



SOFTWARE CONSTRUCTION & DEVELOPMENT
LAB
BSE (V-B)

Submitted By:

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Roll No:

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LAB 05

Installing, Managing Packages, GUI, and Tools in
Ubuntu

Task 1

Java Suggestion Message

```
musfira@ubuntu:~$ 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
musfira@ubuntu:~$
```

Installing Java using apt

```
musfira@ubuntu:~$ sudo apt update && sudo apt upgrade -y
[sudo] password for musfira:
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
25 packages can be upgraded. Run 'apt list --upgradable' to see them.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
The following packages will be upgraded:
  cloud-init coreutils distro-info-data fwupd landscape-common libfwupd2 libnss-systemd libpam-systemd libsystemd-shared libsystemd0 libudev1 powermgmt-base
  python3-software-properties snapd software-properties-common sosreport systemd systemd-dev systemd-hwe-hwdb systemd-resolved systemd-sysv systemd-timesyncd
  tcpdump ubuntu-drivers-common udev
25 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Need to get 50.7 MB of archives.
After this operation, 3,360 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 coreutils amd64 9.4-3ubuntu6.1 [1,413 kB]
Get:2 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libnss-systemd amd64 255.4-1ubuntu8.11 [159 kB]
```

Checking Java Version

```
musfira@ubuntu:~$ 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)
musfira@ubuntu:~$
```

Removing Java Package

```
musfira@ubuntu:~$ sudo apt remove default-jre -y
[sudo] password for musfira:
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 java-common
  libasound2-data libasound2t64 libatk-bridge2.0-0t64 libatk-wrapper-java libatk-wrapper-java-jni libatk1.0-0t64 libatspi2.0-0t64 libavahi-client3
  libavahi-common-data libavahi-common3 libcairo-gobject2 libcairo2 libcolorhug2 libcolord2 libcups2t64 libdat1.0 libdconf1 libdrm-amdgpu1 libdrm-intel1 libepoxy0 libgbm1
  libgdk-pixbuf2.0-0 libgdk-pixbuf2.0-bin libgdk-pixbuf2.0-common libgif7 libgl1 libgl1-mesa-dri libglvnd0 libglx-mesa0 libglx0 libgraphite2-3 libgtk-3-0t64
  libgtk-3-bin libgtk-3-common libharfbuzz0b libice6 libicns2-2 libllvm2.0 libpango-1.0-0 libpangocairo-1.0-0 libpangoft2-1.0-0 libpciaccess0 libpcsclite1
  libplxman-1-0 librsync2-2 librsync2-common libsm6 libthai-data libthai0 libvulkan1 libwayland-client0 libwayland-cursor0 libwayland-egl1 libwayland-server0
  libx11-xcb1 libxaw7 libxcb-dri3-0 libxcb-glx0 libxcb-present0 libxcb-randr0 libxcb-render0 libxcb-shape0 libxcb-shm0 libxcb-sync1 libxcb-xfixes0
  libxcomposite1 libxcursor1 libxdamage1 libxfixes3 libxft2 libxi6 libxinerama1 libxkbfile1 libxmu6 libxrandr2 libxrender1 libxshmfence1 libxt6t64 libxtst6
  libxv1 libxxf86dga1 libxxf86vm1 mesa-libgallium mesa-vulkan-drivers openjdk-21-jre openjdk-21-jre-headless session-migration ubuntu-mono x11-common
  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 26 not upgraded.
After this operation, 6,144 B disk space will be freed.
(Reading database ... 101879 files and directories currently installed.)
Removing default-jre (2:1.21-75-expl) ...
musfira@ubuntu:~$ _
```

Java Not Found After Removal

```
musfira@ubuntu:~$ java
-bash: /usr/bin/java: No such file or directory
```

Clearing Shell Cache (hash -r)

```
musfira@ubuntu:~$ hash -r
musfira@ubuntu:~$ 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
musfira@ubuntu:~$
```

Task 2

Installing Java with apt-get

```
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.
musfira@ubuntu:~$ _
```

Verifying Java Version

```
musfira@ubuntu:~$ 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)
musfira@ubuntu:~$ _
```

