



Fatima Jinnah Women University

Opening Portals of Excellence Through Higher Education

CLOUD COMPUTING LAB 5

Java, apt vs apt-get, snap, GUI, Vim on Ubuntu Server

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

task1_java_suggestion.png

```
valid_lft forever preferred_lft forever
maham123@maham123:~$ 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
maham123@maham123:~$
```

task1_java_install.png

```
Adding debian:UCA_Extended_Validation_Root.pem
Adding debian:UCA_Global_G2_Root.pem
Adding debian:USERTrust_ECC_Certification_Authority.pem
Adding debian:USERTrust_RSA_Certification_Authority.pem
Adding debian:vTrus_ECC_Root_CA.pem
Adding debian:vTrus_Root_CA.pem
Adding debian:X Ramp_Global_CA_Root.pem
done.
Setting up openjdk-21-jre:amd64 (21.0.8+9~us1-0ubuntu1~24.04.1) ...
Processing triggers for libgdk-pixbuf-2.0-0:amd64 (2.42.10+dfsg-3ubuntu3.2) ...
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No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
maham123@maham123:~$
```

task1_java_version.png

```
No VM guests are running outdated hypervisor (qemu) binaries on this host.
maham123@maham123:~$ 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)
```

task1_java_remove.png

```
maham123@maham123: ~$ sudo apt remove openjdk-21-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 alsaa-topology-conf alsu-ucm-conf at-spi2-common at-spi2-core ca-certificates-java dconf-gset
fonts-dejavu-extra gsettings-desktop-schemas gtk-update-icon-cache hicolor-icon-theme humanity-icon-theme java-
libatk-bridge2.0-0t64 libatk-wrapper-java libatk-wrapper-jni libatk1.0-0t64 libatspi2.0-0t64 libavahi-clie
libcairo-gobject2 libcairo2 libcolord2 libcurl2t64 libdatrie1 libdconf1 libdrm-amdgpu1 libdrm-intel1 libepoxy0
libgdk-pixbuf2.0-bin libgdk-pixbuf2.0-common libgif7 libgl1 libgl1-mesa1 libglvnd0 libglx-mesa0 libglx0 libg
libgtk-3-common libharfbuzz0b libice6 liblcms2-2 libl1v20 libpango-1.0-0 libpangocairo-1.0-0 libpangoft2-1.0-0
librsvg2-2 librsvg2-common libsm6 libthai-data libthai0 libvulkan1 libwayland-client0 libwayland-cursor0 libway
libxaw7 libxcb-dri3-0 libxcb-glx0 libxcb-present0 libxcb-randr0 libxcb-render0 libxcb-shape0 libxcb-shm0 libxcb
libxcursor1 libxdamage1 libxf86-fixes3 libxft2 libxi6 libxinerama1 libxkbfile1 libxmu6 libxrandr2 libxrender1 libxs
libxxf86dg1 libxxf86v1 mesa-libgallium mesa-vulkan-drivers openjdk-21-jre-headless session-migration ubuntu-r
Use 'sudo apt autoremove' to remove them.
The following packages will be REMOVED:
openjdk-21-jre
0 upgraded, 0 newly installed, 1 to remove and 67 not upgraded.
After this operation, 731 kB disk space will be freed.
Do you want to continue? [Y/n] Y
(Reading database ... 101557 files and directories currently installed.)
Removing openjdk-21-jre:amd64 (21.0.8+9~us1-0ubuntu1~24.04.1) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
maham123@maham123: ~$
```

task1_java_not_found.png

```
maham123@maham123: ~$ java
Command 'java' not found, but can be installed with:
sudo apt install openjdk-17-jre-headless # version 17.0.16+8~us1-0ubuntu1~24.04.1, or
sudo apt install openjdk-21-jre-headless # version 21.0.8+9~us1-0ubuntu1~24.04.1
sudo apt install default-jre          # version 2:1.17-75
sudo apt install openjdk-11-jre-headless # version 11.0.28+6-1ubuntu1~24.04.1
sudo apt install openjdk-25-jre-headless # version 25+36-1~24.04.2
sudo apt install openjdk-8-jre-headless # version 8u462-ga~us1-0ubuntu2~24.04.2
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
maham123@maham123: ~$
```

task1_hash_clear.png

```
maham123@maham123: ~$ hash -r
maham123@maham123: ~$ java
Command 'java' not found, but can be installed with:
sudo apt install openjdk-17-jre-headless # version 17.0.16+8~us1-0ubuntu1~24.04.1, or
sudo apt install openjdk-21-jre-headless # version 21.0.8+9~us1-0ubuntu1~24.04.1
sudo apt install default-jre          # version 2:1.17-75
sudo apt install openjdk-11-jre-headless # version 11.0.28+6-1ubuntu1~24.04.1
sudo apt install openjdk-25-jre-headless # version 25+36-1~24.04.2
sudo apt install openjdk-8-jre-headless # version 8u462-ga~us1-0ubuntu2~24.04.2
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
maham123@maham123: ~$
```

