CLOUD COMPUTING LAB

Name: Maria Abdul Malik
Reg No: 2023-BSE-076
Submitted to: Sir Muhammad Shoaib
Class: 5B

LAB #05

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

task1_java_install.png

```
Adding debian:TeliaSonera_Root_CA_v1.pem
Adding debian:TrustAsia_Global_Root_CA_G3.pem
Adding debian:TrustAsia_Global_Root_CA_G4.pem
Adding debian:Trustwave_Global_Certification_Authority.pem
Adding debian:Trustwave_Global_ECC_P256_Certification_Authority.pem
Adding debian:Trustwave_Global_ECC_P384_Certification_Authority.pem
Adding debian:T-TeleSec_GlobalRoot_Class_2.pem
Adding debian:T-TeleSec_GlobalRoot_Class_3.pem
Adding debian:TUBITAK_Kamu_SM_SSL_Kok_Sertifikasi_-_Surum_1.pem
Adding debian:TunTrust_Root_CA.pem
Adding debian:TWCA_Global_Root_CA.pem
Adding debian:TWCA_Root_Certification_Authority.pem
Adding debian:UCA_Extended_Validation_Root.pem
Adding debian:UCA_Global_G2_Root.pem
Adding debian:USERTrust_ECC_Certification_Authority.pem
Adding debian:USERTrust_RSA_Certification_Authority.pem
Adding debian:vTrus_ECC_Root_CA.pem
Adding debian:vTrus_Root_CA.pem
Adding debian:XRamp_Global_CA_Root.pem
done.
Setting up openjdk-21-jre:amd64 (21.0.8+9~us1-0ubuntu1~24.04.1) ...
Setting up default-jre-headless (2:1.21-75+exp1) ...
Setting up default-jre (2:1.21-75+exp1) ...
Processing triggers for libgdk-pixbuf-2.0-0:amd64 (2.42.10+dfsg-3ubuntu3.2) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.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

task1_java_version.png

```
maria06@maria076:~$ java --version
openjdk 21.0.8 2025-07-15
OpenJDK Runtime Environment (build 21.0.8+9-Ubuntu-0ubuntu124.04.1)
OpenJDK 64-Bit Server VM (build 21.0.8+9-Ubuntu-0ubuntu124.04.1, mixed mode, sharing)
```

task1_java_remove.png

```
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No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
maria06@maria076:~$ 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)
maria06@maria076:~$ sudo apt remove default-jre -y
[sudo] password for maria06:
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
  libasound2-data libasound2t64 libatk-bridge2.0-0t64 libatk-wrapper-java libatk-wrapper-java-jni libatk1.0-0t64 libatspi2.0-0t64 libavahi-clie
  libavahi-common-data libavahi-common3 libcairo-gobject2 libcairo2 libcolord2 libcups2t64 libdatrie1 libdconf1 libdrm-amdgpu1 libdrm-intel1 lil
  libgdk-pixbuf-2.0-0 libgdk-pixbuf2.0-bin libgdk-pixbuf2.0-common libgif7 libgl1 libgl1-mesa-dri libglvnd0 libglx-mesa0 libglx0 libgraphite2-3
  libgtk-3-bin libgtk-3-common libharfbuzz0b libice6 liblcms2-2 libllvm20 libpango-1.0-0 libpangocairo-1.0-0 libpangoft2-1.0-0 libpciaccess0 lil
  libpixman-1-0 librsvg2-2 librsvg2-common libsm6 libthai-data libthai0 libvulkan1 libwayland-client0 libwayland-cursor0 libwayland-egl1 libway
  libx11-xcb1 libxaw7 libxcb-dri3-0 libxcb-glx0 libxcb-present0 libxcb-randr0 libxcb-render0 libxcb-shape0 libxcb-shm0 libxcb-sync1 libxcb-xfix
  libxcomposite1 libxcursor1 libxdamage1 libxfixes3 libxft2 libxi6 libxinerama1 libxkbfile1 libxmu6 libxrandr2 libxrender1 libxshmfence1 libxt6
  libxv1 libxxf86dga1 libxxf86vm1 mesa-libgallium mesa-vulkan-drivers openjdk-21-jre openjdk-21-jre-headless session-migration ubuntu-mono x11-
  x11-utils
Use 'sudo apt autoremove' to remove them.
The following packages will be REMOVED:
  default-jre
0 upgraded, 0 newly installed, 1 to remove and 62 not upgraded.
After this operation, 6,144 B disk space will be freed.
(Reading database ... 101562 files and directories currently installed.)
Removing default-jre (2:1.21-75+exp1) ...
```

task1_hash_clear.png

```
  --enable-preview
                allow classes to depend on preview features of this release
specify an argument for a long option, you can use --<name>=<value> or
```

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

Task2_aptget_install.png

```
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
  default-jre
0 upgraded, 1 newly installed, 0 to remove and 64 not upgraded.
Need to get 922 B of archives.
After this operation, 6,144 B of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble/main amd64 default-jre amd64 2
Fetched 922 B in 1s (1,202 B/s)
Selecting previously unselected package default-jre.
(Reading database ... 101561 files and directories currently installed.)
Preparing to unpack .../default-jre_2%3a1.21-75+exp1_amd64.deb ...
Unpacking default-jre (2:1.21-75+exp1) ...
Setting up default-jre (2:1.21-75+exp1) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

