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LAB 5

Task 1 - Discover missing command & install Java using apt suggestion

Run the java command to see what the system suggests:

java

```
reenaqureshi@reena2904:~$ java
Command 'java' not found, but can be installed with:
sudo apt install openjdk-17-jre-headless # version 17.0.14+7-1~24.04, or
sudo apt install openjdk-21-jre-headless # version 21.0.6+7-1~24.04.1
sudo apt install default-jre             # version 2:1.17-75
sudo apt install openjdk-11-jre-headless # version 11.0.26+4-1ubuntu1~24.04
sudo apt install openjdk-8-jre-headless  # version 8u442-b06~us1-0ubuntu1~24.04
sudo apt install openjdk-19-jre-headless # version 19.0.2+7-4
sudo apt install openjdk-20-jre-headless # version 20.0.2+9-1
sudo apt install openjdk-22-jre-headless # version 22~22ea-1
reenaqureshi@reena2904:~$
```

Use the suggested apt command (copy the exact package name suggested by the system). Example (replace with the name shown on your VM):

sudo apt install <suggested-package> -y

```

reenaquareshi@reena2904:~$ sudo apt install default-jre
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  adwaita-icon-theme alsa-topology-conf alsa-ucm-conf at-spi2-common at-spi2-core ca-certificates-java dconf-gsettings-backend dconf-service
  default-jre-headless fontconfig fonts-dejavu-extra gsettings-desktop-schemas gtk-update-icon-cache hicolor-icon-theme humanity-icon-theme java
  libasound2-data libasound2t64 libatk-bridge2.0-0t64 libatk-wrapper-java libatk-wrapper-java-jni libatk1.0-0t64 libatspi2.0-0t64 libavahi-client
  libavahi-common-data libavahi-common3 libcairo-gobject2 libcairo2 libcolord2 libcups2t64 libdatrie1 libdconf1 libdrm-amdgpu1 libdrm-intel1 lib
  libgdk-pixbuf-2.0-0 libgdk-pixbuf2.0-bin libgdk-pixbuf2.0-common libgif7 libgl1 libgl1-mesa-dri libglvnd0 libglx-mesa0 libglx0 libgraphite2-3
  libgtk-3-bin libgtk-3-common libharfbuzz0b libice6 liblcms2-2 liblvm19 libpango-1.0-0 libpangocairo-1.0-0 libpangoft2-1.0-0 libpciaccess0 lib
  libpixman-1-0 librsvg2-2 librsvg2-common libsm6 libthai-data libthai0 libvulkan1 libwayland-client0 libwayland-cursor0 libwayland-egl1 libway
  libx11-xcb1 libxaw7 libxcb-dri3-0 libxcb-glx0 libxcb-present0 libxcb-randr0 libxcb-render0 libxcb-shape0 libxcb-shm0 libxcb-sync1 libxcb-xf86
  libxcomposite1 libxcursor1 libxdamage1 libxfixes3 libxft2 libxi6 libxinerama1 libxkbfile1 libxmu6 libxrandr2 libxrender1 libxshmfence1 libxt6
  libxv1 libxxf86dga1 libxxf86vm1 mesa-libgallium mesa-vulkan-drivers openjdk-21-jre openjdk-21-jre-headless session-migration ubuntu-mono x11-
  x11-utils
Suggested packages:
  alsa-utils libasound2-plugins colord cups-common gvfs liblcms2-utils pcsd librsvg2-bin libnss-mdns fonts-ipafont-gothic fonts-ipafont-mincho
  fonts-wqy-microhei | fonts-wqy-zenhei fonts-indic mesa-utils
Recommended packages:
  luit
The following NEW packages will be installed:
  adwaita-icon-theme alsa-topology-conf alsa-ucm-conf at-spi2-common at-spi2-core ca-certificates-java dconf-gsettings-backend dconf-service de
  default-jre-headless fontconfig fonts-dejavu-extra gsettings-desktop-schemas gtk-update-icon-cache hicolor-icon-theme humanity-icon-theme java
  libasound2-data libasound2t64 libatk-bridge2.0-0t64 libatk-wrapper-java libatk-wrapper-java-jni libatk1.0-0t64 libatspi2.0-0t64 libavahi-client
  libavahi-common-data libavahi-common3 libcairo-gobject2 libcairo2 libcolord2 libcups2t64 libdatrie1 libdconf1 libdrm-amdgpu1 libdrm-intel1 lib
  libgdk-pixbuf-2.0-0 libgdk-pixbuf2.0-bin libgdk-pixbuf2.0-common libgif7 libgl1 libgl1-mesa-dri libglvnd0 libglx-mesa0 libglx0 libgraphite2-3
  libgtk-3-bin libgtk-3-common libharfbuzz0b libice6 liblcms2-2 liblvm19 libpango-1.0-0 libpangocairo-1.0-0 libpangoft2-1.0-0 libpciaccess0 lib
  libpixman-1-0 librsvg2-2 librsvg2-common libsm6 libthai-data libthai0 libvulkan1 libwayland-client0 libwayland-cursor0 libwayland-egl1 libway
  libx11-xcb1 libxaw7 libxcb-dri3-0 libxcb-glx0 libxcb-present0 libxcb-randr0 libxcb-render0 libxcb-shape0 libxcb-shm0 libxcb-sync1 libxcb-xf86
  libxcomposite1 libxcursor1 libxdamage1 libxfixes3 libxft2 libxi6 libxinerama1 libxkbfile1 libxmu6 libxrandr2 libxrender1 libxshmfence1 libxt6
  libxv1 libxxf86dga1 libxxf86vm1 mesa-libgallium mesa-vulkan-drivers openjdk-21-jre openjdk-21-jre-headless session-migration ubuntu-mono x11-
  x11-utils
0 upgraded, 106 newly installed, 0 to remove and 0 not upgraded.
Need to get 118 MB of archives.
After this operation, 546 MB of additional disk space will be used.
Do you want to continue? [Y/n]

```

Verify Java is installed and check version:

java --version

```

reenaquareshi@reena2904:~$ java --version
openjdk 21.0.8 2025-07-15
OpenJDK Runtime Environment (build 21.0.8+9-Ubuntu-0ubuntu124.04.1)
OpenJDK 64-Bit Server VM (build 21.0.8+9-Ubuntu-0ubuntu124.04.1, mixed mode, sharing)

```

Remove the Java package using apt remove (use the same package name you installed):

sudo apt remove <suggested-package> -y

```

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
reenaqureshi@reena2904:~$ java --version
openjdk 21.0.8 2025-07-15
OpenJDK Runtime Environment (build 21.0.8+9-Ubuntu-0ubuntu124.04.1)
OpenJDK 64-Bit Server VM (build 21.0.8+9-Ubuntu-0ubuntu124.04.1, mixed mode, sharing)
reenaqureshi@reena2904:~$ sudo apt remove default-jre
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  adwaita-icon-theme alsa-topology-conf alsa-ucm-conf at-spi2-common at-spi2-core ca-certificates-java dconf-gsettings-backend dconf-service
  default-jre-headless fontconfig fonts-dejavu-extra gsettings-desktop-schemas gtk-update-icon-cache hicolor-icon-theme humanity-icon-theme
  libasound2-data libasound2t64 libatk-bridge2.0-0t64 libatk-wrapper-java libatk-wrapper-java-jni libatk1.0-0t64 libatspi2.0-0t64 libavahi-c
  libavahi-common-data libavahi-common3 libcairo-gobject2 libcairo2 libcolord2 libcups2t64 libdatrie1 libdconf1 libdrm-amdgpu1 libdrm-intel1
  libgdk-pixbuf-2.0-0 libgdk-pixbuf2.0-bin libgdk-pixbuf2.0-common libgif7 libgl1 libgl1-mesa-dri libglvnd0 libglx-mesa0 libglx0 libgraphite
  libgtk-3-bin libgtk-3-common libharfbuzz0b libice6 liblcms2-2 libl1vm20 libpango-1.0-0 libpangocairo-1.0-0 libpangoft2-1.0-0 libpciaccess0
  libpixman-1-0 librsvg2-2 librsvg2-common libsm6 libthai-data libthai0 libvulkan1 libwayland-client0 libwayland-cursor0 libwayland-egl1 lib
  libx11-xcb1 libxaw7 libxcb-dri3-0 libxcb-glx0 libxcb-present0 libxcb-randr0 libxcb-render0 libxcb-shape0 libxcb-shm0 libxcb-sync1 libxcb-x
  libxcomposite1 libxcursor1 libxdamage1 libxfixes3 libxft2 libxi6 libxinerama1 libxkbfile1 libxmu6 libxrandr2 libxrender1 libxshmfence1 lib
  libxv1 libxxf86dga1 libxxf86vm1 mesa-libgallium mesa-vulkan-drivers openjdk-21-jre openjdk-21-jre-headless session-migration ubuntu-mono x
  x11-utils
Use 'sudo apt autoremove' to remove them.
The following packages will be REMOVED:
  default-jre
0 upgraded, 0 newly installed, 1 to remove and 67 not upgraded.
After this operation, 6,144 B disk space will be freed.
Do you want to continue? [Y/n] Y
(Reading database ... 101562 files and directories currently installed.)
Removing default-jre (2:1.21-75+exp1) ...
reenaqureshi@reena2904:~$ _

