



Cloud Computing Lab

Submitted To:

Sir Shoaib & Sir Waqas

Submitted By:

Hamail Fatima

Roll No:

2023-BSE-023

Section:

5(A)

Lab #05

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

Goal: Run the java command when it's not installed, follow the system suggestion to install a Java package using apt, verify, then remove and clear shell cache.

Steps (inside the VM terminal)

1. Run the java command to see what the system suggests:

```
java
```

- Expected: message similar to "The program 'java' can be found in the following packages:
... Try: sudo apt install ..."
- Save screenshot as: task1_java_suggestion.png

```
hamail@ubuntu-lab:~$ 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 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+8~us1-0ubuntu2~24.04.2
hamail@ubuntu-lab:~$ _
```

2. 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
```

- Save screenshot of the apt install progress (or final lines) as: task1_java_install.png

```
hamail@ubuntu-lab:~$ sudo apt install version 25+36-1~24.04.2
[sudo] password for hamail:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
E: Unable to locate package version
E: Unable to locate package 25+36-1~24.04.2
hamail@ubuntu-lab:~$ _
```

3. Verify Java is installed and check version:

```
java --version
```

- Save screenshot as: task1_java_version.png

```
Get:1 http://security.ubuntu.com/ubuntu noble-security/main amd64 libcurl2t64 amd64 2.4.7-1.2ubuntu7.4 [272 kB]
Err:1 http://archive.ubuntu.com/ubuntu noble/main amd64 alsac-topology-conf all 1.2.9.1-2
  404 Not Found [IP: 91.189.91.81 80]
Err:3 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libasound2-data all 1.2.11-1ubuntu0.1
  404 Not Found [IP: 91.189.91.81 80]
Err:4 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libasound2t64 amd64 1.2.11-1ubuntu0.1
  404 Not Found [IP: 91.189.91.81 80]
Err:5 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 alsac-uvm-conf all 1.2.10-1ubuntu5.7
  404 Not Found [IP: 91.189.91.81 80]
Err:6 http://archive.ubuntu.com/ubuntu noble/main amd64 ca-certificates-java all 20240118
  404 Not Found [IP: 91.189.91.81 80]
Err:7 http://archive.ubuntu.com/ubuntu noble/main amd64 java-common all 0.75+exp1
  404 Not Found [IP: 91.189.91.81 80]
Err:8 http://archive.ubuntu.com/ubuntu noble/main amd64 libavahi-common-data amd64 0.8-13ubuntu6
  404 Not Found [IP: 91.189.91.81 80]
Err:9 http://archive.ubuntu.com/ubuntu noble/main amd64 libavahi-common3 amd64 0.8-13ubuntu6
  404 Not Found [IP: 91.189.91.81 80]
Err:10 http://archive.ubuntu.com/ubuntu noble/main amd64 libavahi-client3 amd64 0.8-13ubuntu6
  404 Not Found [IP: 91.189.91.81 80]
Err:11 http://archive.ubuntu.com/ubuntu noble/main amd64 libgraphite2-3 amd64 1.3.14-2build1
  404 Not Found [IP: 91.189.91.81 80]
Err:12 http://archive.ubuntu.com/ubuntu noble/main amd64 libharfbuzz0b amd64 8.3.0-2build2
```

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

sudo apt remove <suggested-package> -y

- Save screenshot as: task1_java_remove.png

```
hamail@ubuntu-lab:~$ sudo apt remove openjdk-25-jre-headless=25+36-1~24.04.2 -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Package 'openjdk-25-jre-headless' is not installed, so not removed
0 upgraded, 0 newly installed, 0 to remove and 2 not upgraded.
hamail@ubuntu-lab:~$
```

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

java

- Save screenshot as: task1_java_not_found.png

```
hamail@ubuntu-lab:~$ 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 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
hamail@ubuntu-lab:~$
```

6. 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

- Save screenshot showing hash -r followed by java result as: task1_hash_clear.png

```
sudo apt install openjdk-8-jre-headless  # version 8u462-ga~us1-0ubuntu2~24.04.2
hamail@ubuntu-lab:~$ hash -r
hamail@ubuntu-lab:~$ 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 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
hamail@ubuntu-lab:~$
```

💡 Screenshot Required:

- task1_java_suggestion.png
- task1_java_install.png
- task1_java_version.png
- task1_java_remove.png
- task1_java_not_found.png

- task1_hash_clear.png

Notes:

- Use the exact package the VM suggests. Typical suggestions include default-jre, openjdk-11-jre-headless, or similar.

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

Goal: Repeat install/remove using the apt-get tool to show both package managers.

Steps (inside VM terminal)

1. 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
```

- Save screenshot(s) as: task2_aptget_install.png

```
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  alsatopology-conf alsau-ucm-conf ca-certificates-Java java-common libasound2-data libasound2t64 libavahi-client3 libavahi-common-data libavahi-common3
  libcurl2t64 libgraphite2-3 libharfbuzzob libicms2-2 libpcsselite1
Suggested packages:
  default-jre alsalibs-utils libasound2-plugins cups-common libicms2-utils pscd libnss-mdns fonts-dejavu-extra fonts-ipafont-gothic fonts-ipafont-mincho
  fonts-wqy-microhei | fonts-wqy-zenhei fonts-indic
The following NEWER packages will be installed:
  alsatopology-conf alsau-ucm-conf ca-certificates-Java java-common libasound2-data libasound2t64 libavahi-client3 libavahi-common-data libavahi-common3
  libcurl2t64 libgraphite2-3 libharfbuzzob libicms2elite1 openjdk-25-jre-headless
0 upgraded, 15 newly installed, 0 to remove and 0 not upgraded.
Need to get 1,324 kB/60.4 MB of archives.
After this operation, 250 MB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu/noble/main amd64 alsatopology-conf all 1.2.5.1-2 [15.5 kB]
Err:2 http://archive.ubuntu.com/ubuntu/noble-updates/main amd64 libasound2-data all 1.2.11-1ubuntu0.1
  404 Not Found [IP: 185.125.190.83 80]
Err:3 http://archive.ubuntu.com/ubuntu/noble-updates/main amd64 libasound2t64 amd64 1.2.11-1ubuntu0.1
  404 Not Found [IP: 185.125.190.83 80]
Err:4 http://archive.ubuntu.com/ubuntu/noble-updates/main amd64 alsau-ucm-conf all 1.2.10-1ubuntu0.5.7
  404 Not Found [IP: 185.125.190.83 80]
Get:5 http://archive.ubuntu.com/ubuntu/noble/main amd64 ca-certificates-java all 20240118 [11.6 kB]
Get:6 http://archive.ubuntu.com/ubuntu/noble/main amd64 java-common all 0.75+exp1 [6,798 B]
Get:7 http://archive.ubuntu.com/ubuntu/noble/main amd64 libavahi-common-data amd64 0.8-13ubuntu6 [29.7 kB]
Get:8 http://archive.ubuntu.com/ubuntu/noble/main amd64 libavahi-common3 amd64 0.8-13ubuntu6 [23.3 kB]
Get:9 http://archive.ubuntu.com/ubuntu/noble/main amd64 libavahi-client3 amd64 0.8-13ubuntu6 [26.8 kB]
Get:10 http://archive.ubuntu.com/ubuntu/noble/main amd64 libgraphite2-3 amd64 1.3.14-2build1 [73.0 kB]
Get:11 http://archive.ubuntu.com/ubuntu/noble/main amd64 libharfbuzzob amd64 8.3.0-2build2 [469 kB]
Get:12 http://archive.ubuntu.com/ubuntu/noble/main amd64 libicms2-2 amd64 2.14-2build1 [161 kB]
Get:13 http://archive.ubuntu.com/ubuntu/noble/main amd64 libpcsselite1 amd64 2.0.3-1build1 [21.4 kB]
Fetched 838 kB in 4s (219 kB/s)
E: Failed to fetch http://archive.ubuntu.com/ubuntu/pool/main/a/alsa-lib/libasound2-data_1.2.11-1ubuntu0.1_all.deb 404 Not Found [IP: 185.125.190.83 80]
E: Failed to fetch http://archive.ubuntu.com/ubuntu/pool/main/a/alsa-lib/libasound2t64_1.2.11-1ubuntu0.1_amd64.deb 404 Not Found [IP: 185.125.190.83 80]
E: Failed to fetch http://archive.ubuntu.com/ubuntu/pool/main/a/alsau-ucm-conf/alsau-ucm-conf_1.2.10-1ubuntu0.5.7_all.deb 404 Not Found [IP: 185.125.190.83 80]
E: Unable to fetch some archives, maybe run apt-get update or try with --fix-missing?
hamail@ubuntu-lab:~$
```

2. Verify Java version again:

```
java --version
```

- Save screenshot as: task2_java_version_after_aptget.png

```
hamail@ubuntu-lab:~$ java --version
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
hamail@ubuntu-lab:~$
```

3. Remove Java using apt-get remove:

```
sudo apt-get remove default-jre -y
```

- Save screenshot as: task2_aptget_remove.png

```
hamail@ubuntu-lab:~$ sudo apt-get remove openjdk-25-jre-headless=25+36-1~24.04.2 -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Package 'openjdk-25-jre-headless' is not installed, so not removed
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
hamail@ubuntu-lab:~$ _
```

4. Clear the terminal hash cache and confirm java is missing:

```
hash -r
```

```
java
```

- Save screenshot as: task2_hash_after_remove.png

```
hamail@ubuntu-lab:~$ hash -r
hamail@ubuntu-lab:~$ java
Command 'java' not found, but can be installed with:
sudo apt install openjdk-17-jre-headless  # version 17.0.16+8~us1~ubuntu1~24.04.1, or
sudo apt install openjdk-21-jre-headless  # version 21.0.8+9~us1~ubuntu1~24.04.1
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~ubuntu2~24.04.2
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
hamail@ubuntu-lab:~$
```

📸 Screenshot Required:

- task2_aptget_install.png
- task2_java_version_after_aptget.png
- task2_aptget_remove.png
- task2_hash_after_remove.png

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

Goal: Run the commands and document the difference.

