



CLOUD COMPUTING LAB 5

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

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

task1_java_suggestion.png

```
valid_1ft forever preferred_1ft forever
maham123@maham123:~$ java
Command 'java' not found, but can be installed with:
sudo apt install openjdk-17-jre-headless # version 17.0.14+7-1~24.04, or
sudo apt install openjdk-21-jre-headless # version 21.0.6+7-1~24.04.1
sudo apt install default-jre             # version 2:1.17-75
sudo apt install openjdk-11-jre-headless # version 11.0.26+4-1ubuntu1~24.04
sudo apt install openjdk-8-jre-headless  # version 8u442-b06~us1-0ubuntu1~24.04
sudo apt install openjdk-19-jre-headless # version 19.0.2+7-4
sudo apt install openjdk-20-jre-headless # version 20.0.2+9-1
sudo apt install openjdk-22-jre-headless # version 22~22ea-1
maham123@maham123:~$
```

task1_java_install.png

```
Adding debian:UCA_Extended_Validation_Root.pem
Adding debian:UCA_Global_G2_Root.pem
Adding debian:USERTrust_ECC_Certification_Authority.pem
Adding debian:USERTrust_RSA_Certification_Authority.pem
Adding debian:vTrus_ECC_Root_CA.pem
Adding debian:vTrus_Root_CA.pem
Adding debian:XRamp_Global_CA_Root.pem
done.
Setting up openjdk-21-jre:amd64 (21.0.8+9~us1-0ubuntu1~24.04.1) ...
Processing triggers for libgdk-pixbuf-2.0-0:amd64 (2.42.10+dfsg-3ubuntu3.2) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.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

task1_java_version.png

```
No VM guests are running outdated hypervisor (qemu) binaries on this host.
maham123@maham123:~$ java --version
openjdk 21.0.8 2025-07-15
OpenJDK Runtime Environment (build 21.0.8+9-Ubuntu-0ubuntu124.04.1)
OpenJDK 64-Bit Server VM (build 21.0.8+9-Ubuntu-0ubuntu124.04.1, mixed mode, sharing)
```

task1_java_remove.png

```
maham123@maham123:~$  
maham123@maham123:~$ sudo apt remove openjdk-21-jre  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
The following packages were automatically installed and are no longer required:  
  adwaita-icon-theme alsa-topology-conf alsa-ucm-conf at-spi2-common at-spi2-core ca-certificates-java dconf-gsettings  
  fonts-dejavu-extra gsettings-desktop-schemas gtk-update-icon-cache hicolor-icon-theme humanity-icon-theme java-common  
  libatk-bridge2.0-0t64 libatk-wrapper-java libatk-wrapper-java-jni libatk1.0-0t64 libatspi2.0-0t64 libavahi-client3  
  libcairo-gobject2 libcairo2 libcolord2 libcups2t64 libdatrie1 libdconf1 libdrm-amdgpu1 libdrm-intel1 libepoxy0 libfontc1  
  libgdk-pixbuf2.0-bin libgdk-pixbuf2.0-common libgif7 libgl1 libgl1-mesa-dri libglvnd0 libglx-mesa0 libglx0 libgtk-3-0  
  libgtk-3-common libharfbuzz0b libice6 liblcms2-2 liblvm20 libpango-1.0-0 libpangocairo-1.0-0 libpangoft2-1.0-0 librsync2  
  librsync2-common libsm6 libthai-data libthai0 libvulkan1 libwayland-client0 libwayland-cursor0 libwayland-server0 libx11-6  
  libx11-xcb1 libxaw7 libxcb-dri3-0 libxcb-glx0 libxcb-present0 libxcb-randr0 libxcb-render0 libxcb-shape0 libxcb-shm0 libxcb-xfixes0  
  libxcursor1 libxdamage1 libxfixes3 libxft2 libxi6 libxinerama1 libxkbfile1 libxmu6 libxrandr2 libxrender1 libxxf86vm1  
  libxxf86vm1 mesa-libgallium mesa-vulkan-drivers openjdk-21-jre-headless session-migration ubuntu-firmware  
Use 'sudo apt autoremove' to remove them.  
The following packages will be REMOVED:  
  openjdk-21-jre  
0 upgraded, 0 newly installed, 1 to remove and 67 not upgraded.  
After this operation, 731 kB disk space will be freed.  
Do you want to continue? [Y/n] Y  
(Reading database ... 101557 files and directories currently installed.)  
Removing openjdk-21-jre:amd64 (21.0.8+9~us1-0ubuntu1~24.04.1) ...  
Processing triggers for hicolor-icon-theme (0.17-2) ...  
maham123@maham123:~$
```

task1_java_not_found.png