```

Confirm java is no longer available (run java again) — it should again indicate "not found" or suggest installation:

java

```

--help          print this help message to the output stream
-X             print help on extra options to the error stream
--help-extra    print help on extra options to the output stream
-ea[:<packagename>...][:<classname>]
-enableassertions[:<packagename>...][:<classname>]
               enable assertions with specified granularity
-da[:<packagename>...][:<classname>]
-disableassertions[:<packagename>...][:<classname>]
               disable assertions with specified granularity
-esa | -enablesystemassertions
               enable system assertions
-dsa | -disablesystemassertions
               disable system assertions
-agentlib:<libname>[=<options>]
               load native agent library <libname>, e.g. -agentlib:jdwp
               see also -agentlib:jdwp=help
-agentpath:<pathname>[=<options>]
               load native agent library by full pathname
-javaagent:<jarpath>[=<options>]
               load Java programming language agent, see java.lang.instrument
-splash:<imagepath>
               show splash screen with specified image
               HiDPI scaled images are automatically supported and used
               if available. The unscaled image filename, e.g. image.ext,
               should always be passed as the argument to the -splash option.
               The most appropriate scaled image provided will be picked up
               automatically.
               See the SplashScreen API documentation for more information
@argument files
               one or more argument files containing options
--disable-@files
               prevent further argument file expansion
--enable-preview
               allow classes to depend on preview features of this release
To specify an argument for a long option, you can use --<name>=<value> or
--<name> <value>.
reenaqureshi@reena2904:~$ _

```

Clear the shell's command hash cache so the shell forgets cached command locations (run as your regular user — no sudo required):

hash -r

java

```
-help          print this help message to the output stream
-X            print help on extra options to the error stream
--help-extra  print help on extra options to the output stream
-ea[:<packagename>...|:<classname>]
-enableassertions[:<packagename>...|:<classname>]
               enable assertions with specified granularity
-da[:<packagename>...|:<classname>]
-disableassertions[:<packagename>...|:<classname>]
               disable assertions with specified granularity
-esa | -enablesystemassertions
               enable system assertions
-dsa | -disablesystemassertions
               disable system assertions
-agentlib:<libname>[=<options>]
               load native agent library <libname>, e.g. -agentlib:jdwp
               see also -agentlib:jdwp=help
-agentpath:<pathname>[=<options>]
               load native agent library by full pathname
-javaagent:<jarpath>[=<options>]
               load Java programming language agent, see java.lang.instrument
-splash:<imagepath>
               show splash screen with specified image
               HiDPI scaled images are automatically supported and used
               if available. The unscaled image filename, e.g. image.ext,
               should always be passed as the argument to the -splash option.
               The most appropriate scaled image provided will be picked up
               automatically.
               See the SplashScreen API documentation for more information
@argument files
               one or more argument files containing options
--disable-@files
               prevent further argument file expansion
--enable-preview
               allow classes to depend on preview features of this release
To specify an argument for a long option, you can use --<name>=<value> or
--<name> <value>.
```

reena@reeshi@reena2904:~\$

Task 2 – Install & Remove Java Using apt-get

Install Java using apt-get (choose a common package, e.g., default-jre — or the same package you used in Task 1):

sudo apt-get update

sudo apt-get install default-jre -y

```

reenaqureshi@reena2904:~$ sudo apt-get update
Hit:1 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:2 http://archive.ubuntu.com/ubuntu noble InRelease
Get:3 http://archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:4 http://archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:5 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [1,536 kB]
Get:6 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 Components [175 kB]
Get:7 http://archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Components [212 B]
Get:8 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 Components [378 kB]
Get:9 http://archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Components [940 B]
Get:10 http://archive.ubuntu.com/ubuntu noble-backports/main amd64 Components [7,148 B]
Get:11 http://archive.ubuntu.com/ubuntu noble-backports/restricted amd64 Components [216 B]
Get:12 http://archive.ubuntu.com/ubuntu noble-backports/universe amd64 Components [11.0 kB]
Get:13 http://archive.ubuntu.com/ubuntu noble-backports/multiverse amd64 Components [212 B]
Fetched 2,360 kB in 6s (403 kB/s)
Reading package lists... Done
reenaqureshi@reena2904:~$

```

```

Reading package lists... Done
reenaqureshi@reena2904:~$ sudo apt-get install default-jre -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
  default-jre
0 upgraded, 1 newly installed, 0 to remove and 67 not upgraded.
Need to get 0 B/922 B of archives.
After this operation, 6,144 B of additional disk space will be used.
Selecting previously unselected package default-jre.
(Reading database ... 101561 files and directories currently installed.)
Preparing to unpack .../default-jre_2%3a1.21-75+exp1_amd64.deb ...
Unpacking default-jre (2:1.21-75+exp1) ...
Setting up default-jre (2:1.21-75+exp1) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
reenaqureshi@reena2904:~$

```

Verify Java version again:

java --version

```

reenaqureshi@reena2904:~$ java --version
openjdk 21.0.8 2025-07-15
OpenJDK Runtime Environment (build 21.0.8+9-Ubuntu-0ubuntu124.04.1)
OpenJDK 64-Bit Server VM (build 21.0.8+9-Ubuntu-0ubuntu124.04.1, mixed mode, sharing)
reenaqureshi@reena2904:~$

```

Remove Java using apt-get remove:

```

reenaquareshi@reena2904:~$ sudo apt-get remove default-jre -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  adwaita-icon-theme alsa-topology-conf alsa-ucm-conf at-spi2-common at-spi2-core ca-certificates-java default-jre-headless fontconfig fonts-dejavu-extra gsettings-desktop-schemas gtk-update-icon-cache hicolor-icon-theme libasound2-data libasound2t64 libatk-bridge2.0-0t64 libatk-wrapper-java libatk-wrapper-java-jni libatk1.0-0 libavahi-common-data libavahi-common3 libcairo-gobject2 libcairo2 libcolord2 libcups2t64 libdatrie1 libdbus-1-3 libgdk-pixbuf2.0-0 libgdk-pixbuf2.0-bin libgdk-pixbuf2.0-common libgif7 libgl1 libgl1-mesa-dri libgl1-mesa-glx libgtk-3-bin libgtk-3-common libharfbuzz0b libice6 liblcms2-2 libllvm20 libpango-1.0-0 libpangocairo-1.0-0 libpixman-1-0 librsvg2-2 librsvg2-common libsm6 libthai-data libthai0 libvulkan1 libwayland-client0 libx11-xcb1 libxaw7 libxcb-dri3-0 libxcb-glx0 libxcb-present0 libxcb-randr0 libxcb-render0 libxcb-sha1 libxcomposite1 libxcursor1 libxdamage1 libxfixes3 libxft2 libxi6 libxinerama1 libxkbfile1 libxmu6 libxrandr2 libxxf86dga1 libxxf86vm1 mesa-libgallium mesa-vulkan-drivers openjdk-21-jre openjdk-21-jre-headless x11-utils
Use 'sudo apt autoremove' to remove them.
The following packages will be REMOVED:
  default-jre
0 upgraded, 0 newly installed, 1 to remove and 67 not upgraded.
After this operation, 6,144 B disk space will be freed.
(Reading database ... 101562 files and directories currently installed.)
Removing default-jre (2:1.21-75+exp1) ...
reenaquareshi@reena2904:~$

```

Clear the terminal hash cache and confirm java is missing:

hash -r

java

```

--help      print this help message to the output stream
-X         print help on extra options to the error stream
--help-extra print help on extra options to the output stream
-ea[:<packagename>...[:<classname>]]
-enableassertions[:<packagename>...[:<classname>]]
            enable assertions with specified granularity
-da[:<packagename>...[:<classname>]]
-disableassertions[:<packagename>...[:<classname>]]
            disable assertions with specified granularity
-esa | -enablesystemassertions
            enable system assertions
-dsa | -disablesystemassertions
            disable system assertions
-agentlib:<libname>[=<options>]
            load native agent library <libname>, e.g. -agentlib:jdwp
            see also -agentlib:jdwp=help
-agentpath:<pathname>[=<options>]
            load native agent library by full pathname
-javaagent:<jarpath>[=<options>]
            load Java programming language agent, see java.lang.instrument
-splash:<imagepath>
            show splash screen with specified image
            HiDPI scaled images are automatically supported and used
            if available. The unscaled image filename, e.g. image.ext,
            should always be passed as the argument to the -splash option.
            The most appropriate scaled image provided will be picked up
            automatically.
            See the SplashScreen API documentation for more information
@argument files
            one or more argument files containing options
--disable-@files
            prevent further argument file expansion
--enable-preview
            allow classes to depend on preview features of this release
To specify an argument for a long option, you can use --<name>=<value> or
--<name> <value>.
reenaqureshi@reena2904:~$

```

Task 3 – apt update vs apt upgrade

Update the package index (this downloads the latest lists of available packages):

sudo apt update

```

-esa | -enablesystemassertions
    enable system assertions
-dsa | -disablesystemassertions
    disable system assertions
-agentlib:<libname>[=<options>]
    load native agent library <libname>, e.g. -agentlib:jdwp
    see also -agentlib:jdwp=help
-agentpath:<pathname>[=<options>]
    load native agent library by full pathname
-javaagent:<jarpath>[=<options>]
    load Java programming language agent, see java.lang.instrument
-splash:<imagepath>
    show splash screen with specified image
    HiDPI scaled images are automatically supported and used
    if available. The unscaled image filename, e.g. image.ext,
    should always be passed as the argument to the -splash option.
    The most appropriate scaled image provided will be picked up
    automatically.
    See the SplashScreen API documentation for more information
@argument files
    one or more argument files containing options
--disable-@files
    prevent further argument file expansion
--enable-preview
    allow classes to depend on preview features of this release
To specify an argument for a long option, you can use --<name>=<value> or
--<name> <value>.