Steps (inside VM terminal)

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

```
sudo apt update
```

- Save screenshot as: task3_apt_update.png

```

c. The repository 'http://archive.ubuntu.com/ubuntu noble Release' does not have a Release file.
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.
E: The repository 'http://archive.ubuntu.com/ubuntu noble-updates Release' does not have a Release file.
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.
E: The repository 'http://archive.ubuntu.com/ubuntu noble-backports Release' does not have a Release file.
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.
W: Target Packages (main/binary-amd64/Packages) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Packages (main/binary-all/Packages) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Translations (main/i18n/Translation-en_US) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Translations (main/i18n/Translation-en) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target DEP-11 (main/dep11/Components-amd64.yml) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target DEP-11 (main/dep11/Components-all.yml) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target CNF (main/cnf/Commands-amd64) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target CNF (main/cnf/Commands-all) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Packages (restricted/binary-amd64/Packages) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Packages (restricted/binary-all/Packages) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Translations (restricted/i18n/Translation-en_US) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Translations (restricted/i18n/Translation-en) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target DEP-11 (restricted/dep11/Components-amd64.yml) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target DEP-11 (restricted/dep11/Components-all.yml) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target CNF (restricted/cnf/Commands-amd64) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target CNF (restricted/cnf/Commands-all) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Packages (universe/binary-amd64/Packages) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Packages (universe/binary-all/Packages) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Translations (universe/i18n/Translation-en_US) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Translations (universe/i18n/Translation-en) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target DEP-11 (universe/dep11/Components-amd64.yml) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target DEP-11 (universe/dep11/Components-all.yml) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target CNF (universe/cnf/Commands-amd64) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target CNF (universe/cnf/Commands-all) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
hamail@ubuntu-lab: ~$ 
```

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

`sudo apt upgrade`

- Save screenshot as: task3_apt_upgrade.png

```

hamail@ubuntu-lab:~$ sudo apt upgrade
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.
hamail@ubuntu-lab:~$ 
```

3. 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`

write 3-5 sentences, save and exit

- Open the file or show it on screen and save screenshot as: task3_explanation.png

```

GNU nano 7.2                               /home/hamail/apt_update_vs_upgrade.md
apt updates only refreshes the package list _it checks for new versions but not install anything
apt upgrades actually install the available updates for packages already on the system
apt update updates your local packages apt upgrade    updates your installed software 
```

Screenshot Required:

- task3_apt_update.png
- task3_apt_upgrade.png
- task3_explanation.png

Hint (what to mention):

- apt update refreshes the local package index — it does not change installed packages.
- apt upgrade looks at the updated index and installs newer versions of already-installed packages.
- Without apt update, apt upgrade would use outdated package lists and might not find the newest updates.

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

Goal: Install a snap package (example: VS Code) on a CLI-only server and verify installation using commands that work without a GUI. Keep Code installed for later GUI tasks.

Steps (inside VM terminal)

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

```
sudo snap install --classic code
```

- Save screenshot as: task4_snap_install.png

```
hamail@ubuntu-lab:~$ sudo snap install --classic code
[sudo] password for hamail:
Download snap "snapd" (25577) from channel "stable"
64% 314kB/s 1m02s
```

2. Verify snap shows the package is installed:

```
snap list code
```

- Save screenshot as: task4_snap_list.png

```
hamail@ubuntu-lab:~$ sudo snap install --classic code
[sudo] password for hamail:
2025-11-01T13:22:46Z INFO Waiting for automatic snapd restart...
code 7d842fb8 from Visual Studio Code (vscode) installed
hamail@ubuntu-lab:~$ snap list code
Name    Version   Rev  Tracking      Publisher  Notes
code    7d842fb8 211  latest/stable  vscode     classic
hamail@ubuntu-lab:~$
```

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

```
code --version
```

- Save screenshot(s) as: task4_code_version_or_info.png

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

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

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

- Save screenshot as: task4_snap_bin_location.png

```
ls: cannot access '/snap/bin': No such file or directory
hamail@ubuntu-lab:~$ ls -l /snap/bin | grep code
lrwxrwxrwx 1 root root 13 Nov 1 13:32 code -> /usr/bin/snap
lrwxrwxrwx 1 root root 13 Nov 1 13:32 code.url-handler -> /usr/bin/snap
hamail@ubuntu-lab:~$
```

5. IMPORTANT: Do NOT remove VS Code at the end of this task — keep it installed. It will be launched later in Task 5 and Task 6.

📸 Screenshot Required:

- task4_snap_install.png
- task4_snap_list.png
- task4_code_version_or_info.png
- task4_snap_bin_location.png

Notes:

- The main point is to show that snap installs and can be verified from the CLI even if you cannot start the GUI.

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

Goal: Install a lightweight GUI (XFCE), enable XRDP for remote desktop access, and learn how to control whether the GUI login screen appears at boot. After starting the GUI, launch the VS Code installed in Task 4 to verify GUI app launch. This task is for this lab.

Warning: Installing a GUI on a server consumes additional disk space and memory. Perform on a VM with sufficient resources.

Steps (inside the host terminal / via SSH)

1. 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>
```

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

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

- Save screenshot as: task5_update.png

```
sources.list.d/ubuntu.sources:2
W: Target Translations (universe/i18n/Translation-en_US) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Translations (universe/i18n/Translation-en) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target DEP-11 (universe/depl1/Components-amd64.yml) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target DEP-11 (universe/depl1/Components-all.yml) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target CNF (universe/cnf/Commands-amd64) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target CNF (universe/cnf/Commands-all) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Packages (multiverse/binary-amd64/Packages) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Packages (multiverse/binary-all/Packages) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Translations (multiverse/i18n/Translation-en_US) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Translations (multiverse/i18n/Translation-en) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target DEP-11 (multiverse/depl1/Components-amd64.yml) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target DEP-11 (multiverse/depl1/Components-all.yml) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target CNF (multiverse/cnf/Commands-amd64) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target CNF (multiverse/cnf/Commands-all) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
hamail@ubuntu-lab:~$ z]
```

3. Install XFCE and XFCE goodies (lightweight desktop):

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

- Save screenshot as: task5_xfce_install.png

```
Processing triggers for libgdk-pixbuf-2.0-0:amd64 (2.42.10+dfsg-3ubuntu3.2) ...
Processing triggers for sgml-base (1.31) ...
Processing triggers for libc-bin (2.39-0ubuntu8.6) ...
Processing triggers for dbus (1.14.10-4ubuntu4.1) ...
Processing triggers for ufw (0.36.2-6) ...
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.
```

4. Install and enable XRDП (Remote Desktop Protocol server):

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

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

- Save screenshot as: task5_xrdp_enable.png

```

Setting up libfuse2t64:amd64 (2.9.9-8.1build1) ...
Setting up xrdp (0.9.24-4) ...

Generating 2048 bit rsa key...

ssl_gen_key_xrdp1 ok

saving to /etc/xrdp/rsakeys.ini

Created symlink /etc/systemd/system/multi-user.target.wants/xrdp-sesman.service → /usr/lib/systemd/system/xrdp-sesman.service.
Created symlink /etc/systemd/system/multi-user.target.wants/xrdp.service → /usr/lib/systemd/system/xrdp.service.
Setting up pipewire-module-xrdp (0.2-2) ...
Processing triggers for man-db (2.12.0-4build2) ...
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.
Synchronizing state of xrdp.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable xrdp
hamail@ubuntu-lab:~$ |

```

5. Verify XRDP status:

`sudo systemctl status xrdp`

- Save screenshot as: task5_xrdp_status.png

```

hamail@ubuntu-lab:~$ sudo systemctl status xrdp
● xrdp.service - xrdp daemon
   Loaded: loaded (/usr/lib/systemd/system/xrdp.service; enabled; preset: enabled)
   Active: active (running) since Sat 2025-11-01 14:05:08 UTC; 1min 36s ago
     Docs: man:xrdp(8)
           man:xrdp.ini(5)
 Main PID: 15005 (xrdp)
    Tasks: 1 (limit: 2210)
   Memory: 864.0K (peak: 1.5M)
      CPU: 39ms
     CGroup: /system.slice/xrdp.service
             └─15005 /usr/sbin/xrdp