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

Task2_java_version_after_aptget.png

```
maria06@maria076:~$ 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)
```

Task2_aptget_remov.png

```
maria06@maria076:~$ sudo apt-get remove default-jre -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
```

task2_hash_after_remove.png

```
To specify an argument for a long option, you can use --<name>=<value> or
--<name> <value>.

maria06@maria076:~$ _
```

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

task3_apt_update.png

```
maria06@maria076:~$ sudo apt update
Hit:1 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:2 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:3 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:4 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
31 packages can be upgraded. Run 'apt list --upgradable' to see them.
```

task3_apt_upgrade.png

```
Reading state information... Done
31 packages can be upgraded. Run 'apt list --upgradable' to see them.
maria06@maria076:~$ sudo apt upgrade
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
The following packages were automatically installed and are no longer required:
  adwaita-icon-theme alsa-topology-conf alsa-ucm-conf at-spi2-common at-spi2-core ca-certificates-java dconf-gset
  default-jre-headless fontconfig fonts-dejavu-extra gsettings-desktop-schemas gtk-update-icon-cache hicolor-icon
  libasound2-data libasound2t64 libatk-bridge2.0-0t64 libatk-wrapper-java libatk-wrapper-java-jni libatk1.0-0t64
  libavahi-common-data libavahi-common3 libcairo-gobject2 libcairo2 libcolord2 libcups2t64 libdatrie1 libdconf1 l
  libgdk-pixbuf-2.0-0 libgdk-pixbuf2.0-bin libgdk-pixbuf2.0-common libgif7 libgl1 libgl1-mesa-dri libglvnd0 libgl
  libgtk-3-bin libgtk-3-common libharfbuzz0b libice6 liblcms2-2 libllvm20 libpango-1.0-0 libpangocairo-1.0-0 libp
  libpixman-1-0 librsvg2-2 librsvg2-common libsm6 libthai-data libthai0 libvulkan1 libwayland-client0 libwayland-
  libx11-xcb1 libxaw7 libxcb-dri3-0 libxcb-glx0 libxcb-present0 libxcb-randr0 libxcb-render0 libxcb-shape0 libxcb
  libxcomposite1 libxcursor1 libxdamage1 libxfixes3 libxft2 libxi6 libxinerama1 libxkbfile1 libxmu6 libxrandr2 li
  libxv1 libxxf86dga1 libxxf86vm1 mesa-libgallium mesa-vulkan-drivers openjdk-21-jre openjdk-21-jre-headless sess
  x11-utils
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  linux-headers-6.8.0-87 linux-headers-6.8.0-87-generic linux-image-6.8.0-87-generic linux-modules-6.8.0-87-gener
  linux-tools-6.8.0-87 linux-tools-6.8.0-87-generic
The following packages will be upgraded:
  cloud-init coreutils distro-info-data firmware-sof-signed fwupd landscape-common libfwupd2 libnss-systemd libpa
  libudev1 linux-generic linux-headers-generic linux-image-generic linux-libc-dev linux-tools-common powermgmt-ba
  software-properties-common sosreport systemd systemd-dev systemd-hwe-hwdb systemd-resolved systemd-sysv systemd
31 upgraded, 7 newly installed, 0 to remove and 0 not upgraded.
Need to get 252 MB of archives.
After this operation, 306 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
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]
Get:3 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 systemd-dev all 255.4-1ubuntu8.11 [106 kB]
Get:4 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 systemd-timesyncd amd64 255.4-1ubuntu8.11 [35.3 k
Get:5 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 systemd-resolved amd64 255.4-1ubuntu8.11 [296 kB]
3% [Waiting for headers]
```

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

task4_snap_install.png

```
2025-10-23T14:56:34Z INFO Waiting for automatic snapd restart...
Fetch and check assertions for snap "code" (211)
Fetch and check assertions for snap "code" (211)
```

task4_snap_list.png

```
code 7d842fb8 from Visual Studio Code (vscode✦) installed
safa@safa056:~$ snap list code
Name  Version   Rev  Tracking       Publisher  Notes
code  7d842fb8  211  latest/stable  vscode✦    classic
safa@safa056:~$ code --version
1.105.1
```

task4_code_version_or_info.png

```
code  7d842fb8  211  latest/stable  vscode
safa@safa056:~$ code --version
1.105.1
7d842fb85a0275a4a8e4d7e040d2625abbf7f084
x64
```

task4_snap_bin_location.png

```
lrwxrwxrwx 1 root root 13 Oct 23 15:16 code.url-handler -> /usr/bin/snap
safa@safa056:~$ ls -l /snap/bin ! grep code
ls: cannot access '!': No such file or directory
ls: cannot access 'grep': No such file or directory
ls: cannot access 'code': No such file or directory
/snap/bin:
total 0
lrwxrwxrwx 1 root root 13 Oct 23 15:16 code -> /usr/bin/snap
lrwxrwxrwx 1 root root 13 Oct 23 15:16 code.url-handler -> /usr/bin/snap
```

