



Universiteit Antwerpen  
| Faculteit Toegepaste  
Ingenieurswetenschappen

# Lab of 3-Network Architecture

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**2024-2025**

# Scheduled labs for PR01

Session	Date	Subject	Evaluation	Deadline (23:59)
1	01/10/2024	Introduction to the Linux Operating System: Using the shell & exploring the filesystem	Report	07/10/2024
2	08/10/2024	Working with text files and managing running processes	Report	14/10/2024
3	15/10/2024	Writing shell scripts	Report	22/10/2024
4	23/10/2024	Learning system administration, getting & managing software	Report	28/10/2024
5	29/10/2024	Wireshark introduction	Report	05/11/2024
6	06/11/2024	Protocols in action: TCP and UDP	Report	11/11/2024
7	12/11/2024	Ethernet and ARP	Report	19/11/2024
8	20/11/2024	Setting up a DHCP server	Report	25/11/2024
9	26/11/2024	Setting up a DNS server	Report	03/12/2024
10	04/12/2024	Network Address Translation	Report	09/12/2024
11	10/12/2024	Remote Access & Firewalls (1)		N/A
12	18/12/2024	Remote Access & Firewalls (2)	Blackboard test	

# Scheduled labs for PR02

Session	Date	Subject	Evaluation	Deadline (23:59)
1	02/10/2024	Introduction to the Linux Operating System: Using the shell & exploring the filesystem	Report	08/10/2024
2	09/10/2024	Working with text files and managing running processes	Report	15/10/2024
3	16/10/2024	Writing shell scripts	Report	22/10/2024
4	23/10/2024	Learning system administration, getting & managing software	Report	29/10/2024
5	30/10/2024	Wireshark introduction	Report	05/11/2024
6	06/11/2024	Protocols in action: TCP and UDP	Report	12/11/2024
7	13/11/2024	Ethernet and ARP	Report	19/11/2024
8	20/11/2024	Setting up a DHCP server	Report	26/11/2024
9	27/11/2024	Setting up a DNS server	Report	03/12/2024
10	04/12/2024	Network Address Translation	Report	10/12/2024
11	11/12/2024	Remote Access & Firewalls (1)		N/A
12	18/12/2024	Remote Access & Firewalls (2)	Blackboard test	