```

```

reenaqureshi@reena2904:~$ sudo apt update
Hit:1 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:2 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:3 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:4 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
67 packages can be upgraded. Run 'apt list --upgradable' to see them.
reenaqureshi@reena2904:~$

```

Upgrade installed packages (this installs available updates for currently installed packages):

`sudo apt upgrade`


```

warning: os-prober will not be executed to detect other bootable partitions.
Systems on them will not be added to the GRUB boot configuration.
Check GRUB_DISABLE_OS_PROBER documentation entry.
Adding boot menu entry for UEFI Firmware Settings ...
done
Scanning processes...
Scanning candidates...
Scanning linux images...

Pending kernel upgrade!
Running kernel version:
  6.8.0-71-generic
Diagnostics:
  The currently running kernel version is not the expected kernel version 6.8.0-86-generic.

Restarting the system to load the new kernel will not be handled automatically, so you should consider rebooting.

Restarting services...
systemctl restart cron.service multipathd.service packagekit.service polkit.service upower.service

Service restarts being deferred:
systemctl restart ModemManager.service
/etc/needrestart/restart.d/dbus.service
systemctl restart systemd-logind.service
systemctl restart unattended-upgrades.service

No containers need to be restarted.

User sessions running outdated binaries:
reenaqureshi @ session #1: apt[4362], login[962]
reenaqureshi @ user manager service: systemd[1395]

No VM guests are running outdated hypervisor (qemu) binaries on this host.
reenaqureshi@reena2904:~$

```

Write a short 3–5 sentence explanation describing the difference between apt update and apt upgrade. Put your text into a small file and capture it as a screenshot (do not upload the text file; provide the screenshot):

nano ~/apt_update_vs_upgrade.md

```

reenaqureshi@reena2904:~$ cat ~/apt_update_vs_upgrade.md
apt update refreshes the local package index from online repositories.
it does not install or upgrade any software- it only updates metadata.
apt upgrade installs the latest versions of all currently installed packages
You must always run apt update before apt upgrade
reenaqureshi@reena2904:~$

```

Task 4 - Install Visual Studio Code via snap on CLI and verify (DO NOT remove Code)

Install VS Code via snap (snap may require sudo):

sudo snap install --classic cod

```

You must always run apt update before apt upgrade
reenaqureshi@reena2904:~$ sudo snap install --classic code
[sudo] password for reenaqureshi:
Sorry, try again.
[sudo] password for reenaqureshi:
2025-10-24T05:09:00Z INFO Waiting for automatic snapd restart...
code 7d842fb8 from Visual Studio Code (vscode) installed
reenaqureshi@reena2904:~$

```

Verify snap shows the package is installed:

snap list code

```

code 7d842fb8 from Visual Studio Code (vscode) installed
reenaqureshi@reena2904:~$ snap list code
Name Version Rev Tracking Publisher Notes
code 7d842fb8 211 latest/stable vscode classic
reenaqureshi@reena2904:~$

```

Check the installed application's version. On some systems code --version is available; also check snap info:

code --versio

```

reenaqureshi@reena2904:~$ code --version
1.105.1
7d842fb85a0275a4a8e4d7e040d2625abbf7f084
x64
reenaqureshi@reena2904:~$

```

```

reenaquareshi@reena2904:~$ snap info code
name:      code
summary:   Code editing. Redefined.
publisher: Visual Studio Code (vscode)
store-url: https://snapcraft.io/code
contact:   https://twitter.com/code
license:   unset
description: |
  Visual Studio Code is a new choice of tool that combines the
  simplicity of a code editor with what developers need for the core
  edit-build-debug cycle.
commands:
  - code
  - code.url-handler
snap-id:    Ht0aUHi7ofh9Fbwh6m7jUN2pAy6kzBiu
tracking:   latest/stable
refresh-date: today at 05:10 UTC
channels:
  latest/stable: 7d842fb8 2025-10-15 (211) 346MB classic
  latest/candidate: ↑
  latest/beta:    ↑
  latest/edge:    ↑
installed:      7d842fb8 (211) 346MB classic
reenaquareshi@reena2904:~$

```

If the code binary is not in PATH, show where the snap placed it:

```
ls -l /snap/bin | grep code
```

```

reenaquareshi@reena2904:~$ ls -l /snap/bin | grep code
lrwxrwxrwx 1 root root 13 Oct 24 05:10 code -> /usr/bin/snap
lrwxrwxrwx 1 root root 13 Oct 24 05:10 code.url-handler -> /usr/bin/snap

```

Task 5 - Install XFCE GUI + XRDP - minimal desktop and remote access (GUI) and launch VS Code

From your host, open your preferred terminal (for example: Windows Command Prompt, PowerShell, macOS Terminal, or Linux Terminal) and connect to the VM using SSH. Example:

```
ssh student@<vm-ip-address>
```

```

C:\Users\Reena Qureshi>ssh reenaqureshi@192.168.76.129
reenaqureshi@192.168.76.129's password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-71-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

System information as of Fri Oct 24 05:27:36 AM UTC 2025

System load:  0.04               Processes:           227
Usage of /:   70.3% of 9.75GB    Users logged in:    1
Memory usage: 25%               IPv4 address for ens33: 192.168.76.129
Swap usage:   0%

 * Strictly confined Kubernetes makes edge and IoT secure. Learn how MicroK8s
   just raised the bar for easy, resilient and secure K8s cluster deployment.

   https://ubuntu.com/engage/secure-kubernetes-at-the-edge

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

6 additional security updates can be applied with ESM Apps.
Learn more about enabling ESM Apps service at https://ubuntu.com/esm

*** System restart required ***
Last login: Wed Oct 22 16:25:35 2025 from 192.168.76.1

```

Update the server (download package lists and apply upgrades):

`sudo apt update && sudo apt upgrade -y`

```

reenaqureshi@reena2904:~$ sudo apt update && sudo apt upgrade -y
[sudo] password for reenaqureshi:
Hit:1 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:3 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:4 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
All packages are up to date.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
The following packages were automatically installed and are no longer required:
  ca-certificates-java default-jre-headless fonts-dejavu-extra java-common libatk-wrapper-java libatk-wrapper-
  libgif7 openjdk-21-jre openjdk-21-jre-headless
Use 'sudo apt autoremove' to remove them.
Get more security updates through Ubuntu Pro with 'esm-apps' enabled:
  libzvb1-common libavcodec60 libzvb10t64 libavutil58 libswresample4 7zip
Learn more about Ubuntu Pro at https://ubuntu.com/pro
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
reenaqureshi@reena2904:~$ sudo apt install xfsprogs xfsprogs-gui xfsprogs-gui

```

Install XFCE and XFCE goodies (lightweight desktop):

```
sudo apt install xfce4 xfce4-goodies -y
```

```
reenaquareshi@reena2904:~$ sudo apt install xfce4 xfce4-goodies -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
xfce4 is already the newest version (4.18).
xfce4-goodies is already the newest version (4.18.2build1).
The following packages were automatically installed and are no longer required:
  ca-certificates-java default-jre-headless fonts-dejavu-extra java-common libatk-wrapper-java libatk-wrapper-java-gtk
  libgif7 openjdk-21-jre openjdk-21-jre-headless
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
```

Install and enable XRDP (Remote Desktop Protocol server):

```
sudo apt install xrdp -y
```

```
sudo systemctl enable --now xrdp
```

```
reenaquareshi@reena2904:~$ sudo apt install xrdp -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
xrdp is already the newest version (0.9.24-4).
The following packages were automatically installed and are no longer required:
  ca-certificates-java default-jre-headless fonts-dejavu-extra java-common libatk-wrap
  libgif7 openjdk-21-jre openjdk-21-jre-headless
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
```