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

task5_update.png

```
        inet6 fe80::20c:29ff:fe8a:bda0/64 scope link
        valid_lft forever preferred_lft forever
safa@safa056:~$ ssh safa@192.168.56.135
safa@192.168.56.135's password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-71-generic x86_64)

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

 System information as of Thu Oct 23 03:36:34 PM UTC 2025

  System load:  0.0               Processes:                219
  Usage of /:   61.8% of 9.75GB   Users logged in:          1
  Memory usage: 19%               IPv4 address for ens33: 192.168.56.135
  Swap usage:   0%

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

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

Expanded Security Maintenance for Applications is not enabled.

71 updates can be applied immediately.
45 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status


Last login: Thu Oct 16 16:23:09 2025 from 192.168.56.135
safa@safa056:~$ sudo apt update && suddo apt upgrade -y
[sudo] password for safa:
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
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
64 packages can be upgraded. Run 'apt list --upgradable' to see them.
Command 'suddo' not found, did you mean:
  command 'sudo' from deb sudo (1.9.15p5-3ubuntu5.24.04.1)
  command 'sudo' from deb sudo-ldap (1.9.15p5-3ubuntu5.24.04.1)
Try: sudo apt install <deb name>
safa@safa056:~$
```

task5_xfce_install.pn

```
Setting up libecal-2.0-3:amd64 (3.52.3-0ubuntu1) ...
Setting up network-manager-gnome (1.34.0-1ubuntu3) ...
Setting up libedata-cal-2.0-2t64:amd64 (3.52.3-0ubuntu1) ...
Setting up libedata-book-1.2-27t64:amd64 (3.52.3-0ubuntu1) ...
Setting up libedataserverui-1.2-4t64:amd64 (3.52.3-0ubuntu1) ...
Setting up indicator-datetime (15.10+21.04.20210304-0ubuntu6) ...
Setting up unity-control-center (15.04.0+23.04.20230220-0ubuntu8) ...
Setting up libebook-1.2-21t64:amd64 (3.52.3-0ubuntu1) ...
Setting up indicator-bluetooth (0.0.6+17.10.20170605-0ubuntu5) ...
Setting up evolution-data-server (3.52.3-0ubuntu1) ...
Processing triggers for dictionaries-common (1.29.7) ...
aspell-autobuildhash: processing: en [en-common].
aspell-autobuildhash: processing: en [en-variant_0].
aspell-autobuildhash: processing: en [en-variant_1].
aspell-autobuildhash: processing: en [en-variant_2].
aspell-autobuildhash: processing: en [en-w_accents-only].
aspell-autobuildhash: processing: en [en-wo_accents-only].
aspell-autobuildhash: processing: en [en_AU-variant_0].
aspell-autobuildhash: processing: en [en_AU-variant_1].
aspell-autobuildhash: processing: en [en_AU-w_accents-only].
aspell-autobuildhash: processing: en [en_AU-wo_accents-only].
aspell-autobuildhash: processing: en [en_CA-variant_0].
aspell-autobuildhash: processing: en [en_CA-variant_1].
aspell-autobuildhash: processing: en [en_CA-w_accents-only].
aspell-autobuildhash: processing: en [en_CA-wo_accents-only].
aspell-autobuildhash: processing: en [en_GB-ise-w_accents-only].
aspell-autobuildhash: processing: en [en_GB-ise-wo_accents-only].
aspell-autobuildhash: processing: en [en_GB-ize-w_accents-only].
aspell-autobuildhash: processing: en [en_GB-ize-wo_accents-only].
aspell-autobuildhash: processing: en [en_GB-variant_0].
aspell-autobuildhash: processing: en [en_GB-variant_1].
aspell-autobuildhash: processing: en [en_US-w_accents-only].
aspell-autobuildhash: processing: en [en_US-wo_accents-only].
Processing triggers for sgml-base (1.31) ...
Processing triggers for libc-bin (2.39-0ubuntu8.5) ...
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.
```

task5_xrdp_enable.png

```
No VM guests are running outdated hypervisor (qemu) binaries on this host.
safa@safa056:~$ sudo systemctl enable --now xrdp
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
```