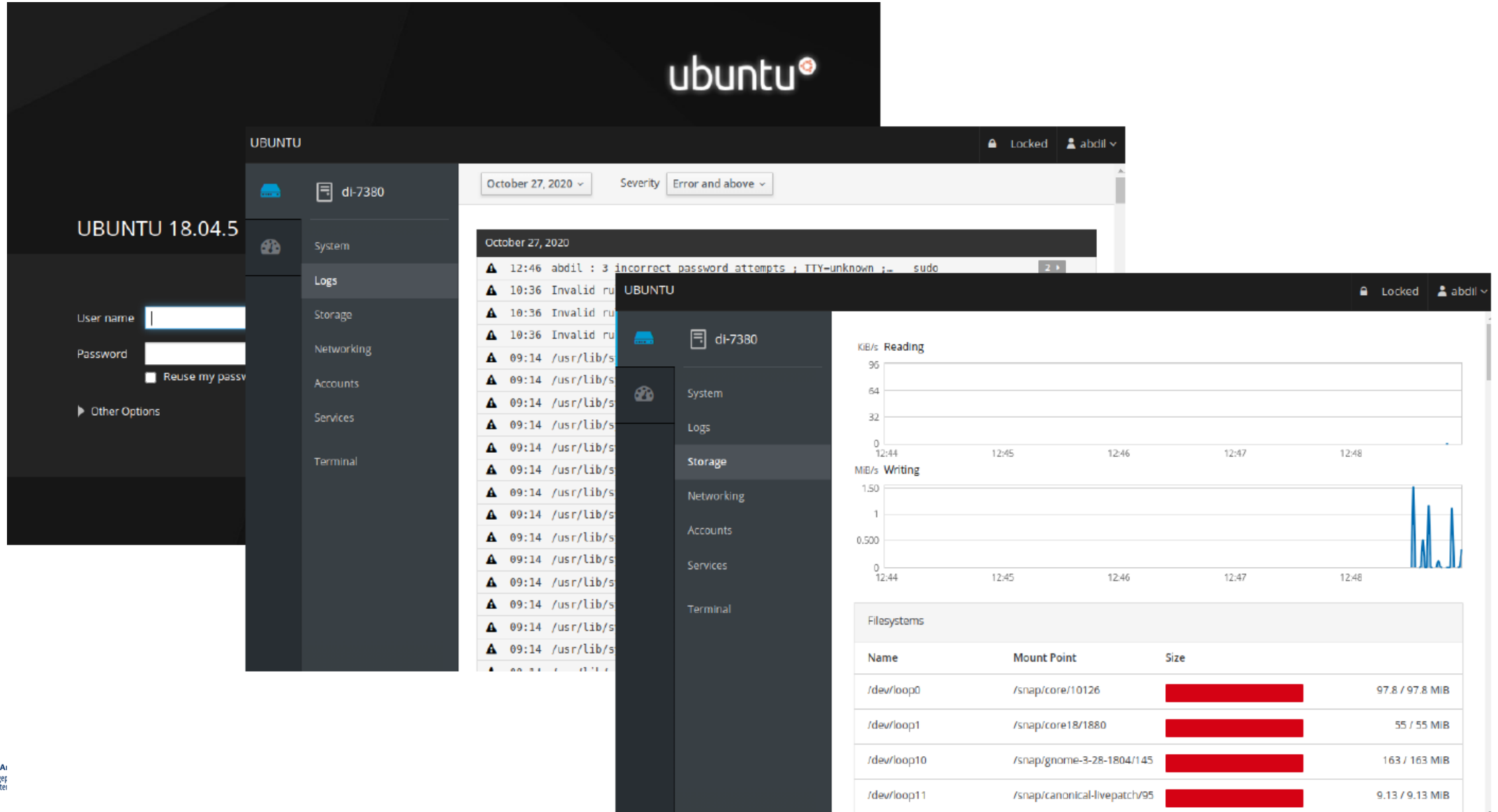
# Session 4

**Learning system administration, getting & managing software**

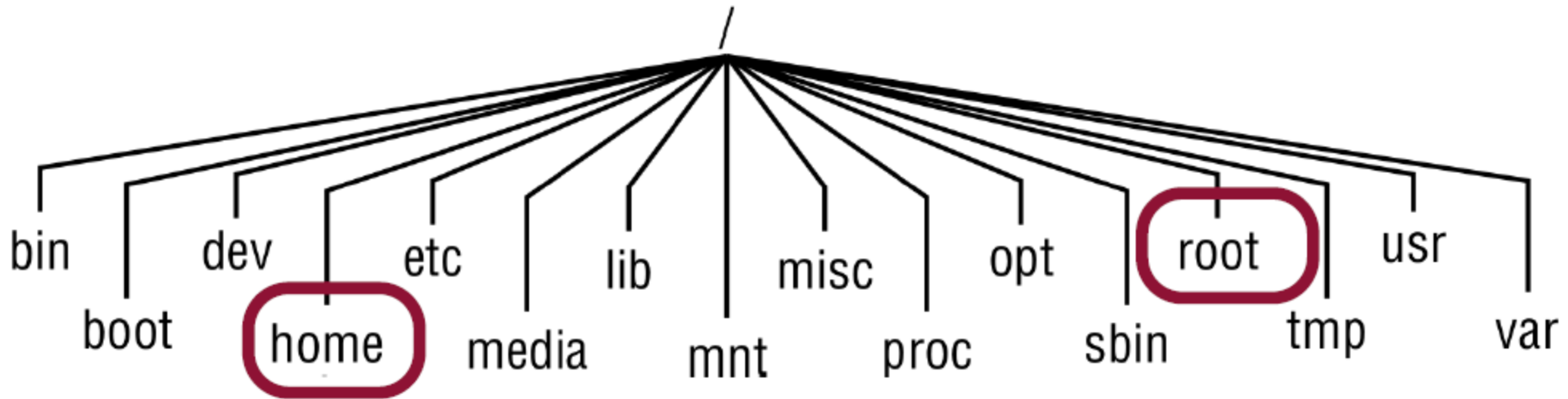
# Overview: system administration

1. Browser-based graphical admin tool
2. Using the root account
3. Configuration files
4. Admin commands
5. Log files
6. Checking and configuring hardware

