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Aim:

- \* Install your choice of Linux distribution e.g. ubuntu
- \* Customize desktop environment by changing different default options like changing default background, themes, screensavers.
- + Screen Resolution
- \* Time settings.

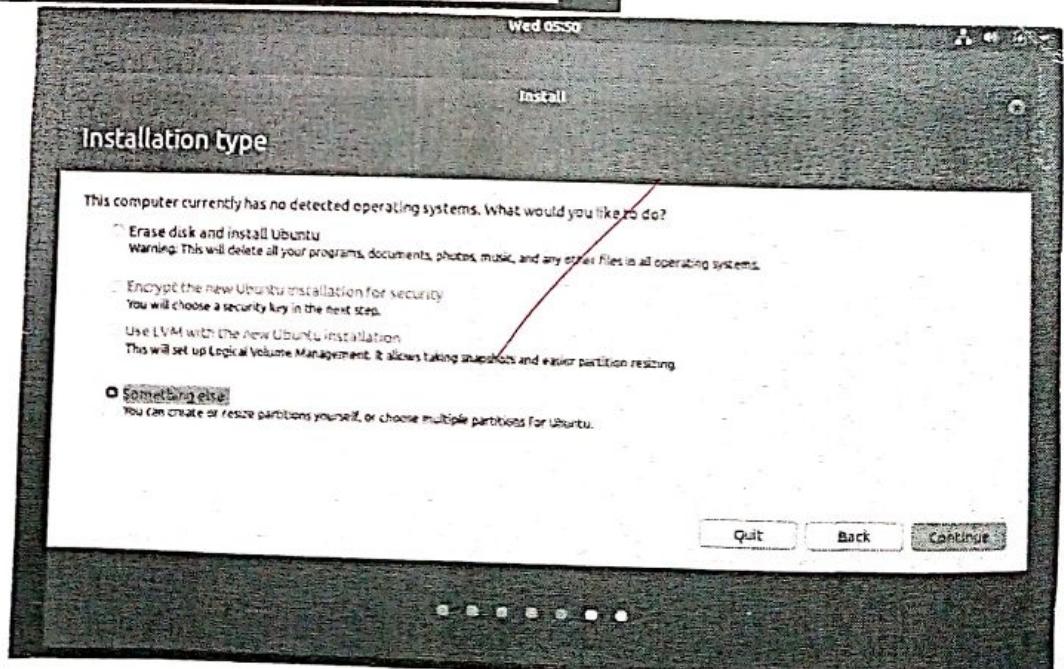
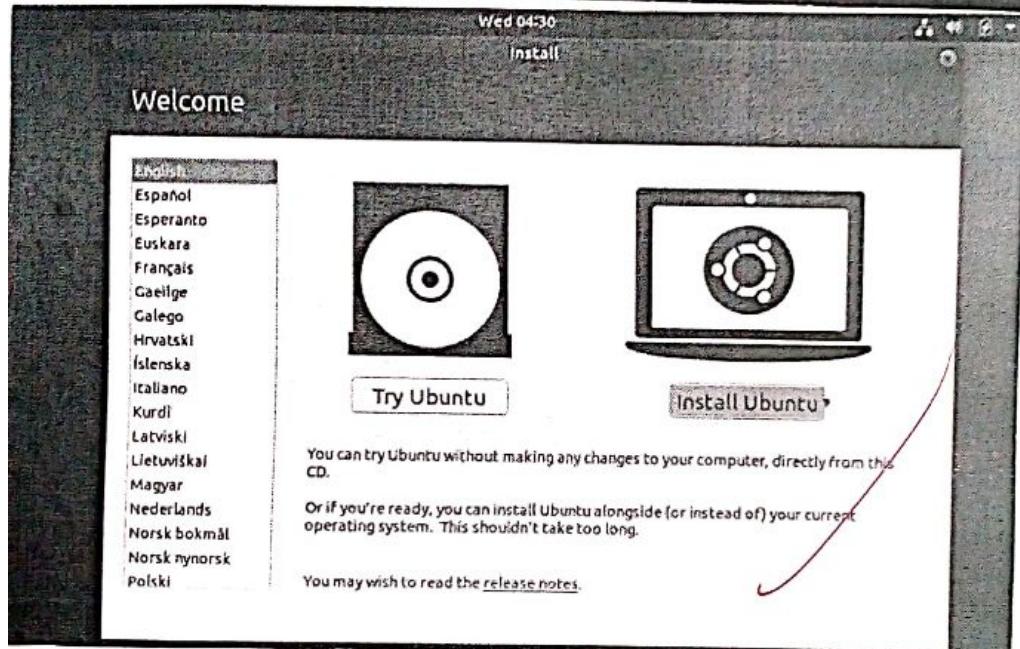
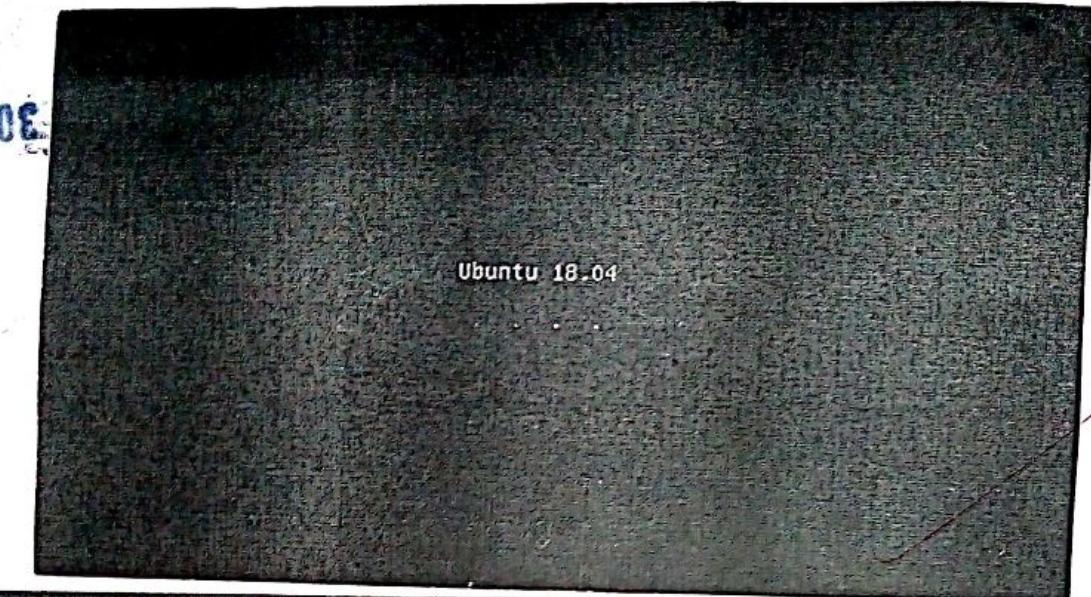
### a) Installation of Linux - Ubuntu.