Removing Java using apt-get

```

musfira@ubuntu:~$ 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)
musfira@ubuntu:~$ 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 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-common
  libasound2-data libasound2t64 libatk-bridge2.0-0t64 libatk-wrapper-java libatk-wrapper-java-jni libatk1.0-0t64 libatspi2.0-0t64 libavahi-client3
  libavahi-common-data libavahi-common3 libcairo-gobject2 libcairo2 libcolorim2 libcupst2t64 libdatatr1 libdconf1 libdrm-amdgpu1 libdrm-intel1 libepoxy0 libgbm1
  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-3-0t64
  libgtk-3-bin libgtk-3-common libharfbuzz0b libice6 liblcms2-2 libllvm20 libpango-1.0-0 libpangocairo-1.0-0 libpangoft2-1.0-0 libpciaccess0 libpcsclite1
  libpixman-1-0 librsvg2-2 librsvg2-common libsm6 libthai-data libthai0 libvulkan1 libwayland-client0 libwayland-cursor0 libwayland-egl1 libwayland-server0
  libx11-xcb1 libxaw7 libxcb-dri3-0 libxcb-glx0 libxcb-present0 libxcb-randr0 libxcb-render0 libxcb-shape0 libxcb-shm0 libxcb-sync1 libxcb-xfixes0
  libxcomposite1 libxcursor1 libxdamage1 libxfixes3 libxft2 libx16 libxinerama1 libxkbfile1 libxmu6 libxrandr2 libxrender1 libxshmfence1 libxt6t64 libxtst6
  libxv1 libxxf86dga1 libxxf86vm1 mesa-libgallium mesa-vulkan-drivers openjdk-21-jre openjdk-21-jre-headless session-migration ubuntu-mono x11-common
  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 33 not upgraded.
After this operation, 6,144 B disk space will be freed.
(Reading database ... 101879 files and directories currently installed.)
Removing default-jre (2:1.21-75exp1) ...
musfira@ubuntu:~$

```

Verifying Java Removed

```

musfira@ubuntu:~$ hash -r
musfira@ubuntu:~$ 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
musfira@ubuntu:~$ _

```

Task 3

Running apt update

```

musfira@ubuntu:~$ 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
33 packages can be upgraded. Run 'apt list --upgradable' to see them.
musfira@ubuntu:~$

```

Running apt upgrade

```

musfira@ubuntu:~$ 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
33 packages can be upgraded. Run 'apt list --upgradable' to see them.
musfira@ubuntu:~$ _

```

Written Explanation File

```
musfira@ubuntu:~$ cat apt_update_vs_upgrade.md
Musfira Farooq
BSE (V-B)
Cloud Computing
Its my lab task
musfira@ubuntu:~$ _
```

Task 4

Installing VS Code using Snap

```
musfira@ubuntu:~$ sudo snap install --classic code
2025-10-25T12:21:26Z INFO Waiting for automatic snapd restart...
Download snap "code" (211) from channel "stable"
Download snap "code" (211) from channel "stable"
code 7d842fb8 from Visual Studio Code (vscode) installed
musfira@ubuntu:~$
```

Listing Installed Snap Packages

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

Checking VS Code Version

```
musfira@ubuntu:~$ code --version
1.105.1
7d842fb85a0275a4a8e4d7e040d2625abbf7f084
x64
musfira@ubuntu:~$
```

Snap Binary Location for Code

```
musfira@ubuntu:~$ ls -l /snap/bin | grep code
lrwxrwxrwx 1 root root 13 Oct 25 13:06 code -> /usr/bin/snap
lrwxrwxrwx 1 root root 13 Oct 25 13:06 code.url-handler -> /usr/bin/snap
musfira@ubuntu:~$ _
```

Task 5

Updating Packages

```

musfira@ubuntu:~$ sudo apt update && sudo apt upgrade -y
[sudo] password for musfira:
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
25 packages can be upgraded. Run 'apt list --upgradable' to see them.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
The following packages will be upgraded:
  cloud-init coreutils distro-info-data fwupd landscape-common libfwupd2 libnss-systemd libpam-systemd libsystemd-shared libsystemd0 libudev1 powermgmt-base
  python3-software-properties snapd software-properties-common sosreport systemd systemd-dev systemd-hwe-hwdb systemd-resolved systemd-sysv systemd-timesyncd
  tcpdump ubuntu-drivers-common udev
25 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Need to get 50.7 MB of archives.
After this operation, 3,360 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 coreutils amd64 9.4-3ubuntu6.1 [1,413 kB]
Get:2 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libnss-systemd amd64 255.4-1ubuntu8.11 [159 kB]

```

Installing XFCE4 Desktop Environment

```

Pending kernel upgrade!
Running kernel version:
  6.8.0-85-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...

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:
  musfira @ session #1: login[1147]
  musfira @ session #14: sshd[11333]
  musfira @ user manager service: systemd[1430]

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

```

Enabling XRDP Service

```

musfira@ubuntu:~$ sudo apt install xrdp -y
[sudo] password for musfira:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
xrdp is already the newest version (0.9.24-4).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
musfira@ubuntu:~$ sudo systemctl enable --now xrdp
Synchronizing state of xrdp.service with SysV service script with /usr/lib/systemd/systemd-sys
Executing: /usr/lib/systemd/systemd-sysv-install enable xrdp
musfira@ubuntu:~$ _