Task 2 - Install & remove Java using apt-get (explicitly)

task2_aptget_install.png

```
Replacing debian:X Ramp_Global_CA_Root.pem
done.
Setting up openjdk-21-jre:amd64 (21.0.8+9~us1~0ubuntu1~24.04.1) ...
Setting up default-jre-headless (2:1.21-75+exp1) ...
Setting up default-jre (2:1.21-75+exp1) ...
Processing triggers for libgdk-pixbuf-2.0-0:amd64 (2.42.10+dfsg-3ubuntu3.2) ...
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.
maham123@maham123:~$
```

task2_java_version_after_aptget.png

```
No VM guests are running outdated hypervisor (qemu) binaries on this host.
maham123@maham123:~$ 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)
maham123@maham123:~$
```

task2_aptget_remove.png

```
maham123@maham123:~$ 
maham123@maham123:~$ 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 alsamixer-conf alsavnc-conf at-spi2-common at-spi2-core ca-certificates-java dconf-gsettings-backend default-jre-headless fontconfig fonts-dejavu-extra gsettings-desktop-schemas gtk-update-icon-cache hicolor-icon-theme libasound2-data libasound2-t64 libatk-bridge2.0-0t64 libatk-wrapper-java libatk-wrapper-java-jni libatk1.0-0t64 libavahi-common-data libavahi-common3 libcairo-gobject2 libcairo2 libcolord2 libcups2-t64 libdatrie1 libdconf1 libgdk-pixbuf2.0-0 libgdk-pixbuf2.0-bin libgdk-pixbuf2.0-common libgif7 libgl1 libgl1-mesa-dri libglvnd0 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 libvulkan1 libwayland-client0 libwayland-libx11-xcb1 libxaw7 libxcb-dri3-0 libxcb-glx0 libxcb-present0 libxcb-randr0 libxcb-render0 libxcb-shape0 libxcb-xcomposite1 libxcursor1 libxdamage1 libxfixed3 libxft2 libxi6 libxinerama1 libxkbfile1 libxmu6 libxrandr2 libxv1 libxxf86dga1 libxxf86vm1 mesa-libgallium mesa-vulkan-drivers openjdk-21-jre openjdk-21-jre-headless sess-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) ...
```

task2_hash_after_remove.png

```
processing triggers for libc-bin (2.35-0ubuntu0.5) ...
maham123@maham123:~$ hash -r
maham123@maham123:~$ java

Command 'java' not found, but can be installed with:
sudo apt install openjdk-17-jre-headless # version 17.0.16+8~us1-0ubuntu1~24.04.1, or
sudo apt install openjdk-21-jre-headless # version 21.0.8+9~us1-0ubuntu1~24.04.1
sudo apt install default-jre          # version 2:1.17-75
sudo apt install openjdk-11-jre-headless # version 11.0.28+6-1ubuntu1~24.04.1
sudo apt install openjdk-25-jre-headless # version 25+36-1~24.04.2
sudo apt install openjdk-8-jre-headless # version 8u462-ga~us1-0ubuntu2~24.04.2
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
maham123@maham123:~$
```

Task 3 - apt update vs apt upgrade - run & explain

task3_apt_update.png

```
maham123@maham123: ~$ 
maham123@maham123:~$ sudo apt update

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
67 packages can be upgraded. Run 'apt list --upgradable' to see them.
```

task3_apt_upgrade.png

```
Check grub disable_uefi_firmware 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:
  maham123 @ session #1: apt[7365], login[1295]
  maham123 @ user manager service: systemd[1488]
maham123@maham123:~$
```

task3_explanation.png

```
maham123@maham123:~$ cat ~/apt_update_vs_upgrade.md

The command 'sudo apt update' refreshes the local package index by downloading the latest lists of available packages. It does not install or upgrade any software; it only updates information.

The command 'sudo apt upgrade' compares installed packages with the updated index and installs newer versions where available. It also removes any packages that are no longer needed.

Without running 'apt update' first, 'apt upgrade' might not detect the latest updates because it would be using old information.
```

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

task4_snap_install.png

```
maham123@maham123:~$ sudo snap install --classic code

2025-10-24T08:52:49Z INFO Waiting for automatic snapd restart...
code/7d842fb8 from Visual Studio Code (vscode) installed
maham123@maham123:~$
```

task4_snap_list.png

```
Code/7d842fb8 from Visual Studio Code (vscode) installed
maham123@maham123:~$ snap list code

Name    Version   Rev  Tracking      Publisher  Notes
code    7d842fb8  211  latest/stable  vscode     classic
maham123@maham123:~$
```

task4_code_version_or_info.png

```
maham123@maham123:~$ 
maham123@maham123:~$ code --version

1.105.1
7d842fb85a0275a4a8e4d7e040d2625abbf7f084
x64
maham123@maham123:~$ 
maham123@maham123:~$ 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 08:53 UTC
channels:
  latest/stable: 7d842fb8 2025-10-15 (211) 346MB classic
  latest/candidate: ↑
  latest/beta: ↑
  latest/edge: ↑
installed: 7d842fb8 (211) 346MB classic
maham123@maham123:~$
```

task4_snap_bin_location.png

```
maham123@maham123:~$ ls -l /snap/bin | grep code
lrwxrwxrwx 1 root root 13 Oct 24 08:53 code -> /usr/bin/snap
lrwxrwxrwx 1 root root 13 Oct 24 08:53 code.url-handler -> /usr/bin/snap
maham123@maham123:~$
```

