

**NATIONAL UNIVERSITY OF COMPUTER AND  
EMERGING SCIENCES**

**PROGRAM: SOFTWARE ENGINEERING**



***OPERATING SYSTEMS LAB***

**LAB TASK- 02**

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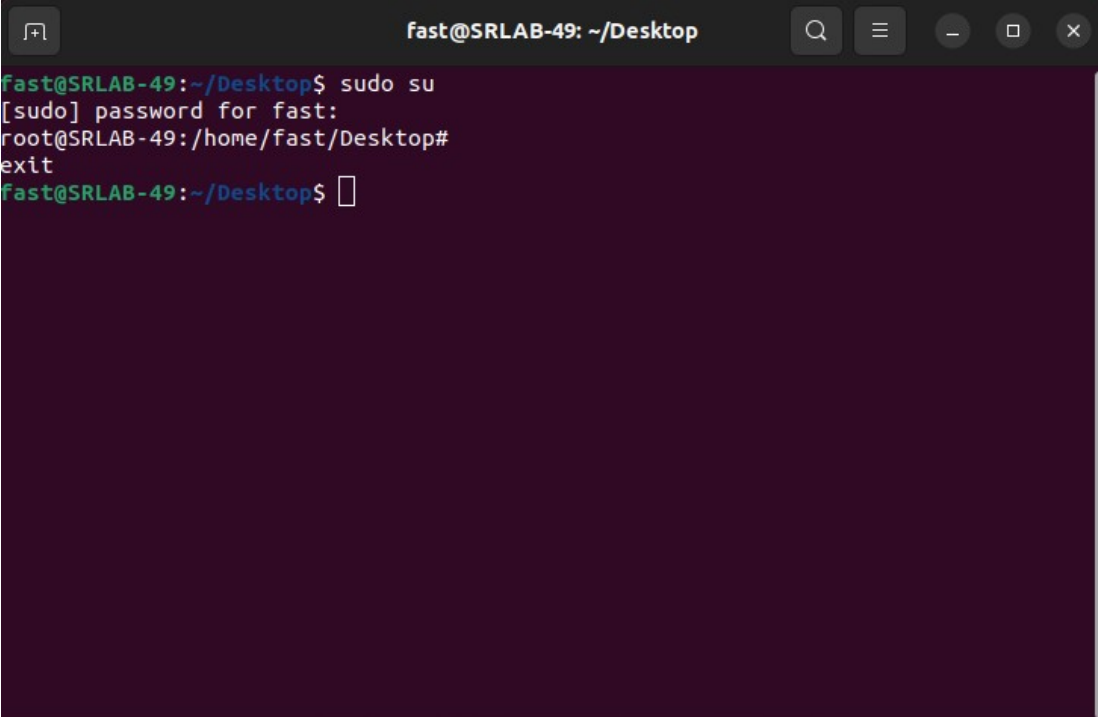
**A DEPARTMENT OF COMPUTER SCIENCE**

## 1. What is Sudo:

**`sudo`** stands for "**superuser do.**"

*It's a command used in Linux operating systems to allow a permitted user to execute a command with the security privileges of another user, usually the superuser (root).*

→ *Essentially, it lets you perform tasks that require higher permissions, like installing software or **modifying system files**.*

A terminal window titled 'fast@SRLAB-49: ~/Desktop' with standard window controls. The terminal shows the following sequence of commands and output:

```
fast@SRLAB-49:~/Desktop$ sudo su
[sudo] password for fast:
root@SRLAB-49:/home/fast/Desktop#
exit
fast@SRLAB-49:~/Desktop$
```

You can see after typing command **sudo su**, your pc asked password, after entering password you are now working as root user.

→ You can also go to root-user by **sudo -i** and ***for leaving root user simply type exit or press CTRL+D***

## 2. What is ls command:

The **`ls` command** is used in Linux operating systems **to list the files and directories in a directory.**

→ **It's a way to see what's inside a folder.**

```
fast@SRLAB-49: ~/Desktop
fast@SRLAB-49:~/Desktop$ ls
'22p-9318_Ahmed_BS(SE)-5B_LAB_TASK_02.odt'  hello.c  'New Folder'
a.out                                         iso_mount  QPTask
fast@SRLAB-49:~/Desktop$
```

## What is ls command:

You can see by entering “ls” command *all the folders and files inside Desktop directory appears*