```

Checking XRDP Status

```

musfira@ubuntu:~$ sudo systemctl status xrdp
• xrdp.service - xrdp daemon
   Loaded: loaded (/usr/lib/systemd/system/xrdp.service; enabled; preset: enabled)
   Active: active (running) since Sat 2025-10-25 13:54:49 UTC; 4min 11s ago
     Docs: man:xrdp(8)
           man:xrdp.ini(5)
   Main PID: 21164 (xrdp)
    Tasks: 1 (limit: 4548)
   Memory: 868.0K (peak: 1.5M)
      CPU: 59ms
   CGroup: /system.slice/xrdp.service
           └─21164 /usr/sbin/xrdp

Oct 25 13:54:48 ubuntu systemd[1]: Starting xrdp.service - xrdp daemon...
Oct 25 13:54:48 ubuntu xrdp[21162]: [INFO ] address [0.0.0.0] port [3389] mode 1
Oct 25 13:54:48 ubuntu xrdp[21162]: [INFO ] listening to port 3389 on 0.0.0.0
Oct 25 13:54:48 ubuntu xrdp[21162]: [INFO ] xrdp_listen_pp done
Oct 25 13:54:48 ubuntu systemd[1]: xrdp.service: Can't open PID file /run/xrdp/xrdp.pid (yet?) after start
Oct 25 13:54:49 ubuntu systemd[1]: Started xrdp.service - xrdp daemon.
Oct 25 13:54:50 ubuntu xrdp[21164]: [INFO ] starting xrdp with pid 21164
Oct 25 13:54:50 ubuntu xrdp[21164]: [INFO ] address [0.0.0.0] port [3389] mode 1
Oct 25 13:54:50 ubuntu xrdp[21164]: [INFO ] listening to port 3389 on 0.0.0.0
Oct 25 13:54:50 ubuntu xrdp[21164]: [INFO ] xrdp_listen_pp done
musfira@ubuntu:~$ _

```

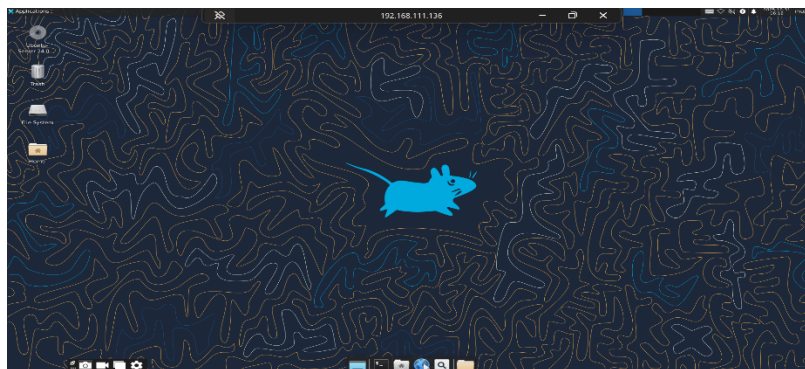
Configuring .xsession for XFCE

```

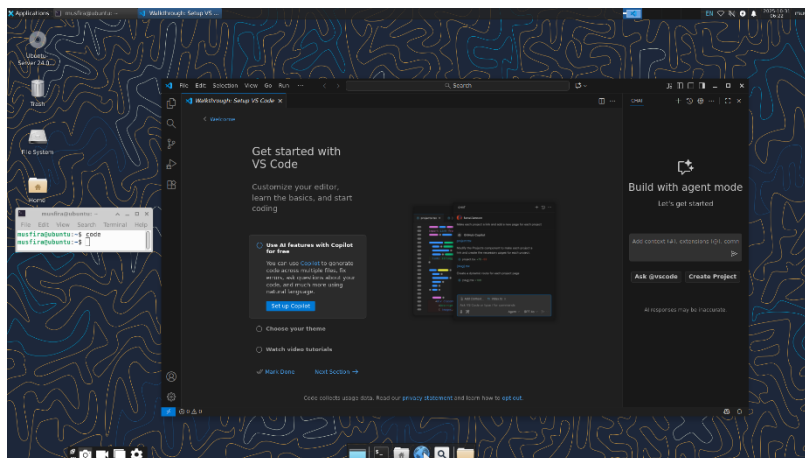
musfira@ubuntu:~$ echo xfce4-session > ~/.xsession
musfira@ubuntu:~$ _

```

Remote Desktop Connection Established



Launching VS Code in GUI



Task 6

Installing LightDM and Greeter

```
no vm guests are running outdoted hypervisor (qemu) binaries on this host
musfira@ubuntu:~$ sudo apt install lightdm lightdm-gtk-greeter -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
lightdm is already the newest version (1.30.0-0ubuntu14).
lightdm-gtk-greeter is already the newest version (2.0.9-0ubuntu3).
0 upgraded, 0 newly installed, 0 to remove and 5 not upgraded.
musfira@ubuntu:~$
```

Configuring LightDM for XFCE

```
musfira@ubuntu:~$ 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/lightdm/lightdm.conf.d/99-xfce.conf
[sudo] password for musfira:
[Seat:*]
greeter-session=lightdm-gtk-greeter
user-session=xfce
autologin-user-timeout=0
```

