common
  binutils-x86-64-linux-gnu build-essential dpkg-dev fakeroot g++ g++-9 gcc
  gcc-9 libalgorithm-diff-perl libalgorithm-diff-xs-perl
  libalgorithm-merge-perl libasan5 libatomic1 libbinutils libc-dev-bin
  libc6-dev libcrypt-dev libctf-nobfd0 libctf0 libfakeroot libgcc-9-dev
  libitm1 liblsan0 libquadmath0 libstdc++-9-dev libtsan0 libubsan1
  linux-libc-dev make manpages-dev
The following packages will be upgraded:
  accountsservice adwaita-icon-theme apparmor appport appport-gtk apt apt-utils
  aptdaemon aptdaemon-data bind9-dnswl-bin bind9-host bind9-libs
```

Putting the same command line as in the picture

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

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

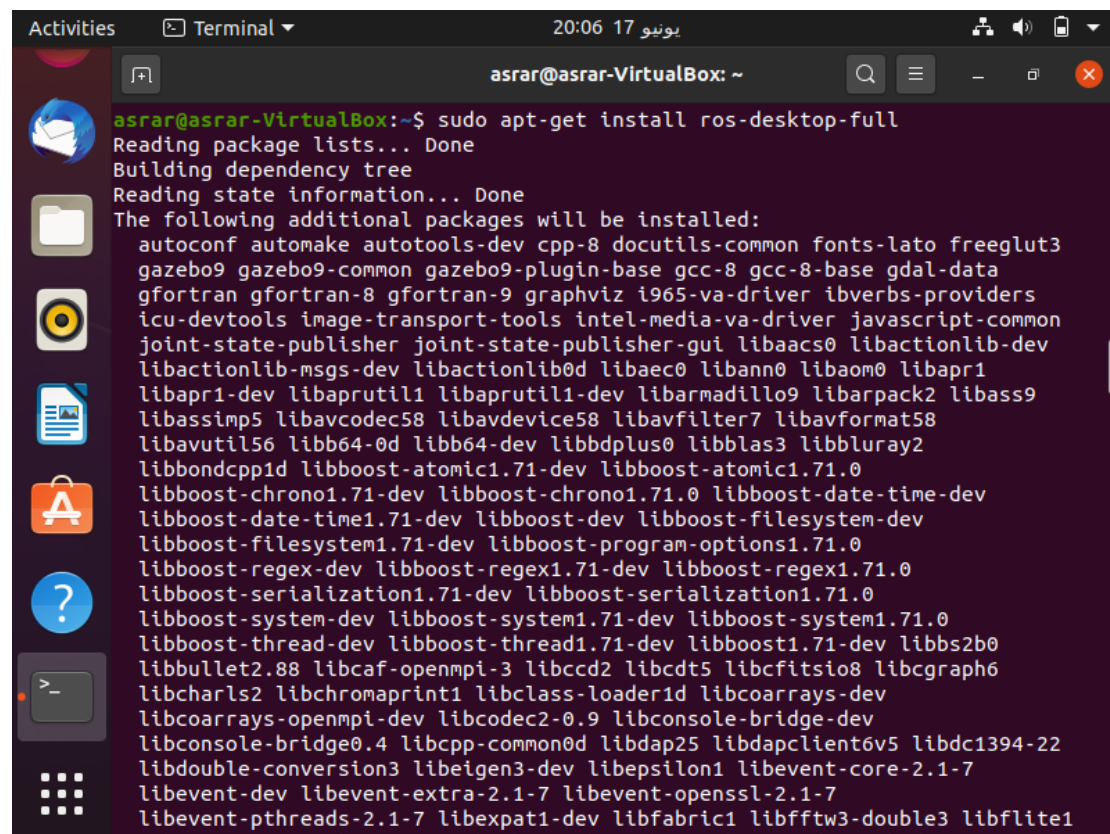
Sudo apt-get upgrade



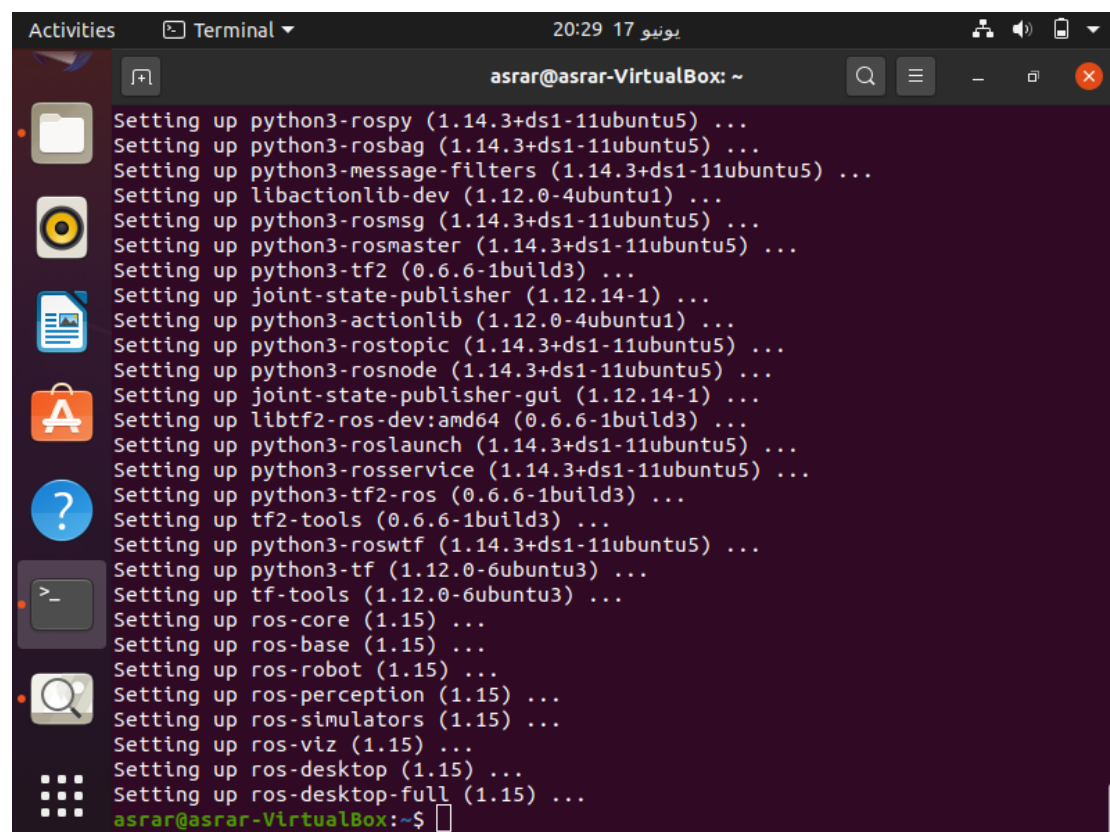
```
Activities Terminal 01:01 17 يونيو
asrar@asrar-VirtualBox: ~
Setting up update-manager (1:20.04.10) ...
Setting up gnome-shell-extension-ubuntu-dock (68ubuntu1~20.04.1) ...
Setting up ubuntu-desktop-minimal (1.450.1) ...
Setting up ubuntu-desktop (1.450.1) ...
Processing triggers for ca-certificates (20190110ubuntu1.1) ...
Updating certificates in /etc/ssl/certs...
0 added, 0 removed; done.
Running hooks in /etc/ca-certificates/update.d...
done.
Processing triggers for initramfs-tools (0.136ubuntu6.1) ...
update-initramfs: Generating /boot/initrd.img-5.4.0-37-generic
Processing triggers for libc-bin (2.31-0ubuntu9) ...
asrar@asrar-VirtualBox:~$ sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu $(lsb_release -sc) main" > /etc/apt/sources.list.d/ros-latest.list'
asrar@asrar-VirtualBox:~$ sudo apt-key adv --keyserver 'hkp://keyserver.ubuntu.com:80' --recv-key C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654
Executing: /tmp/apt-key-gpghome.gRAAdWFSBbG/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
asrar@asrar-VirtualBox:~$ sudo apt-get upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
asrar@asrar-VirtualBox:~$
```

Then put the command line to download ros

```
sudo apt-get install ros-desktop-full
```



```
asrar@asrar-VirtualBox: ~  