task5_xrdp_status.png

task5_xsession.png

task5_rdp_connect.png

task5_vscode_launch.png
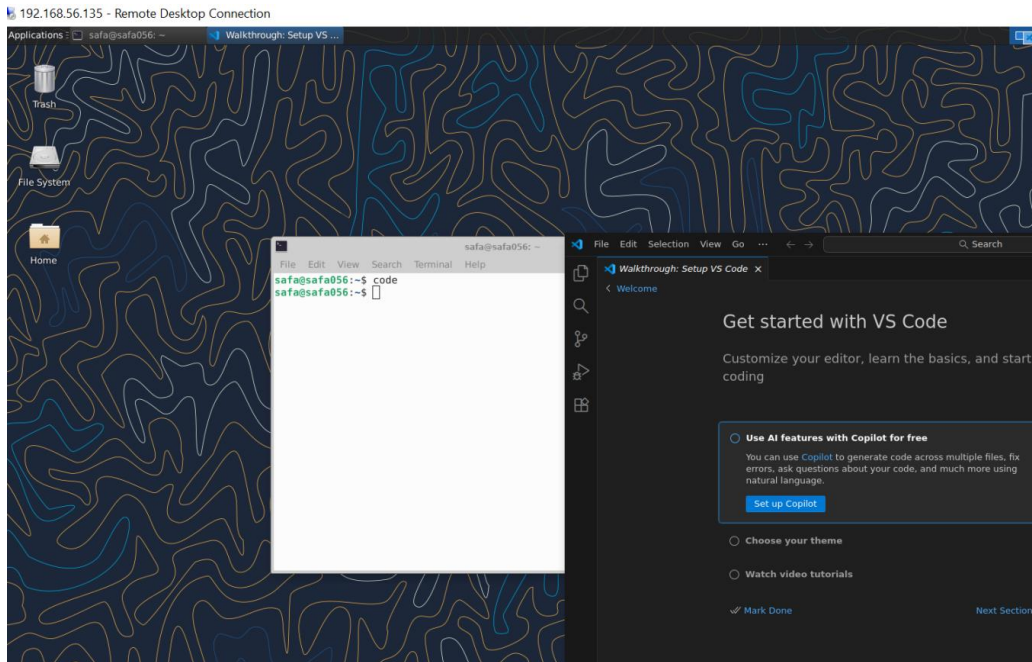
Task 6 - Install lightdm-gtk-greeter and GUI verification - start GUI, open VS Code, take snapshot, then end (GUI)

task6_lightdm_install.png

task6_lightdm_config.png

task6_lightdm_cleanup.png

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

task6_lightdm_restart.png

```
$ sudo systemctl restart lightdm
$ _
```

task6_gui_enable_boot.png

```
ynchronizing state of lightdm.service with SysV service script with /usr/lib/systemd/syst
xecuting: /usr/lib/systemd/systemd-sysv-install enable lightdm
he unit files have no installation config (WantedBy=, RequiredBy=, UpheldBy=,
lso=, or Alias= settings in the [Install] section, and DefaultInstance= for
emplate units). This means they are not meant to be enabled or disabled using systemctl.

ossible 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.
safa@safa056:~$ sudo systemctl set-default graphical.target
```

task6_after_reboot_gui.png
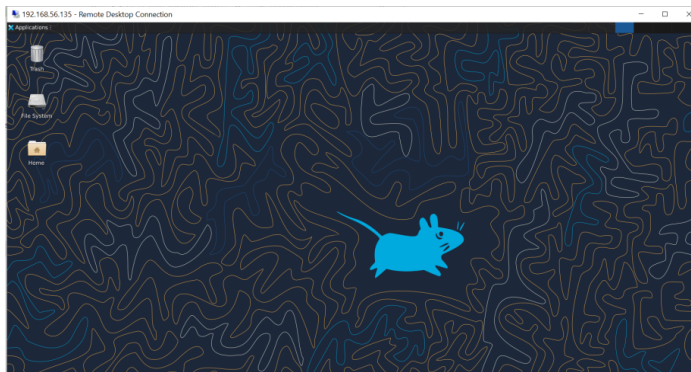
task6_after_reboot_cli.png

```
Password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-71-generic x86_64)

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

 System information as of Fri Oct 24 05:07:41 AM UTC 2025

  System load:  0.75               Processes:             333
  Usage of /:   73.0% of 9.75GB    Users logged in:       0
  Memory usage: 19%                IPv4 address for ens33: 192.168.56.135
  Swap usage:   0%

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

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

Expanded Security Maintenance for Applications is not enabled.

71 updates can be applied immediately.
45 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

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


safa@safa056:~$ _
```
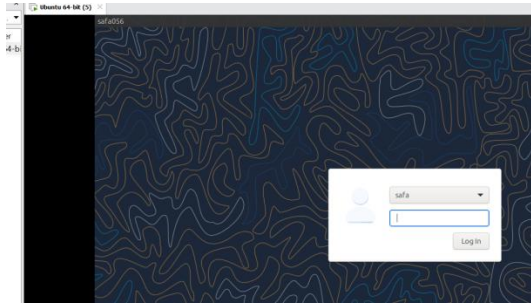
task6_gui_start.png

task6_gui_stop.png


```
safa@safa056:~$ sudo systemctl stop lightdm
[sudo] password for safa:
```

task6_gui_start_command.png


```
safa@safa056:~$ sudo systemctl start lightdm
[sudo] password for safa: _
```

task6_vscode_launch.png
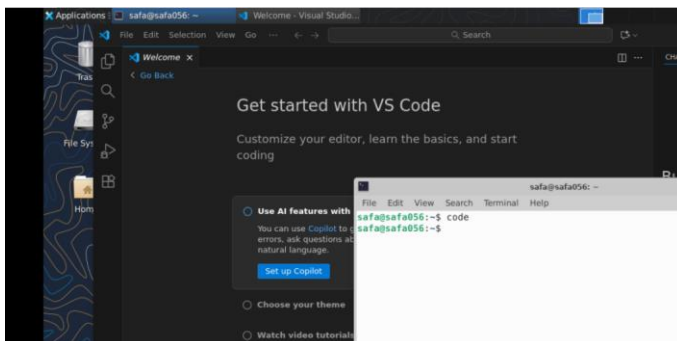
Task 7 - Install Google Chrome by adding its apt source & key (Chrome)