Cleaning Session Files

```
musfira@ubuntu:~$ sudo rm -f /var/lib/lightdm/.Xauthority
sudo rm -f ~/.Xauthority
sudo rm -rf ~/.cache/sessions
sudo chown -R musfira:musfira /home/musfira
chown: cannot access '/home/musfira/thinclient_drives': Permission denied
musfira@ubuntu:~$
```

Restarting LightDM Service

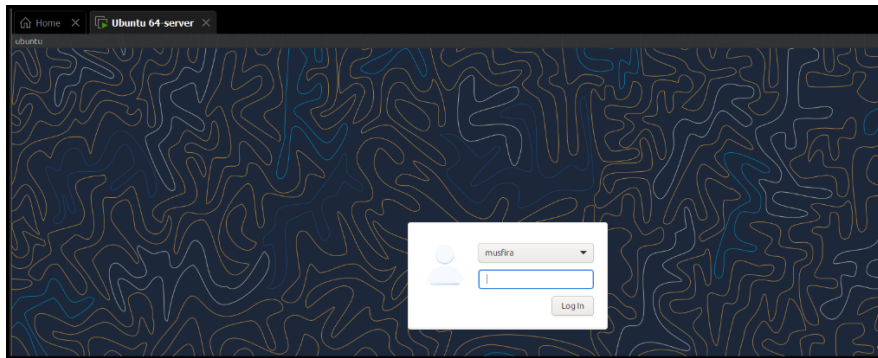
```
musfira@ubuntu:~$ sudo systemctl restart lightdm
musfira@ubuntu:~$
```

Enabling GUI on Boot

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

GUI Login After Reboot



Disabling GUI on Boot

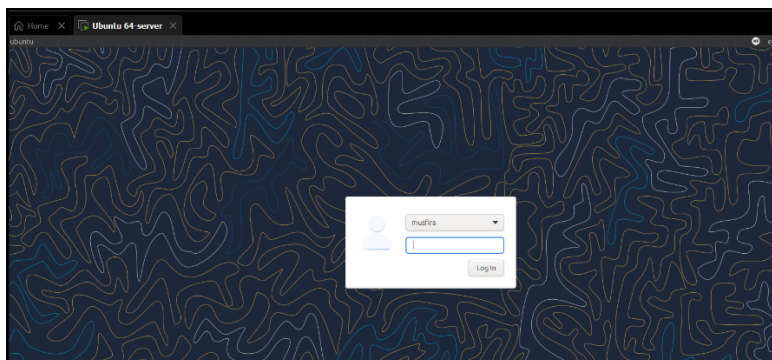
```
musfira@ubuntu: ~  
File Edit View Search Terminal Help  
musfira@ubuntu:~$ sudo systemctl set-default multi-user.target  
[sudo] password for musfira:  
musfira@ubuntu:~$ sudo systemctl disable lightdm  
Synchronizing state of lightdm.service with SysV service script with /usr/lib/sy  
stemd/systemd-sysv-install.  
Executing: /usr/lib/systemd/systemd-sysv-install disable lightdm  
Removed "/etc/systemd/system/display-manager.service".  
musfira@ubuntu:~$
```

CLI Mode After Reboot

```
Ubuntu 24.04.3 LTS ubuntu tty1  
ubuntu login:
```

Starting GUI Manually

```
musfira@ubuntu:~$ sudo systemctl start lightdm  
[sudo] password for musfira:  
musfira@ubuntu:~$
```



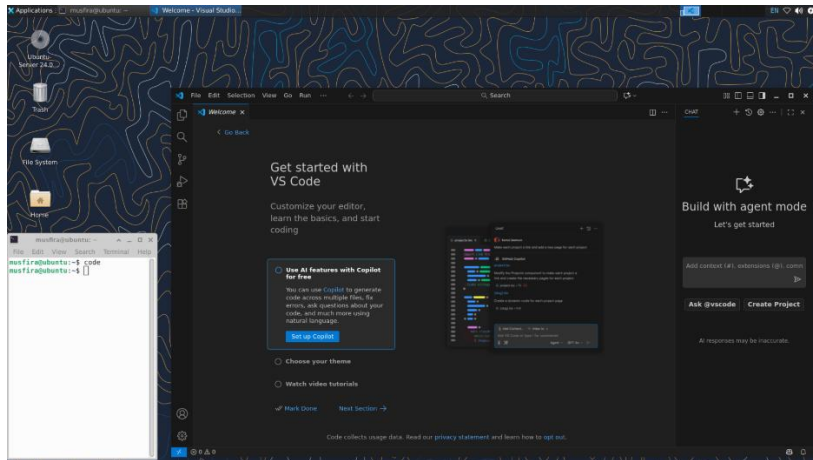
Stopping GUI Manually

```
musfira@ubuntu:~$ sudo systemctl stop lightdm  
musfira@ubuntu:~$
```