Using a USB drive.

- Most newer computers can boot from USB. You should see a welcome screen prompting you to choose your language and giving you the option to install Ubuntu or try it from the USB.
- If your computer doesn't automatically do so, you might need to press the F12 Key to bring up the boot menu, but be careful not to hold it down that can cause an error message.

#### 1. Prepare to install Ubuntu.

- We recommend you plug your computer into a power source.
- You should also make sure you have enough space on your computer to install Ubuntu.
- We advise you to select Download updates while installing and install this third-party software now.
- You should also stay connected to the internet so you get the latest updates while you install Ubuntu.
- If you are not connected to the internet, you will be asked to select a wireless network, if available. We advise you to connect during installation so we ensure your machine up to date.



## 2. Allocate drive space.

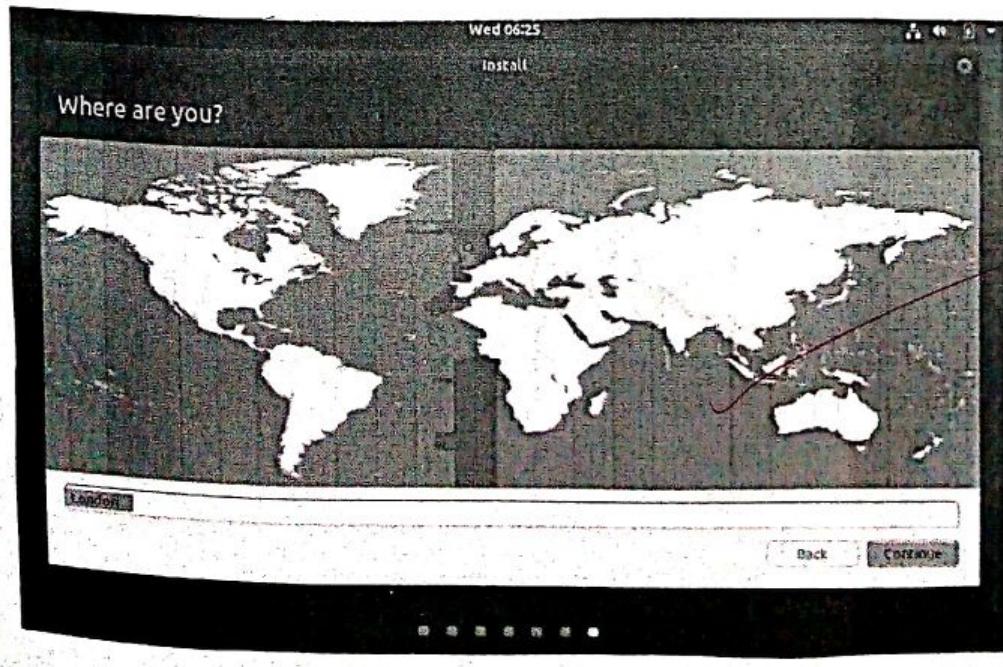
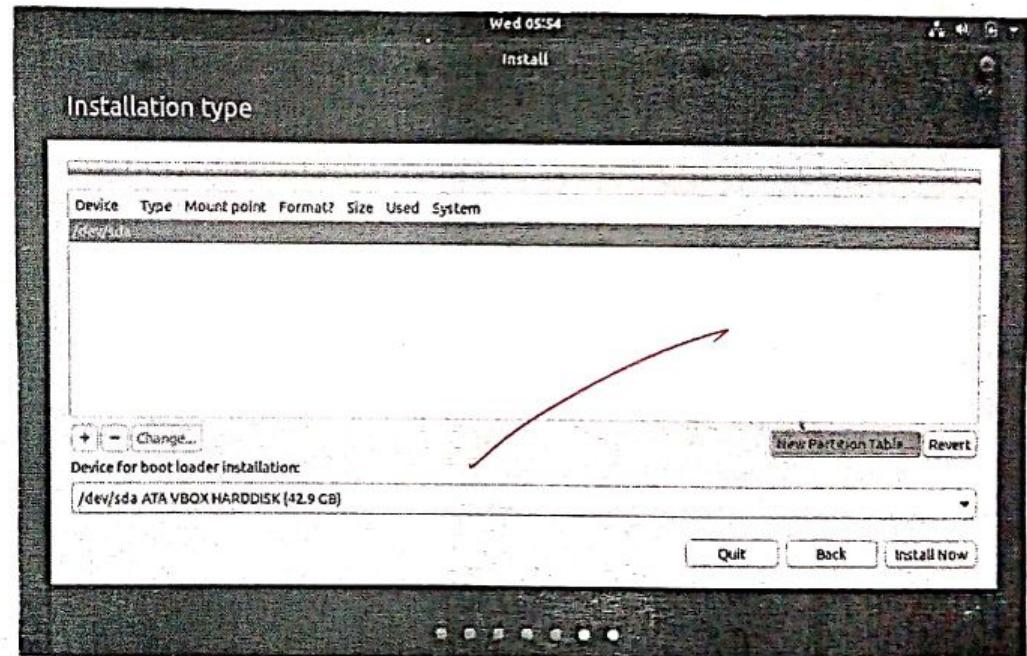
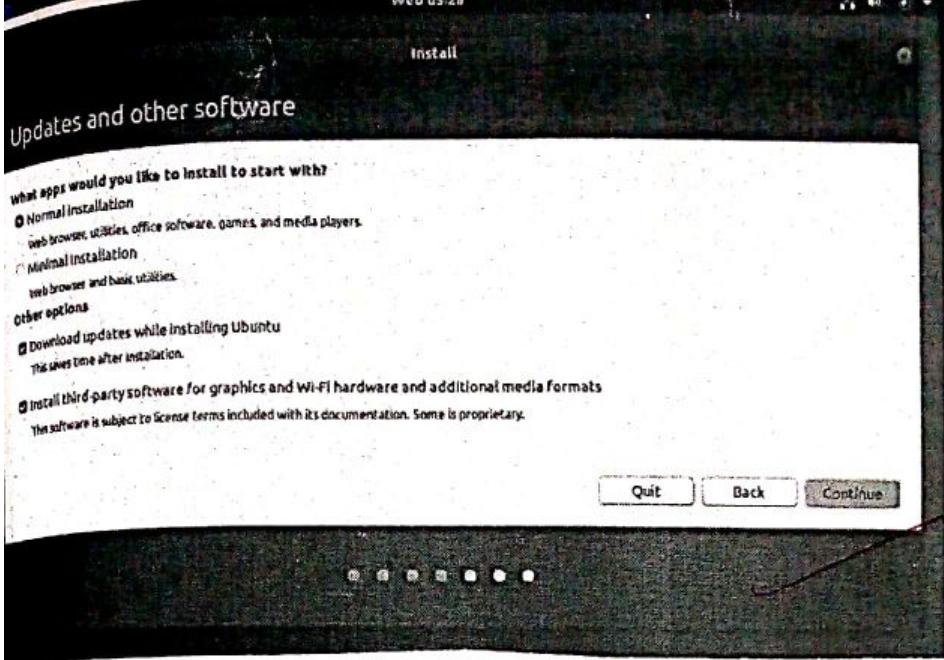
- Use the checkboxes to choose whether you had like to install Ubuntu alongside another operating system, delete your existing operating system and replace it with Ubuntu, or if you are an advanced user choose the 'something else' option