$ sudo apt-get install ros-desktop-full  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
The following additional packages will be installed:  
autoconf automake autotools-dev cpp-8 docutils-common fonts-lato freeglut3  
gazebo9 gazebo9-common gazebo9-plugin-base gcc-8 gcc-8-base gdal-data  
gfortran gfortran-8 gfortran-9 graphviz i965-vd-driver ibverbs-providers  
icu-devtools image-transport-tools intel-media-vd-driver javascript-common  
joint-state-publisher joint-state-publisher-gui libaacs0 libactionlib-dev  
libactionlib-msgs-dev libactionlib0d libaio0 libann0 libaom0 libapr1  
libapr1-dev libaprutil1 libaprutil1-dev libarmadillo9 libarpak2 libass9  
libassimp5 libavcodec58 libavdevice58 libavfilter7 libavformat58  
libavutil56 libb64-0d libb64-dev libbdplus0 libblas3 libbluray2  
libbondcpp1d libboost-atomic1.71-dev libboost-atomic1.71.0  
libboost-chrono1.71-dev libboost-chrono1.71.0 libboost-date-time-dev  
libboost-date-time1.71-dev libboost-dev libboost-filesystem-dev  
libboost-filesystem1.71-dev libboost-program-options1.71.0  
libboost-regex-dev libboost-regex1.71-dev libboost-regex1.71.0  
libboost-serialization1.71-dev libboost-serialization1.71.0  
libboost-system-dev libboost-system1.71-dev libboost-system1.71.0  
libboost-thread-dev libboost-thread1.71-dev libboost1.71-dev libbs2b0  
libbullet2.88 libcaf-openmpi-3 libccd2 libcdt5 libcfitsio8 libcgraph6  
libcharls2 libchromaprint1 libclass-loader1d libcoarrays-dev  
libcoarrays-openmpi-dev libcodec2-0.9 libconsole-bridge-dev  
libconsole-bridge0.4 libcpp-common0d libdap25 libdapclient6v5 libdc1394-22  
libdouble-conversion3 libeigen3-dev libepsilon1 libevent-core-2.1-7  
libevent-dev libevent-extra-2.1-7 libevent-openssl-2.1-7  
libevent-pthreads-2.1-7 libexpat1-dev libfabric1 libfftw3-double3 libflite1
```



```
Setting up python3-rosipy (1.14.3+ds1-11ubuntu5) ...  
Setting up python3-rosbag (1.14.3+ds1-11ubuntu5) ...  
Setting up python3-message-filters (1.14.3+ds1-11ubuntu5) ...  
Setting up libactionlib-dev (1.12.0-4ubuntu1) ...  
Setting up python3-rosmmsg (1.14.3+ds1-11ubuntu5) ...  
Setting up python3-rosmaster (1.14.3+ds1-11ubuntu5) ...  
Setting up python3-tf2 (0.6.6-1build3) ...  