# 1. Cockpit



## 2. Root account



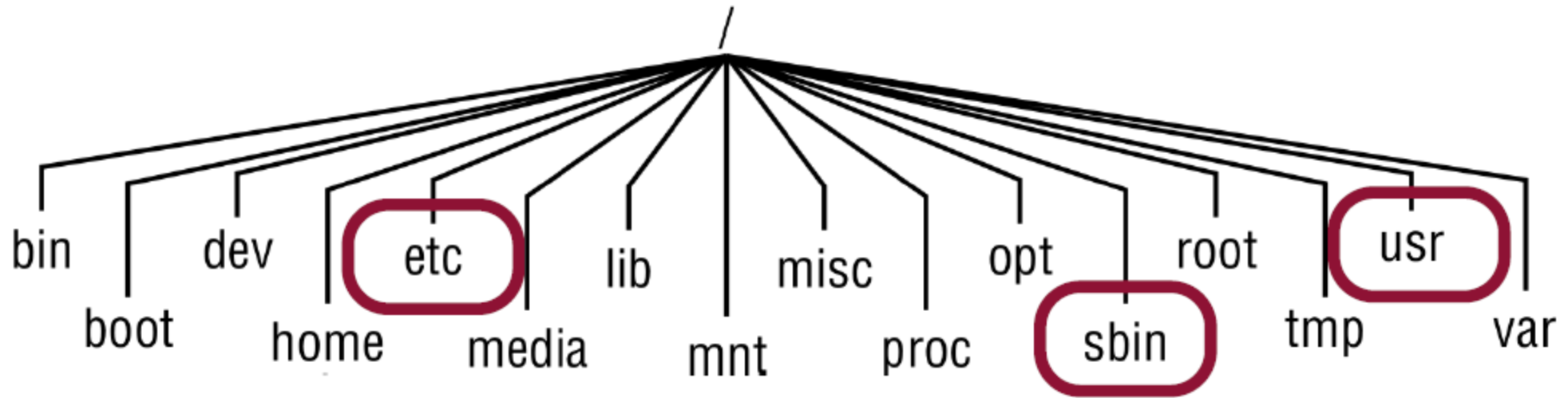
**su** command: switch user. Tries to switch to root by default.

**su** <user> will log in as <user>, but maintain your current working directory.

**su -** <user> will log in the home directory of <user>.

**sudo** command: perform commands as if you were the root user.

### 3. Configuration files and admin commands



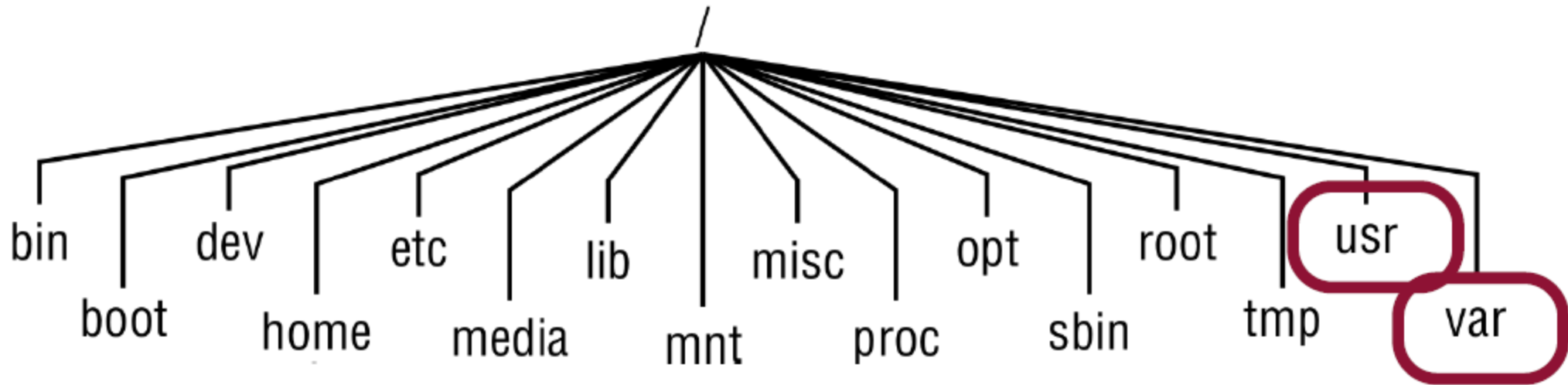
System-wide configurations are mainly stored in **/etc/**

User-specific config files can be found in the home folder (~) under files and folders starting with a dot (.).