```
maham123@maham123:~$  
maham123@maham123:~$ java  
Command 'java' not found, but can be installed with:  
sudo apt install openjdk-17-jre-headless # version 17.0.16+8~us1-0ubuntu1~24.04.1, or  
sudo apt install openjdk-21-jre-headless # version 21.0.8+9~us1-0ubuntu1~24.04.1  
sudo apt install default-jre # version 2:1.17-75  
sudo apt install openjdk-11-jre-headless # version 11.0.28+6-1ubuntu1~24.04.1  
sudo apt install openjdk-25-jre-headless # version 25+36-1~24.04.2  
sudo apt install openjdk-8-jre-headless # version 8u462-ga~us1-0ubuntu2~24.04.2  
sudo apt install openjdk-19-jre-headless # version 19.0.2+7-4  
sudo apt install openjdk-20-jre-headless # version 20.0.2+9-1  
sudo apt install openjdk-22-jre-headless # version 22~22ea-1  
maham123@maham123:~$
```

task1_hash_clear.png

```
maham123@maham123:~$  
maham123@maham123:~$ hash -r  
maham123@maham123:~$ java  
Command 'java' not found, but can be installed with:  
sudo apt install openjdk-17-jre-headless # version 17.0.16+8~us1-0ubuntu1~24.04.1, or  
sudo apt install openjdk-21-jre-headless # version 21.0.8+9~us1-0ubuntu1~24.04.1  
sudo apt install default-jre # version 2:1.17-75  
sudo apt install openjdk-11-jre-headless # version 11.0.28+6-1ubuntu1~24.04.1  
sudo apt install openjdk-25-jre-headless # version 25+36-1~24.04.2  
sudo apt install openjdk-8-jre-headless # version 8u462-ga~us1-0ubuntu2~24.04.2  
sudo apt install openjdk-19-jre-headless # version 19.0.2+7-4  
sudo apt install openjdk-20-jre-headless # version 20.0.2+9-1  
sudo apt install openjdk-22-jre-headless # version 22~22ea-1  
maham123@maham123:~$
```

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

task2_aptget_install.png

```
Replacing debian: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.
maham123@maham123:~$
```

task2_java_version_after_aptget.png

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

openjdk 21.0.8 2025-07-15
OpenJDK Runtime Environment (build 21.0.8+9-Ubuntu-0ubuntu124.04.1)
OpenJDK 64-Bit Server VM (build 21.0.8+9-Ubuntu-0ubuntu124.04.1, mixed mode, sharing)
maham123@maham123:~$
```