Setting up joint-state-publisher (1.12.14-1) ...  
Setting up python3-actionlib (1.12.0-4ubuntu1) ...  
Setting up python3-rostopic (1.14.3+ds1-11ubuntu5) ...  
Setting up python3-rosnode (1.14.3+ds1-11ubuntu5) ...  
Setting up joint-state-publisher-gui (1.12.14-1) ...  
Setting up libtf2-ros-dev:amd64 (0.6.6-1build3) ...  
Setting up python3-roslaunch (1.14.3+ds1-11ubuntu5) ...  
Setting up python3-rosservice (1.14.3+ds1-11ubuntu5) ...  
Setting up python3-tf2-ros (0.6.6-1build3) ...  
Setting up tf2-tools (0.6.6-1build3) ...  
Setting up python3-roswtf (1.14.3+ds1-11ubuntu5) ...  
Setting up python3-tf (1.12.0-6ubuntu3) ...  
Setting up tf-tools (1.12.0-6ubuntu3) ...  
Setting up ros-core (1.15) ...  
Setting up ros-base (1.15) ...  
Setting up ros-robot (1.15) ...  
Setting up ros-perception (1.15) ...  
Setting up ros-simulators (1.15) ...  
Setting up ros-viz (1.15) ...  
Setting up ros-desktop (1.15) ...  
Setting up ros-desktop-full (1.15) ...  
asrar@asrar-VirtualBox: ~$
```


References:

1- <https://www.udemy.com/course/ros-basics-program-robots/learn/lecture/8892578#overview>

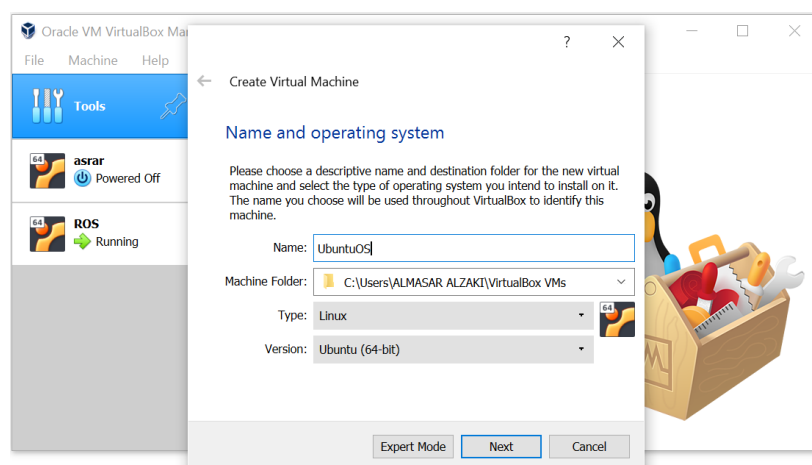
2- <http://wiki.ros.org/kinetic/Installation/Ubuntu>

طريقة تثبيت ROS على جهازك

تحميل virtualbox على جهازك حتى تتمكن من تنصيب Ubuntu من هذا الرابط
<https://www.virtualbox.org/wiki/Downloads>



قم بتنزيل Ubuntu من الرابط <https://ubuntu.com/download/desktop> و بعد ذلك من
virtualbox اختر new واختار نوع نظام التشغيل linux كما هو موضح في الصورة ثم اضغط على التالي



اختر حجم الذاكرة ثم اضغط على التالي

The screenshot shows the 'Create Virtual Machine' wizard at the 'Memory size' step. The title bar includes a question mark and a close button. The main heading is 'Memory size'. Below it, the text says: 'Select the amount of memory (RAM) in megabytes to be allocated to the virtual machine.' and 'The recommended memory size is 1024 MB.' A horizontal slider is shown with a blue handle positioned at 1024 MB. The slider has labels '4 MB' at the left end and '8192 MB' at the right end. To the right of the slider, there is a text box containing '1024' and a 'MB' unit label. At the bottom right, there are 'Next' and 'Cancel' buttons.