Nov 01 14:05:06 ubuntu-lab systemd[1]: Starting xrdp.service - xrdp daemon...
Nov 01 14:05:06 ubuntu-lab xrdp[15004]: [INFO ] address [0.0.0.0] port [3389] mode 1
Nov 01 14:05:06 ubuntu-lab xrdp[15004]: [INFO ] listening to port 3389 on 0.0.0.0
Nov 01 14:05:06 ubuntu-lab xrdp[15004]: [INFO ] xrdp_listen_pp done
Nov 01 14:05:07 ubuntu-lab systemd[1]: xrdp.service: Can't open PID file /run/xrdp/xrdp.pid (yet?) after start: No s
Nov 01 14:05:08 ubuntu-lab systemd[1]: Started xrdp.service - xrdp daemon.
Nov 01 14:05:09 ubuntu-lab xrdp[15005]: [INFO ] starting xrdp with pid 15005
Nov 01 14:05:09 ubuntu-lab xrdp[15005]: [INFO ] address [0.0.0.0] port [3389] mode 1
Nov 01 14:05:09 ubuntu-lab xrdp[15005]: [INFO ] listening to port 3389 on 0.0.0.0
Nov 01 14:05:09 ubuntu-lab xrdp[15005]: [INFO ] xrdp_listen_pp done
[lines 1-22/22 (END)]

```

6. Configure XRDP to use XFCE session:

`echo xfce4-session > ~/.xsession`

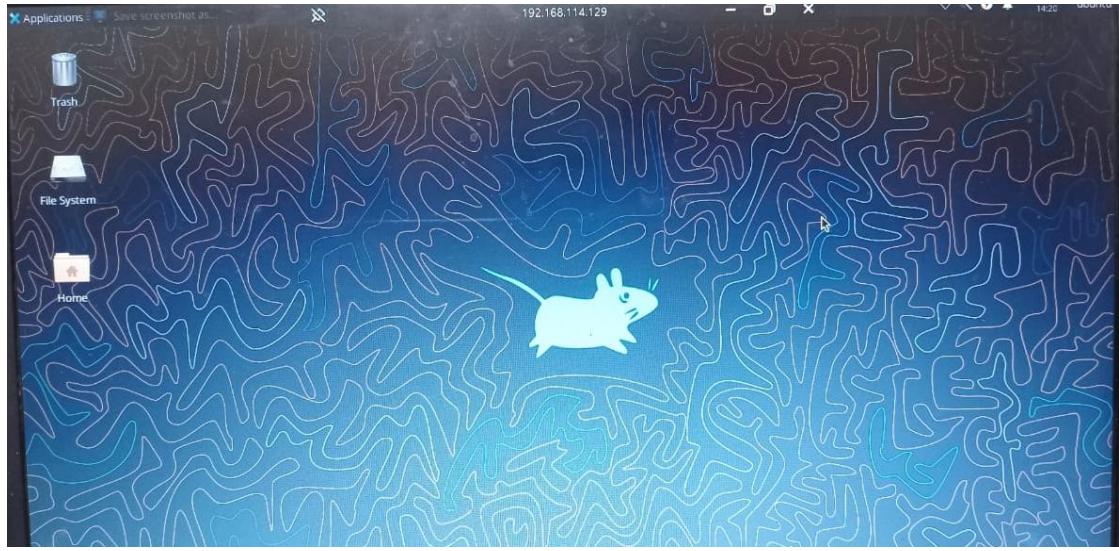
- Save screenshot as: task5_xsession.png

```

hamail@ubuntu-lab:~$ echo xfce4-session > ~/.xsession

```

7. From a Windows host or RDP client, connect with Remote Desktop (mstsc) to your server IP and login using your Ubuntu username/password. Capture a screenshot of the remote desktop or the RDP session window (if allowed by your environment) and save it as: task5_rdp_connect.png

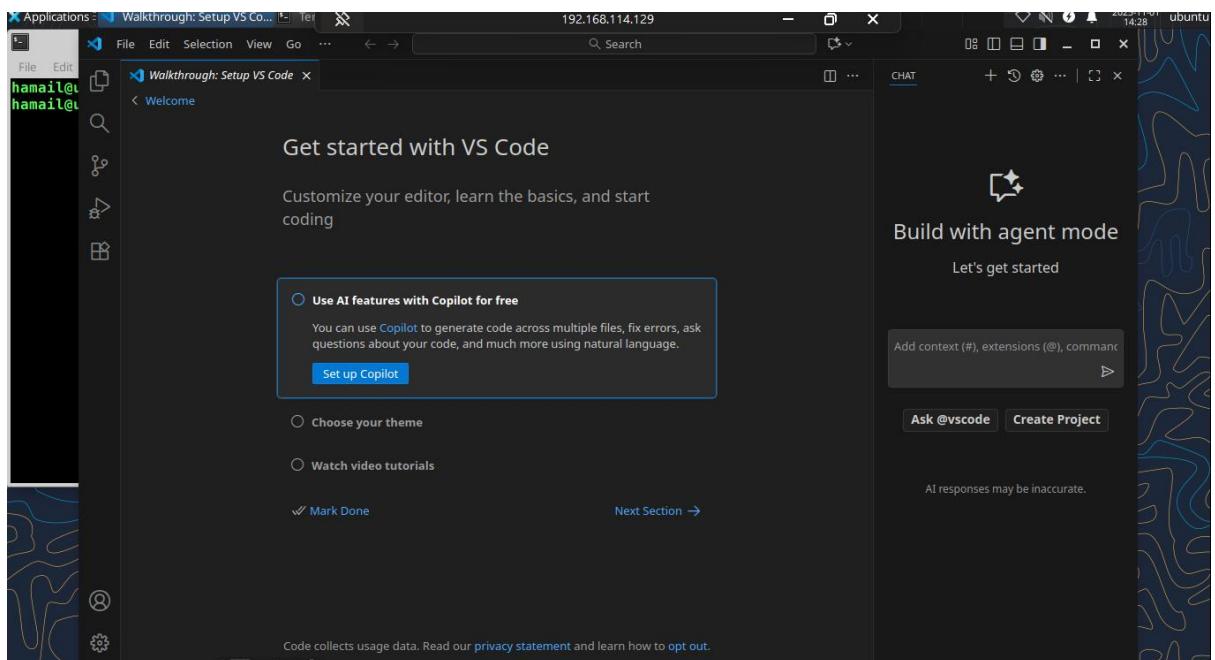


If you cannot capture a screenshot from the client, show ss -ltnp or ps evidence that the session was established and save as an alternative.

8. 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

- Save a screenshot of VS Code running in the GUI as: task5_vscode_launch.png



- (Optional) From inside VS Code you may open a file or explore the UI — but DO NOT need to create or save files here for Task 5.
- Log out of the Ubuntu server, close the session, and exit the remote desktop program.

📸 Screenshot Required:

- task5_update.png
- task5_xfce_install.png
- task5_xrdp_enable.png
- task5_xrdp_status.png
- task5_xsession.png
- task5_rdp_connect.png
- task5_vscode_launch.png

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

Steps (inside the host terminal / via SSH)

1. 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
- Save screenshot as: task6_lightdm_install.png

```
Last login: Sat Nov  1 13:44:29 2025 from 192.168.114.1
hamail@ubuntu-lab:~$ sudo apt install lightdm lightdm-gtk-greeter -y
[sudo] password for hamail:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
lightdm is already the newest version (1.30.0-0ubuntu14).
lightdm set to manually installed.
The following additional packages will be installed:
  gnome-accessibility-themes gnome-themes-extra gnome-themes-extra-data gtk2-engines-pixbuf
Recommended packages:
  policykit-1
The following NEW packages will be installed:
  gnome-accessibility-themes gnome-themes-extra gnome-themes-extra-data gtk2-engines-pixbuf lightdm-gtk-greeter
0 upgraded, 5 newly installed, 0 to remove and 0 not upgraded.
Need to get 2,495 kB of archives.
After this operation, 7,003 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble/main amd64 gnome-accessibility-themes all 3.28-2ubuntu5 [2,296 kB]
Get:2 http://security.ubuntu.com/ubuntu noble-security/main amd64 gtk2-engines-pixbuf amd64 2.24.33-4ubuntu1.1 [20.6 kB]
Get:3 http://archive.ubuntu.com/ubuntu noble/main amd64 gnome-themes-extra-data all 3.28-2ubuntu5 [69.4 kB]
Get:4 http://archive.ubuntu.com/ubuntu/noble/main amd64 gnome-themes-extra amd64 3.28-2ubuntu5 [15.2 kB]
Get:5 http://archive.ubuntu.com/ubuntu noble/universe amd64 lightdm-gtk-greeter amd64 2.0.9-0ubuntu3 [94.3 kB]
Fetched 2,495 kB in 5s (512 kB/s)
Selecting previously unselected package gnome-accessibility-themes.
(Reading database ... 188296 files and directories currently installed.)
```

- 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/lightdm/lightdm.conf.d/99-xfce.conf
```

- Save screenshot as: task6_lightdm_config.png

```
hamail@ubuntu-lab:~$ 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
[Seat:*]
greeter-session=lightdm-gtk-greeter
user-session=xfce
autologin-user-timeout=0
hamail@ubuntu-lab:~$ |
```

- 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
```

- Save screenshot as: task6_lightdm_cleanup.png

```
hamail@ubuntu-lab:~$ sudo rm -f /var/lib/lightdm/.Xauthority
sudo rm -f ~/.Xauthority
sudo rm -rf ~/.cache/sessions
sudo chown -R $USER:$USER /home/$USER
hamail@ubuntu-lab:~$ |
```

- Restart LightDM:

```
sudo systemctl restart lightdm
```

- Save screenshot as: task6_lightdm_restart.png

```
sudo chown -R $USER:$USER /home/$USER
hamail@ubuntu-lab:~$ sudo systemctl restart lightdm
```

2. Control GUI login at boot — ENABLE first, then DISABLE (observe and understand terminal/GUI behavior after each reboot)

Important: students MUST perform the reboot after each target change to observe the boot-time behavior. The sequence below has been adjusted so you ENABLE the GUI boot target first, reboot and observe GUI, then DISABLE the GUI boot target, reboot and observe the CLI.

- 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
```

- Save a screenshot immediately after running the commands as: task6_gui_enable_boot.png