task7_install_chrome_error.png


```
safa@safa056:~$ sudo apt install google-chrome-stable -y
[sudo] password for safa:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
E: Unable to locate package google-chrome-stable
```

task7_ls_etc_apt.png

```
total 52
drwxr-xr-x   9 root root  4096 Sep 27 08:47 .
drwxr-xr-x 142 root root 12288 Oct 23 16:15 ..
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    70 Sep 27 07:44 sources.list
drwxr-xr-x   2 root root  4096 Sep 27 12:08 sources.list.d
-rw-r--r--   1 root root  1024 Sep 27 08:47 .sources.list.swp
drwxr-xr-x   2 root root  4096 Aug  5 17:01 trusted.gpg.d
```

task7_cat_sources_list.png

```
# Ubuntu sources have moved to /etc/apt/sources.list.d/ubuntu.sources
```

task7_ls_sources_list_d.png

```
total 16
drwxr-xr-x 2 root root 4096 Sep 27 12:08 .
drwxr-xr-x 9 root root 4096 Sep 27 08:47 ..
-rw-r--r-- 1 root root  384 Sep 27 12:08 ubuntu.sources
-rw-r--r-- 1 root root 2552 Aug  5 17:02 ubuntu.sources.curtin.orig
```

task7_cat_ubuntu_sources.png

```
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
```

task7_edit_ubuntu_sources.png

```
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
```

task7_add_key.png

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

task7_apt_update.png

```
Get:1 http://dl.google.com/linux/chrome/deb stable InRelease [1,825 B]
Hit:2 http://archive.ubuntu.com/ubuntu noble InRelease
Get:3 http://dl.google.com/linux/chrome/deb stable/main amd64 Packages [1,214 B]
Get:4 http://archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:5 http://archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:6 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [1,536 kB]
Get:7 http://archive.ubuntu.com/ubuntu noble-updates/main Translation-en [292 kB]
Get:8 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 Components [175 kB]
Get:9 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 c-n-f Metadata [15.4 kB]
Get:10 http://archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Components [212 B]
Get:11 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 Components [378 kB]
Get:12 http://archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Components [940 B]
Get:13 http://archive.ubuntu.com/ubuntu noble-backports/main amd64 Components [7,148 B]
Get:14 http://archive.ubuntu.com/ubuntu noble-backports/restricted amd64 Components [216 B]
```

task7_install_chrome.png

```
Get:14 http://archive.ubuntu.com/ubuntu noble-backports/restricted amd64 Components [21
Get:15 http://archive.ubuntu.com/ubuntu noble-backports/universe amd64 Components [11.0
Get:16 http://archive.ubuntu.com/ubuntu noble-backports/multiverse amd64 Components [21
Fetched 2,671 kB in 8s (337 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
64 packages can be upgraded. Run 'apt list --upgradable' to see them.
safa@safa056:~$ sudo apt install google-chrome-stable -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  ca-certificates-java default-jre-headless fonts-dejavu-extra java-common libatk-wrapp
  libgif7 openjdk-21-jre openjdk-21-jre-headless
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  fonts-liberation fonts-liberation-sans-narrow
```

task7_alternate_remove.png

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

task7_alternate_edit.png

```
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
```

task7_remove_key.png

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

task7_create_google_chrome_list.png

```
$ echo "deb [arch=amd64 signed-by=/etc/apt/keyrings/google.gpg] http://dl.google.com/linux/chrome/deb/ sta
do tee /etc/apt/sources.list.d/google-chrome.list > /dev/null
```

task7_list_sources_after_create.png

```
total 20
drwxr-xr-x 2 root root 4096 Oct 24 05:50 .
drwxr-xr-x 9 root root 4096 Sep 27 08:47 ..
-rw-r--r-- 1 root root  107 Oct 24 05:52 google-chrome.list
-rw-r--r-- 1 root root  384 Oct 24 05:49 ubuntu.sources
-rw-r--r-- 1 root root 2552 Aug  5 17:02 ubuntu.sources.curtin.c
```

task7_add_key_alt.png

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

task7_apt_update_alt.png

```
Get:1 http://dl.google.com/linux/chrome/deb stable InRelease [1,825 B]
Hit:2 http://archive.ubuntu.com/ubuntu noble InRelease
Get:3 http://dl.google.com/linux/chrome/deb stable/main amd64 Packages [1,214 B]
Get:4 http://archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:5 http://archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:6 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [1,536 kB]
Get:7 http://archive.ubuntu.com/ubuntu noble-updates/main Translation-en [292 kB]
Get:8 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 Components [175 kB]
Get:9 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 c-n-f Metadata [15.4 kB]
Get:10 http://archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Components [212 B]
Get:11 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 Components [378 kB]
Get:12 http://archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Components [940 B]
Get:13 http://archive.ubuntu.com/ubuntu noble-backports/main amd64 Components [7,148 B]
```