اختر create a virtual hard disk now ثم اضغط انشاء

The screenshot shows the 'Create Virtual Machine' wizard at the 'Hard disk' step. The title bar includes a question mark and a close button. The main heading is 'Hard disk'. Below it, the text says: 'If you wish you can add a virtual hard disk to the new machine. You can either create a new hard disk file or select one from the list or from another location using the folder icon.' and 'If you need a more complex storage set-up you can skip this step and make the changes to the machine settings once the machine is created.' and 'The recommended size of the hard disk is 10.00 GB.' There are three radio button options: 'Do not add a virtual hard disk', 'Create a virtual hard disk now' (which is selected), and 'Use an existing virtual hard disk file'. Below these options is a text box containing 'ROS.vdi (Normal, 30.00 GB)' and a folder icon. At the bottom right, there are 'Create' and 'Cancel' buttons.

اختر VID ثم اضغط التالي

? ×

← Create Virtual Hard Disk

Hard disk file type

Please choose the type of file that you would like to use for the new virtual hard disk. If you do not need to use it with other virtualization software you can leave this setting unchanged.

☒ VDI (VirtualBox Disk Image)

☐ VHD (Virtual Hard Disk)

☐ VMDK (Virtual Machine Disk)

Expert Mode

Next

Cancel

اختر Dynamically allocated ثم اضغط التالي

? ×

← Create Virtual Hard Disk

Storage on physical hard disk

Please choose whether the new virtual hard disk file should grow as it is used (dynamically allocated) or if it should be created at its maximum size (fixed size).

A **dynamically allocated** hard disk file will only use space on your physical hard disk as it fills up (up to a maximum **fixed size**), although it will not shrink again automatically when space on it is freed.

A **fixed size** hard disk file may take longer to create on some systems but is often faster to use.

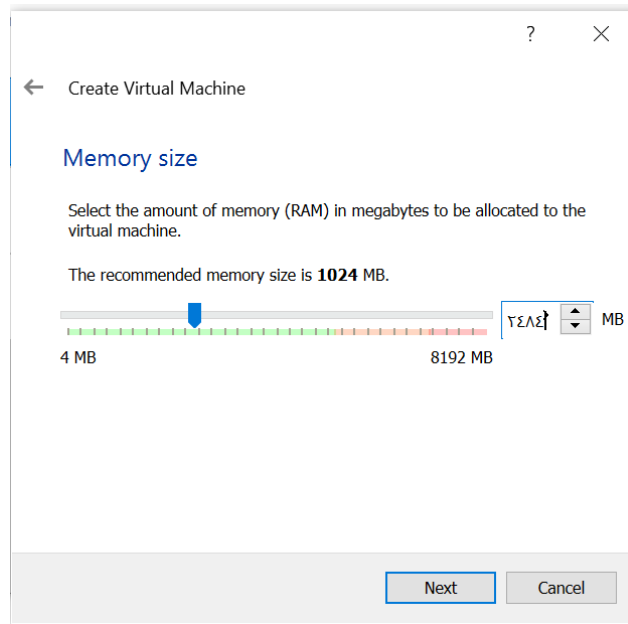
☒ Dynamically allocated

☐ Fixed size

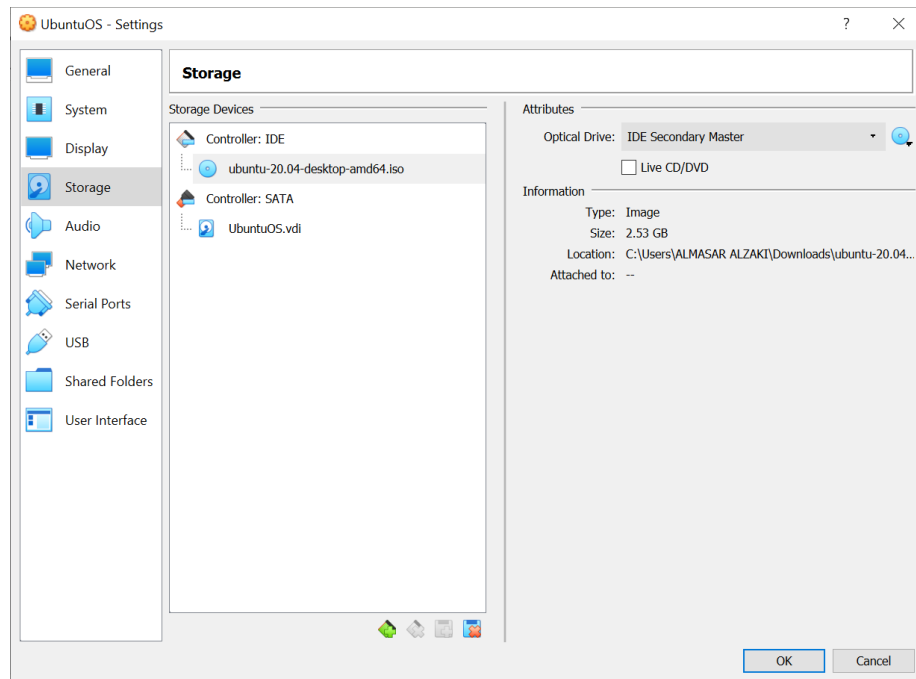
Next

Cancel

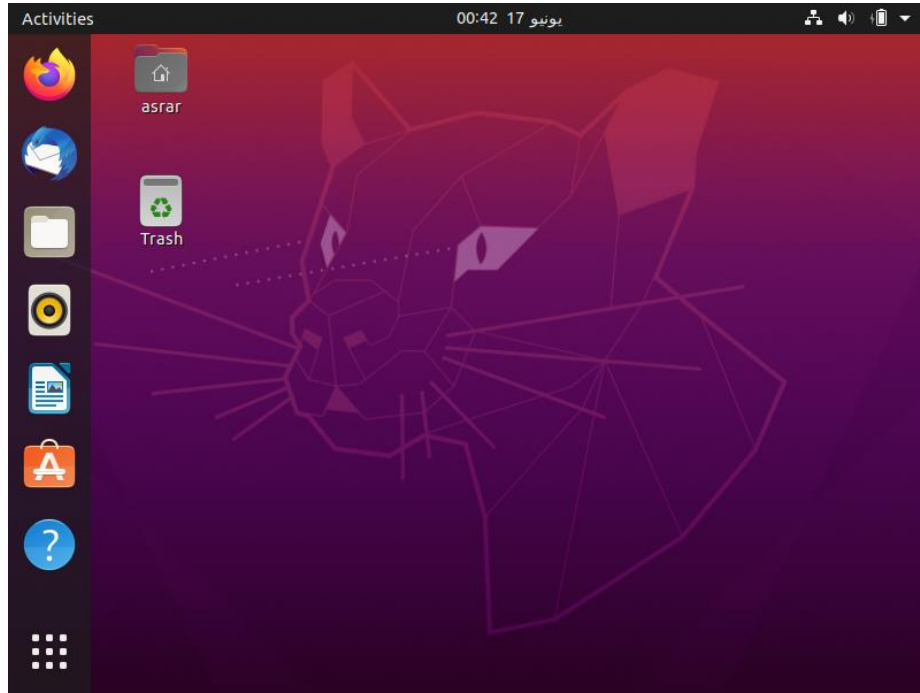