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

task5_update.png

```
maham123@maham123:~$ sudo apt update && sudo apt upgrade -y
[sudo] password for maham123:
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
All packages are up to date.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
```

task5_xfce_install.png

```
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:  
maham123 @ session #1: login[1295]  
maham123 @ user manager service: systemd[1488]  
  
No VM guests are running outdated hypervisor (qemu) binaries on  
this host.
```

task5_xrdp_enable.png

```
User sessions running outdated binaries:  
maham123 @ session #1: login[1295]  
maham123 @ user manager service: systemd[1488]  
  
No VM guests are running outdated hypervisor (qemu) binaries on  
this host.  
maham123@maham123:~$ sudo systemctl enable --now xrdp  
Synchronizing state of xrdp.service with SysV service script wit  
h /usr/lib/systemd/systemd-sysv-install.  
Executing: /usr/lib/systemd/systemd-sysv-install enable xrdp
```

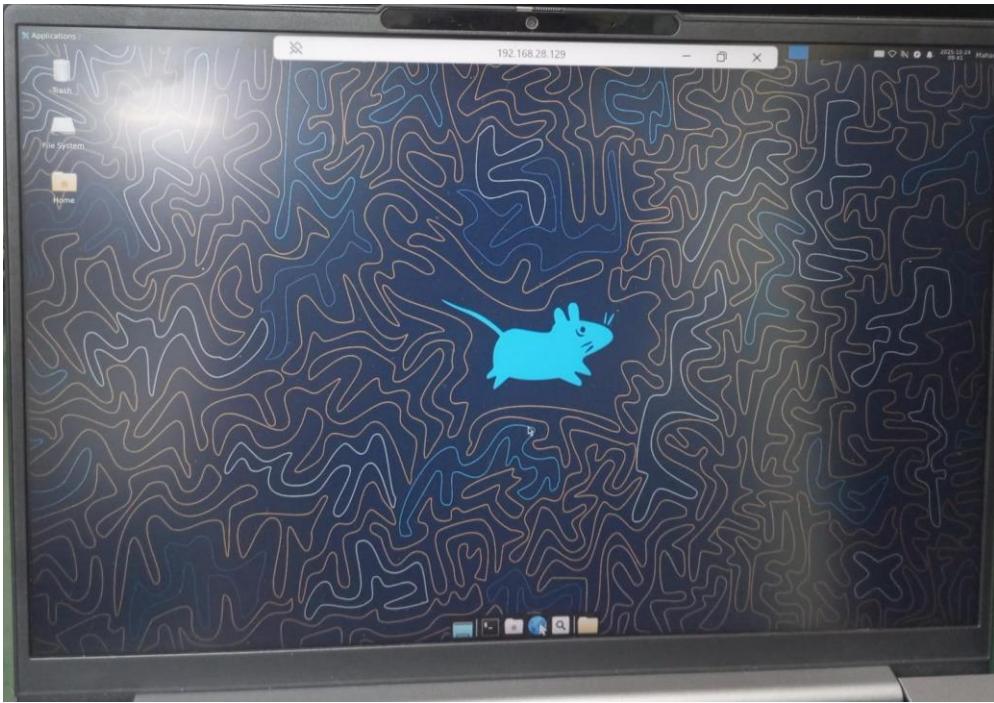
task5_xrdp_status.png

```
maham123@maham123:~$ sudo systemctl status xrdp  
● xrdp.service - xrdp daemon  
  Loaded: loaded (/usr/lib/systemd/system/xrdp.service; enabled)  
  Active: active (running) since Fri 2025-10-24 09:08:05 UTC  
    Docs: man:xrdp(8)  
          man:xrdp.ini(5)  
 Main PID: 32896 (xrdp)  
   Tasks: 1 (limit: 2210)  
  Memory: 872.0K (peak: 1.5M)  
    CPU: 22ms  
   CGroup: /system.slice/xrdp.service  
           └─32896 /usr/sbin/xrdp  
  
Oct 24 09:08:04 maham123 systemd[1]: Starting xrdp.service - xr  
Oct 24 09:08:04 maham123 xrdp[32894]: [INFO ] address [0.0.0.0]>  
Oct 24 09:08:04 maham123 xrdp[32894]: [INFO ] listening to port>  
Oct 24 09:08:04 maham123 xrdp[32894]: [INFO ] xrdp_listen_pp do>  
Oct 24 09:08:04 maham123 systemd[1]: xrdp.service: Can't open P>  
Oct 24 09:08:05 maham123 systemd[1]: Started xrdp.service - xrd>  
Oct 24 09:08:06 maham123 xrdp[32896]: [INFO ] starting xrdp wit>  
Oct 24 09:08:06 maham123 xrdp[32896]: [INFO ] address [0.0.0.0]>  
Oct 24 09:08:06 maham123 xrdp[32896]: [INFO ] listening to port>  
Oct 24 09:08:06 maham123 xrdp[32896]: [INFO ] xrdp_listen_pp do>  
Lines 1-22/22 (END)
```