task7_install_chrome_alt.png

```
et:20 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Components [212
et:21 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 c-n-f Metadata
etched 5,373 kB in 8s (655 kB/s)
eading package lists... Done
uilding dependency tree... Done
eading state information... Done
4 packages can be upgraded. Run 'apt list --upgradable' to see them.
afa@safa056:~$ sudo apt install google-chrome-stable -y
eading package lists... Done
uilding dependency tree... Done
eading state information... Done
he following packages were automatically installed and are no longer required:
 ca-certificates-java default-jre-headless fonts-dejavu-extra java-common libatk-wrappe
 libgif7 openjdk-21-jre openjdk-21-jre-headless
se 'sudo apt autoremove' to remove them.
he following NEW packages will be installed:
 google-chrome-stable
 upgraded, 1 newly installed, 0 to remove and 64 not upgraded.
eed to get 120 MB of archives.
```

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

task8_add_ppa_audacity.png

```
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://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
Get:5 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble InRelease [18.1 kB]
Get:6 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble/main amd64 Packages [1,064 B]
Get:7 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble/main Translation-en [492 B]
Hit:8 http://dl.google.com/linux/chrome/deb stable InRelease
Fetched 19.6 kB in 2s (11.0 kB/s)
Reading package lists... Done
```

task8_apt_update_audacity.png

```
Hit:1 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:3 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble InRelease
Hit:4 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:5 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Hit:6 http://dl.google.com/linux/chrome/deb stable InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
64 packages can be upgraded. Run 'apt list --upgradable' to see them.
```

task8_install_audacity.png

```
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  ca-certificates-java default-jre-headless fonts-dejavu-extra java-common libatk-wrapper-java libatk-wrapper-java-jni
  libgif7 openjdk-21-jre openjdk-21-jre-headless
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  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 libsbsms10 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 libxkbcommon-x11-0 libzix-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:
  audacity audacity-data libdouble-conversion3 libflac++10 libid3tag0 liblilv-0-0 libmd4c0 libopusfile0 libpcre2-16-0
```

task8_audacity_launch.png Or task8_audacity_version.png

task8_add_ppa_obs.png

task8_apt_update_obs.png

task8_install_obs.png

```
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  ca-certificates-java default-jre-headless fonts-dejavu-extra java-common libatk-wrapper-java libatk-wrapper-java-jni
  libgif7 openjdk-21-jre openjdk-21-jre-headless
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  libaacs0 libass9 libavdevice60 libavfilter9 libavformat60 libb2-1 libbdplus0 libblas3 libbluray2 libbs2b0
  libchromaprint1 libcjson1 libdc1394-25 libdecor-0-0 libdecor-0-plugin-1-gtk libfdk-aac2 libfftw3-double3 libflite1
  libgfortran5 libgme0 liblapack3 libluajit-5.1-2 libluajit-5.1-common libmbedcrypto7t64 libmbedtls14t64
  libmbedx509-1t64 libmysofa1 libnorm1t64 libopenal-data libopenal1 libopenmpt0t64 libpgm-5.3-0t64 libplacebo338
```
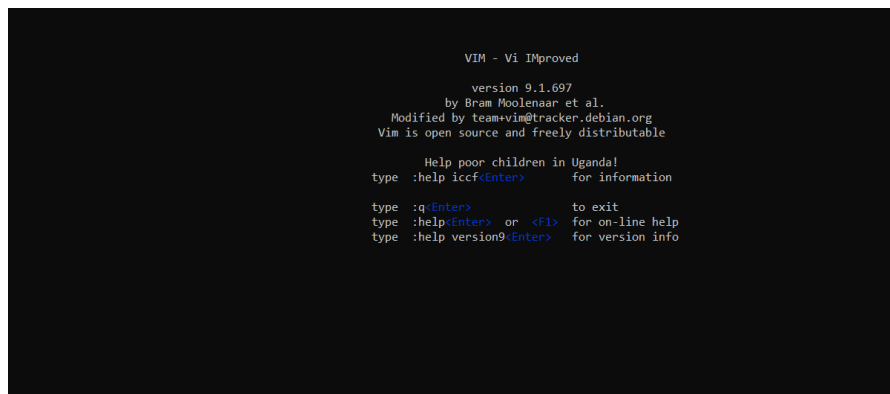
task8_obs_launch.png Or task8_obs_version.png
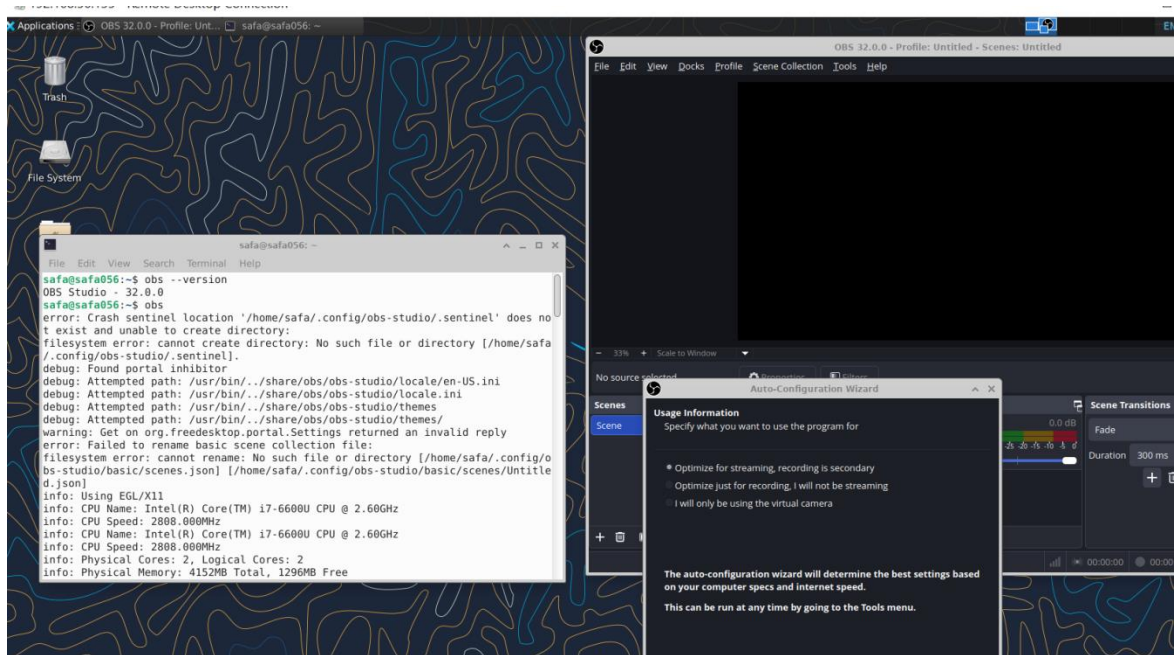
Task 9 - Create a Kubernetes sample YAML using vim