حدد حجم الملف 30 GB ثم اضغط انشاء



ثم اختر setting وبعدها اختر storage ثم حدد الموقع لل ubuntu الذي حملته على جهازك



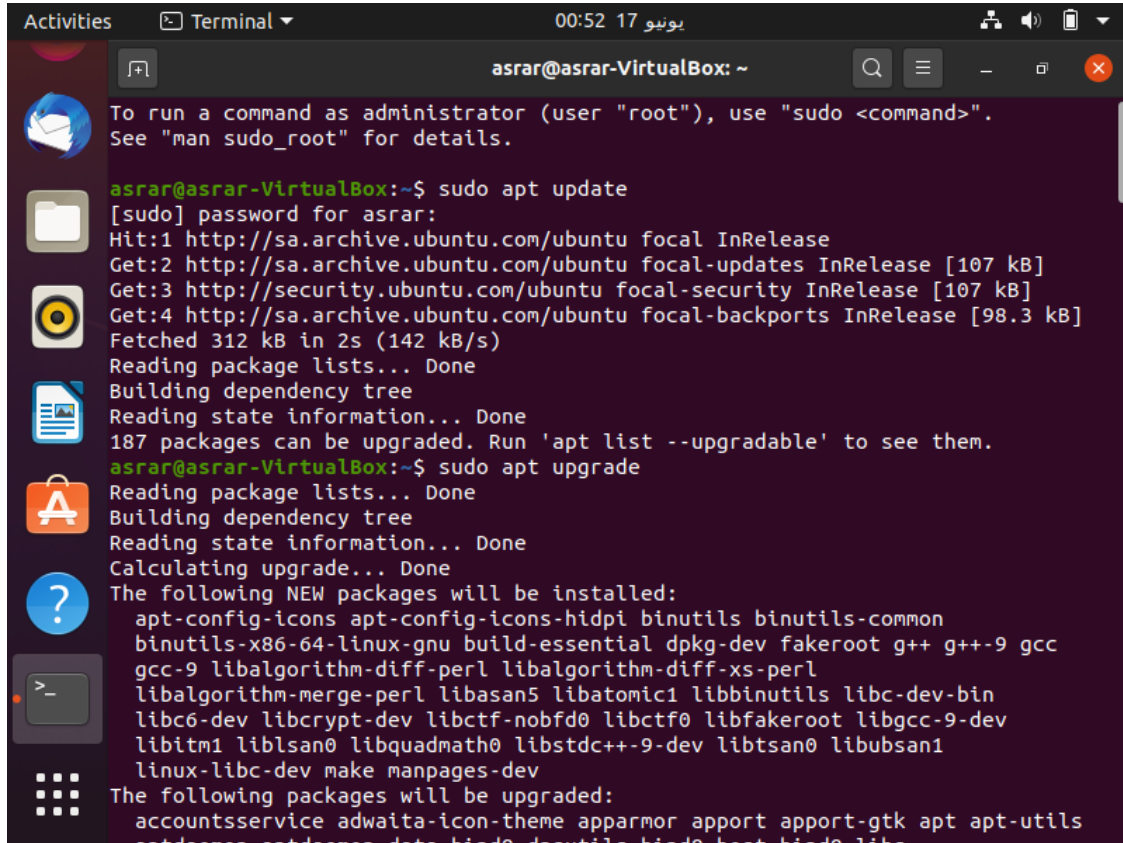
بعدها افتح النظام الذي عملته ونزل الابلنتو وحدد اللغة وبعدها اختر في نوع التنزيل Erase disk and install ubuntu و اخر شي ضع اسمك و باسورد خاص فيك للنظام التشغيل وبعدها تنتظر حتى يتحمل ويفتح معك كما في الصورة



افتح terminal ونضع الاوامر

Sudo apt update

Sudo apt upgrade



```
Activities Terminal 00:52 17 يونيو
asrar@asrar-VirtualBox: ~
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

asrar@asrar-VirtualBox:~$ sudo apt update
[sudo] password for asrar:
Hit:1 http://sa.archive.ubuntu.com/ubuntu focal InRelease
Get:2 http://sa.archive.ubuntu.com/ubuntu focal-updates InRelease [107 kB]
Get:3 http://security.ubuntu.com/ubuntu focal-security InRelease [107 kB]
Get:4 http://sa.archive.ubuntu.com/ubuntu focal-backports InRelease [98.3 kB]
Fetched 312 kB in 2s (142 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
187 packages can be upgraded. Run 'apt list --upgradable' to see them.