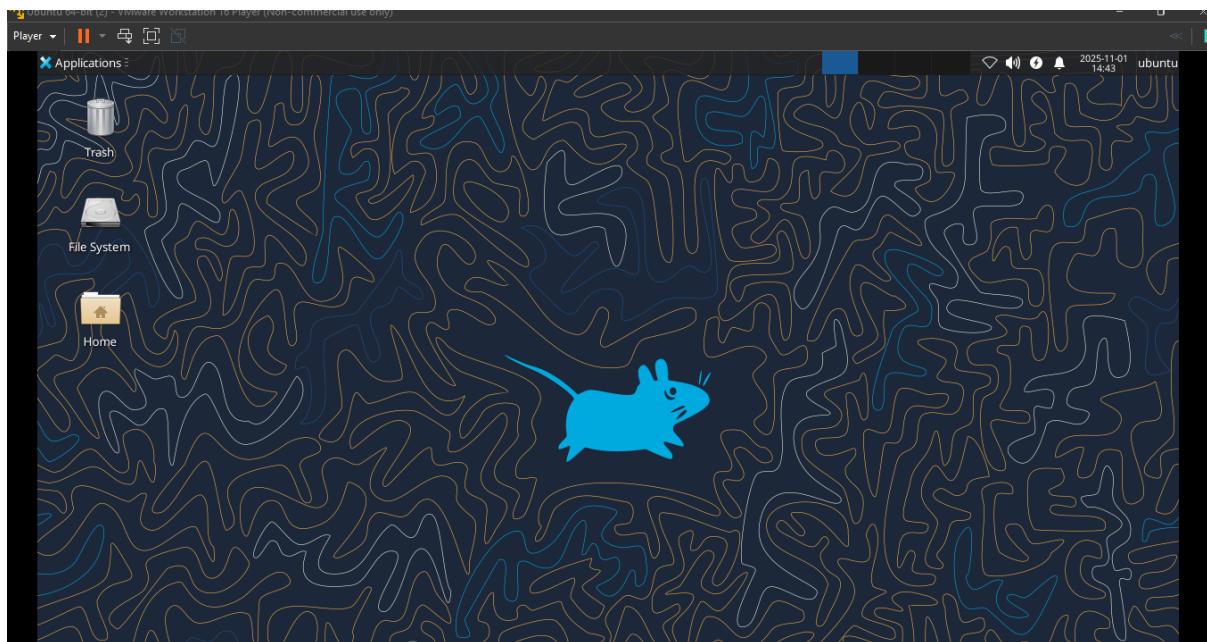
```
hamail@ubuntu-lab:~$ sudo systemctl enable lightdm
sudo systemctl set-default graphical.target
Synchronizing state of lightdm.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable lightdm
The unit files have no installation 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.
Created symlink /etc/systemd/system/default.target → /usr/lib/systemd/system/graphical.target.
hamail@ubuntu-lab:~$ |
```

- Reboot the VM to observe that it boots to the GUI login screen:

`sudo reboot`

- After the VM boots, capture a screenshot of the GUI login screen (or remote desktop showing the greeter) and save it as: task6_after_reboot_gui.png



- Disable GUI Login Screen (Boot to CLI)
 - Set the default boot target to multi-user (text mode) and disable LightDM so the system boots to the terminal:
 - `sudo systemctl set-default multi-user.target`
 - `sudo systemctl disable lightdm`
- Save a screenshot immediately after running the commands as: task6_gui_disable_boot.png

```
hamail@ubuntu-lab:~$ sudo systemctl set-default multi-user.target
sudo systemctl disable lightdm
[sudo] password for hamail:
Removed "/etc/systemd/system/default.target".
Created symlink /etc/systemd/system/default.target → /usr/lib/systemd/system/multi-user.target.
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".
hamail@ubuntu-lab:~$ |
```

- Reboot the VM to observe that it boots to the terminal (CLI):

```
sudo reboot
```

- After the VM boots, capture a screenshot of the login prompt or terminal session showing CLI-only behavior and save it as: task6_after_reboot_cli.png

```
hamail@ubuntu-lab:~$ sudo reboot

Broadcast message from root@ubuntu-lab on pts/1 (Sat 2025-11-01 14:45:53 UTC):

The system will reboot now!

hamail@ubuntu-lab:~$ client_loop: send disconnect: Connection reset
PS C:\Users\admin> |
```

- Start/Stop GUI manually (no reboot)

- You can start the GUI session without changing the boot target. This is useful if you want to keep the boot target as CLI but run GUI temporarily:
- Save screenshot(s) showing the start commands and any immediate status output as: task6_gui_start.png

```
hamail@ubuntu-lab:~$ client_loop: send disconnect: Connection reset
PS C:\Users\admin> ssh hamail@192.168.114.129
hamail@192.168.114.129's 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 Nov  1 02:48:16 UTC 2025

System load:  0.54           Processes:          257
Usage of /:   71.1% of 9.75GB  Users logged in:     1
Memory usage: 16%            IPv4 address for ens3: 192.168.114.129
Swap usage:   0%             |
```

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

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

```
Last login: Sat Nov  1 14:44:09 2025 from 192.168.114.1
hamail@ubuntu-lab:~$ systemctl get-default
multi-user.target
hamail@ubuntu-lab:~$ sudo systemctl isolate graphical.target
[sudo] password for hamail:
hamail@ubuntu-lab:~$ sudo systemctl isolate graphical.target
hamail@ubuntu-lab:~$ |
```

```
sudo systemctl start lightdm # start GUI now
```

- Press Ctrl + Alt + F3 to switch back to TTY. You can stop the GUI session without changing the boot target.

```
sudo systemctl stop lightdm # stop GUI now
```

- Save screenshot(s) showing the start/stop commands and any immediate status output as: task6_gui_stop.png

```
hamail@ubuntu-lab:~$ sudo systemctl stop lightdm # stop GUI now
hamail@ubuntu-lab:~$ |
```

3. Start the GUI (if the system is currently set to CLI or the GUI is not running):

```
sudo systemctl start lightdm
```

- Save a screenshot immediately after running the command as: task6_gui_start_command.png

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

```
code
```

- Save a screenshot of VS Code running in the GUI as: task6_vscode_launch.png

5. Close VS Code using the GUI window controls. Task 6 ends here.

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

Goal: Add Google's apt source and signing key so that sudo apt install google-chrome-stable succeeds. This task intentionally begins by attempting to install Chrome directly (the install will fail if the repository/key are not yet configured) — capture that failure as evidence, then proceed to add the repository/key and install successfully. Also includes an alternate (preferred) one-line list method.

IMPORTANT: Third-party repositories require trusted signing keys. Only add keys from official vendor URLs. Some systems require /etc/apt/keyrings to exist — create it if missing with sudo mkdir -p /etc/apt/keyrings.

Steps (inside the VM terminal or GUI terminal or host terminal / via SSH)

1. (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
```

- Expected: this will typically fail with "Unable to locate package google-chrome-stable" or similar because the Google repo/key are not yet configured.

- Save a screenshot of the error output as: task7_install_chrome_error.png

```
Last login: Sat Nov  1 14:48:17 2025 from 192.168.114.1
hamail@ubuntu-lab:~$ sudo apt install google-chrome-stable -y
[sudo] password for hamail:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
E: Unable to locate package google-chrome-stable
hamail@ubuntu-lab:~$ |
```

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

ls -la /etc/apt

- Save screenshot as: task7_ls_etc_apt.png

```
hamail@ubuntu-lab:~$ ls -la /etc/apt
total 52
drwxr-xr-x  9 root root  4096 Nov  1 12:56 .
drwxr-xr-x 139 root root 12288 Nov  1 14:05 ..
drwxr-xr-x  2 root root  4096 Aug  5 17:14 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   344 Nov  1 12:56 sources.list
drwxr-xr-x  2 root root  4096 Oct 29 13:00 sources.list.d
-rw-r--r--  1 root root    71 Nov  1 10:48 sources.list.save
drwxr-xr-x  2 root root  4096 Aug  5 17:01 trusted.gpg.d
hamail@ubuntu-lab:~$ |
```

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

cat /etc/apt/sources.list

- Save screenshot as: task7_cat_sources_list.png

```
hamail@ubuntu-lab:~$ cat /etc/apt/sources.list
deb http://archive.ubuntu.com/ubuntu noble main restricted universe multiverse
deb http://archive.ubuntu.com/ubuntu noble-updates main restricted universe multiverse
deb http://archive.ubuntu.com/ubuntu noble-backports main restricted universe multiverse
deb http://security.ubuntu.com/ubuntu noble-security main restricted universe multiverse
hamail@ubuntu-lab:~$ |
```

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

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

- Save screenshot as: task7_ls_sources_list_d.png

```
hamail@ubuntu-lab:~$ ls -la /etc/apt/sources.list.d/
total 16
drwxr-xr-x 2 root root 4096 Oct 29 13:00 .
drwxr-xr-x 9 root root 4096 Nov  1 12:56 ..
-rw-r--r-- 1 root root  382 Oct 29 13:00 ubuntu.sources
-rw-r--r-- 1 root root 2552 Aug  5 17:02 ubuntu.sources.curtin.orig
hamail@ubuntu-lab:~$ |
```

5. 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
```

- Save screenshot as: task7_cat_ubuntu_sources.png

```
hamail@ubuntu-lab:~$ 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
hamail@ubuntu-lab:~$ |
```

6. 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
```

- Append these exact lines at the end of the file:

```
Types: deb
```

```
URIs: http://dl.google.com/linux/chrome/deb/
```

```
Suites: stable
```

```
Components: main
```

```
Architectures: amd64
```

```
Signed-By: /etc/apt/keyrings/google.gpg
```

- Save the file (Ctrl+O → Enter) and exit (Ctrl+X).
- Save a screenshot after editing (or show the file contents with cat) as: task7_edit_ubuntu_sources.png