task9_vim_check.png

task9_vim_edit.png

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

task9_k8s_saved.png

```
safa@safa056:~/Lab5$ safa@safa056:~/Lab5$ ls -la
total 12
drwxrwxr-x  2 safa safa 4096 Oct 24 06:20 .
drwxr-x--- 22 safa safa 4096 Oct 24 06:20 ..
-rw-rw-r--  1 safa safa  284 Oct 24 06:20 k8s-sample.yaml
safa@safa056:~/Lab5$
```

Task 10 - Edit the Kubernetes YAML - add annotation, verify, then discard temporary change
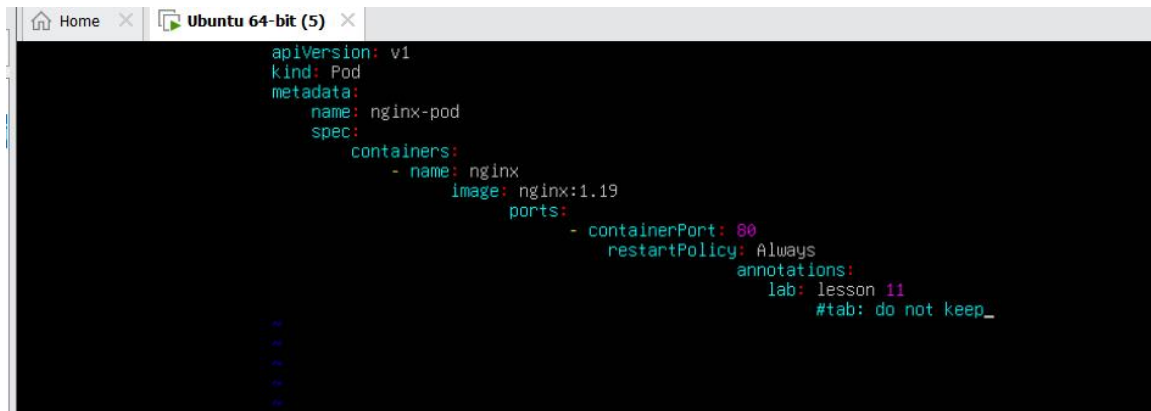
task10_verify_annotation.png

```
~
~
"k8s-sample.yaml" 13L, 409B written
safa@safa056:~/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: lesson 11
safa@safa056:~/Lab5$
```

task10_verify_entering_temp_data.png

task10_verify_no_temp_comment.png

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

task11_dd_delete_and_undo.png

```
apiVersion: v1
kind: Pod
metadata:
    name: nginx-pod
    spec:
        containers:
            - name: nginx
                image: nginx:1.19
                    ports:
                        - containerPort: 80
                            restartPolicy: Always
                                annotations:
                                    lab: lesson 11
```

```
3 more lines; before #1  4 seconds ago
```