Administrative commands are stored under **/usr/sbin/** and **/sbin/** One such example is **visudo**



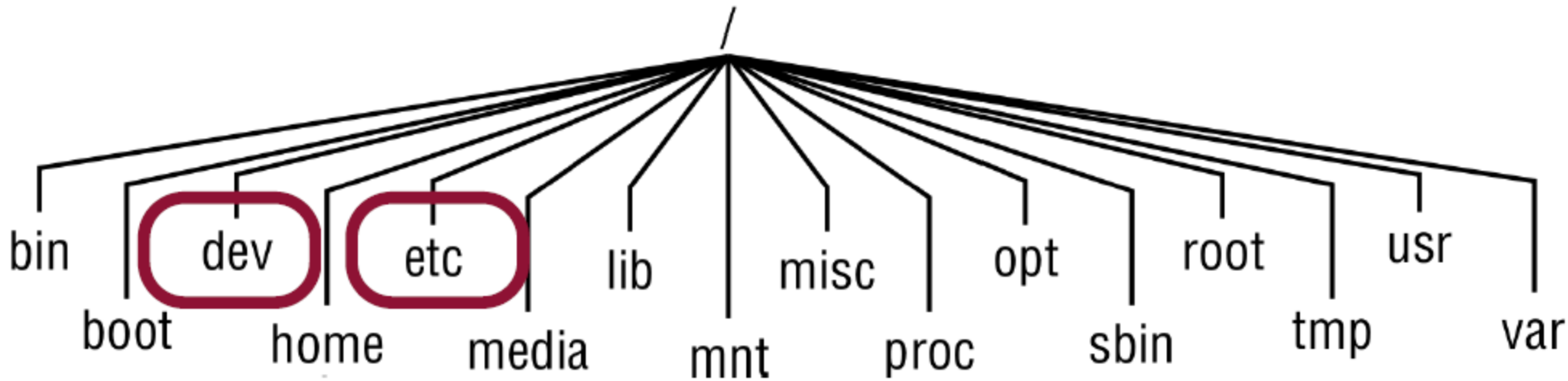
## 4. Log files



**journalctl** may be used to query the contents of the **systemd(1)** journal as written by **systemd-journald.service(8)**.

If called without parameters, it will show the full contents of the journal, starting with the oldest entry collected.

## 5. Checking and configuring hardware



An example: Refer to your USB device by the same path, irrespective of the serial port it was assigned to.

```
12:56 $ cat /etc/udev/rules.d/10-loc.rules | grep b570091376
ACTION=="add", ATTRS{serial}=="b570091376", SYMLINK+="subcon868"
```

```
12:59 $ find_serial_id | grep b570091376
/dev/ttyACM0 - Silicon_Laboratories_Inc._EZR32_USB_CDC_serial_port_device_b570091376 - SERIAL ID (short): b570091376
```

```
12:54 $ ll /dev/subcon868
lrwxrwxrwx 1 root root 7 Oct 27 12:42 /dev/subcon868 -> ttyACM0
```



# Overview: getting and managing software

1. Installing software from the desktop
2. Working with DEB packaging
3. Using APT to manage packages

# 1. Installing software from the desktop



## 2. Working with DEB packaging

- DEB refers to the **Debian Package format** (files ending in **.deb**).
- The **.deb file** contains the actual program or software, along with metadata such as dependencies, and version information.
- **dpkg** is the low-level tool responsible for working with .deb packages.
  - Does not handle dependencies!

# 3. Using APT to install packages

The **APT (Advanced Package Tool)** aims to solve the challenge of managing dependencies.

- No more software installations whilst having to consider every dependency by yourself.
- Remote repositories are queried for dependencies and the main software you are trying to install.
- Steps to upgrade packages:
  - Update package repositories: `apt-get update`
  - Upgrade package(s): `apt-get upgrade`
- Steps to install packages:
  - Update package repositories: `apt-get update`
  - Install package: `apt-get install <PACKAGE>`

# Exercises

# Exercises

*Make sure to provide all the configuration file changes you made.*

1. Find all files under the **/var/spool** directory that are owned by users other than root and display a long listing of them.
2. Become the root user using the **su** - command. To prove that you have root privilege, create an empty or plain-text file named **/mnt/test.txt**. Exit the shell when you are finished.
3. Create a regular user **user1**.
4. Log in as the regular user and become root using **su -**. Edit the **/etc/sudoers** file to allow your regular user account to have full root privilege via the sudo command.
5. As **user1**, use the sudo command to create a file called **/mnt/test2.txt**. Verify that the file is there and owned by the root user.
6. Install the following packages: `qemu-system libvirt-daemon-system virt-manager`