GUI Start Command Displayed

```
musfira@ubuntu:~$ sudo systemctl start lightdm
musfira@ubuntu:~$
```

Launching VS Code from GUI



Task 7

Chrome Install Error Message

```
musfira@ubuntu: ~
File Edit View Search Terminal Help

musfira@ubuntu:~$ code
musfira@ubuntu:~$ sudo apt install google-chrome-stable -y
[sudo] password for musfira:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
E: Unable to locate package google-chrome-stable
musfira@ubuntu:~$
```

Listing apt Directory Contents

```
E: Unable to locate package google-chrome-stable
musfira@ubuntu:~$ ls -la /etc/apt
total 48
drwxr-xr-x  9 root root 4096 Oct 19 06:56 .
drwxr-xr-x 140 root root 12288 Oct 31 06:16 ..
drwxr-xr-x  2 root root 4096 Oct 25 13:23 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 19 08:12 sources.list
drwxr-xr-x  2 root root 4096 Oct 19 08:12 sources.list.d
drwxr-xr-x  2 root root 4096 Aug  5 17:01 trusted.gpg.d
musfira@ubuntu:~$
```

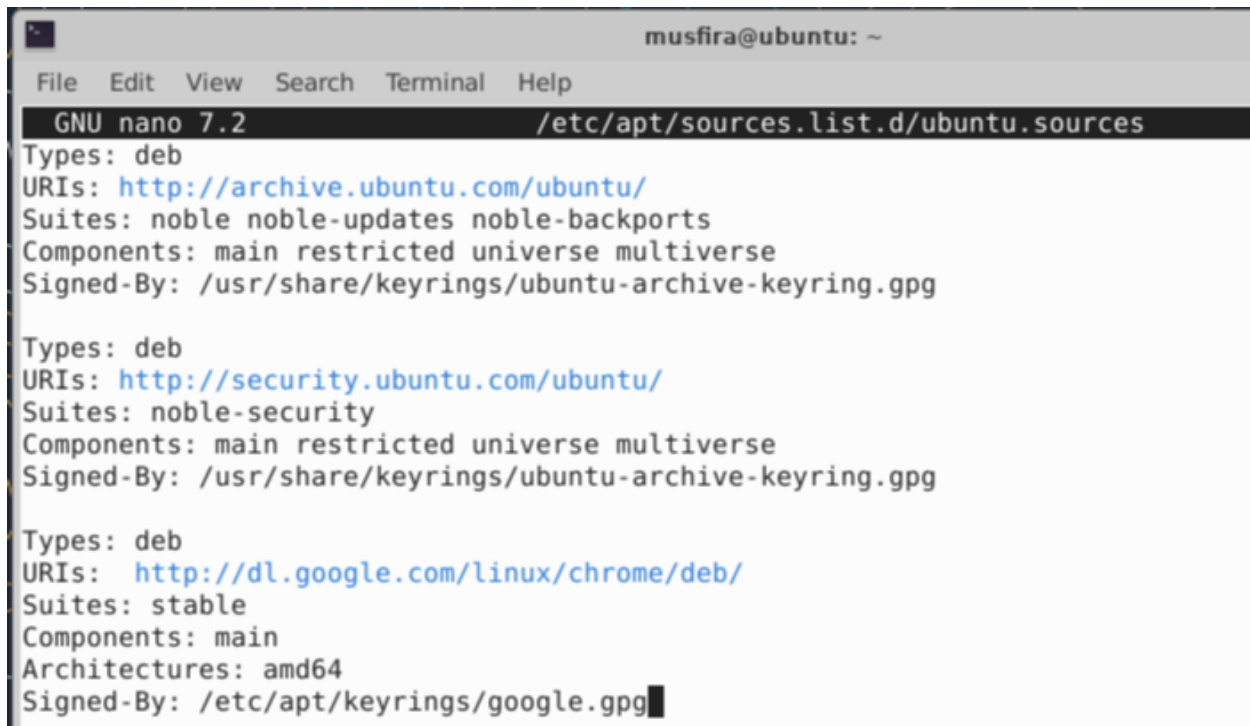
Viewing sources.list File

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

Viewing sources.list.d Directory

```
musfira@ubuntu:~$ ls -la /etc/apt/sources.list.d/
total 16
drwxr-xr-x 2 root root 4096 Oct 19 08:12 .
drwxr-xr-x 9 root root 4096 Oct 19 06:56 ..
-rw-r--r-- 1 root root 383 Oct 19 06:56 ubuntu.sources
-rw-r--r-- 1 root root 2552 Aug 5 17:02 ubuntu.sources.curtin.orig
musfira@ubuntu:~$
```

Editing ubuntu.sources to Add Chrome Stanza



```
musfira@ubuntu: ~
File Edit View Search Terminal Help
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: 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
```