Verify XRDP status:

```
sudo systemctl status xrdp
```

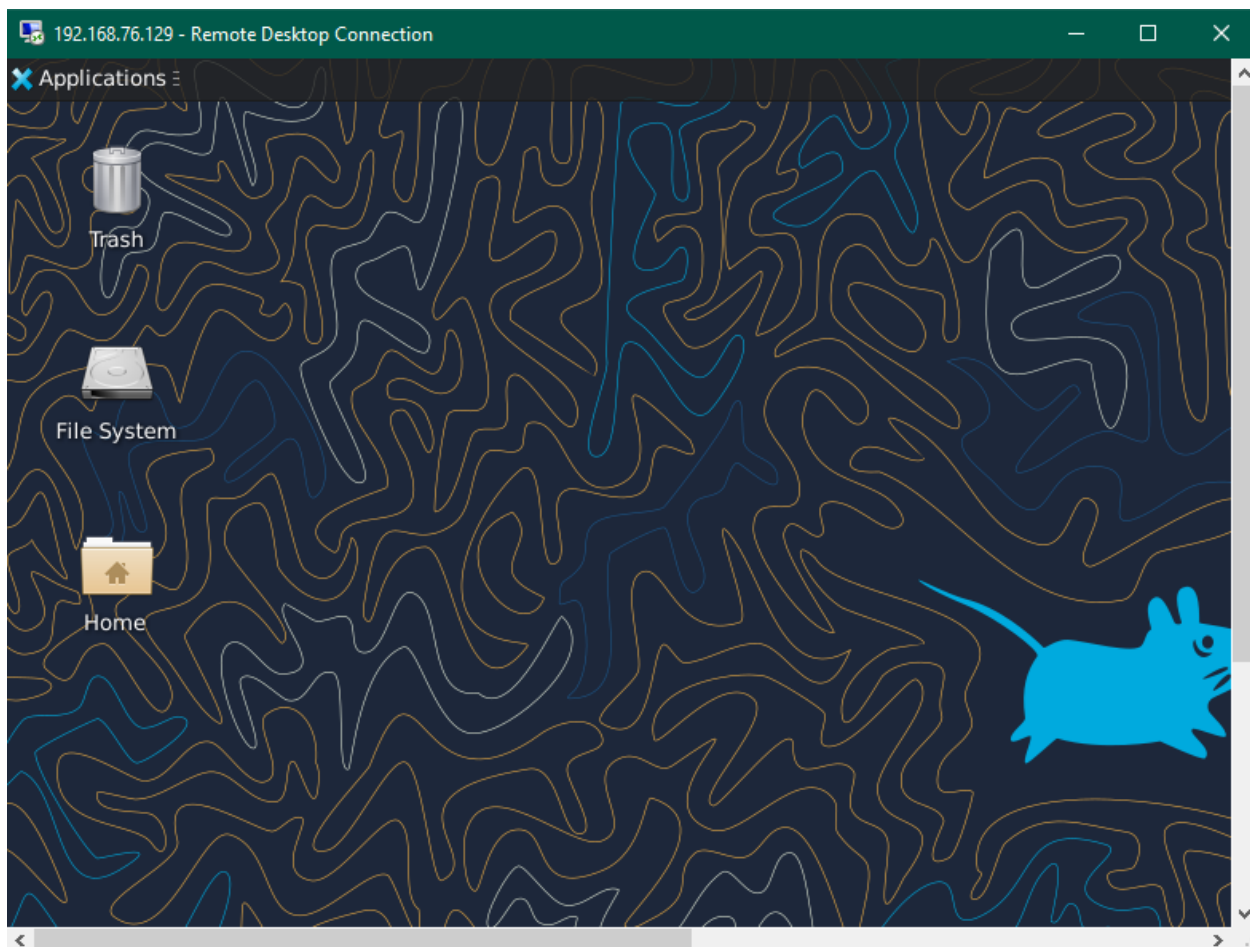
```

reenaqureshi@reena2904:~$ sudo systemctl status xrdp
● xrdp.service - xrdp daemon
   Loaded: loaded (/usr/lib/systemd/system/xrdp.service; enabled; preset: enabled)
   Active: active (running) since Fri 2025-10-24 05:23:08 UTC; 14min ago
     Docs: man:xrdp(8)
           man:xrdp.ini(5)
  Main PID: 28826 (xrdp)
    Tasks: 1 (limit: 2210)
   Memory: 864.0K (peak: 1.5M)
      CPU: 32ms
   CGroup: /system.slice/xrdp.service
           └─28826 /usr/sbin/xrdp

Oct 24 05:23:07 reena2904 systemd[1]: Starting xrdp.service - xrdp daemon...
Oct 24 05:23:07 reena2904 xrdp[28824]: [INFO ] address [0.0.0.0] port [3389] mode 1
Oct 24 05:23:07 reena2904 xrdp[28824]: [INFO ] listening to port 3389 on 0.0.0.0
Oct 24 05:23:07 reena2904 xrdp[28824]: [INFO ] xrdp_listen_pp done
Oct 24 05:23:07 reena2904 systemd[1]: xrdp.service: Can't open PID file /run/xrdp/xrdp.pid (yet?) after start: No such
Oct 24 05:23:08 reena2904 systemd[1]: Started xrdp.service - xrdp daemon.
Oct 24 05:23:09 reena2904 xrdp[28826]: [INFO ] starting xrdp with pid 28826
Oct 24 05:23:09 reena2904 xrdp[28826]: [INFO ] address [0.0.0.0] port [3389] mode 1
Oct 24 05:23:09 reena2904 xrdp[28826]: [INFO ] listening to port 3389 on 0.0.0.0
Oct 24 05:23:09 reena2904 xrdp[28826]: [INFO ] xrdp_listen_pp done
lines 1-22/22 (END)

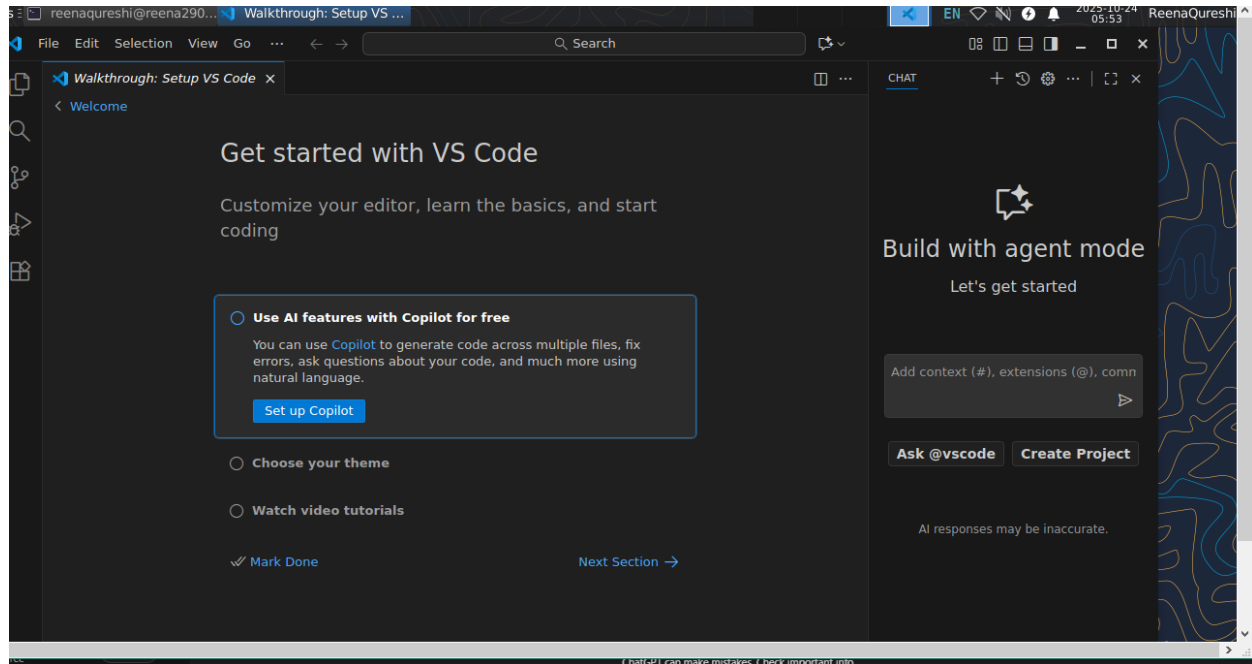
```

From a Windows host or RDP client, connect with Remote Desktop (mstsc) to your server IP and login using your Ubuntu username/password



After you are in the GUI (local console or RDP session), launch Visual Studio Code (installed in Task 4) from the GUI menu or a terminal inside the GUI. Example command from a GUI terminal:

code



Task 6 - Install lightdm-gtk-greeter and GUI verification – start GUI, open VS Code, take snapshot, then end (GUI)

Fix GUI login screen issues (if lightdm / greeter problems appear)

Install LightDM and greeter using Host Terminal:

```
sudo apt install lightdm lightdm-gtk-greeter -y
```

```

Preparing to unpack .../gtk2-engines-pixbuf_2.24.33-4ubuntu1.1_amd64.deb ...
Unpacking gtk2-engines-pixbuf:amd64 (2.24.33-4ubuntu1.1) ...
Selecting previously unselected package gnome-themes-extra:amd64.
Preparing to unpack .../gnome-themes-extra_3.28-2ubuntu5_amd64.deb ...
Unpacking gnome-themes-extra:amd64 (3.28-2ubuntu5) ...
Selecting previously unselected package lightdm-gtk-greeter.
Preparing to unpack .../lightdm-gtk-greeter_2.0.9-0ubuntu3_amd64.deb ...
Unpacking lightdm-gtk-greeter (2.0.9-0ubuntu3) ...
Setting up gnome-themes-extra-data (3.28-2ubuntu5) ...
Setting up gnome-accessibility-themes (3.28-2ubuntu5) ...
Setting up gtk2-engines-pixbuf:amd64 (2.24.33-4ubuntu1.1) ...
Setting up lightdm-gtk-greeter (2.0.9-0ubuntu3) ...
update-alternatives: using /usr/share/xgreeters/lightdm-gtk-greeter.desktop to provide
ter.desktop (lightdm-greeter) in auto mode
Setting up gnome-themes-extra:amd64 (3.28-2ubuntu5) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
Scanning processes...
Scanning candidates...
Scanning linux images...

Pending kernel upgrade!
Running kernel version:
  6.8.0-71-generic
Diagnostics:
  The currently running kernel version is not the expected kernel version 6.8.0-86-

Restarting the system to load the new kernel will not be handled automatically, so

Restarting services...

Service restarts being deferred:
  /etc/needrestart/restart.d/dbus.service
  systemctl restart systemd-logind.service
  systemctl restart unattended-upgrades.service

No containers need to be restarted.

User sessions running outdated binaries:
  reenaqureshi @ session #1: login[962]
  reenaqureshi @ user manager service: systemd[1395]

No VM guests are running outdated hypervisor (qemu) binaries on this host.
reenaqureshi@reena2904:~$