task2_aptget_remove.png

```
maham123@maham123:~$
maham123@maham123:~$ sudo apt-get remove default-jre -y

Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  adwaita-icon-theme alsa-topology-conf alsa-ucm-conf at-spi2-common at-spi2-core ca-certificates-java dconf-gsettings-desktop-schemas
  default-jre-headless fontconfig fonts-dejavu-extra gsettings-desktop-schemas gtk-update-icon-cache hicolor-icon-theme libasound2-data
  libasound2t64 libatk-bridge2.0-0t64 libatk-wrapper-java libatk-wrapper-java-jni libatk1.0-0t64 libavahi-common-data libavahi-common3
  libcairo-gobject2 libcairo2 libcolord2 libcups2t64 libdatrie1 libdconf1 libgdk-pixbuf-2.0-0 libgdk-pixbuf2.0-bin libgdk-pixbuf2.0-common
  libgif7 libgl1 libgl1-mesa-dri libglvnd0 libgtk-3-bin libgtk-3-common libharfbuzz0b libice6 liblcms2-2 libllvm20 libpango-1.0-0 libpangocairo-1.0-0
  libpixman-1-0 libsvg2-2 libsvg2-common libsm6 libthai-data libthai0 libvulkan1 libwayland-client0 libwayland-dev libx11-xcb1 libxaw7
  libxcb-dri3-0 libxcb-glx0 libxcb-present0 libxcb-randr0 libxcb-render0 libxcb-shape0 libxcb1 libxcomposite1 libxcursor1 libxdamage1
  libxfixes3 libxft2 libxi6 libxinerama1 libxkbfile1 libxmu6 libxrandr2 libxxf86dga1 libxxf86vm1 mesa-libgallium mesa-vulkan-drivers
  openjdk-21-jre openjdk-21-jre-headless session-x11-utils
Use 'sudo apt autoremove' to remove them.
The following packages will be REMOVED:
  default-jre
0 upgraded, 0 newly installed, 1 to remove and 67 not upgraded.
After this operation, 6,144 B disk space will be freed.
(Reading database ... 101562 files and directories currently installed.)
Removing default-jre (2:1.21-75+exp1) ...
maham123@maham123:~$
```

task2_hash_after_remove.png

```
Processing triggers for libc-bin (2.35-0ubuntu3.5) ...
maham123@maham123:~$ hash -r
maham123@maham123:~$ java

Command 'java' not found, but can be installed with:
sudo apt install openjdk-17-jre-headless # version 17.0.16+8~us1-0ubuntu1~24.04.1, or
sudo apt install openjdk-21-jre-headless # version 21.0.8+9~us1-0ubuntu1~24.04.1
sudo apt install default-jre # version 2:1.17-75
sudo apt install openjdk-11-jre-headless # version 11.0.28+6-1ubuntu1~24.04.1
sudo apt install openjdk-25-jre-headless # version 25+36-1~24.04.2
sudo apt install openjdk-8-jre-headless # version 8u462-ga~us1-0ubuntu2~24.04.2
sudo apt install openjdk-19-jre-headless # version 19.0.2+7-4
sudo apt install openjdk-20-jre-headless # version 20.0.2+9-1
sudo apt install openjdk-22-jre-headless # version 22~22ea-1
maham123@maham123:~$
```

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

task3_apt_update.png

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

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

task3_apt_upgrade.png

```
check arch_biosdell_003 robor documentation entry.
Adding boot menu entry for UEFI Firmware Settings ...
done
Scanning processes...
Scanning candidates...
Scanning linux images...

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

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

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

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

No containers need to be restarted.

User sessions running outdated binaries:
maham123 @ session #1: apt[7365], login[1295]
maham123 @ user manager service: systemd[1488]
maham123@maham123:~$
```


task3_explanation.png

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

The command 'sudo apt update' refreshes the local package index by downloading the latest lists of available packages and their versions; it only updates information.

The command 'sudo apt upgrade' compares installed packages with the updated index and installs newer versions of them if available.