task5_xsession.png

```
OCT 24 09:08:06 maham123 xrdp[32896]: [INFO ] xrdp_listen_pp  
maham123@maham123:~$ echo xfce4-session > ~/.xsession  
maham123@maham123:~$
```

task5_rdp_connect.png



task5_vscode_launch.png

```
maham123@maham123:~$ echo xfce4-session > ~/.xsession
maham123@maham123:~$ ss -ltnp | grep 3389
LISTEN 0          2                               *:3389           *:*
maham123@maham123:~$ ps aux | grep xrdp
root      32885  0.0  0.2  15944  4676 ?        S     09:08   0:00 /usr/sbin/xrdp
-sesman
xrdp      32896  0.0  0.1  13116  2300 ?        S     09:08   0:00 /usr/sbin/xrdp
xrdp      33156  0.3  1.4  56800  28668 ?       S     09:14   0:01 /usr/sbin/xrdp
root      33160  0.0  0.2  16180  4504 ?       S     09:15   0:00 /usr/sbin/xrdp
-sesman
maham123   33162  0.5  6.3  428412 124516 ?      Sl    09:15   0:02 /usr/lib/xorg/
Xorg :10 -auth .Xauthority -config xrdp/xorg.conf -noreset -nolisten tcp -logfile
.xorgxrdp.%s.log
maham123   33165  0.0  0.2  89772  5760 ?      Sl    09:15   0:00 /usr/sbin/xrdp
-chansrv
maham123   33738  0.0  0.1   6544  2304 pts/0     S+   09:23   0:00 grep --color=a
uto xrdp
maham123@maham123:~$ code
```

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

task6_lightdm_install.png

```
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 cons.

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:
maham123 @ session #1: login[1295]
maham123 @ user manager service: systemd[1488]

No VM guests are running outdated hypervisor (qemu) binaries on this host.
maham123@maham123:~$
```

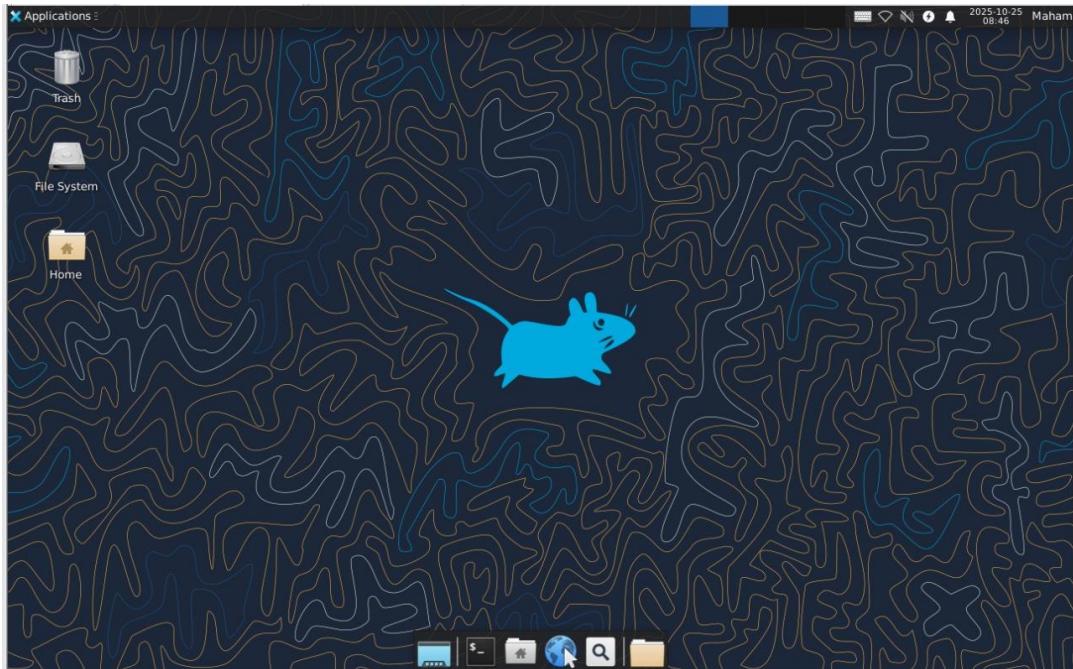
task6_lightdm_config.png

```
no VM guests are running outdated hypervisor (qemu) binaries on this host.
maham123@maham123:~$ sudo mkdir -p /etc/lightdm/lightdm.conf.d
maham123@maham123:~$ echo -e "[Seat:*]\ngreeter-session=lightdm-gtk-greeter\nuser-session=xfce\nau
/99-xfce.conf
[Seat:*]
greeter-session=lightdm-gtk-greeter
user-session=xfce
autologin-user-timeout=0
maham123@maham123:~$
```