You can Type the command **“ls --help”** and a list of commands that can be used along **“ls command”**.

```
fast@SRLAB-49:~/Desktop$ ls
'22p-9318_Ahmed_BS(SE)-5B_LAB_TASK_02.odt'  hello.c  'New Folder'
a.out                                         iso_mount  QPTask
fast@SRLAB-49:~/Desktop$ ls --help
Usage: ls [OPTION]... [FILE]...
List information about the FILES (the current directory by default).
Sort entries alphabetically if none of -cftuvSUX nor --sort is specified.

Mandatory arguments to long options are mandatory for short options too.
  -a, --all                        do not ignore entries starting with .
  -A, --almost-all               do not list implied . and ..
  --author                       with -l, print the author of each file
  -b, --escape                   print C-style escapes for nongraphic characters
  --block-size=SIZE              with -l, scale sizes by SIZE when printing them;
                                e.g., '--block-size=M'; see SIZE format below
  -B, --ignore-backups           do not list implied entries ending with ~
  -C                             with -lt: sort by, and show, ctime (time of last
                                modification of file status information);
                                with -l: show ctime and sort by name;
                                otherwise: sort by ctime, newest first
  -C                             list entries by columns
  --color[=WHEN]                colorize the output; WHEN can be 'always' (default
                                if omitted), 'auto', or 'never'; more info below
  -d, --directory               list directories themselves, not their contents
  -D, --dired                   generate output designed for Emacs' dired mode
  -f                             do not sort, enable -aU, disable -ls --color
  -F, --classify                append indicator (one of */=>@|) to entries
  --file-type                   likewise, except do not append '*'
  --format=WORD                 across -x, commas -m, horizontal -x, long -l,
                                single-column -1, verbose -l, vertical -C
  --full-time                   like -l --time-style=full-iso
  -g                             like -l, but do not list owner
  --group-directories-first     group directories before files;
                                can be augmented with a --sort option, but any
                                use of --sort=none (-U) disables grouping
  -G, --no-group                in a long listing, don't print group names
  -h, --human-readable          with -l and -s, print sizes like 1K 234M 2G etc.
  --si                          likewise, but use powers of 1000 not 1024
  -H, --dereference-command-line follow symbolic links listed on the command line
  --dereference-command-line-symlink-to-dir follow each command line symbolic link
                                that points to a directory
  --hide=PATTERN                do not list implied entries matching shell PATTERN
                                (overridden by -a or -A)
  --hyperlink[=WHEN]           hyperlink file names; WHEN can be 'always'
                                (default if omitted), 'auto', or 'never'
  --indicator-style=WORD       append indicator with style WORD to entry names:
                                none (default), slash (-p),
                                file-type (--file-type), classify (-F)
  -i, --inode                   print the index number of each file
  -I, --ignore=PATTERN          do not list implied entries matching shell PATTERN
  -k, --kibibytes               default to 1024-byte blocks for disk usage;
                                used only with -s and per directory totals
  -l                             use a long listing format
```

We will see some of these commands uses

1) Like typing **“ls -l”** will list one file per line. Avoid usage of '\n'.

```
fast@SRLAB-49:~/Desktop$ ls -l
'22p-9318_Ahmed_BS(SE)-5B_LAB_TASK_02.odt'
a.out
hello.c
iso_mount
'New Folder'
QPTask
```

2) Similarly entering command **“ls -a”** will show all the files and folders even the hidden files and folders will also be shown.

```
fast@SRLAB-49:~/Desktop$ ls -a
.
..
'22p-9318_Ahmed_BS(SE)-5B_LAB_TASK_02.odt'
a.out
hello.c
iso_mount
'..lock.22p-9318_Ahmed_BS(SE)-5B_LAB_TASK_02.odt#'
'New Folder'
QPTask
fast@SRLAB-49:~/Desktop$
```

3) If you enter the **“ls -l”** command in Ubuntu **It provides a detailed listing of files and directories in the current directory.**

→ **It shows additional information such as file permissions, number of links, owner, group, size, and the last modified date and time for each item.**

```
fast@SRLAB-49:~/Desktop$ ls -l
total 236
-rw-rw-r-- 1 fast fast 205752 22' 20:51 2 اگست '22p-9318_Ahmed_BS(SE)-5B_LAB_TASK_02.odt'
-rwxrwxr-x 1 fast fast 15960 15:50 21 اگست a.out
-rw-rw-r-- 1 fast fast 278 17:23 26 اگست hello.c
drwxrwxr-x 2 fast fast 4096 16:23 30 اپریل iso_mount
drwxrwxr-x 2 fast fast 4096 15:40 30 اپریل 'New Folder'
drwxrwxr-x 2 fast fast 4096 15:48 30 اپریل QPTask
fast@SRLAB-49:~/Desktop$
```