```

Create LightDM config to use XFCE:

```
sudo mkdir -p /etc/lightdm/lightdm.conf.d
```

```
echo -e "[Seat:*]\ngreeter-session=lightdm-gtk-greeter\nuser-session=xfce\nautologin-
user-timeout=0" | sudo tee /etc
```



```
reenaqureshi@reena2904:~$ sudo mkdir -p /etc/lightdm/lightdm.conf.d
reenaqureshi@reena2904:~$ echo "[greeter-session=lightdm-gtk-greeter\nuser-session=xfce\nautologin-user-timeout=0" | sudo tee /etc/lightdm/lightdm.conf.d/99-xfce.conf
reenaqureshi@reena2904:~$
```

Clean up problematic session files and permissions:

```
sudo rm -f /var/lib/lightdm/.Xauthority
```

```
sudo rm -f ~/.Xauthority
```

```
sudo rm -rf ~/.cache/sessions
```

```
sudo chown -R $USER:$USER /home/$USER
```

```
reenaqureshi@reena2904:~$ sudo rm -f /var/lib/lightdm/.Xauthority
reenaqureshi@reena2904:~$ sudo rm -f ~/.Xauthority
reenaqureshi@reena2904:~$ sudo rm -rf ~/.cache/sessions
reenaqureshi@reena2904:~$ sudo chown -R $USER:$USER /home/$USER
reenaqureshi@reena2904:~$
```

Restart LightDM:

```
sudo systemctl restart lightdm
```

```
reenaqureshi@reena2904:~$ sudo systemctl restart lightdm
reenaqureshi@reena2904:~$
```

Enable GUI Login Screen (Boot to GUI)

Re-enable LightDM and set the graphical target as default:

```
sudo systemctl enable lightdm
```

```
sudo systemctl set-default graphical.target
```

```
reenaqureshi@reena2904:~$ sudo systemctl restart lightdm
reenaqureshi@reena2904:~$ sudo systemctl enable lightdm
Synchronizing state of lightdm.service with SysV service script with /usr/lib/systemd/systemd-sysv-install
Executing: /usr/lib/systemd/systemd-sysv-install enable lightdm
The unit files have no installation config (WantedBy=, RequiredBy=, UpheldBy=, Also=, or Alias= settings in the [Install] section, and DefaultInstance= for template units). This means they are not meant to be enabled or disabled using systemctl.
```

Possible reasons for having these kinds of units are:

- A unit may be statically enabled by being symlinked from another unit's .wants/, .requires/, or .upholds/ directory.
- A unit's purpose may be to act as a helper for some other unit which has a requirement dependency on it.
- A unit may be started when needed via activation (socket, path, timer, D-Bus, udev, scripted systemctl call, ...).
- In case of template units, the unit is meant to be enabled with some instance name specified.

```
reenaqureshi@reena2904:~$ sudo systemctl set-default graphical.target
Created symlink /etc/systemd/system/default.target → /usr/lib/systemd/system/graphical.target.
reenaqureshi@reena2904:~$
```

```
reenaqureshi@reena2904:~$ sudo reboot
```

Broadcast message from root@reena2904 on pts/1 (Fri 2025-10-24 06:08:32 UTC):

The system will reboot now!

```
Last login: Fri Oct 24 05:27:37 2025 from 192.168.76.1
reenaqureshi@reena2904:~$ sudo systemctl set-default multi-user.target
ble lightdm[sudo] password for reenaqureshi:
Sorry, try again.
[sudo] password for reenaqureshi:
Removed "/etc/systemd/system/default.target".
Created symlink /etc/systemd/system/default.target → /usr/lib/systemd/system/multi-user.target.
reenaqureshi@reena2904:~$ sudo systemctl disable lightdm
Synchronizing state of lightdm.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install disable lightdm
Removed "/etc/systemd/system/display-manager.service".
reenaqureshi@reena2904:~$
```

sudo reboot

```
Removed "/etc/systemd/system/display-manager.service".
reenaqureshi@reena2904:~$ sudo reboot

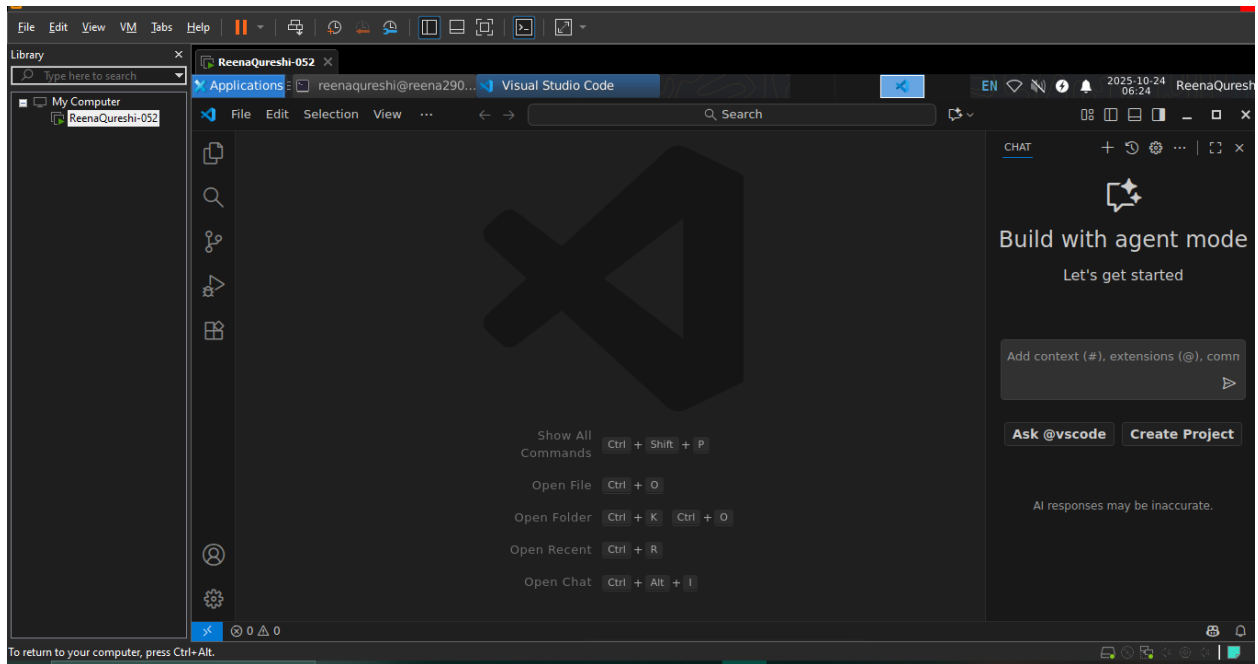
Broadcast message from root@reena2904 on pts/1 (Fri 2025-10-24 06:16:08 UTC):

The system will reboot now!
```

```
Last login: Fri Oct 24 06:12:50 2025 from 192.168.76.1
reenaqureshi@reena2904:~$ sudo systemctl start lightdm
[sudo] password for reenaqureshi:
reenaqureshi@reena2904:~$ sudo systemctl stop lightdm # stop GUI now
reenaqureshi@reena2904:~$
reenaqureshi@reena2904:~$ sudo systemctl stop lightdm
reenaqureshi@reena2904:~$
```

In the GUI session launch Visual Studio Code (installed earlier in Task 4). From a GUI terminal inside the desktop, run:

code



Task 7 - Install Google Chrome by adding its apt source & key (Chrome)

(Learning step — first command must be the install attempt) Attempt to install Google Chrome directly to see the failure when the repo/key are missing:

```
sudo apt install google-chrome-stable -y
```

```
reenaqureshi@reena2904:~$ sudo apt install google-chrome-stable -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
E: Unable to locate package google-chrome-stable
reenaqureshi@reena2904:~$
```

Inspect apt configuration so you understand why install failed. List the /etc/apt directory:

```
ls -la /etc/apt
```

```
reenaqureshi@reena2904:~$ ls -la /etc/apt
total 48
drwxr-xr-x  9 root root  4096 Sep 26 10:02 .
drwxr-xr-x 142 root root 12288 Oct 24 05:47 ..
drwxr-xr-x  2 root root  4096 Oct 24 04:52 apt.conf.d
drwxr-xr-x  2 root root  4096 Mar 31  2024 auth.conf.d
drwxr-xr-x  2 root root  4096 Mar 31  2024 keyrings
drwxr-xr-x  2 root root  4096 Aug  5 17:14 preferences.d
drwxr-xr-x  2 root root  4096 Aug  5 17:14 preferences.d.save
-rw-r--r--  1 root root    70 Sep 26 10:10 sources.list
drwxr-xr-x  2 root root  4096 Oct 24 04:32 sources.list.d
drwxr-xr-x  2 root root  4096 Aug  5 17:01 trusted.gpg.d
reenaqureshi@reena2904:~$
```