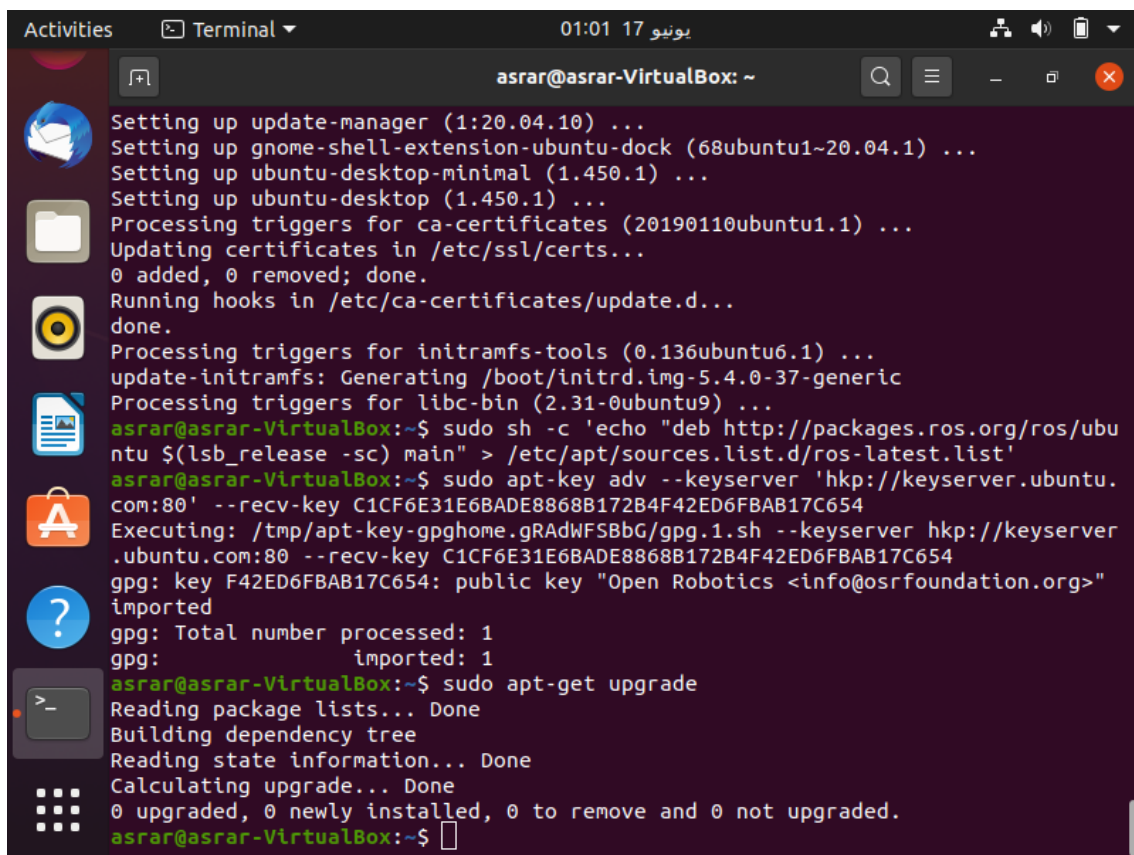
asrar@asrar-VirtualBox:~$ sudo apt upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done
The following NEW packages will be installed:
  apt-config-icons apt-config-icons-hidpi binutils binutils-common
  binutils-x86-64-linux-gnu build-essential dpkg-dev fakeroot g++ g++-9 gcc
  gcc-9 libalgorithm-diff-perl libalgorithm-diff-xs-perl
  libalgorithm-merge-perl libasan5 libatomic1 libbinutils libc-dev-bin
  libc6-dev libcrypt-dev libctf-nobfd0 libctf0 libfakeroot libgcc-9-dev
  libitm1 liblsan0 libquadmath0 libstdc++-9-dev libtsan0 libubsan1
  linux-libc-dev make manpages-dev
The following packages will be upgraded:
  accountsservice adwaita-icon-theme apparmor apport apport-gtk apt apt-utils
  aptdaemon aptdaemon-data bind9 bind9-dnssd bind9-host bind9-libs
```

ونضع نفس اسطر الاوامر الموجوده كما في الصوره

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

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

Sudo apt-get upgrade



```
Activities Terminal 01:01 17 يونيو
asrar@asrar-VirtualBox: ~
Setting up update-manager (1:20.04.10) ...
Setting up gnome-shell-extension-ubuntu-dock (68ubuntu1~20.04.1) ...
Setting up ubuntu-desktop-minimal (1.450.1) ...
Setting up ubuntu-desktop (1.450.1) ...
Processing triggers for ca-certificates (20190110ubuntu1.1) ...
Updating certificates in /etc/ssl/certs...
0 added, 0 removed; done.
Running hooks in /etc/ca-certificates/update.d...
done.