task6_lightdm_cleanup.png

```
autologin-user-timeout=0
maham123@maham123:~$ sudo rm -f /var/lib/lightdm/.Xauthority
maham123@maham123:~$ sudo rm -f ~/.Xauthority
maham123@maham123:~$ sudo rm -rf ~/.cache/sessions
maham123@maham123:~$ sudo chown -R $USER:$USER /home/$USER
maham123@maham123:~$
```

task6_lightdm_restart.png



task6_gui_enable_boot.png

```
maham123@maham123:~$ sudo systemctl enable lightdm
[sudo] password for maham123:
Sorry, try again.
[sudo] password for maham123:
Synchronizing state of lightdm.service with SysV service script with /usr/lib/systemd/
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 systemc...
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.
maham123@maham123:~$ sudo systemctl set-default graphical.target
Created symlink /etc/systemd/system/default.target → /usr/lib/systemd/system/graphical
maham123@maham123:~$
```

task6_after_reboot_gui.png

```
Ubuntu 24.04.3 LTS maham123 tty3

maham123 login: maham123
Password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-86-generic x86_64)

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

System information as of Sat Oct 25 08:54:10 AM UTC 2025

System load:  1.17          Processes:           316
Usage of /:   68.0% of 9.75GB  Users logged in:      1
Memory usage: 34%
Swap usage:   0%             IPv4 address for ens3: 192.168.28.129

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

maham123@maham123:~$ _
```

task6_gui_disable_boot.png

```
maham123@maham123:~$ sudo systemctl set-default multi-user.target
[sudo] password for maham123:
Removed "/etc/systemd/system/default.target".
Created symlink /etc/systemd/system/default.target → /usr/lib/systemd/system/multi-user.target.
maham123@maham123:~$ ^C
maham123@maham123:~$ sudo systemctl set-default multi-user.target
maham123@maham123:~$ _
```

task6_after_reboot_cli.png



task6_after_reboot_cli.png

```
Ubuntu 24.04.3 LTS maham123 tty1
maham123 login: maaham123
Password:
Login incorrect
maham123 login: maham123
Password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-86-generic x86_64)

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

System information as of Sat Oct 25 08:57:57 AM UTC 2025

System load: 0.57      Processes: 252
Usage of /: 68.1% of 9.75GB  Users logged in: 0
Memory usage: 14%          IPv4 address for ens33: 192.168.28.129
Swap usage: 0%          

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

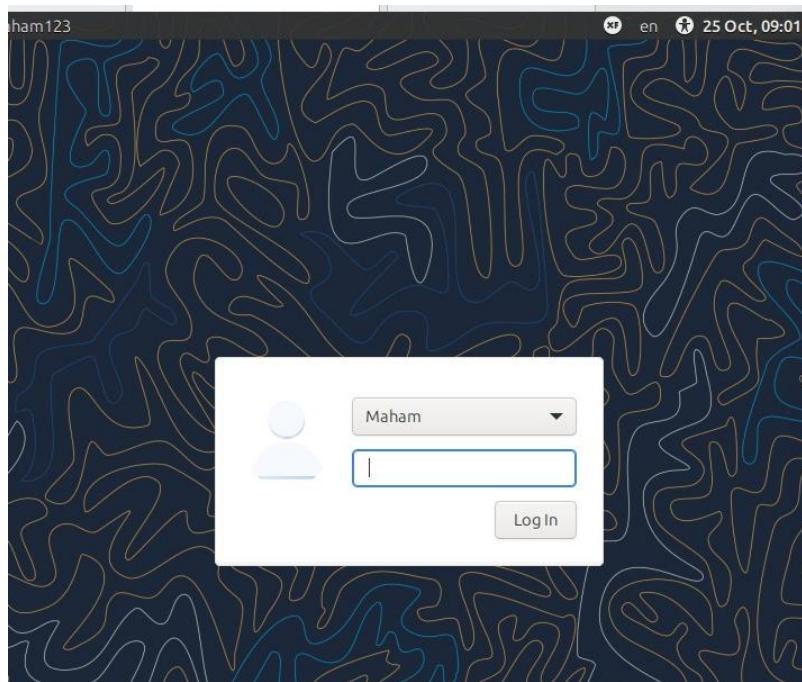
6 additional security updates can be applied with ESM Apps.
Learn more about enabling ESM Apps service at https://ubuntu.com/esm

maham123@maham123:~$
```

task6_gui_start.png

```
maham123@maham123:~$ sudo systemctl start lightdm
[sudo] password for maham123:
Sorry, try again.
[sudo] password for maham123:
```

task6_gui_start_command.png



task6_gui_stop.png

```
maham123@maham123:~$ sudo systemctl stop lightdm  
[sudo] password for maham123:  
Sorry, try again.  
[sudo] password for maham123:  
maham123@maham123:~$ _
```

task6_vscode_launch.png

```
[sudo] password for maham123:  
maham123@maham123:~$ code  
  
maham123@maham123:~$  
maham123@maham123:~$
```