View the main /etc/apt/sources.list:

```
cat /etc/apt/sources.list
```

```
Last login: Fri Oct 24 06:17:09 2025 from 192.168.76.1
reenaqureshi@reena2904:~$ cat /etc/apt/sources.list
# Ubuntu sources have moved to /etc/apt/sources.list.d/ubuntu.sources
```

List files under /etc/apt/sources.list.d:

```
ls -la /etc/apt/sources.list.d/
```

```
signed by: /usr/share/keyrings/ubuntu-archive-keyring.gpg
reenaqureshi@reena2904:~$ ls -la /etc/apt/sources.list.d/
total 16
drwxr-xr-x 2 root root 4096 Oct 24 04:32 .
drwxr-xr-x 9 root root 4096 Sep 26 10:02 ..
-rw-r--r-- 1 root root  383 Oct 24 04:32 ubuntu.sources
-rw-r--r-- 1 root root 2552 Aug  5 17:02 ubuntu.sources.curtin.orig
reenaqureshi@reena2904:~$
```

If there is a file named ubuntu.sources (or similarly named source file), display it to see whether Chrome's repo is present:

```
cat /etc/apt/sources.list.d/ubuntu.sources
```

Add Chrome repository metadata to a sources file (method A — using ubuntu.sources).
Open or create the file and append the stanza (you can alternatively use the preferred one-line method in step 11):

```
sudo nano /etc/apt/sources.list.d/ubuntu.sources
```

```
reenaquareshi@reena2904:~$ cat /etc/apt/sources.list.d/ubuntu.sources
Types: deb
URIs: http://archive.ubuntu.com/ubuntu/
Suites: noble noble-updates noble-backports
Components: main restricted universe multiverse
Signed-By: /usr/share/keyrings/ubuntu-archive-keyring.gpg

Types: deb
URIs: http://security.ubuntu.com/ubuntu/
Suites: noble-security
Components: main restricted universe multiverse
Signed-By: /usr/share/keyrings/ubuntu-archive-keyring.gpg

Types: deb
URIs: http://dl.google.com/linux/chrome/deb/
Suites: stable
Components: main
Architectures: amd64
Signed-By: /etc/apt/keyrings/google.gpg
reenaquareshi@reena2904:~$
```

Ensure the keyrings directory exists and import Google's signing key:

```
curl -fsSL https://dl.google.com/linux/linux_signing_key.pub | sudo gpg --dearmor -o
/etc/apt/keyrings/google.gpg
```

```
reenaquareshi@reena2904:~$ curl -fsSL https://dl.google.com/linux/linux_signing_key.pub | sudo gpg --dear
mor -o /etc/apt/keyrings/google.gpg
File '/etc/apt/keyrings/google.gpg' exists. Overwrite? (y/N) y
reenaquareshi@reena2904:~$
```

Update apt and attempt to install Chrome again (now that repo + key are added):

```
sudo apt update
```

```
sudo apt install google-chrome-stable -y
```

```

reenaquareshi@reena2904:~$ sudo apt update
Hit:1 http://security.ubuntu.com/ubuntu noble-security InRelease
Get:2 http://dl.google.com/linux/chrome/deb stable InRelease [1,825 B]
Hit:3 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:4 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:5 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Get:6 http://dl.google.com/linux/chrome/deb stable/main amd64 Packages [1,215 B]
Fetched 3,040 B in 1s (2,342 B/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
All packages are up to date.
reenaquareshi@reena2904:~$ sudo apt install google-chrome-stable -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  ca-certificates-java default-jre-headless fonts-dejavu-extra java-common libatk-wrapper-java
  libatk-wrapper-java-jni libgif7 openjdk-21-jre openjdk-21-jre-headless
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  fonts-liberation fonts-liberation-sans-narrow
The following NEW packages will be installed:
  fonts-liberation fonts-liberation-sans-narrow google-chrome-stable
0 upgraded, 3 newly installed, 0 to remove and 0 not upgraded.
Need to get 122 MB of archives.
After this operation, 401 MB of additional disk space will be used.
Get:1 http://dl.google.com/linux/chrome/deb stable/main amd64 google-chrome-stable amd64 141.0.7390.122-1 [120 MB]
Selecting previously unselected package fonts-liberation.
Unpacking fonts-liberation (1:2.1.5-3) ..... 97
Selecting previously unselected package google-chrome-stable.....]

```

Cleanup before alternate method you added the chrome earlier and want to switch to the preferred method:

`sudo apt remove google-chrome-stable -y`

`sudo nano /etc/apt/sources.list.d/ubuntu.sources` # remove the chrome stanza you added earlier, save and exit

`sudo rm -f /etc/apt/keyrings/google.gpg`

```

reenaquareshi@reena2904:~$ sudo apt remove google-chrome-stable -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  ca-certificates-java default-jre-headless fonts-dejavu-extra java-common libatk-wrapper-java
  libatk-wrapper-java-jni libgif7 openjdk-21-jre openjdk-21-jre-headless
Use 'sudo apt autoremove' to remove them.
The following packages will be REMOVED:
  google-chrome-stable
0 upgraded, 0 newly installed, 1 to remove and 0 not upgraded.
After this operation, 396 MB disk space will be freed.
(Reading database ... 180499 files and directories currently installed.)
Removing google-chrome-stable (141.0.7390.122-1) ...
Processing triggers for desktop-file-utils (0.27-2build1) ...
Processing triggers for gnome-menus (3.36.0-1.1ubuntu3) ...
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for bamfdaemon (0.5.6+22.04.20220217-0ubuntu5) ...
Rebuilding /usr/share/applications/bamf-2.index...
reenaquareshi@reena2904:~$ sudo nano /etc/apt/sources.list.d/ubuntu.sources
reenaquareshi@reena2904:~$ reenaquareshi@reena2904:~$ sudo rm -f /etc/apt/keyrings/google.gpg
reenaquareshi@reena2904:~$

```

Create a dedicated one-line list file for Google Chrome (preferred):

```

echo "deb [arch=amd64 signed-by=/etc/apt/keyrings/google.gpg]
http://dl.google.com/linux/chrome/deb/ stable main"

```

```

reenaquareshi@reena2904:~$ echo "deb [arch=amd64 signed-by=/etc/apt/keyrings/google.gpg] http://dl.google
.com/linux/chrome/deb/ stable main" | sudo tee /etc/apt/sources.list.d/google-chrome.list > /dev/null

```

Verify the new file exists:

```
ls -la /etc/apt/sources.list.d/
```

```

total 20
drwxr-xr-x 2 root root 4096 Oct 25 11:45 .
drwxr-xr-x 9 root root 4096 Sep 26 10:02 ..
-rw-r--r-- 1 root root  107 Oct 25 11:46 google-chrome.list
-rw-r--r-- 1 root root  383 Oct 25 11:45 ubuntu.sources
-rw-r--r-- 1 root root 2552 Aug  5 17:02 ubuntu.sources.curtin.orig
reenaquareshi@reena2904:~$

```

Re-add the Google signing key (if removed previously or not present):

```
sudo mkdir -p /etc/apt/keyrings
```

```
curl -fsSL https://dl.google.com/linux/linux_signing_key.pub | sudo gpg --dearmor -o
/etc/apt/keyrings/google.gpg

```

```
reenaqureshi@reena2904:~$ sudo mkdir -p /etc/apt/keyrings
com/linux/linux_signing_key.pub | sudo gpg --dearmor curl -fsSL https://dl.google.com/linux/linux_signin
g_key.pub | sudo gpg --dearmor -o /etc/apt/keyrings/google.gpgreenaqureshi@reena2904:~$
```

Update apt and install Chrome (preferred flow):

sudo apt update

sudo apt install google-chrome-stable -y

```
get:1 http://dl.google.com/linux/chrome/deb/stable/main amd64 google-chrome-stable amd64 141.0.7390.122-
Selecting previously unselected package google-chrome-stable.
(Reading database ... 180218 files and directories currently installed.)
Preparing to unpack .../google-chrome-stable_141.0.7390.122-1_amd64.deb ...
Unpacking google-chrome-stable (141.0.7390.122-1) ...
Setting up google-chrome-stable (141.0.7390.122-1) ...
update-alternatives: using /usr/bin/google-chrome-stable to provide /usr/bin/x-www-browser (x-www-browse
r) in auto mode
update-alternatives: using /usr/bin/google-chrome-stable to provide /usr/bin/gnome-www-browser (gnome-ww
w-browser) in auto mode
update-alternatives: using /usr/bin/google-chrome-stable to provide /usr/bin/google-chrome (google-chrom
e) in auto mode
Processing triggers for gnome-menus (3.36.0-1ubuntu3) ...
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for bamfdaemon (0.5.6+22.04.20220217-0ubuntu5) ...
Rebuilding /usr/share/applications/bamf-2.index...
Processing triggers for desktop-file-utils (0.27-2build1) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
reenaqureshi@reena2904:~$
```