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

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

task4_snap_install.png

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

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

task4_snap_list.png

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

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

task4_code_version_or_info.png

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

1.105.1
7d842fb85a0275a4a8e4d7e040d2625abbf7f084
x64
maham123@maham123:~$
maham123@maham123:~$ snap info code

name:      code
summary:   Code editing. Redefined.
publisher: Visual Studio Code (vscode)
store-url: https://snapcraft.io/code
contact:   https://twitter.com/code
license:   unset
```

```

description: |
  Visual Studio Code is a new choice of tool that combines the
  simplicity of a code editor with what developers need for the core
  edit-build-debug cycle.
commands:
  - code
  - code.url-handler
snap-id:      Ht0aUHi7ofh9Fbwh6m7jUN2pAy6kzBiu
tracking:     latest/stable
refresh-date: today at 08:53 UTC
channels:
  latest/stable: 7d842fb8 2025-10-15 (211) 346MB classic
  latest/candidate: ↑
  latest/beta:    ↑
  latest/edge:    ↑
installed:      7d842fb8 (211) 346MB classic
maham123@maham123:~$

```

task4_snap_bin_location.png

```

maham123@maham123:~$
maham123@maham123:~$ ls -l /snap/bin | grep code

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

```

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

task5_update.png

```

maham123@maham123:~$ sudo apt update && sudo apt upgrade -y
[sudo] password for maham123:
Hit:1 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:2 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:3 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:4 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
All packages are up to date.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
maham123@maham123:~$

```

task5_xfce_install.png

```

Restarting services...

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

No containers need to be restarted.

```

```
User sessions running outdated binaries:
maham123 @ session #1: login[1295]
maham123 @ user manager service: systemd[1488]

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

task5_xrdp_enable.png

```
User sessions running outdated binaries:
maham123 @ session #1: login[1295]
maham123 @ user manager service: systemd[1488]

No VM guests are running outdated hypervisor (qemu) binaries on
this host.
maham123@maham123:~$ sudo systemctl enable --now xrdp
Synchronizing state of xrdp.service with SysV service script wit
h /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable xrdp
```

task5_xrdp_status.png

```
maham123@maham123:~$ sudo systemctl status xrdp
● xrdp.service - xrdp daemon
   Loaded: loaded (/usr/lib/systemd/system/xrdp.service; enab>
   Active: active (running) since Fri 2025-10-24 09:08:05 UTC>
   Docs: man:xrdp(8)
         man:xrdp.ini(5)
   Main PID: 32896 (xrdp)
     Tasks: 1 (limit: 2210)
   Memory: 872.0K (peak: 1.5M)
      CPU: 22ms
   CGroup: /system.slice/xrdp.service
           └─32896 /usr/sbin/xrdp

Oct 24 09:08:04 maham123 systemd[1]: Starting xrdp.service - xr>
Oct 24 09:08:04 maham123 xrdp[32894]: [INFO ] address [0.0.0.0]>
Oct 24 09:08:04 maham123 xrdp[32894]: [INFO ] listening to port>
Oct 24 09:08:04 maham123 xrdp[32894]: [INFO ] xrdp_listen_pp do>
Oct 24 09:08:04 maham123 systemd[1]: xrdp.service: Can't open P>
Oct 24 09:08:05 maham123 systemd[1]: Started xrdp.service - xrd>
Oct 24 09:08:06 maham123 xrdp[32896]: [INFO ] starting xrdp wit>
Oct 24 09:08:06 maham123 xrdp[32896]: [INFO ] address [0.0.0.0]>
Oct 24 09:08:06 maham123 xrdp[32896]: [INFO ] listening to port>
Oct 24 09:08:06 maham123 xrdp[32896]: [INFO ] xrdp_listen_pp do>
lines 1-22/22 (END)
```

task5_xsession.png

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


task5_rdp_connect.png



task5_vscode_launch.png

```
maham123@maham123:~$ echo xfce4-session > ~/.xsession
maham123@maham123:~$ ss -ltnp | grep 3389
LISTEN 0      2            *:3389      *:*
```