task11_delete3_and_undo.png

```
apiVersion: v1
kind: Pod
metadata:
    name: nginx-pod
    spec:
        containers:
            - name: nginx
                image: nginx:1.19
                    ports:
                        - containerPort: 80
                            restartPolicy: Always
                                annotations:
                                    lab: lesson 11
safa@safa056:~/Lab5$
```
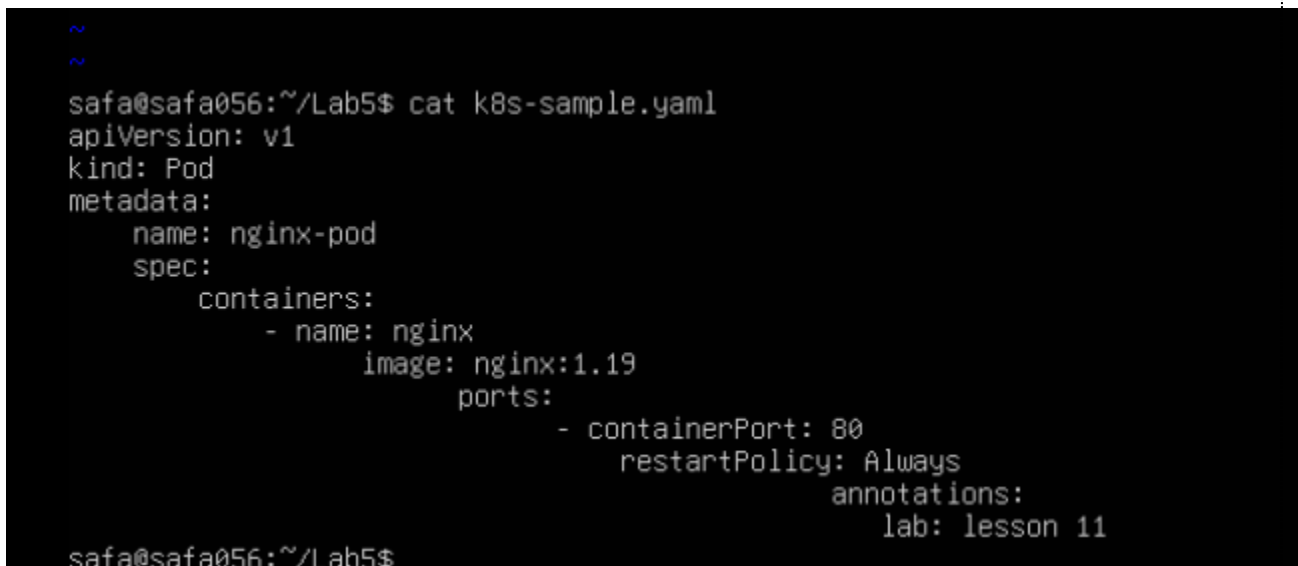
task11_line1.png

```
apiVersion: v1
kind: Pod
metadata:
    name: nginx-pod
    spec:
        containers:
            - name: nginx
                image: nginx:1.19
                    ports:
                        - containerPort: 80
                            restartPolicy: Always
                                annotations:
                                    lab: lesson 11
```

task11_navigation.png

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

task12_search_nginx.png

task12_n_and_N_navigation.png

task12_added_occurrences.png

```
apiVersion: v1
kind: Pod
metadata:
    name: nginx-pod
    spec:
        containers:
            - name: nginx
              image: nginx:1.19
              ports:
                    - containerPort: 80
                      restartPolicy: Always
                          annotations:
                              lab: lesson 11
    ~
    ~
    ~
```

task12_cycle_matches.png

```
apiVersion: v1
kind: Pod
metadata:
    comment: nginx333
    name: nginx-pod
    spec:
        containers:
            - name: nginx
              image: nginx:1.19
              ports:
                    - containerPort: 80
                      restartPolicy: Always
                          annotations:
                              lab: lesson 11
                              new: nginx55 5
    ~
    ~
```

```
apiVersion: v1
kind: Pod
metadata:
    comment: nginx333
    name: nginx-pod
    spec:
        containers:
            - name: nginx
              image: nginx:1.19
              ports:
                    - containerPort: 80
                      restartPolicy: Always
                          annotations:
                              lab: lesson 11
                              new: nginx55 5
    ~
```

```
apiVersion: v1
kind: Pod
metadata:
    comment: nginx333
    name: nginx-pod
    spec:
        containers:
            - name: nginx
              image: nginx:1.19
              ports:
                    - containerPort: 80
                      restartPolicy: Always
                          annotations:
                              lab: lesson 11
                              new: nginx55 5
    ~
    ~
```

task12_substitute_result.png

```
apiVersion: v1
kind: Pod
metadata:
    comment: webapp333
     name: webapp-pod
     spec:
        containers:
            - name: webapp
               image: webapp:1.19
                   ports:
                        - containerPort: 80
                          restartPolicy: Always
                                annotations:
                                    lab: lesson 11
                                    new: webapp55 5
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
5 substitutions on 5 lines
```

task12_undo_and_quit.png

```
apiVersion: v1
kind: Pod
metadata:
    comment: nginx333
     name: nginx-pod
     spec:
        containers:
            - name: nginx
               image: nginx:1.19
                   ports:
                        - containerPort: 80
                          restartPolicy: Always
                                annotations:
                                    lab: lesson 11
                                    new: nginx55 5
~
~
~
~
```