Task 8 - Install applications via PPA (Audacity & OBS) and launch

Add the Audacity PPA, update apt and install audacity:


```

dpkg-query -f='${Package} ${Version} ${Architecture} ${Source} ${Component}\n' -W -f='${Package} ${Version} ${Architecture} ${Source} ${Component}\n'
reenaqureshi@reena2904:~$ sudo add-apt-repository ppa:ubuntuhandbook1/audacity -y
[sudo] password for reenaqureshi:
Repository: 'Types: deb
URIs: https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu/
Suites: noble
Components: main
'

Description:
Unofficial build of Audacity audio editor

For help, please use Audacity forum: http://forum.audacityteam.org/

If the packages here are helpful, you may buy me a coffee:

https://ko-fi.com/ubuntuhandbook1
More info: https://launchpad.net/~ubuntuhandbook1/+archive/ubuntu/audacity
Adding repository.
Hit:1 http://dl.google.com/linux/chrome/deb stable InRelease
Err:1 http://dl.google.com/linux/chrome/deb stable InRelease
  The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 32EE5355A6BC6E42
Hit:2 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:3 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:4 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:5 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Get:6 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble InRelease [18.1 kB]
Get:7 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble/main amd64 Packages [1,064 B]
Get:8 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble/main Translation-en [492 B]
Fetched 19.6 kB in 3s (7,451 B/s)
Reading package lists... Done
W: An error occurred during the signature verification. The repository is not updated and the previous index files will be used
/ linux/chrome/deb stable InRelease: The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 32EE5355A6BC6E42
Err:1 http://dl.google.com/linux/chrome/deb/dists/stable/InRelease The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 32EE5355A6BC6E42
W: Some index files failed to download. They have been ignored, or old ones used instead.
reenaqureshi@reena2904:~$

```

```

reenaqureshi@reena2904:~$ sudo apt update
Hit:1 http://dl.google.com/linux/chrome/deb stable InRelease
Hit:2 http://security.ubuntu.com/ubuntu noble-security InRelease
Err:1 http://dl.google.com/linux/chrome/deb stable InRelease
  The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 32EE5355A6BC6E42
Hit:3 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:4 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble InRelease
Hit:5 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:6 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
All packages are up to date.
W: An error occurred during the signature verification. The repository is not updated and the previous index files will be used. GPG error: http://dl.google.com/linux/chrome/deb/dists/stable/InRelease: The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 32EE5355A6BC6E42
W: Failed to fetch http://dl.google.com/linux/chrome/deb/dists/stable/InRelease The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 32EE5355A6BC6E42
W: Some index files failed to download. They have been ignored, or old ones used instead.
reenaqureshi@reena2904:~$

```

```

Setting up lib3d-0-0:amd64 (0.16.16-2build1) ...
Setting up libsratom-0-0:amd64 (0.6.16-1build1) ...
Setting up liblilv-0-0:amd64 (0.24.22-1build1) ...
Setting up libqt5x11extras5:amd64 (5.15.13-1) ...
Setting up libqt5qmlmodels5:amd64 (5.15.13+dfsg-1ubuntu0.1) ...
Setting up libqt5widgets5t64:amd64 (5.15.13+dfsg-1ubuntu1) ...
Setting up libqt5svg5:amd64 (5.15.13-1) ...
Setting up audacity (3.7.5-0build1~ubuntu24.04) ...
Setting up qt5-gtk-platformtheme:amd64 (5.15.13+dfsg-1ubuntu1) ...
Setting up libqt5waylandclient5:amd64 (5.15.13-1) ...
Setting up libqt5quick5:amd64 (5.15.13+dfsg-1ubuntu0.1) ...
Setting up libqt5waylandcompositor5:amd64 (5.15.13-1) ...
Setting up qtwayland5:amd64 (5.15.13-1) ...
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for shared-mime-info (2.4-4) ...
Processing triggers for bamfdaemon (0.5.6+22.04.20220217-0ubuntu5) ...
Rebuilding /usr/share/applications/bamf-2.index...
Processing triggers for desktop-file-utils (0.27-2build1) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
Processing triggers for gnome-menus (3.36.0-1.1ubuntu3) ...
Processing triggers for libc-bin (2.39-0ubuntu8.6) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.

```

audacity --version

audacity

```

No VM guests are running outdated hypervisor (qemu) binaries
reenaqureshi@reena2904:~$ audacity --version
reenaqureshi@reena2904:~$ audacity
reenaqureshi@reena2904:~$ which audacity
/usr/bin/audacity
reenaqureshi@reena2904:~$

```

Add the OBS Studio PPA, update apt and install obs-studio:

sudo add-apt-repository ppa:obsproject/obs-studio -y

sudo apt update

sudo apt install obs-studio -y

```
reenaqureshi@reena2904:~$ sudo add-apt-repository ppa:obsproject/obs-studio -y
Repository: 'Types: deb
URIs: https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu/
Suites: noble
Components: main
'
Description:
Latest stable release of OBS Studio
More info: https://launchpad.net/~obsproject/+archive/ubuntu/obs-studio
Adding repository.
Hit:1 http://dl.google.com/linux/chrome/deb stable InRelease
Err:1 http://dl.google.com/linux/chrome/deb stable InRelease
  The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 32EE5355A68C6E42
Hit:2 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:3 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:4 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:5 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Get:6 https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu noble InRelease [17.8 kB]
Hit:7 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble InRelease
Get:8 https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu noble/main amd64 Packages [1,172 B]
Get:9 https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu noble/main Translation-en [160 B]
Fetched 19.1 kB in 2s (8,852 B/s)
Reading package lists... Done
W: An error occurred during the signature verification. The repository is not updated and the previous index files will be used.
http://dl.google.com/linux/chrome/deb stable InRelease: The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 32EE5355A68C6E42
W: Failed to fetch http://dl.google.com/linux/chrome/deb/dists/stable/InRelease The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 32EE5355A68C6E42
W: Some index files failed to download. They have been ignored, or old ones used instead.
reenaqureshi@reena2904:~$
```

```
reenaqureshi@reena2904:~$ sudo apt update
Hit:1 http://dl.google.com/linux/chrome/deb stable InRelease
Hit:2 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:3 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Err:1 http://dl.google.com/linux/chrome/deb stable InRelease
  The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 32EE5355A68C6E42
Hit:4 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:5 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Hit:6 https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu noble InRelease
Hit:7 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
All packages are up to date.
W: An error occurred during the signature verification. The repository is not updated and the previous index files will be used.
http://dl.google.com/linux/chrome/deb stable InRelease: The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 32EE5355A68C6E42
W: Failed to fetch http://dl.google.com/linux/chrome/deb/dists/stable/InRelease The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 32EE5355A68C6E42
W: Some index files failed to download. They have been ignored, or old ones used instead.
reenaqureshi@reena2904:~$
```

```

Setting up libqt6svg6:amd64 (6.4.2-4ubuntu3) ...
Setting up libqt6waylandclient6:amd64 (6.4.2-5build3) ...
Setting up libass9:amd64 (1:0.17.1-2build1) ...
Setting up qt6-gtk-platformtheme:amd64 (6.4.2+dfsg-21.1build5) ...
Setting up libqt6quick6:amd64 (6.4.2+dfsg-4build3) ...
Setting up libmbd1s14t64:amd64 (2.28.8-1) ...
Setting up libqt6wlshellintegration6:amd64 (6.4.2-5build3) ...
Setting up libqt6waylandcompositor6:amd64 (6.4.2-5build3) ...
Setting up libqt6waylandeglcompositorhwinintegration6:amd64 (6.4.2-5build3) ...
Setting up libqt6waylandegllclienthwinintegration6:amd64 (6.4.2-5build3) ...
Setting up libpocketsphinx3:amd64 (0.8.0+real5prealpha+1-15ubuntu5) ...
Setting up qt6-wayland:amd64 (6.4.2-5build3) ...
Setting up libavfilter9:amd64 (7:6.1.1-3ubuntu5) ...
Setting up libavdevice60:amd64 (7:6.1.1-3ubuntu5) ...
Setting up obs-studio (32.0.0-0obsproject1~noble) ...
Processing triggers for bamfdaemon (0.5.6+22.04.20220217-0ubuntu5) ...
Rebuilding /usr/share/applications/bamf-2.index...
Processing triggers for desktop-file-utils (0.27-2build1) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
Processing triggers for gnome-menus (3.36.0-1.1ubuntu3) ...
Processing triggers for libc-bin (2.39-0ubuntu8.6) ...
Processing triggers for man-db (2.12.0-4build2) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
reenaqureshi@reena2904:~$