4) The ***"ls -d" command*** in Ubuntu ***lists directories themselves rather than their contents.***

→ For example, ***if you use ls -d \*/***, it will show the ***directories in the current location without listing their contents.***

→ ***This can be useful if you want to see the directory names without expanding into them.***

```
fast@SRLAB-49:~/Desktop$ ls -d
*
fast@SRLAB-49:~/Desktop$ ls -d */
iso_mount/  'New Folder/'  QPTask/
fast@SRLAB-49:~/Desktop$
```

You can see by entering only **ls -d** command it shows only relative directory while using **ls -d \*/** command will also show only the directories inside it.

5) The ***ls -n command*** in Linux operating systems ***lists directory contents with numeric user and group IDs instead of names.***

→ This is useful in scenarios where you might need to see the numeric values of ownership instead of resolving them to user or group names.

Here's a breakdown of the ls -n output:

- The command displays a list of files and directories.
- ***For each file or directory, it shows details such as permissions, number of links, numeric user ID (UID), numeric group ID (GID), file size, modification date, and file name.***

```

fast@SRLAB-49:~$ ls -l
total 44
drwxr-xr-x 5 1000 1000 4096 21:27 2 ستمبر Desktop
drwxr-xr-x 3 1000 1000 4096 10:17 30 اپریل Documents
drwxr-xr-x 2 1000 1000 4096 20:40 2 ستمبر Downloads
drwxrwxr-x 2 1000 1000 4096 16:29 30 اپریل iso-creation
drwxr-xr-x 2 1000 1000 4096 20:43 3 اپریل Music
drwxr-xr-x 3 1000 1000 4096 15:47 30 اپریل Pictures
drwxr-xr-x 2 1000 1000 4096 20:43 3 اپریل Public
drwx----- 8 1000 1000 4096 16:29 6 مئی snap
drwxr-xr-x 2 1000 1000 4096 20:43 3 اپریل Templates
drwxr-xr-x 2 1000 1000 4096 20:43 3 اپریل Videos
drwxrwxr-x 5 1000 1000 4096 15:55 30 اپریل 'VirtualBox VMs'
fast@SRLAB-49:~$

```

In this output:

- 1000 is the numeric UID of the file owner.
- 1000 is the numeric GID of the group.

This can be useful for scripting or when managing systems where user and group names might not be readily available or when working with systems where user and group names have not been properly set up.

### 3. What is cd command:

The **cd command** in Linux operating systems stands for "change directory" and is used to navigate between directories in the filesystem.

#### cd Command

- **Usage:** cd [directory]
- **Function:** Changes the current working directory to the specified [directory].
- **Example:** cd Documents changes the current directory to Documents, assuming it's a subdirectory of the current directory.



**cd ..**

- **Usage:** cd ..
- **Function:** Moves up one level in the directory hierarchy.
- **Example:** If you are in /home/user/Documents and run cd .., you will move up to /home/user.

**cd /**

- **Usage:** cd /
- **Function:** Changes the current directory to the root directory of the filesystem.
- **Example:** If you are in /home/user/Documents and run cd /, you will move to the root directory (/).

```
fast@SRLAB-49:~$ ls
Desktop  Documents  Downloads  iso-creation  Music  Pictures  Public  snap  Templates  Videos  'VirtualBox VMs'
fast@SRLAB-49:~$ cd /
fast@SRLAB-49:/$ ls
bin  boot  cdrom  dev  etc  home  lib  lib32  lib64  libx32  lost+found  media  mnt  opt  proc  root  run  sbin  snap  srv  sys  tmp  usr  var
fast@SRLAB-49:/$ cd
fast@SRLAB-49:~$ ls
Desktop  Documents  Downloads  iso-creation  Music  Pictures  Public  snap  Templates  Videos  'VirtualBox VMs'
fast@SRLAB-49:~$ cd Desktop/
fast@SRLAB-49:~/Desktop$ ls
'22p-9318_Ahmed_BS(SE)-5B_LAB_TASK_02.odt'  a.out  hello.c  iso_mount  'New Folder'  QPTask
fast@SRLAB-49:~/Desktop$ cd ..
fast@SRLAB-49:~$ ls
Desktop  Documents  Downloads  iso-creation  Music  Pictures  Public  snap  Templates  Videos  'VirtualBox VMs'
fast@SRLAB-49:~$
```