Adding Google Signing Key

```
musfira@ubuntu:~$ sudo nano /etc/apt/sources.list.d/ubuntu.sources
musfira@ubuntu:~$ curl -fsSL https://dl.google.com/linux/linux_signing_key.pub | sudo gpg --dearmor -o /etc/apt/keyrings/google.gpg
musfira@ubuntu:~$
```

Updating Packages

```
musfira@ubuntu:~$ sudo apt update
Hit:1 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:3 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu noble-security InRelease
Get:5 http://dl.google.com/linux/chrome/deb stable InRelease [1,825 B]
Get:6 http://dl.google.com/linux/chrome/deb stable/main amd64 Packages [1,212 B]
Fetched 3,037 B in 7s (426 B/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.
musfira@ubuntu:~$
```

Installing Google Chrome

```

musfira@ubuntu:~$ sudo apt install google-chrome-stable -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
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 5 not upgraded.
Need to get 119 MB of archives.
After this operation, 395 MB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble/main amd64 fonts-liberation all 1:2.1.5-3 [1,603 kB]
Get:2 http://dl.google.com/linux/chrome/deb stable/main amd64 google-chrome-stable amd64 142.0.7444.59-1 [118 MB]

```

Removing Chrome Package

```

musfira@ubuntu:~$ sudo apt remove google-chrome-stable -y
sudo nano /etc/apt/sources.list.d/ubuntu.sources # remove the
sudo rm -f /etc/apt/keyrings/google.gpg
[sudo] password for musfira:
Sorry, try again.
[sudo] password for musfira:
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.
musfira@ubuntu:~$

```

Editing File to Remove Chrome Stanza

```

musfira@ubuntu:~$ 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
musfira@ubuntu:~$

```

Removing Google Key

```

musfira@ubuntu:~$ ls -la /etc/apt/sources.list.d/
total 20
drwxr-xr-x 2 root root 4096 Oct 31 10:18 .
drwxr-xr-x 9 root root 4096 Oct 19 06:56 ..
-rw-r--r-- 1 root root 107 Oct 31 10:18 google-chrome.list
-rw-r--r-- 1 root root 385 Oct 31 10:16 ubuntu.sources
-rw-r--r-- 1 root root 2552 Aug  5 17:02 ubuntu.sources.curtin.orig
musfira@ubuntu:~$

```

Creating google-chrome.list File

```

musfira@ubuntu:~$ 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
musfira@ubuntu:~$

```

Verifying sources.list.d Directory After Creation

```

musfira@ubuntu:~$ sudo apt update
Hit:1 http://archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:3 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:4 http://dl.google.com/linux/chrome/deb stable InRelease [1,825 B]
Get:5 http://dl.google.com/linux/chrome/deb stable/main amd64 Packages [1,210 B]
Get:6 http://archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:7 http://security.ubuntu.com/ubuntu noble-security/main amd64 Components [21.5 kB]
Get:8 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [1,573 kB]
Get:9 http://security.ubuntu.com/ubuntu noble-security/main amd64 c-n-f Metadata [9,008 B]
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 Components [52.3 kB]
Get:12 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Components [208 B]
Get:13 http://archive.ubuntu.com/ubuntu noble-updates/main Translation-en [297 kB]
Get:14 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 Components [175 kB]
Get:15 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 c-n-f Metadata [15.4 kB]
Get:16 http://archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Packages [2,226 kB]
Get:17 http://archive.ubuntu.com/ubuntu noble-updates/restricted Translation-en [505 kB]

```

Final Chrome Installation Success

```

musfira@ubuntu:~$ sudo apt install google-chrome-stable -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
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 5 not upgraded.

```

Task 8

Adding Audacity PPA

```

musfira@ubuntu:~$ 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.
Found existing deb entry in /etc/apt/sources.list.d/ubuntuhandbook1-ubuntu-audacity-noble.sources
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
Hit:5 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble InRelease
Hit:6 http://dl.google.com/linux/chrome/deb stable InRelease
Reading package lists... Done
musfira@ubuntu:~$