```
Signed-By: /usr/share/keyrings/ubuntu-archive-keyring.gpg
hamail@ubuntu-lab:~$ sudo nano /etc/apt/sources.list.d/ubuntu.sources
hamail@ubuntu-lab:~$ |
```

7. 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
```

- Save screenshot as: task7_add_key.png

```
hamail@ubuntu-lab:~$ curl -fsSL https://dl.google.com/linux/linux_signing_key.pub | sudo gpg --dearmor -o /etc/apt/keyrings/google.gpg
hamail@ubuntu-lab:~$ |
```

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

```
sudo apt update
```

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

- Save screenshots as: task7_apt_update.png and task7_install_chrome.png

```
hamail@ubuntu-lab:~$ sudo apt update
sudo apt install google-chrome-stable -y
Get:1 http://dl.google.com/linux/chrome/deb stable InRelease [1,825 B]
Get:2 http://dl.google.com/linux/chrome/deb stable/main amd64 Packages [1,211 B]
Hit:3 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:4 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:5 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Ign:6 http://archive.ubuntu.com/ubuntu noble InRelease
Ign:7 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Ign:8 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Err:9 http://archive.ubuntu.com/ubuntu noble Release
  404  Not Found [IP: 91.189.91.81 80]
Err:10 http://archive.ubuntu.com/ubuntu noble-updates Release
  404  Not Found [IP: 91.189.91.81 80]
Err:11 http://archive.ubuntu.com/ubuntu noble-backports Release
  404  Not Found [IP: 91.189.91.81 80]
Reading package lists... Done
E: The method driver /usr/lib/apt/methods/hhttp could not be found.
N: Is the package apt-transport-hhttp installed?
W: Target Packages (main/binary-amd64/Packages) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Packages (main/binary-all/Packages) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Translations (main/i18n/Translation-en_US) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Translations (main/i18n/Translation-en) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target DEP-11 (main/dep11/Components-amd64.yml) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
```

```
Unpacking google-chrome-stable (142.0.7444.59-1) ...
Selecting previously unselected package fonts-liberation-sans-narrow.
Preparing to unpack .../fonts-liberation-sans-narrow_1%3a1.07.6-4_all.deb ...
Unpacking fonts-liberation-sans-narrow (1:1.07.6-4) ...
Setting up fonts-liberation (1:2.1.5-3) ...
Setting up fonts-liberation-sans-narrow (1:1.07.6-4) ...
Setting up google-chrome-stable (142.0.7444.59-1) ...
update-alternatives: using /usr/bin/google-chrome-stable to provide /usr/bin/x-www-browser (x-www-browser) in auto mode
update-alternatives: using /usr/bin/google-chrome-stable to provide /usr/bin/gnome-www-browser (gnome-www-browser) in auto mode
update-alternatives: using /usr/bin/google-chrome-stable to provide /usr/bin/google-chrome (google-chrome) in auto mode
Processing triggers for mate-menus (1.26.1-1build3) ...
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for fontconfig (2.15.0-1.1ubuntu2) ...
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.
hamail@ubuntu-lab:~$ |
```

9. Alternate (preferred, cleaner) method — create a single google-chrome.list entry
10. 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
```

 - Save screenshots as: task7_alternate_remove.png, task7_alternate_edit.png, and task7_remove_key.png

```
hamail@ubuntu-lab:~$ sudo add-apt-repository ppa:ubuntuhandbook1/audacity -y
sudo apt update
sudo apt install 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
Hit:3 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:4 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Ign:5 http://archive.ubuntu.com/Ubuntu noble InRelease
Ign:6 http://archive.ubuntu.com/Ubuntu noble-updates InRelease
Ign:7 http://archive.ubuntu.com/Ubuntu noble-backports InRelease
Get:8 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble InRelease [18.1 kB]
Err:9 http://archive.ubuntu.com/Ubuntu noble Release
  404  Not Found [IP: 91.189.91.82 80]
```

```
W: Target Translations (multiverse/i18n/Translation-en_US) is configured multiple times in
/etc/apt/sources.list.d/ubuntu.sources:2
W: Target Translations (multiverse/i18n/Translation-en) is configured multiple times in /
/etc/apt/sources.list.d/ubuntu.sources:2
W: Target DEP-11 (multiverse/dep11/Components-amd64.yml) is configured multiple times in /
c/apt/sources.list.d/ubuntu.sources:2
W: Target DEP-11 (multiverse/dep11/Components-all.yml) is configured multiple times in /et
apt/sources.list.d/ubuntu.sources:2
W: Target CNF (multiverse/cnf/Commands-amd64) is configured multiple times in /etc/apt/sou
ces.list.d/ubuntu.sources:2
W: Target CNF (multiverse/cnf/Commands-all) is configured multiple times in /etc/apt/sourc
.list.d/ubuntu.sources:2
W: Target Packages (main/binary-amd64/Packages) is configured multiple times in /etc/apt/s
st:3 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target Packages (main/binary-all/Packages) is configured multiple times in /etc/apt/sou
:3 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target Translations (main/i18n/Translation-en_US) is configured multiple times in /etc/
me.list:3 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target Translations (main/i18n/Translation-en) is configured multiple times in /etc/apt
list:3 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target DEP-11 (main/dep11/Components-amd64.yml) is configured multiple times in /etc/ap
.list:3 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target DEP-11 (main/dep11/Components-all.yml) is configured multiple times in /etc/ap
ist:3 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target CNF (main/cnf/Commands-amd64) is configured multiple times in /etc/apt/sources.l
/etc/apt/sources.list.d/ubuntu.sources:3
W: Target CNF (main/cnf/Commands-all) is configured multiple times in /etc/apt/sources.li
etc/apt/sources.list.d/ubuntu.sources:3
Reading package lists... Done
Building dependency tree... Done
```

```

Setting up libsbombs10:amd64 (2.3.0-1build1) ...
Setting up libwxbase3.2-1t64:amd64 (3.2.4+dfsg-4build1) ...
Setting up libopusfile0:amd64 (0.12-4build3) ...
Setting up libwxgtk3.2-1t64:amd64 (3.2.4+dfsg-4build1) ...
Setting up libserd-0-0:amd64 (0.32.2-1) ...
Setting up libsord-0-0:amd64 (0.16.16-2build1) ...
Setting up librato-metric-0-0:amd64 (0.6.16-1build1) ...
Setting up liblilyv-0-0:amd64 (0.24.22-1build1) ...
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 mate-menus (1.26.1-1build3) ...
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.
hamail@ubuntu-lab:~$ sudo apt update

```

11. 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" | sudo tee
/etc/apt/sources.list.d/google-chrome.list > /dev/null

```

- Save screenshot as: task7_create_google_chrome_list.png

```

hamail@ubuntu-lab:~$ 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

```

12. Verify the new file exists:

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

- Save screenshot as: task7_list_sources_after_create.png

```

hamail@ubuntu-lab:~$ ls -la /etc/apt/sources.list.d/
total 24
drwxr-xr-x 2 root root 4096 Nov  1 15:32 .
drwxr-xr-x 9 root root 4096 Nov  1 12:56 ..
-rw-r--r-- 1 root root  107 Nov  1 15:46 google-chrome.list
-rw-r--r-- 1 root root 1794 Nov  1 15:32 ubuntuhandbook1-ubuntu-audacity-noble.sources
-rw-r--r-- 1 root root  532 Nov  1 15:32 ubuntu.sources
-rw-r--r-- 1 root root 2552 Aug  5 17:02 ubuntu.sources.curtin.orig
hamail@ubuntu-lab:~$ |

```

13. 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
```

- Save screenshot as: task7_add_key_alt.png

```
hamail@ubuntu-lab:~$ 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
File '/etc/apt/keyrings/google.gpg' exists. Overwrite? (y/N) y
hamail@ubuntu-lab:~$ |
```

14. Update apt and install Chrome (preferred flow):

```
sudo apt update
```

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

- Save screenshots as: task7_apt_update_alt.png and task7_install_chrome_alt.png

```
hamail@ubuntu-lab:~$ sudo apt update
sudo apt install google-chrome-stable -y
Hit:1 http://dl.google.com/linux/chrome/deb stable InRelease
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-backports InRelease
Ign:5 http://archive.ubuntu.com/Ubuntu noble InRelease
Ign:6 http://archive.ubuntu.com/Ubuntu noble-updates InRelease
Ign:7 http://archive.ubuntu.com/Ubuntu noble-backports InRelease
Err:8 http://archive.ubuntu.com/Ubuntu noble Release
  404 Not Found [IP: 185.125.190.81 80]
Err:9 http://archive.ubuntu.com/Ubuntu noble-updates Release
  404 Not Found [IP: 185.125.190.81 80]
Err:10 http://archive.ubuntu.com/Ubuntu noble-backports Release
  404 Not Found [IP: 185.125.190.81 80]
Hit:11 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble InRelease
```