USER	PID	PPID	CPU	MEM	VSZ	SSZ	STAT	START	TIME	COMMAND
root	32885	0.0	0.2	15944	4676	?	S	09:08	0:00	/usr/sbin/xrdp
-sesman										
xrdp	32896	0.0	0.1	13116	2300	?	S	09:08	0:00	/usr/sbin/xrdp
xrdp	33156	0.3	1.4	56800	28668	?	S	09:14	0:01	/usr/sbin/xrdp
root	33160	0.0	0.2	16180	4504	?	S	09:15	0:00	/usr/sbin/xrdp
-sesman										
maham123	33162	0.5	6.3	428412	124516	?	Sl	09:15	0:02	/usr/lib/xorg/Xorg :10 -auth .Xauthority -config xrdp/xorg.conf -noreset -nolisten tcp -logfile .xorgxrdp.%s.log
maham123	33165	0.0	0.2	89772	5760	?	Sl	09:15	0:00	/usr/sbin/xrdp
-chansrv										
maham123	33738	0.0	0.1	6544	2304	pts/0	S+	09:23	0:00	grep --color=a
uto xrdp										

```
maham123@maham123:~$ code
```

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

task6_lightdm_install.png

```
6.8.0-71-generic
Diagnostics:
  The currently running kernel version is not the expected kernel version 6.8.0-86-generic.

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

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

No containers need to be restarted.

User sessions running outdated binaries:
maham123 @ session #1: login[1295]
maham123 @ user manager service: systemd[1488]

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

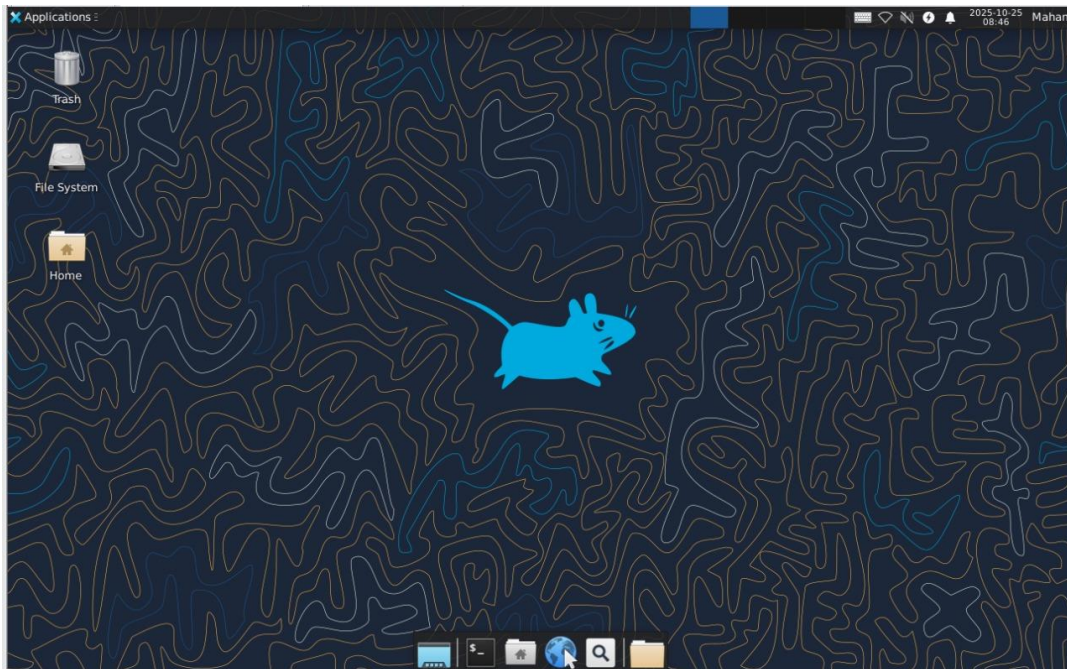
task6_lightdm_config.png

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

task6_lightdm_cleanup.png

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

task6_lightdm_restart.png



task6_gui_enable_boot.png

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


task6_after_reboot_gui.png