```

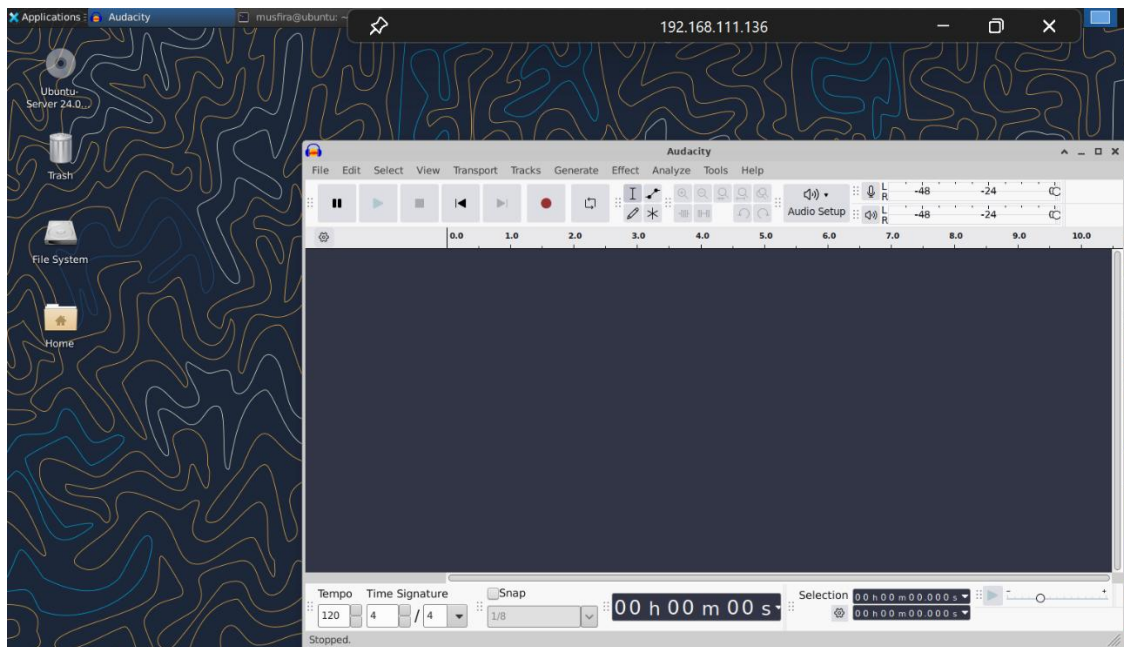

Updating Repositories for Audacity

```
musfira@ubuntu:~$ sudo apt update
Hit:1 https://dl.google.com/linux/chrome/deb stable InRelease
Hit:2 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble InRelease
Hit:3 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:4 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:5 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:6 http://archive.ubuntu.com/ubuntu noble-backports 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.
musfira@ubuntu:~$
```

Installing Audacity

```
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  audacity-data libdouble-conversion3 libflac++10 libid3tag0 liblilv-0-0 libmd4c0 libopusfile0
  libpcre2-16-0 libpcre2-32-0 libportaudio2 libportmidi0 libportsmf0t64 libqt5core5t64
  libqt5dbus5t64 libqt5gui5t64 libqt5network5t64 libqt5qml5 libqt5qmlmodels5 libqt5quick5
  libqt5svg5 libqt5waylandclient5 libqt5waylandcompositor5 libqt5widgets5t64 libqt5x11extras5
  libsbml0 libserd-0-0 libsord-0-0 libsoundtouch1 libsratom-0-0 libsuil-0-0
  libvamp-hostsdk3v5 libwxbase3.2-1t64 libwxgtk3.2-1t64 libxcb-icccm4 libxcb-image0
  libxcb-keysyms1 libxcb-render-util0 libxcb-xinerama0 libxcb-xinput0 libxcb-xkb1
  libxcbcommon-x11-0 libxix-0-0 qt5-gtk-platformtheme qttranslations5-l10n qtwayland5
Suggested packages:
  ladspa-plugin qgnomeplatform-qt5 qt5-image-formats-plugins qt5-qmltooling-plugins serdi
  sordi
The following NEW packages will be installed:
```

Launching or Verifying Audacity



Adding OBS PPA

```

musfira@ubuntu:~$ 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.
Found existing deb entry in /etc/apt/sources.list.d/obsproject-ubuntu-obs-studio
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
Get:4 https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu noble InRele
Hit:5 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble InR
Hit:6 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Get:7 https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu noble/main a
Get:8 https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu noble/main T
Hit:9 https://dl.google.com/linux/chrome/deb stable InRelease
Fetched 19.1 kB in 3s (5,871 B/s)
Reading package lists... Done

```

Updating Repositories for OBS

```

musfira@ubuntu:~$ sudo apt update
Hit:1 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:3 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:5 https://dl.google.com/linux/chrome/deb stable InRelease
Hit:6 https://ppa.launchpadcontent.net/obsproject/obs-studio/ubun
ase
Hit:7 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/u
elease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done