Processing triggers for initscripts-tools (0.136ubuntu6.1) ...
update-initramfs: Generating /boot/initrd.img-5.4.0-37-generic
Processing triggers for libc-bin (2.31-0ubuntu9) ...
asrar@asrar-VirtualBox:~$ sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu $(lsb_release -sc) main" > /etc/apt/sources.list.d/ros-latest.list'
asrar@asrar-VirtualBox:~$ sudo apt-key adv --keyserver 'hkp://keyserver.ubuntu.com:80' --recv-key C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654
Executing: /tmp/apt-key-gpghome.gRAdWFSBbG/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
asrar@asrar-VirtualBox:~$ sudo apt-get upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
asrar@asrar-VirtualBox:~$
```

وبعدها تضع الامر لتنزيل ros

```
sudo apt-get install ros-desktop-full
```

```
Activities Terminal 20:06 17 يونيو
asrar@asrar-VirtualBox: ~
asrar@asrar-VirtualBox:~$ sudo apt-get install ros-desktop-full
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  autoconf automake autotools-dev cpp-8 docutils-common fonts-lato freeglut3
  gazebo9 gazebo9-common gazebo9-plugin-base gcc-8 gcc-8-base gdal-data
  gfortran gfortran-8 gfortran-9 graphviz i965-va-driver ibverbs-providers
  icu-devtools image-transport-tools intel-media-va-driver javascript-common
  joint-state-publisher joint-state-publisher-gui libaacs0 libactionlib-dev
  libactionlib-msgs-dev libactionlib0d libaer0 libann0 libao0 libapr1
  libapr1-dev libaprutil1 libaprutil1-dev libarmadillo9 libarpac2 libass9
  libassimp5 libavcodec58 libavdevice58 libavfilter7 libavformat58
  libavutil56 libb64-0d libb64-dev libbdplus0 libblas3 libbluray2
  libbondcpp1d libboost-atomic1.71-dev libboost-atomic1.71.0
  libboost-chrono1.71-dev libboost-chrono1.71.0 libboost-date-time-dev
  libboost-date-time1.71-dev libboost-dev libboost-file-system-dev
  libboost-file-system1.71-dev libboost-program-options1.71.0
  libboost-regex-dev libboost-regex1.71-dev libboost-regex1.71.0
  libboost-serialization1.71-dev libboost-serialization1.71.0
  libboost-system-dev libboost-system1.71-dev libboost-system1.71.0
  libboost-thread-dev libboost-thread1.71-dev libboost1.71-dev libbs2b0
  libbullet2.88 libcaf-openmpi-3 libccd2 libcdt5 libcfitsio8 libcgraph6
  libcharls2 libchromaprint1 libclass-loader1d libcoarrays-dev
  libcoarrays-openmpi-dev libcodec2-0.9 libconsole-bridge-dev
  libconsole-bridge0.4 libcpp-common0d libdap25 libdapclient6v5 libdc1394-22
  libdouble-conversion3 libeigen3-dev libepsilon1 libevent-core-2.1-7
  libevent-dev libevent-extra-2.1-7 libevent-openssl-2.1-7
  libevent-pthreads-2.1-7 libexpat1-dev libfabric1 libfftw3-double3 libflite1
```


Activities Terminal 20:29 17 يونيو

asrar@asrar-VirtualBox: ~

```
Setting up python3-rospy (1.14.3+ds1-11ubuntu5) ...
Setting up python3-roscpp (1.14.3+ds1-11ubuntu5) ...
Setting up python3-message-filters (1.14.3+ds1-11ubuntu5) ...
Setting up libactionlib-dev (1.12.0-4ubuntu1) ...
Setting up python3-rosmmsg (1.14.3+ds1-11ubuntu5) ...
Setting up python3-rosmaster (1.14.3+ds1-11ubuntu5) ...
Setting up python3-tf2 (0.6.6-1build3) ...
Setting up joint-state-publisher (1.12.14-1) ...
Setting up python3-actionlib (1.12.0-4ubuntu1) ...
Setting up python3-rostopic (1.14.3+ds1-11ubuntu5) ...
Setting up python3-rosnode (1.14.3+ds1-11ubuntu5) ...
Setting up joint-state-publisher-gui (1.12.14-1) ...
Setting up libtf2-ros-dev:amd64 (0.6.6-1build3) ...
Setting up python3-roslaunch (1.14.3+ds1-11ubuntu5) ...
Setting up python3-rosservice (1.14.3+ds1-11ubuntu5) ...
Setting up python3-tf2-ros (0.6.6-1build3) ...
Setting up tf2-tools (0.6.6-1build3) ...
Setting up python3-rosmsg (1.14.3+ds1-11ubuntu5) ...
Setting up python3-tf (1.12.0-6ubuntu3) ...
Setting up tf-tools (1.12.0-6ubuntu3) ...
Setting up ros-core (1.15) ...
Setting up ros-base (1.15) ...
Setting up ros-robot (1.15) ...
Setting up ros-perception (1.15) ...
Setting up ros-simulators (1.15) ...
Setting up ros-viz (1.15) ...
Setting up ros-desktop (1.15) ...
Setting up ros-desktop-full (1.15) ...
asrar@asrar-VirtualBox:~$
```