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

task7_install_chrome_error.png

```
maham123@maham123:~$  
maham123@maham123:~$ sudo apt install google-chrome-stable -y  
  
[sudo] password for maham123:  
Sorry, try again.  
[sudo] password for maham123:  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
E: Unable to locate package google-chrome-stable  
maham123@maham123:~$
```

task7_ls_etc_apt.png

```
!  unable to locate package google-chrome-stable  
maham123@maham123:~$ ls -la /etc/apt  
  
total 48  
drwxr-xr-x  9 root  root  4096 Oct 24  08:00 .  
drwxr-xr-x 141 root  root 12288 Oct 24  09:15 ..  
drwxr-xr-x  2 root  root  4096 Oct 24  08:46 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 Oct 24  08:00 sources.list  
drwxr-xr-x  2 root  root  4096 Oct  3  05:59 sources.list.d  
drwxr-xr-x  2 root  root  4096 Aug  5 17:01 trusted.gpg.d  
maham123@maham123:~$  
maham123@maham123:~$ _
```

task7_cat_sources_list.png

```
maham123@maham123:~$ cat /etc/apt/sources.list  
# Ubuntu sources have moved to /etc/apt/sources.list.d/ubuntu.sources  
maham123@maham123:~$  
maham123@maham123:~$
```

task7_ls_sources_list_d.png

```
maham123@maham123:~$ ls -la /etc/apt/sources.list.d/  
total 16  
drwxr-xr-x 2 root root 4096 Oct  3 05:59 .  
drwxr-xr-x 9 root root 4096 Oct 24 08:00 ..  
-rw-r--r-- 1 root root  383 Oct  3 10:14 ubuntu.sources  
-rw-r--r-- 1 root root 2552 Aug  5 17:02 ubuntu.sources.curtin.orig  
maham123@maham123:~$  
maham123@maham123:~$ _
```

task7_cat_ubuntu_sources.png

```
maham123@maham123:~$ 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  
maham123@maham123:~$  
maham123@maham123:~$ _
```

task7_edit_ubuntu_sources.png

```
GNU nano 7.2                                     /etc/apt/sources  
Types: deb URIs: http://archive.ubuntu.com/ubuntu/ Suites: noble noble-updates  
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  
  
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
```

task7_add_key.png

```
maham123@maham123:~$ curl -fsSL https://dl.google.com/linux/linux_signing_key.pub | sudo gpg --dearmor -  
curl: (6) Could not resolve host: dl.google.com  
File '/etc/apt/keyrings/google.gpg' exists. Overwrite? (y/N) y  
gpg: no valid OpenPGP data found.  
maham123@maham123:~$
```

task7_apt_update.png

```
maham123@maham123:~$ sudo apt update  
Get:1 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]  
Get:2 http://dl.google.com/linux/chrome/deb stable InRelease [1,825 B]  
Get:3 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [1,270 kB]  
Get:4 http://dl.google.com/linux/chrome/deb stable/main amd64 Packages [1,210 B]  
Get:5 http://security.ubuntu.com/ubuntu noble-security/main Translation-en [211 kB]  
Get:6 http://security.ubuntu.com/ubuntu noble-security/main amd64 Components [21.5 kB]  
Get:7 http://security.ubuntu.com/ubuntu noble-security/main amd64 c-n-f Metadata [9,008 B]  
Get:8 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Packages [2,080 kB]  
Get:9 http://security.ubuntu.com/ubuntu noble-security/restricted Translation-en [470 kB]  
Get:10 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Components [212 B]  
Get:11 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [906 kB]  
Get:12 http://security.ubuntu.com/ubuntu noble-security/universe Translation-en [203 kB]  
Get:13 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Components [52.3 kB]  
Get:14 http://security.ubuntu.com/ubuntu noble-security/universe amd64 c-n-f Metadata [19.4 kB]  
Get:15 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Components [212 B]  
Fetched 5,371 kB in 4s (1,497 kB/s)  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
5 packages can be upgraded. Run 'apt list --upgradable' to see them.
```

task7_install_chrome.png

```
Some packages can be upgraded. Run 'apt list --upgradable' to see them.  
maham123@maham123:~$ sudo apt install google-chrome-stable -y  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
Some packages could not be installed. This may mean that you have  
requested an impossible situation or if you are using the unstable  
distribution that some required packages have not yet been created  
or been moved out of Incoming.  
The following information may help to resolve the situation:  
  
The following packages have unmet dependencies:  
 google-chrome-stable : Depends: fonts-liberation but it is not installable  
E: Unable to correct problems, you have held broken packages.  
maham123@maham123:~$
```

task7_alternate_remove.png

```
maham123@maham123:~$ sudo apt remove google-chrome-stable -y  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
Package 'google-chrome-stable' is not installed, so not removed  
0 upgraded, 0 newly installed, 0 to remove and 5 not upgraded.  
maham123@maham123:~$
```

task7_alternate_edit.png

```
GNU nano 7.2 /etc/apt/sources.list.d/ubuntu.sources
Types: deb URIs: http://archive.ubuntu.com/ubuntu/ Suites: noble noble-updates noble-backports Components: m
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
```

task7_remove_key.png

```
maham123@maham123:~$ sudo rm -f /etc/apt/keyrings/google.gpg
maham123@maham123:~$ _
```