```
W: Target DEP-11 (multiverse/dep11/Components-amd64.yml) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target DEP-11 (multiverse/dep11/Components-all.yml) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target CNF (multiverse/cnf/Commands-amd64) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target CNF (multiverse/cnf/Commands-all) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Packages (main/binary-amd64/Packages) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target Packages (main/binary-all/Packages) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target Translations (main/i18n/Translation-en_US) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target Translations (main/i18n/Translation-en) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target DEP-11 (main/dep11/Components-amd64.yml) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target DEP-11 (main/dep11/Components-all.yml) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target CNF (main/cnf/Commands-amd64) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target CNF (main/cnf/Commands-all) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
google-chrome-stable is already the newest version (142.0.7444.59-1).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
hamail@ubuntu-lab:~$ |
```

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

Goal: Add PPAs for Audacity and OBS Studio, update apt, install the packages, and launch them (or verify installation) from the CLI/GUI. Capture screenshots for each step.

NOTE: Performing these steps will add third-party PPAs to the system. Only add PPAs from trusted sources (these are common community PPAs). If your VM environment restricts PPAs, document any errors.

Steps (inside the VM terminal or GUI terminal)

1. Add the Audacity PPA, update apt and install audacity:

```
sudo add-apt-repository ppa:ubuntuhandbook1/audacity -y
```

```
sudo apt update
```

```
sudo apt install audacity -y
```

- Save screenshots as:

- task8_add_ppa_audacity.png (output of add-apt-repository)

```
/sources.list.d/ubuntu.sources:2
W: Target Translations (multiverse/i18n/Translation-en_US) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Translations (multiverse/i18n/Translation-en) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target DEP-11 (multiverse/dep11/Components-amd64.yml) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target DEP-11 (multiverse/dep11/Components-all.yml) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target CNF (multiverse/cnf/Commands-amd64) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target CNF (multiverse/cnf/Commands-all) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Packages (main/binary-amd64/Packages) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target Packages (main/binary-all/Packages) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target Translations (main/i18n/Translation-en_US) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target Translations (main/i18n/Translation-en) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target DEP-11 (main/dep11/Components-amd64.yml) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target DEP-11 (main/dep11/Components-all.yml) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target CNF (main/cnf/Commands-amd64) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target CNF (main/cnf/Commands-all) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
hamail@ubuntu-lab:~$ |
```

- task8_apt_update_audacity.png (apt update after adding PPA)

```
/sources.list.d/ubuntu.sources:2
W: Target Translations (multiverse/i18n/Translation-en_US) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Translations (multiverse/i18n/Translation-en) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target DEP-11 (multiverse/dep11/Components-amd64.yml) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target DEP-11 (multiverse/dep11/Components-all.yml) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target CNF (multiverse/cnf/Commands-amd64) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target CNF (multiverse/cnf/Commands-all) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources.list.d/ubuntu.sources:2
W: Target Packages (main/binary-amd64/Packages) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target Packages (main/binary-all/Packages) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target Translations (main/i18n/Translation-en_US) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target Translations (main/i18n/Translation-en) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target DEP-11 (main/dep11/Components-amd64.yml) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target DEP-11 (main/dep11/Components-all.yml) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target CNF (main/cnf/Commands-amd64) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target CNF (main/cnf/Commands-all) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
hamail@ubuntu-lab:~$ |
```

- task8_install_audacity.png (apt install output)

```
hamail@ubuntu-lab:~$ sudo apt install audacity -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
audacity is already the newest version (3.7.5-0build1~ubuntu24.04).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
hamail@ubuntu-lab:~$ |
```

2. Launch Audacity (from GUI or CLI). On a headless server you may not get a GUI window — if you are using the XFCE GUI session, launch from a GUI terminal or run check for binary:

```
audacity --version
```

```
audacity
```

- Save screenshots as:
 - task8_audacity_launch.png (GUI launch screenshot if possible)
or task8_audacity_version.png (CLI verification)

```
hamail@ubuntu-lab:~$ audacity --version
audacity
hamail@ubuntu-lab:~$ |
```

3. 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
```

- Save screenshots as:
 - task8_add_ppa_obs.png (output of add-apt-repository)

```
hamail@ubuntu-lab:~$ 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
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-backports InRelease
Ign:5 http://archive.ubuntu.com/ubuntu noble InRelease
Ign:6 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Ign:7 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Err:8 http://archive.ubuntu.com/ubuntu noble Release
  404 Not Found [IP: 91.189.91.82 80]
Err:9 http://archive.ubuntu.com/ubuntu noble-updates Release
  404 Not Found [IP: 91.189.91.82 80]
Err:10 http://archive.ubuntu.com/ubuntu noble-backports Release
  404 Not Found [IP: 91.189.91.82 80]
Get:11 https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu noble InRelease [17.8 kB]
Hit:12 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble InRelease
Get:13 https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu noble/main amd64 Packages [1,172 B]
Get:14 https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu noble/main Translation-en [160 B]
|
```

- o task8_apt_update_obs.png (apt update after adding PPA)

```
hamail@ubuntu-lab:~$ 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://security.ubuntu.com/ubuntu noble-security InRelease
Hit:4 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Ign:5 http://archive.ubuntu.com/Ubuntu noble InRelease
Hit:6 https://ppa.launchpadcontent.net/obs-project/obs-studio/ubuntu noble InRelease
Ign:7 http://archive.ubuntu.com/Ubuntu noble-updates InRelease
Hit:8 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble InRelease
Ign:9 http://archive.ubuntu.com/Ubuntu noble-backports InRelease
Err:10 http://archive.ubuntu.com/Ubuntu noble Release
  404 Not Found [IP: 185.125.190.83 80]
Err:11 http://archive.ubuntu.com/Ubuntu noble-updates Release
  404 Not Found [IP: 185.125.190.83 80]
Err:12 http://archive.ubuntu.com/Ubuntu noble-backports Release
  404 Not Found [IP: 185.125.190.83 80]
Reading package lists... Done
E: The method driver /usr/lib/apt/methods/http could not be found.
N: Is the package apt-transport-https installed?
W: Target Packages (main/binary-amd64/Packages) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target Packages (main/binary-all/Packages) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target Translations (main/i18n/Translation-en_US) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
W: Target Translations (main/i18n/Translation-en) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3
```

- o task8_install_obs.png (apt install output)

```
RBj
Get:26 http://archive.ubuntu.com/ubuntu noble/universe amd64 libpostproc57 amd64 7:6.1.1-3ubuntu5 [49.9 kB]
Get:27 http://archive.ubuntu.com/ubuntu noble/main amd64 libfftw3-double3 amd64 3.3.10-1ubuntu3 [838 kB]
Get:28 http://archive.ubuntu.com/ubuntu noble/universe amd64 librubberband2 amd64 3.3.0+dfsg-2build1 [130 kB]
Get:29 http://archive.ubuntu.com/ubuntu noble/universe amd64 libswscale7 amd64 7:6.1.1-3ubuntu5 [193 kB]
Get:30 http://archive.ubuntu.com/ubuntu noble/universe amd64 libvidstab1.1 amd64 1.1.0-2build1 [38.5 kB]
Get:31 http://archive.ubuntu.com/ubuntu noble/universe amd64 libzimg2 amd64 3.0.5+ds1-1build1 [254 kB]
Get:32 http://archive.ubuntu.com/ubuntu noble/universe amd64 libavfilter9 amd64 7:6.1.1-3ubuntu5 [4,235 kB]
Get:33 http://archive.ubuntu.com/ubuntu noble/universe amd64 libdc1394-25 amd64 2.2.6-4build1 [90.1 kB]
Get:34 http://archive.ubuntu.com/ubuntu noble/universe amd64 libopenal-data all 1:1.23.1-4build1 [161 kB]
Get:35 http://archive.ubuntu.com/ubuntu noble/universe amd64 libsndio7.0 amd64 1.9.0-0.3build3 [29.6 kB]
Get:36 http://archive.ubuntu.com/ubuntu noble/universe amd64 libopenal amd64 1:1.23.1-4build1 [540 kB]
Get:37 http://archive.ubuntu.com/ubuntu noble/main amd64 libdecor-0-0 amd64 0.2.2-1build2 [16.5 kB]
Get:38 http://archive.ubuntu.com/ubuntu noble/main amd64 libSDL2-2.0-0 amd64 2.30.0+dfsg-1build3 [685 kB]
Get:39 http://archive.ubuntu.com/ubuntu noble/universe amd64 libavdevice60 amd64 7:6.1.1-3ubuntu5 [82.3 kB]
Get:40 http://archive.ubuntu.com/ubuntu noble/universe amd64 libb2-1 amd64 0.98.1-1.1build1 [45.0 kB]
Get:41 http://archive.ubuntu.com/ubuntu noble/universe amd64 libbplus0 amd64 0.2.0-3build1 [52.2 kB]
Get:42 http://archive.ubuntu.com/ubuntu noble/main amd64 libdecor-0-plugin-1-gtk amd64 0.2.2-1build2 [22.2 kB]
Get:43 http://archive.ubuntu.com/ubuntu noble/universe amd64 libfdk-aac2 amd64 2.0.2-3~ubuntu4 [332 kB]
Get:44 http://archive.ubuntu.com/ubuntu noble/universe amd64 libluajit-5.1-common all 2.1.0+git20231223.c525bcb+dfsg-1 [49.2 kB]
Get:45 http://archive.ubuntu.com/ubuntu noble/universe amd64 libluajit-5.1-2 amd64 2.1.0+git20231223.c525bcb+dfsg-1 [275 kB]
Get:46 http://archive.ubuntu.com/ubuntu noble/universe amd64 libmbedx509-1t64 amd64 2.28.8-1 [46.6 kB]
Get:47 http://archive.ubuntu.com/ubuntu noble/universe amd64 libmbedtls14t64 amd64 2.28.8-1 [82.2 kB]
Get:48 http://archive.ubuntu.com/ubuntu noble/universe amd64 libqrcodegenccpp1 amd64 1.8.0-1.2build1 [27.6 kB]
Get:49 http://archive.ubuntu.com/ubuntu noble/universe amd64 libqt6core6t64 amd64 6.4.2+dfsg-21.1build5 [1,789 kB]
27% [49 libqt6core6t64 977 kB/1,789 kB 55%] [3 obs-studio 1,231 kB/105 MB 1%] 79.3 kB/s 30min 44s|
```

4. Launch OBS Studio (from GUI or verify binary presence):

obs --version

obs

- Save screenshots as:

 - o task8_obs_launch.png (GUI launch screenshot if possible) or task8_obs_version.png (CLI verification)

```
hamail@ubuntu-lab:~$ obs --version
obs
OBS Studio - 32.0.2
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: xcb, offscreen, eglfs, vkkhrendisplay, wayland, minimalegl, linuxfb, wayland-egl, minimal,
vnc.
|
```

Task 9 - Create a Kubernetes sample YAML using vim

Goal: Confirm vim availability, create a working directory for Lab5, and use vim to create and save a Kubernetes Pod manifest named k8s-sample.yaml.