```
Ubuntu 24.04.3 LTS maham123 tty3
maham123 login: maham123
Password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-86-generic x86_64)

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

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

System load:  1.17           Processes:            316
Usage of /:   68.0% of 9.75GB Users logged in:             1
Memory usage: 34%           IPv4 address for ens33: 192.168.28.129
Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

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

maham123@maham123:~$ _
```

task6_gui_disable_boot.png

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

task6_after_reboot_cli.png



task6_after_reboot_cli.png

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

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

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

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

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

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

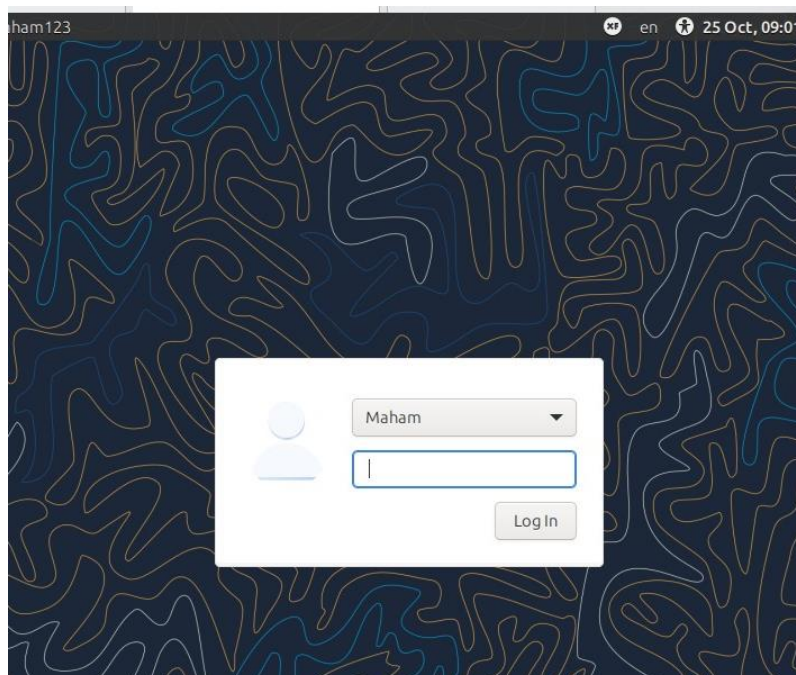
maham123@maham123:~$ _
```

task6_gui_start.png

```
maham123@maham123:~$ sudo systemctl start lightdm

[sudo] password for maham123:
Sorry, try again.
[sudo] password for maham123:
```

task6_gui_start_command.png



task6_gui_stop.png

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

task6_vscode_launch.png

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

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

task7_install_chrome_error.png

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

task7_ls_etc_apt.png

```
E: Unable to locate package google-chrome-stable  
maham123@maham123:~$ ls -la /etc/apt  
  
total 48  
drwxr-xr-x  9 root root  4096 Oct 24 08:00 .  
drwxr-xr-x 141 root root 12288 Oct 24 09:15 ..  
drwxr-xr-x  2 root root  4096 Oct 24 08:46 apt.conf.d  
drwxr-xr-x  2 root root  4096 Mar 31 2024 auth.conf.d  
drwxr-xr-x  2 root root  4096 Mar 31 2024 keyrings  
drwxr-xr-x  2 root root  4096 Aug  5 17:14 preferences.d  
drwxr-xr-x  2 root root  4096 Aug  5 17:14 preferences.d.save  
-rw-r--r--  1 root root    70 Oct 24 08:00 sources.list  
drwxr-xr-x  2 root root  4096 Oct  3 05:59 sources.list.d  
drwxr-xr-x  2 root root  4096 Aug  5 17:01 trusted.gpg.d  
maham123@maham123:~$  
maham123@maham123:~$ _
```