-

## Summary of Uses

- cd [directory]: Navigate to a specific directory.
- cd ..: Move up one directory level.
- **cd /: Move to the root directory of the filesystem for coming back simply enter cd.**

#### 4. What is pwd command:

The ***pwd command stands for "print working directory"*** and is **used in Linux operating systems to display the current working directory.**

#### **Usage**

- **Command:** pwd
- **Function:** Outputs the absolute path of the directory you are currently in.

```
fast@SRLAB-49:~/Desktop$ pwd
/home/fast/Desktop
fast@SRLAB-49:~/Desktop$ mkdir test1
fast@SRLAB-49:~/Desktop$ ls
'22p-9318_Ahmed_BS(SE)-5B LAB_TASK_02.odt'  a.out  hello.c  iso_mount  'New Folder'  QPTask  test1
fast@SRLAB-49:~/Desktop$
```

#### **Example**

If you are in the directory `/home/fast/Desktop` and you run the command `pwd`, it will output: **`/home/fast/Desktop`**

#### **Uses of pwd**

**Confirm Current Directory:** Helps you verify your current location in the filesystem, which is useful for ensuring you are in the correct directory before executing further commands.

- 1) **Script Debugging:** In scripts, `pwd` can be used to record the current directory, especially when navigating directories programmatically. This can help in debugging or logging directory paths.



2)**Path Reference:** Useful when you need to reference or work with absolute paths, particularly when moving files, running programs, or setting environment variables.

3)**Navigation Aid:** Helps in visualizing your location in the filesystem, making it easier to understand the context of your work, especially when dealing with deep directory structures.

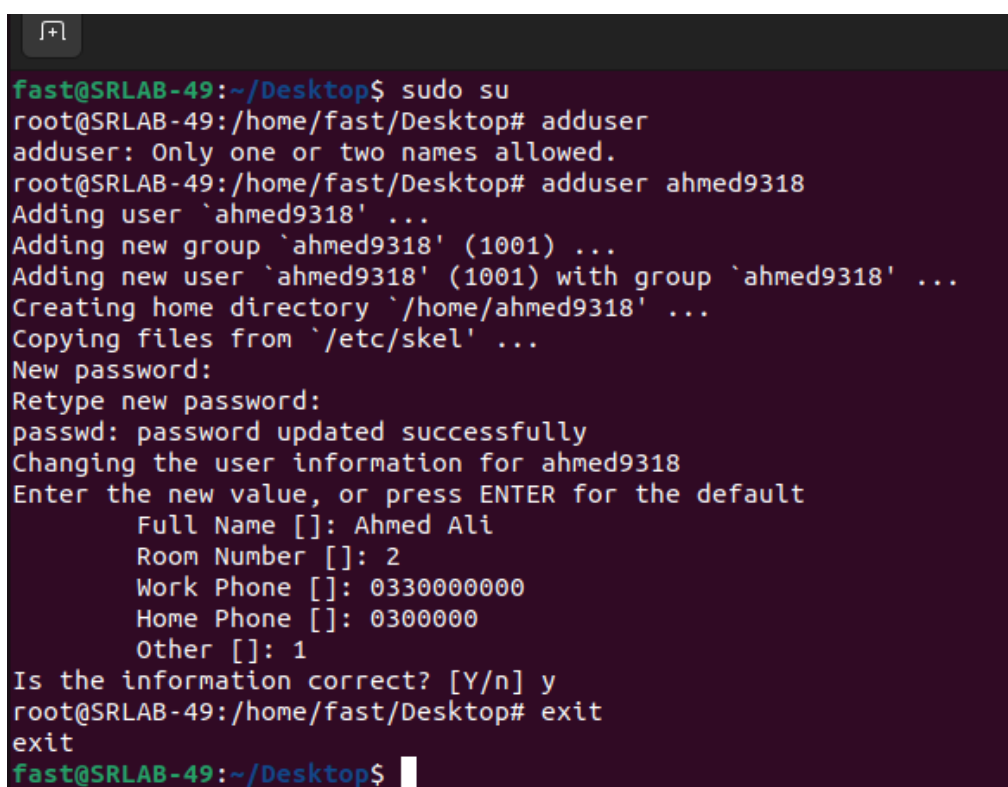
## 5. What is adduser command:

**adduser** : *Addition of new user.*

*The **`adduser`** command in Ubuntu is used to create a new user account on the system.*

*→ It sets up the user's home directory and initial configuration files, and can also prompt you to enter additional information like the user's full name.*

*→ For adding user you first need to go to root user type command **sudo su** or **sudo -i**.*



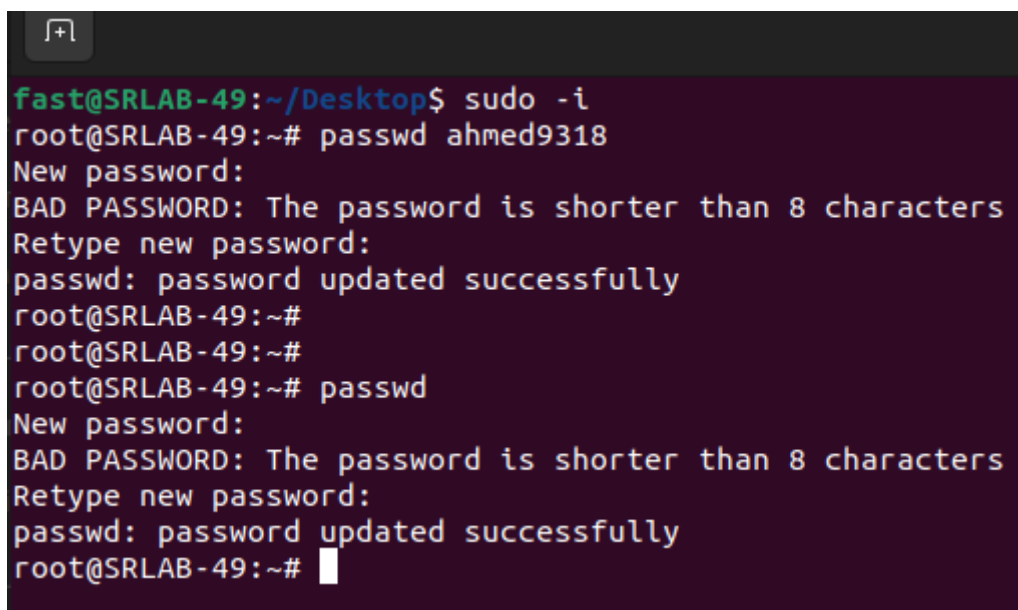
```
fast@SRLAB-49:~/Desktop$ sudo su
root@SRLAB-49:/home/fast/Desktop# adduser
adduser: Only one or two names allowed.
root@SRLAB-49:/home/fast/Desktop# adduser ahmed9318
Adding user `ahmed9318' ...
Adding new group `ahmed9318' (1001) ...
Adding new user `ahmed9318' (1001) with group `ahmed9318' ...
Creating home directory `/home/ahmed9318' ...
Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for ahmed9318
Enter the new value, or press ENTER for the default
  Full Name []: Ahmed Ali
    Room Number []: 2
    Work Phone []: 0330000000
    Home Phone []: 0300000
      Other []: 1
Is the information correct? [Y/n] y
root@SRLAB-49:/home/fast/Desktop# exit
exit
fast@SRLAB-49:~/Desktop$
```

*first go to root user by entering **command sudo su**  
enter the password  
then type command **adduser**  
again type **adduser[name of user]**  
Enter password for new user  
Confirm password for new user  
You will be asked some information  
fill it up and after filling you will be asked;  
Is the information correct enter y.*

## **6. What is passwd command:**

*The **`passwd`** command in Ubuntu is used to change a user's password.*

*→ It can be used to update your own password or, with appropriate permissions, to change the passwords of other users.*

A terminal window with a dark purple background. The prompt is 'fast@SRLAB-49:~/Desktop\$'. The user enters 'sudo -i', changing the prompt to 'root@SRLAB-49:~#'. Then 'passwd ahmed9318' is entered. The prompt changes to 'New password:'. The user enters 'ahmed9318', but the system responds with 'BAD PASSWORD: The password is shorter than 8 characters'. The user enters 'ahmed9318' again, and the system responds with 'passwd: password updated successfully'. The prompt returns to 'root@SRLAB-49:~#'. The user enters 'passwd' again. The prompt changes to 'New password:'. The user enters 'ahmed9318', but the system responds with 'BAD PASSWORD: The password is shorter than 8 characters'. The user enters 'ahmed9318' again, and the system responds with 'passwd: password updated successfully'. The prompt returns to 'root@SRLAB-49:~#'.

```
fast@SRLAB-49:~/Desktop$ sudo -i
root@SRLAB-49:~# passwd ahmed9318
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
passwd: password updated successfully
root@SRLAB-49:~#
root@SRLAB-49:~#
root@SRLAB-49:~# passwd
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
passwd: password updated successfully
root@SRLAB-49:~#
```