```

Installing OBS Studio

```

musfira@ubuntu:~$ sudo apt install -y obs-studio
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
libaaacs0 libass9 libavdevice60 libavfilter9 libavformat60 libb2-1 libbdplus0
libblas3 libbluray2 libbs2b0 libchromaprint1 libcbjson1 libdcl394-25
libdecor-0-0 libdecor-0-plugin-1-gtk libfdk-aac2 libfftw3-double3 libflite1
libgfortran5 libgme0 liblapack3 liblua5.1-2 liblua5.1-common
libmbedcrypto7t64 libmbedtls14t64 libmbedtls509-1t64 libmysofa1 libnorm1t64
libopenal-data libopenal1 libopenmpt0t64 libpgm-5.3-0t64 libplacebo338
libpocketsphinx3 libpostproc57 libqrencode4 libqt6core6t64
libqt6dbus6t64 libqt6gui6t64 libqt6network6t64 libqt6opengl6t64 libqt6qml6
libqt6qmlmodels6 libqt6quick6 libqt6svg6 libqt6waylandclient6
libqt6waylandcompositor6 libqt6waylandeglclienthwinintegration6
libqt6waylandeglcompositorhwinintegration6 libqt6widgets6t64
libqt6wlshellintegration6 libqt6xml6t64 librabbitmq4 librist4 librubberband2
libsdl2-2.0-0 libsndio7.0 libsphinxbase3t64 libsrtp1.5-gnutls
libssl1.5-openssl libssh-gcrypt-4 libswscale7 libtss0t64 libudfread0
libunibreak5 libvidstab1.1 libxcb-composite0 libzimg2 libzmq5
pocketsphinx-en-us qt6-gtk-platformtheme qt6-qtbase qt6-qtdeclarative
qt6-translations-l10n qt6-wayland

```

Updating again

```

musfira@ubuntu:~$ sudo apt update
[sudo] password for musfira:
Sorry, try again.
[sudo] password for musfira:
Hit:1 http://archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:3 http://archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Hit:4 https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu noble InRelease
Hit:5 https://dl.google.com/linux/chrome/deb stable InRelease
Hit:6 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble InRelease
Get:7 http://archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:8 http://security.ubuntu.com/ubuntu noble-security/main amd64 Components [21.5 kB]
Get:9 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 Components [175 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 Components [52.3 kB]
Get:12 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Components [212 B]
Get:13 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 c-n-f Metadata [15.4 kB]
Get:14 http://archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Components [212 B]
Get:15 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 Components [378 kB]
Get:16 http://archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Components [940 B]
Get:17 http://archive.ubuntu.com/ubuntu noble-backports/main amd64 Components [7,140 B]
Get:18 http://archive.ubuntu.com/ubuntu noble-backports/restricted amd64 Components [216 B]
Get:19 http://archive.ubuntu.com/ubuntu noble-backports/universe amd64 Components [11.0 kB]
Get:20 http://archive.ubuntu.com/ubuntu noble-backports/multiverse amd64 Components [212 B]
Fetched 1,041 kB in 5s (212 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.
musfira@ubuntu:~$

```

Launching or Verifying OBS Studio

```

musfira@ubuntu:~$ sudo apt install obs-studio -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
obs-studio is already the newest version (32.0.2-0obsproject1~noble).
0 upgraded, 0 newly installed, 0 to remove and 5 not upgraded.
musfira@ubuntu:~$

```

```

musfira@ubuntu:~$ obs --version
OBS Studio - 32.0.2

```

Task 9

Checking Vim Installation

```

      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

```


Creating Lab5 Directory and Navigating

```
musfira@ubuntu:~$ vim
musfira@ubuntu:~$ mkdir -p ~/Lab5
cd ~/Lab5
musfira@ubuntu:~/Lab5$ pwd
/home/musfira/Lab5
musfira@ubuntu:~/Lab5$
```

Editing k8s-sample.yaml in Vim

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

Verifying YAML File Saved

```
musfira@ubuntu:~/Lab5$ ls -la
total 24
drwxrwxr-x  2 musfira musfira  4096 Oct 31 16:15 .
drwxr-x--- 24 musfira musfira  4096 Oct 31 16:15 ..
-rw-rw-r--  1 musfira musfira   171 Oct 31 16:15 k8s-sample.yaml
-rw-----  1 musfira musfira 12288 Oct 31 16:09 .k8s-sample.yaml.swp
musfira@ubuntu:~/Lab5$
```

Task 10

YAML File After Adding Annotation

```
musfira@ubuntu:~/Lab5$ cd ~/Lab5
vim k8s-sample.yaml
musfira@ubuntu:~/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
musfira@ubuntu:~/Lab5$
```

Temporary Edit in Vim (Before Discarding)

```
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
```

File After Discarding Temporary Changes

```
musfira@ubuntu:~/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
musfira@ubuntu:~/Lab5$
```

Task 11

Deleting a Line and Undoing

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

annotations:
  lab: lesson11
~
```

Deleting 3 Lines and Undoing

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

annotations:
  lab: lesson11
~
```

Navigating to Line 1

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

annotations:
  lab: lesson11
~
~
```

Navigation Between Line Ends

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

annotations:
  lab: lesson11
~
```

Task 12

Searching for “nginx”

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

annotations:
  lab: lesson11
~
```

Navigating Matches with n / N

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

annotations:
  lab: lesson11
~
```

Adding Extra “nginx” Occurrences

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

Navigating Between Matches

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

Substituting nginx → webapp

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

Undoing Substitution

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

annotations:
  lab: lesson11
```

Exam Evaluation

Docker Desktop Successfully Installed