task7_cat_sources_list.png

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

task7_ls_sources_list_d.png

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

task7_cat_ubuntu_sources.png

```
maham123@maham123:~$  
maham123@maham123:~$ cat /etc/apt/sources.list.d/ubuntu.sources  
  
Types: deb  
URIs: http://archive.ubuntu.com/ubuntu/  
Suites: noble noble-updates noble-backports  
Components: main restricted universe multiverse  
Signed-By: /usr/share/keyrings/ubuntu-archive-keyring.gpg  
  
Types: deb  
URIs: http://security.ubuntu.com/ubuntu/  
Suites: noble-security  
Components: main restricted universe multiverse  
Signed-By: /usr/share/keyrings/ubuntu-archive-keyring.gpg  
maham123@maham123:~$  
maham123@maham123:~$ _
```

task7_edit_ubuntu_sources.png

```
GNU nano 7.2 /etc/apt/sources  
Types: deb URIs: http://archive.ubuntu.com/ubuntu/ Suites: noble noble-updates  
Signed-By: /usr/share/keyrings/ubuntu-archive-keyring.gpg  
Types: deb  
  
URIs: http://dl.google.com/linux/chrome/deb/  
  
Suites: stable  
  
Components: main  
  
Architectures: amd64  
  
Signed-By: /etc/apt/keyrings/google.gpg  
  
Types: deb  
URIs: http://security.ubuntu.com/ubuntu/  
Suites: noble-security  
Components: main restricted universe multiverse  
Signed-By: /usr/share/keyrings/ubuntu-archive-keyring.gpg
```

task7_add_key.png

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

task7_apt_update.png

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

task7_install_chrome.png

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

task7_alternate_remove.png

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

task7_alternate_edit.png

```
GNU nano 7.2 /etc/apt/sources.list.d/ubuntu.sources
Types: deb URIs: http://archive.ubuntu.com/ubuntu/ Suites: noble noble-updates noble-backports Components: m
Signed-By: /usr/share/keyrings/ubuntu-archive-keyring.gpg
Types: deb
URIs: http://security.ubuntu.com/ubuntu/
Suites: noble-security
Components: main restricted universe multiverse
Signed-By: /usr/share/keyrings/ubuntu-archive-keyring.gpg
```

task7_remove_key.png

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

task7_create_google_chrome_list.png

```
maham123@maham123:~$ sudo rm -f /etc/apt/keyrings/google.gpg
maham123@maham123:~$ echo "deb [arch=amd64 signed-by=/etc/apt/keyrings/google.gpg] http://dl.google.com/linux/chrome/deb stable InRelease" > /etc/apt/sources.list.d/google-chrome.list
maham123@maham123:~$
maham123@maham123:~$ _
```

task7_list_sources_after_create.png

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

task7_add_key_alt.png

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

task7_apt_update_alt.png

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


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

task8_add_ppa_audacity.png

```
maham123@maham123:~$ sudo add-apt-repository ppa:ubuntuhandbook1/audacity -y

Repository: 'Types: deb
URIs: https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu/
Suites: noble
Components: main
'

Description:
Unofficial build of Audacity audio editor

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

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

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

task8_apt_update_audacity.png

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

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

task8_install_audacity.png

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

The following packages have unmet dependencies:
 audacity : Depends: libflac++10 (>= 1.3.1) but it is not installable
            Depends: libportsmf0t64 (>= 0.1~svn20101010) but it is not installable
            Depends: libbsms10 (>= 2.3.0) but it is not going to be installed
            Depends: libwxbase3.2-1t64 (>= 3.2.4+dfsg) but it is not installable
            Depends: libwxgtk3.2-1t64 (>= 3.2.4+dfsg) but it is not installable
```