task7_create_google_chrome_list.png

```
maham123@maham123:~$ sudo rm -f /etc/apt/keyrings/google.gpg
maham123@maham123:~$ echo "deb [arch=amd64 signed-by=/etc/apt/keyrings/google.gpg] http://dl.google.co
es.list.d/google-chrome.list > /dev/null
maham123@maham123:~$ 
maham123@maham123:~$ _
```

task7_list_sources_after_create.png

```
maham123@maham123:~$ 
maham123@maham123:~$ ls -la /etc/apt/sources.list.d/
total 20
drwxr-xr-x 2 root root 4096 Oct 31 18:25 *
drwxr-xr-x 9 root root 4096 Oct 24 08:00 ..
-rw-r--r-- 1 root root 107 Oct 31 18:25 google-chrome.list
-rw-r--r-- 1 root root 385 Oct 31 18:23 ubuntu.sources
-rw-r--r-- 1 root root 2552 Aug 5 17:02 ubuntu.sources.curtin.orig
maham123@maham123:~$
```

task7_add_key_alt.png

```
maham123@maham123:~$ sudo mkdir -p /etc/apt/keyrings
maham123@maham123:~$ curl -fsSL https://dl.google.com/linux/linux_signing_key.pub | sudo gpg --dearm
maham123@maham123:~$ _
```

task7_apt_update_alt.png

```
maham123@maham123:~$ curl -fsSL https://curl.haxx.se/ca/cacert.pem | sudo apt update
maham123@maham123:~$ sudo apt update
Hit:1 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:2 http://dl.google.com/linux/chrome/deb stable InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
5 packages can be upgraded. Run 'apt list --upgradable' to see them.
```

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

task8_add_ppa_audacity.png

```
maham123@maham123:~$ sudo add-apt-repository ppa:ubuntuhandbook1/audacity -y
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://security.ubuntu.com/ubuntu noble-security InRelease
Hit:2 https://dl.google.com/linux/chrome/deb stable InRelease
Get:3 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble InRelease [18.1 kB]
Get:4 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble/main amd64 Packages [1,064 B]
Get:5 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble/main Translation-en [492 B]
Fetched 19.6 kB in 2s (10.3 kB/s)
Reading package lists... Done
maham123@maham123:~$ _
```

task8_apt_update_audacity.png

```
Reading package lists... done
maham123@maham123:~$ sudo apt update
Hit:1 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:2 https://dl.google.com/linux/chrome/deb stable InRelease
Hit:3 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
5 packages can be upgraded. Run 'apt list --upgradable' to see them.
maham123@maham123:~$ _
```

task8_install_audacity.png

```
W: See apt-secure(8) manpage for repository creation and user configuration details.
maham123@maham123:~$ sudo apt install audacity -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Some packages could not be installed. This may mean that you have
requested an impossible situation or if you are using the unstable
distribution that some required packages have not yet been created
or been moved out of Incoming.
The following information may help to resolve the situation:

The following packages have unmet dependencies:
audacity : Depends: libflac++10 (>= 1.3.1) but it is not installable
           Depends: libportsmf0t64 (>= 0.1~svn20101010) but it is not installable
           Depends: libssbsms10 (>= 2.3.0) but it is not going to be installed
           Depends: libwxbase3.2-1t64 (>= 3.2.4+dfsg) but it is not installable
           Depends: libwxgtk3.2-1t64 (>= 3.2.4+dfsg) but it is not installable
           Depends: libwxgtk3.2-1t64 (>= 3.2.4+dfsg) but it is not installable
```

task8_audacity_version.png

```
maham123@maham123:~$ audacity --version
Command 'audacity' not found, but can be installed with:
sudo snap install audacity # version 3.7.1, or
sudo apt install audacity # version 2.4.2~dfsg0-5
See 'snap info audacity' for additional versions.
maham123@maham123:~$
maham123@maham123:~$ _
```

task8_add_ppa_obs.png

```
maham123@maham123:~$ 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://archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://security.ubuntu.com/ubuntu jammy-security InRelease
Hit:4 https://dl.google.com/linux/chrome/deb stable InRelease
Hit:5 http://security.ubuntu.com/ubuntu noble-security 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/ubuntuhandbook1/audacity/ubuntu jammy InRelease [18.3 kB]
Get:9 https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu noble/main amd64 Packages [1,172 B]
Get:10 https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu noble/main Translation-en [160 B]
Err:8 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu jammy InRelease
  The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 5738AE8480447DDF
Reading package lists... Done
W: GPG error: https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu jammy InRelease: The following
key is not available: NO_PUBKEY 5738AE8480447DDF NO_PUBKEY 4C1CBE14852541CB
E: The repository 'https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu jammy InRelease' is not
N: Updating from such a repository can't be done securely, and is therefore disabled by default.
N: See apt-secure(8) manpage for repository creation and user configuration details.
maham123@maham123:~$
```