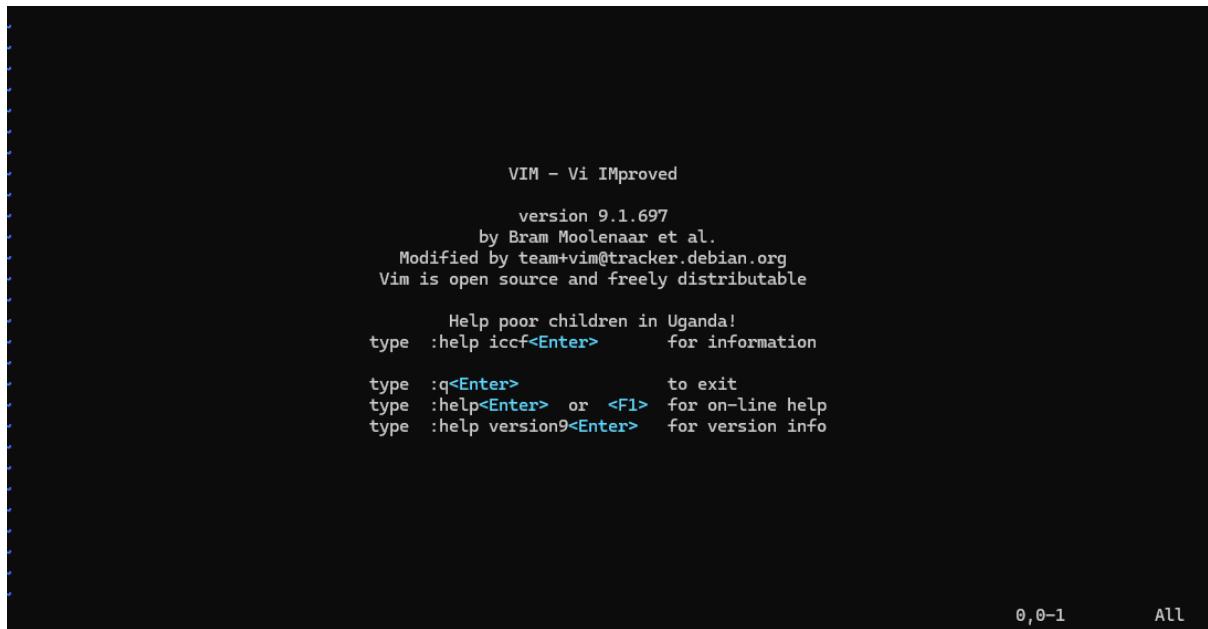
NOTE: The first command in Task 9 is to run vim to confirm whether vim is installed.

Steps (inside the VM terminal or host terminal / via SSH)

1. Check whether vim is installed by running:

```
vim
```

- If vim opens, you will see the vim interface; if not installed you will see a command-not-found error.
- Save a screenshot of the result (either the vim splash screen or the error) as: task9_vim_check.png



- If vim is not installed, install it:

```
sudo apt update
```

```
sudo apt install vim -y
```

- Save screenshot of the installation as: task9_vim_install.png (only if you installed it).

```
C:/apt/sources.list.d/ubuntu.sources.2  
W: Target DEP-11 (multiverse/dep11/Components-all.yml) is configured multiple times in /etc/apt/sources.list:4 and /etc/  
apt/sources.list.d/ubuntu.sources:2  
W: Target CNF (multiverse/cnf/Commands-amd64) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sourc  
es.list.d/ubuntu.sources:2  
W: Target CNF (multiverse/cnf/Commands-all) is configured multiple times in /etc/apt/sources.list:4 and /etc/apt/sources  
.list.d/ubuntu.sources:2  
W: Target Packages (main/binary-amd64/Packages) is configured multiple times in /etc/apt/sources.list.d/google-chrome.li  
st:1 and /etc/apt/sources.list.d/ubuntu.sources:3  
W: Target Packages (main/binary-all/Packages) is configured multiple times in /etc/apt/sources.list.d/google-chrome.list  
:1 and /etc/apt/sources.list.d/ubuntu.sources:3  
W: Target Translations (main/i18n/Translation-en_US) is configured multiple times in /etc/apt/sources.list.d/google-chro  
me.list:1 and /etc/apt/sources.list.d/ubuntu.sources:3  
W: Target Translations (main/i18n/Translation-en) is configured multiple times in /etc/apt/sources.list.d/google-chrome.  
list:1 and /etc/apt/sources.list.d/ubuntu.sources:3  

```

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

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

```
cd ~/Lab5
```

- Save screenshot showing mkdir and cd or pwd output as: task9_mkdir_cd.png

```
hamail@ubuntu-lab:~$ mkdir -p ~/Lab5  
cd ~/Lab5  
hamail@ubuntu-lab:~/Lab5$ |
```

3. Create the Kubernetes sample file using vim:

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

- Once vim opens, enable insert mode by pressing i, then paste the following YAML exactly:

```
apiVersion: v1  
kind: Pod  
metadata:  
  name: nginx-pod  
spec:  
  containers:  
    - name: nginx  
      image: nginx:1.19
```

ports:

- containerPort: 80

restartPolicy: Always

- Save a screenshot of the vim editor showing the file contents before saving as 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
```

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

```
:wq
```

- Save a screenshot of the ls -la output showing the file exists task9_k8s_saved.png

```
hamail@ubuntu-lab:~/Lab5$ ls -la
total 12
drwxrwxr-x  2 hamail hamail 4096 Nov  1 18:04 .
drwxr-x--- 23 hamail hamail 4096 Nov  1 18:04 ..
-rw-rw-r--  1 hamail hamail 170 Nov  1 18:04 k8s-sample.yaml
hamail@ubuntu-lab:~/Lab5$ |
```

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

Goal: Practice vim edits: add a permanent annotation under metadata, verify it, then open the file again, make a temporary edit and discard it (no save). This demonstrates saving and discarding changes in vim.

Steps (inside the VM terminal or host terminal / via SSH)

1. Open the manifest with vim:

```
cd ~/Lab5
```

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

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

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

Example (insert these lines under metadata:):

annotations:

```
lab: lesson11
```

- After adding the lines, press Esc to return to command mode and save & quit:

```
:wq
```

- Save a screenshot showing the saved file contents (using cat) as: task10_verify_annotation.png

```
cat: Lab5: No such file or directory
hamail@ubuntu-lab:~/Lab5$ cat ~/Lab5
cat: /home/hamail/Lab5: Is a directory
hamail@ubuntu-lab:~/Lab5$ |
```

Example verify command:

```
cat k8s-sample.yaml
```

3. 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:

```
# temp: do-not-keep
```

- Save a screenshot showing vim editor having temp data as: task10_verify_entering_temp_data.png

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

- Do NOT save. Press Esc to go back to command mode, then force quit without saving:

:q!

- Verify the file does NOT contain the temporary comment:

cat k8s-sample.yaml

- Save a screenshot of the cat output proving the temporary comment is not present as: task10_verify_no_temp_comment.png

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

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

Goal: Practice searching in vim with /, navigate matches with n and N, add additional matches, substitute across the file, undo, and exit without saving. Capture screenshots to show each verification step.

NOTE: Perform these steps in the ~/Lab5 directory on the previously created k8s-sample.yaml.

Steps (inside the VM terminal / in the ~/Lab5 directory)

1. Open the file with vim:

cd ~/Lab5

vim k8s-sample.yaml

2. Search for the string nginx using the forward search command:

- From command mode type:

/nginx

and press Enter.

- Note the first match is highlighted and the cursor is placed on it. Save a screenshot showing the first match in vim as: task12_search_nginx.png

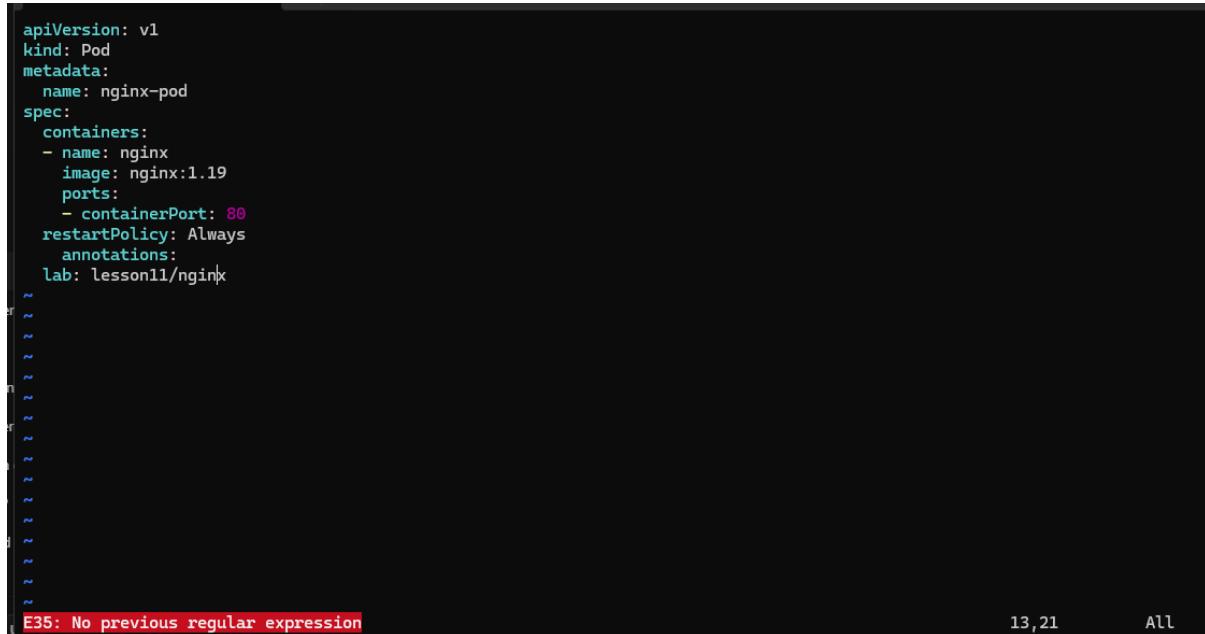


A screenshot of a terminal window titled "hamail@ubuntu-lab: ~". The window contains the following text:

```
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
spec:
  containers:
  - name: nginx
    image: nginx:1.19
    ports:
    - containerPort: 80
  restartPolicy: Always
  annotations:
    lab: lesson11cd ~/Lab5
vim k8s-sample.yaml
/nginx
~
```

3. Move to the next match and previous match:

- Press n to jump to the next match (capture screenshot if desired) and press N to jump back to the previous match. Save a screenshot showing navigation between matches as: task12_n_and_N_navigation.png



A screenshot of a terminal window titled "hamail@ubuntu-lab: ~". The window contains the same YAML configuration as the first screenshot. The cursor is at the end of the file, and the status bar at the bottom shows the message "E35: No previous regular expression".

The status bar also displays "13,21" and "All".

```
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
spec:
  containers:
    - name: nginx
      image: nginx:1.19
      ports:
        - containerPort: 80
  restartPolicy: Always
  annotations:
    lab: lesson11/nginx
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
E35: No previous regular expression
```

13, 21 All

4. Add two more occurrences of the word nginx in the file:

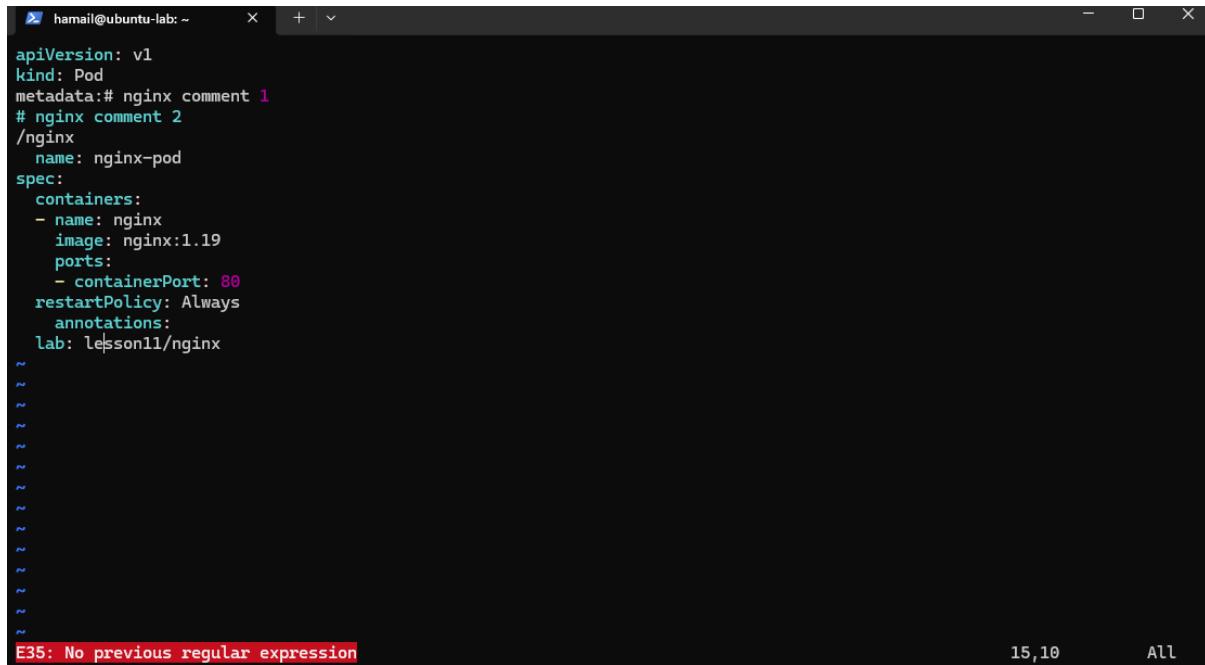
- Enter insert mode (i) at an appropriate place (for example add two new comment lines or add them under metadata as comments), type two new occurrences of nginx, then press Esc to return to command mode and save the file with :w.
- Save a screenshot showing the added occurrences (or cat output) as: task12_added_occurrences.png

```
hamail@ubuntu-lab: ~          + | 
apiVersion: v1
kind: Pod
metadata:# nginx comment 1
# nginx comment 2

  name: nginx-pod
spec:
  containers:
    - name: nginx
      image: nginx:1.19
      ports:
        - containerPort: 80
  restartPolicy: Always
  annotations:
    lab: lesson11/nginx
~
~
```

5. Demonstrate that n cycles forward through all matches:

- In vim command mode press /nginx Enter, then repeatedly press n to cycle forward through each match. Capture a short sequence (or a terminal screenshot showing the cursor on a later match) as: task12_cycle_matches.png



```
hamail@ubuntu-lab: ~
apiVersion: v1
kind: Pod
metadata:# nginx comment 1
# nginx comment 2
/nginx
  name: nginx-pod
spec:
  containers:
    - name: nginx
      image: nginx:1.19
      ports:
        - containerPort: 80
  restartPolicy: Always
  annotations:
    lab: lesson11/nginx
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
E35: No previous regular expression
```

15,10

All

6. Substitute all occurrences of nginx with webapp:

- From command mode execute the substitute command:
:%s/nginx/webapp
- This will replace all occurrences in the file (note: this changes the buffer). Save a screenshot showing the substitution result (or cat k8s-sample.yaml) as: task12_substitute_result.png

```
Last login: Sat Nov  1 18:46:53 2025 from 192.168.114.1
hamail@ubuntu-lab:~$ :%s/nginx/webapp
-bash: :%s/nginx/webapp: No such file or directory
hamail@ubuntu-lab:~$ |
```

7. Immediately undo the substitution using u:

- Press u in command mode to undo the last change. Save a screenshot showing the file restored to the previous state as: task12_undo_and_quit.png

```
hamail@ubuntu-lab:~$ u
u: command not found
hamail@ubuntu-lab:~$ |
```

8. 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!
```

- If you intentionally saved the substitution and then undid it and wish to quit normally, use :q.

Exam Evaluation Question

Goal: This is an exam-style evaluation prompt. Students are asked to install Docker Desktop as part of the evaluation exercise on VM. No commands, solutions, hints, or step-by-step instructions are provided here — install Docker Desktop using your own knowledge and research.

Instructions for students:

- Install Docker Desktop on your VMWare Workstation Ubuntu Server. No commands or solutions are provided in this lab — treat this as an evaluation/exam question.
- Verify Docker Desktop is installed by launching the Docker Desktop application and confirming it runs.
- Capture a screenshot of Docker Desktop running (or other clear evidence that Docker Desktop is installed and started) and save it as: exam_evaluation_docker_desktop.png

Notes:

- This task intentionally provides no commands, package names, or step-by-step instructions. You must research and determine the correct installation steps for your OS/environment.

📸 Screenshot Required:

- exam_evaluation_docker_desktop.png

```
hamail@ubuntu-lab:~$ docker info
docker run hello-world
Command 'docker' not found, but can be installed with:
sudo snap install docker      # version 28.4.0, or
sudo snap install docker      # version 28.1.1+1
sudo apt install docker.io    # version 27.5.1-0ubuntu3~24.04.2
sudo apt install podman-docker # version 4.9.3+ds1-1ubuntu0.1
See 'snap info <snapname>' for additional versions.
Command 'docker' not found, but can be installed with:
sudo snap install docker      # version 28.4.0, or
sudo snap install docker      # version 28.1.1+1
sudo apt install docker.io    # version 27.5.1-0ubuntu3~24.04.2
sudo apt install podman-docker # version 4.9.3+ds1-1ubuntu0.1
See 'snap info <snapname>' for additional versions.
hamail@ubuntu-lab:~$ exam_evaluation_docker_desktop.png
```

Troubleshooting & notes

- If any apt commands fail due to networking, capture the error output as screenshots and include them in your submission.
- When working with vim, remember i to enter insert mode, Esc to return to command mode, :wq to save and quit, and :q! to quit without saving. For undo use u, for redo use Ctrl-R, and numeric deletes can be 3dd or d3d. For search use /pattern, navigate with n and N, and substitute with :%s/pattern/replacement.