task8_audacity_version.png

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

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

task8_add_ppa_obs.png

```
maham123@maham123:~$ sudo add-apt-repository ppa:obsproject/obs-studio -y

Repository: 'Types: deb
URIs: https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu/
Suites: noble
Components: main
'

Description:
Latest stable release of OBS Studio
More info: https://launchpad.net/~obsproject/+archive/ubuntu/obs-studio
Adding repository.
Hit:1 http://archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://security.ubuntu.com/ubuntu jammy-security InRelease
Hit:4 https://dl.google.com/linux/chrome/deb stable InRelease
Hit:5 http://security.ubuntu.com/ubuntu noble-security InRelease
Get:6 https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu noble InRelease [17.8 kB]
Hit:7 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble InRelease
Get:8 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu jammy InRelease [18.3 kB]
Get:9 https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu noble/main amd64 Packages [1,172 B]
Get:10 https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu noble/main Translation-en [160 B]
Err:8 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu jammy InRelease
  The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 5738
Reading package lists... Done
W: GPG error: https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu jammy InRelease: The fol
  key is not available: NO_PUBKEY 5738AE8480447DDF NO_PUBKEY 4C1CBE14852541CB
E: The repository 'https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu jammy InRelease' is
N: Updating from such a repository can't be done securely, and is therefore disabled by default.
N: See apt-secure(8) manpage for repository creation and user configuration details.
maham123@maham123:~$
```

task8_apt_update_obs.png

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

task8_install_obs.png

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

The following packages have unmet dependencies:
 obs-studio : Depends: libavdevice60 (>= 7:6.0) but it is not installable
               Depends: libavformat60 (>= 7:6.0) but it is not installable
               Depends: libmbdcrypto7t64 (>= 2.28.0) but it is not installable
               Depends: libmbd1s14t64 (>= 2.28.0) but it is not installable
               Depends: libmbd509-1t64 (>= 2.28.0) but it is not installable
               Depends: libqt6core6t64 (>= 6.4.0) but it is not installable
               Depends: libqt6dbus6t64 (>= 6.3.0) but it is not installable
               Depends: libqt6gui6t64 (>= 6.4.0) but it is not installable
               Depends: libqt6network6t64 (>= 6.1.2) but it is not installable
               Depends: libqt6widgets6t64 (>= 6.3.0) but it is not installable
               Depends: libqt6xml6t64 (>= 6.1.2) but it is not installable
               Depends: librist4 (>= 0.2.6+dfsg) but it is not installable
               Depends: libsrt1.5-openssl (>= 1.5.3) but it is not installable
               Depends: libswscale7 (>= 7:6.0) but it is not installable
               Depends: qt6-qpa-plugins but it is not going to be installed
E: Unable to correct problems, you have held broken packages.
maham123@maham123:~$
```

task8_obs_version.png

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

Task 9 - Create a Kubernetes sample YAML using vim

task9_vim_check.png

```

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

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

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

task9_mkdir_cd.png

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

task9_vim_edit.png

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

task9_k8s_saved.png

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

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

task10_verify_annotation.png

```
"k8s-sample.yaml" 28L, 350B written
maham123@maham123:~/Lab5$ cat k8s-sample.yaml

apiVersion: v1

kind: Pod

metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
```

```
spec:
  containers:
    - name: nginx
      image: nginx:1.19
      ports:
        - containerPort: 80
      restartPolicy: Always
```

task10_verify_entering_temp_data.png

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

task10_verify_no_temp_comment.png

```
maham123@maham123:~/Lab5$ cat k8s-sample.yaml
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
spec:
  containers:
    - name: nginx
      image: nginx:1.19
      ports:
        - containerPort: 80
      restartPolicy: Always
```

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

task11_dd_delete_and_undo.png

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


task11_delete3_and_undo.png

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

task11_line1.png

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

task11_navigation.png

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

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

task12_search_nginx.png

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

task12_n_and_N_navigation.png

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

task12_added_occurrences.png

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

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

task12_cycle_matches.png

```
    annotations:
      lab: lesson11

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

```
/nginx
```

task12_substitute_result.png

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

task12_undo_and_quit.png

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