## **What is passwd command:**

*First You need to go to root user for that I used **sudo -i** command.*

→ *Then if You enter only **passwd** command it will ask you to enter the new password it means it is changing the password of current user.*

→ *For changing password of other user go to root user for that I used **sudo -i** command;*

*Type **passwd[name of other user]** and hit enter you will be asked to enter new password.*

## **7. What is ifconfig command:**

**ifconfig:** *Used to configure and display network interfaces on a system. It shows information about network interfaces like IP addresses and network statistics.*

```
fast@SRLAB-49:~/Desktop$ ifconfig
Command 'ifconfig' not found, but can be installed with:
sudo apt install net-tools
fast@SRLAB-49:~/Desktop$ sudo apt install net-tools
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libreoffice-ogltrans linux-image-6.2.0-26-generic linux-modules-6.2.0-26-generic linux-modules-extra-6.2.0-26-generic
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  net-tools
0 upgraded, 1 newly installed, 0 to remove and 152 not upgraded.
Need to get 204 kB of archives.
After this operation, 819 kB of additional disk space will be used.
Get:1 http://pk.archive.ubuntu.com/ubuntu jammy/main amd64 net-tools amd64 1.60+git20181103.0eebece-1ubuntu5 [204 kB]
Fetched 204 kB in 11s (19.2 kB/s)
Selecting previously unselected package net-tools.
(Reading database ... 252295 files and directories currently installed.)
Preparing to unpack .../net-tools_1.60+git20181103.0eebece-1ubuntu5_amd64.deb ...
Unpacking net-tools (1.60+git20181103.0eebece-1ubuntu5) ...
Setting up net-tools (1.60+git20181103.0eebece-1ubuntu5) ...
Processing triggers for man-db (2.10.2-1) ...
```

*If this command is not working type **sudo apt install net-tools** and try again*

```

fast@SRLAB-49:~/Desktop$ ifconfig
enp0s31f6: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 172.16.4.29 netmask 255.255.255.0 broadcast 172.16.4.255
    inet6 fe80::5977:c9d:d9df:e740 prefixlen 64 scopeid 0x20<link>
    ether 6c:3c:8c:59:ce:e3 txqueuelen 1000 (Ethernet)
    RX packets 89990 bytes 23502428 (23.5 MB)
    RX errors 0 dropped 24 overruns 0 frame 0
    TX packets 15288 bytes 2631476 (2.6 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 19 memory 0x74100000-74120000

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 6447 bytes 624035 (624.0 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 6447 bytes 624035 (624.0 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

wlp0s20f3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.220.119 netmask 255.255.255.0 broadcast 192.168.220.255
    inet6 fe80::e9d2:bc85:6c1d:f085 prefixlen 64 scopeid 0x20<link>
    ether 30:05:05:3a:78:89 txqueuelen 1000 (Ethernet)
    RX packets 4525 bytes 1567246 (1.5 MB)
    RX errors 0 dropped 175 overruns 0 frame 0
    TX packets 2579 bytes 473221 (473.2 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

fast@SRLAB-49:~/Desktop$

```

***iwconfig:*** Used to configure and display wireless network interfaces. It shows details about wireless network settings such as SSID, frequency, and signal strength.

***Just type iwconfig in terminal.***

***Sudo apt update:***

***The `sudo apt update` command in Ubuntu updates the local package index with the latest information from the software repositories.***

→ It helps ensure that you have the most current information about available packages and their versions before installing or upgrading software.

```
fast@SRLAB-49:~/Desktop$ sudo apt update
Get:1 http://security.ubuntu.com/ubuntu jammy-security InRelease [129 kB]
Hit:2 http://pk.archive.ubuntu.com/ubuntu jammy InRelease
Hit:3 http://pk.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:4 http://pk.archive.ubuntu.com/ubuntu jammy-backports InRelease
Fetched 129 kB in 20s (6,352 B/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
152 packages can be upgraded. Run 'apt list --upgradable' to see them.
fast@SRLAB-49:~/Desktop$ ifconfig
```

*While installing sudo apt install tree show you directories and files with in a directory in hierarichal structures*