task8_apt_update_obs.png

```
N: See apt-secure(8) manpage for repository creation and user configuration details.
maham123@maham123:~$ sudo apt update
Hit:1 http://archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://security.ubuntu.com/ubuntu jammy-security InRelease
Hit:3 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:4 http://archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:5 https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu noble InRelease
Hit:6 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble InRelease
Hit:7 https://dl.google.com/linux/chrome/deb stable InRelease
Get:8 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu jammy InRelease [18.3 kB]
Err:8 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu jammy InRelease
  The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 5738AE8480447DDF
Reading package lists... Done
W: GPG error: https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu jammy InRelease: The following
key is not available: NO_PUBKEY 5738AE8480447DDF NO_PUBKEY 4C1CBE14852541CB
E: The repository 'https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu jammy InRelease' is not
N: Updating from such a repository can't be done securely, and is therefore disabled by default.
N: See apt-secure(8) manpage for repository creation and user configuration details.
```

task8_install_obs.png

```
maham123@maham123:~$ sudo apt install obs-studio -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Some packages could not be installed. This may mean that you have
requested an impossible situation or if you are using the unstable
distribution that some required packages have not yet been created
or been moved out of Incoming.
The following information may help to resolve the situation:

The following packages have unmet dependencies:
obs-studio : Depends: libavdevice60 (>= 7:6.0) but it is not installable
              Depends: libavformat60 (>= 7:6.0) but it is not installable
              Depends: libmbedtls7t64 (>= 2.28.0) but it is not installable
              Depends: libmbedtls14t64 (>= 2.28.0) but it is not installable
              Depends: libmbedtls509-1t64 (>= 2.28.0) but it is not installable
              Depends: libqt6core6t64 (>= 6.4.0) but it is not installable
              Depends: libqt6dbus6t64 (>= 6.3.0) but it is not installable
              Depends: libqt6gui6t64 (>= 6.4.0) but it is not installable
              Depends: libqt6network6t64 (>= 6.1.2) but it is not installable
              Depends: libqt6widgets6t64 (>= 6.3.0) but it is not installable
              Depends: libqt6xml6t64 (>= 6.1.2) but it is not installable
              Depends: librist4 (>= 0.2.6+dfsg) but it is not installable
              Depends: libsrt1.5-openssl (>= 1.5.3) but it is not installable
              Depends: libswscale7 (>= 7:6.0) but it is not installable
              Depends: qt6-qpa-plugins but it is not going to be installed
E: Unable to correct problems, you have held broken packages.
maham123@maham123:~$
```

task8_obs_version.png

```
• Unable to correct problems, you have held broken packages.
maham123@maham123:~$ obs --version
Command 'obs' not found, but can be installed with:
sudo apt install obs-studio
maham123@maham123:~$
```

Task 9 - Create a Kubernetes sample YAML using vim

task9_vim_check.png

```
VIM - Vi IMproved
version 9.1.697
by Bram Moolenaar et al.
Modified by team-vim@tracker.debian.org
Vim is open source and freely distributable

      Help poor children in Uganda!
type :help iccf<Enter>          for information

type :q<Enter>                  to exit
type :help<Enter> or <F1>       for on-line help
type :help version9<Enter>       for version info
```

task9_mkdir_cd.png

```
maham123@maham123:~/Lab5$ mkdir -p ~/Lab5
maham123@maham123:~/Lab5$ cd ~/Lab5
maham123@maham123:~/Lab5$ pwd
/home/maham123/Lab5
maham123@maham123:~/Lab5$ _
```

task9_vim_edit.png

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

task9_k8s_saved.png

```
maham123@maham123:~/Lab5$ ls -la
total 12
drwxrwxr-x  2 maham123 maham123 4096 Nov  1 11:47 .
drwxr-x--- 19 maham123 maham123 4096 Nov  1 11:47 ..
-rw-rw-r--  1 maham123 maham123  296 Nov  1 11:47 k8s-sample.yaml
maham123@maham123:~/Lab5$ 
maham123@maham123:~/Lab5$
```

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

task10_verify_annotation.png

```
"k8s-sample.yaml" 28L, 350B written
maham123@maham123:~/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
```

task10_verify_entering_temp_data.png

```
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
```

task10_verify_no_temp_comment.png

```
maham123@maham123:~/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
```

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

task11_dd_delete_and_undo.png

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

task11_delete3_and_undo.png

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

task11_line1.png

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

task11_navigation.png

```
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

task12_search_nginx.png

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

task12_n_and_N_navigation.png

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

task12_added_occurrences.png

```
image: nginx:1.19
ports:
  - containerPort: 80
  restartPolicy: Always
  # NGINX EXTRA ONE
  # NGINX EXTRA TWO
```

```
"k8s-sample.yaml" 30L, 493B written
```

task12_cycle_matches.png

```
annotations:
  lab: lesson11

spec:
  containers:
    image: nginx:1.19
    ports:
      - containerPort: 80
        restartPolicy: Always
        # NGINX EXTRA ONE
        # NGINX EXTRA TWO
```

/nginx

task12_substitute_result.png

```
apiVersion: v1
kind: Pod
metadata:
  name: webapp-pod
  annotations:
    lab: lesson11
spec:
  containers:
    image: webapp:1.19
    ports:
      restartPolicy: Always
      # NGINX EXTRA ONE
      # NGINX EXTRA TWO
      -
```

task12_undo_and_quit.png

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