```

obs --version

obs

```

reenaqureshi@reena2904:~$ obs --version
OBS Studio - 32.0.0
reenaqureshi@reena2904:~$ obs
qt.qpa.xcb: could not connect to display
qt.qpa.plugin: Could not load the Qt platform plugin "xcb" in "" even though it was found.
This application failed to start because no Qt platform plugin could be initialized. Reinstalling the application may fix this problem.

Available platform plugins are: wayland-egl, xcb, linuxfb, wayland, minimalegl, offscreen, vkkhrdisplay, minimal, vnc, eglfs.

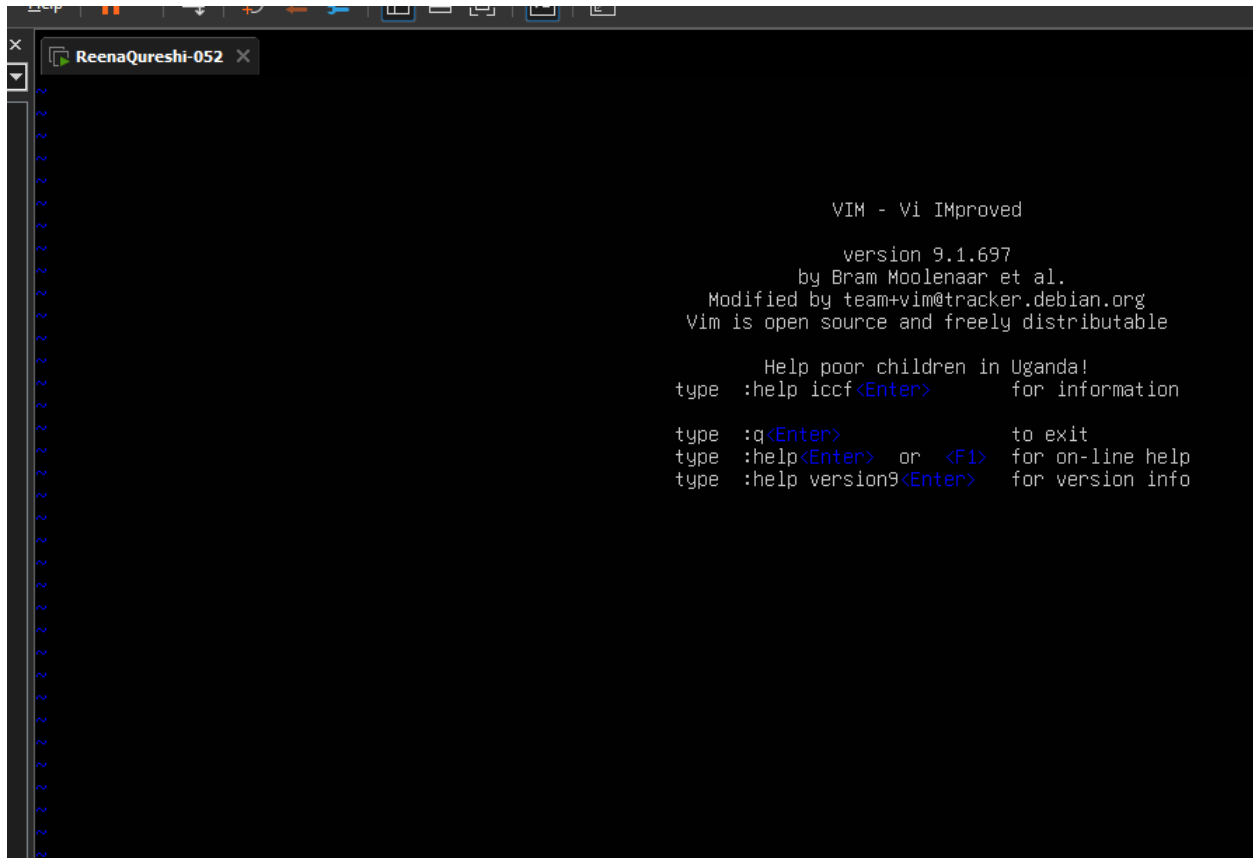
Aborted (core dumped)
reenaqureshi@reena2904:~$

```

Task 9 - Create a Kubernetes sample YAML using vim

Check whether vim is installed by running:

vim



Create the Lab5 working directory in your home and change into it:

```
mkdir -p ~/Lab5
```

```
cd ~/Lab5
```

```
reenaqureshi@reena2904:~$ mkdir -p ~/Lab5
reenaqureshi@reena2904:~$ cd ~/Lab5
reenaqureshi@reena2904:~/Lab5$
```

Create the Kubernetes sample file using vim:

```
vim k8s-sample.yaml
```

```
ReenaQureshi-052 x
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
spec:
  containers:
  - name: nginx
    image: nginx:1.19
    ports:
    - containerPort: 80
  restartPolicy: Always
~
~
~
~
```

Exit insert mode by pressing Esc, then save and quit vim with:

:wq

```
k8s-sample.yaml [new] 11L, 170B written
reenaqareshi@reena2904:~/Lab5$ ls -la
total 12
drwxrwxr-x  2 reenaqareshi reenaqareshi 4096 Oct 25 13:19 .
drwxr-x--- 21 reenaqareshi reenaqareshi 4096 Oct 25 13:19 ..
-rw-rw-r--  1 reenaqareshi reenaqareshi  170 Oct 25 13:19 k8s-sample.yaml
reenaqareshi@reena2904:~/Lab5$
```

Task 10 - Edit the Kubernetes YAML - add annotation, verify, then discard temporary change

Open the manifest with vim:

When vim opens, ensure you are in command mode (press Esc) then press i to enter insert mode.

Add the annotation under the metadata section (indentation must match YAML).

Example (insert these lines under metadata:):

Save a screenshot showing the saved file contents

```
reenaquareshi@reena2904:~/Lab5$ cat k8s-sample.yaml
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
spec:
  containers:
  - name: nginx
    image: nginx:1.19
    ports:
      - containerPort: 80
    restartPolicy: Always
```

Discard changes (practice: make a temporary edit and exit without saving)

Open the file again:

```
vim k8s-sample.yaml
```

Enter insert mode (i) and add a temporary comment line anywhere, for example:

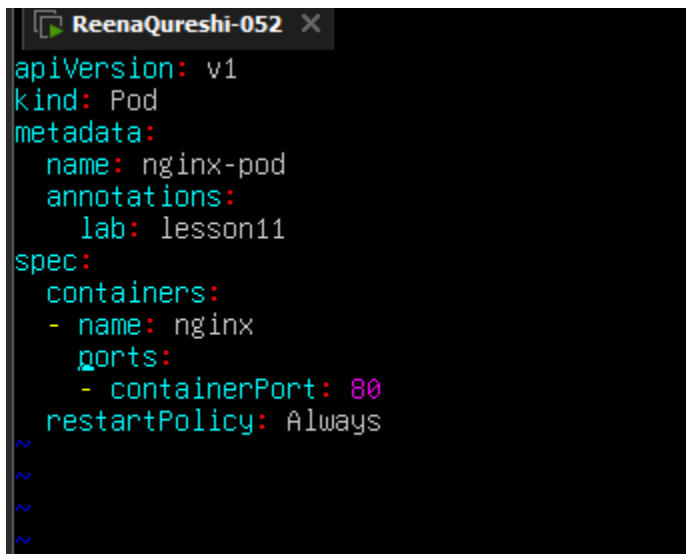
```
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
spec:
  containers:
  - name: nginx
    image: nginx:1.19
    ports:
      - containerPort: 80
    restartPolicy: Always
# temp: do not keep
~
~
```

Verify the file does NOT contain the temporary comment:

```
~
reenaqureshi@reena2904:~/Lab5$ cat k8s-sample.yaml
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
spec:
  containers:
  - name: nginx
    image: nginx:1.19
    ports:
    - containerPort: 80
  restartPolicy: Always
reenaqureshi@reena2904:~/Lab5$ _
```

Task 11 - Vim editing practice - delete, undo, numeric deletes, navigation

Delete the line containing image: nginx:1.19 with a single command:



```
ReenaQureshi-052 x
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
spec:
  containers:
  - name: nginx
  ports:
  - containerPort: 80
  restartPolicy: Always
~
~
~
~
```

Immediately undo the deletion


```
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
spec:
  containers:
  - name: nginx
    image: nginx:1.19
    ports:
      - containerPort: 80
    restartPolicy: Always
~
~
~
```

Delete 3 lines at once using the numeric delete command

d3d

```
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
spec:
  containers:
    ports:
      - containerPort: 80
    restartPolicy: Always
~
~
~
~
~
```

Immediately undo the deletion

```
ReenaQureshi-052 x
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
spec:
  containers:
  - name: nginx
    image: nginx:1.19
    ports:
    - containerPort: 80
  restartPolicy: Always
~
~
~
```

Task 12 - Vim search, add matches, substitute, undo

From command mode type:

/nginx

Move to the next match and previous match

```
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
spec:
  containers:
  - name: nginx
    image: nginx:1.19
    ports:
    - containerPort: 80
  restartPolicy: Always
~
~
~
```

Add two more occurrences of the word nginx in the f

```
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
spec:
  containers:
    - name: nginx
      image: nginx:1.19
      ports:
        - containerPort: 80
  restartPolicy: Always
  # nginx
  # nginx
```

```
kind: Pod
metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
spec:
  containers:
  - name: nginx
    image: nginx:1.19
    ports:
    - containerPort: 80
  restartPolicy: Always
  # nginx
  # nginx
~
~
~
~
```

Substitute all occurrences of nginx with webapp:

```
apiVersion: v1
kind: Pod
metadata:
  name: webpage-pod
  annotations:
    lab: lesson11
spec:
  containers:
    - name: webpage
      image: webpage:1.19
      ports:
        - containerPort: 80
      restartPolicy: Always
      # webpage
      # webpage
```

Immediately undo the substitution using u

```
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
spec:
  containers:
    - name: nginx
      image: nginx:1.19
      ports:
        - containerPort: 80
  restartPolicy: Always
  # nginx
  # nginx
```

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[50](#)

5 changes; before #6 44 seconds ago

Quit vim without saving any accidental changes (if you didn't already save after substitution and want to discard):

If you want to ensure no changes were written, exit with:

$$:q!$$

[illegible]

do or press Ctrl+G