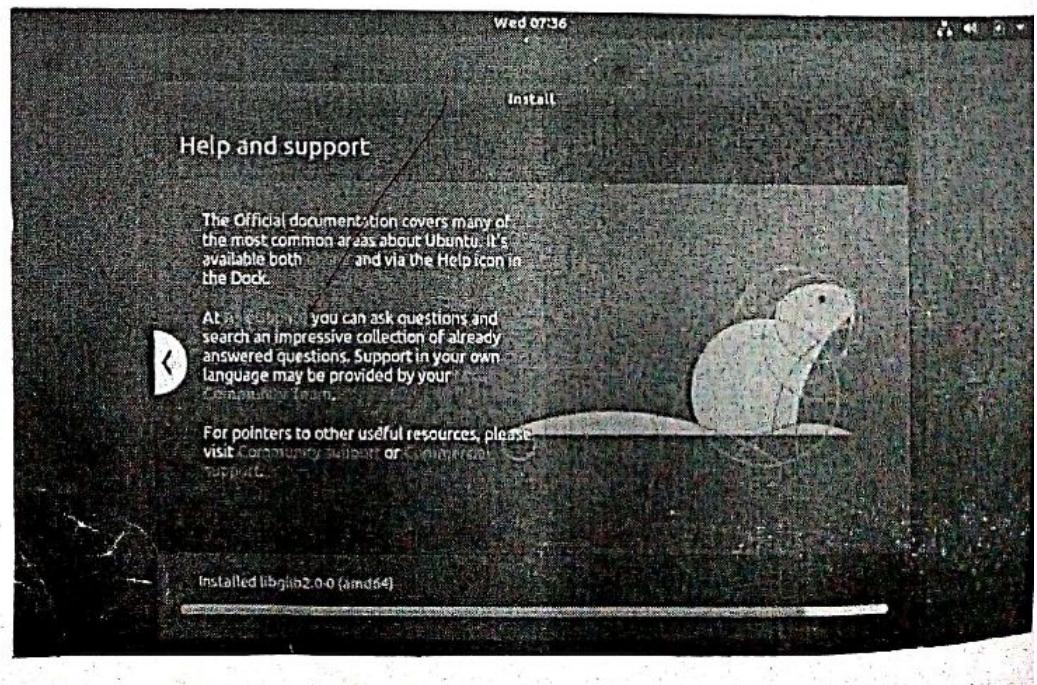
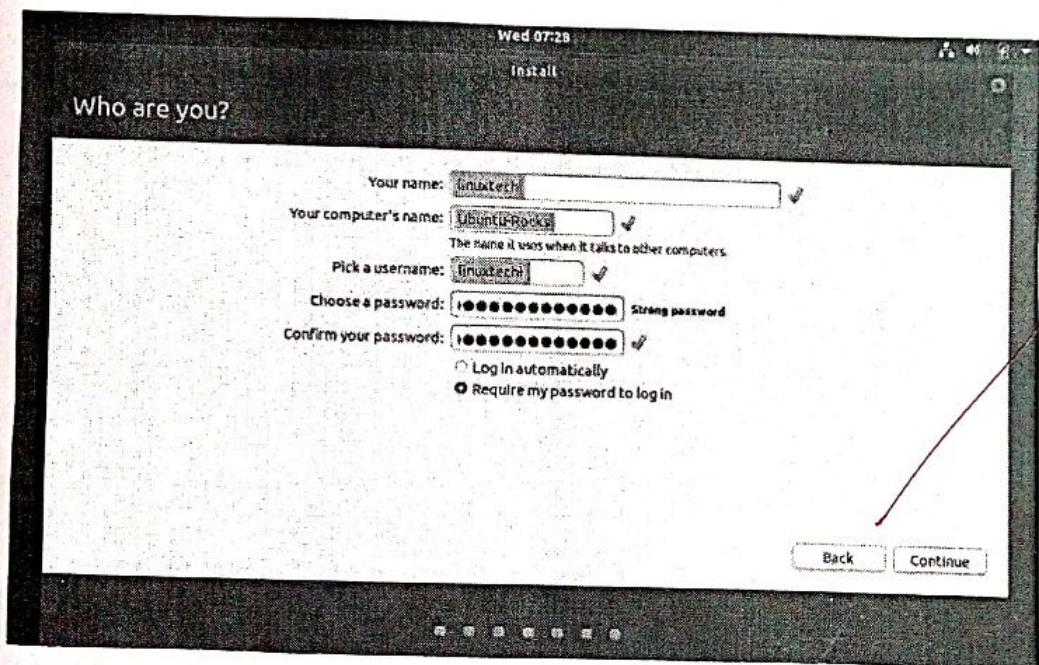
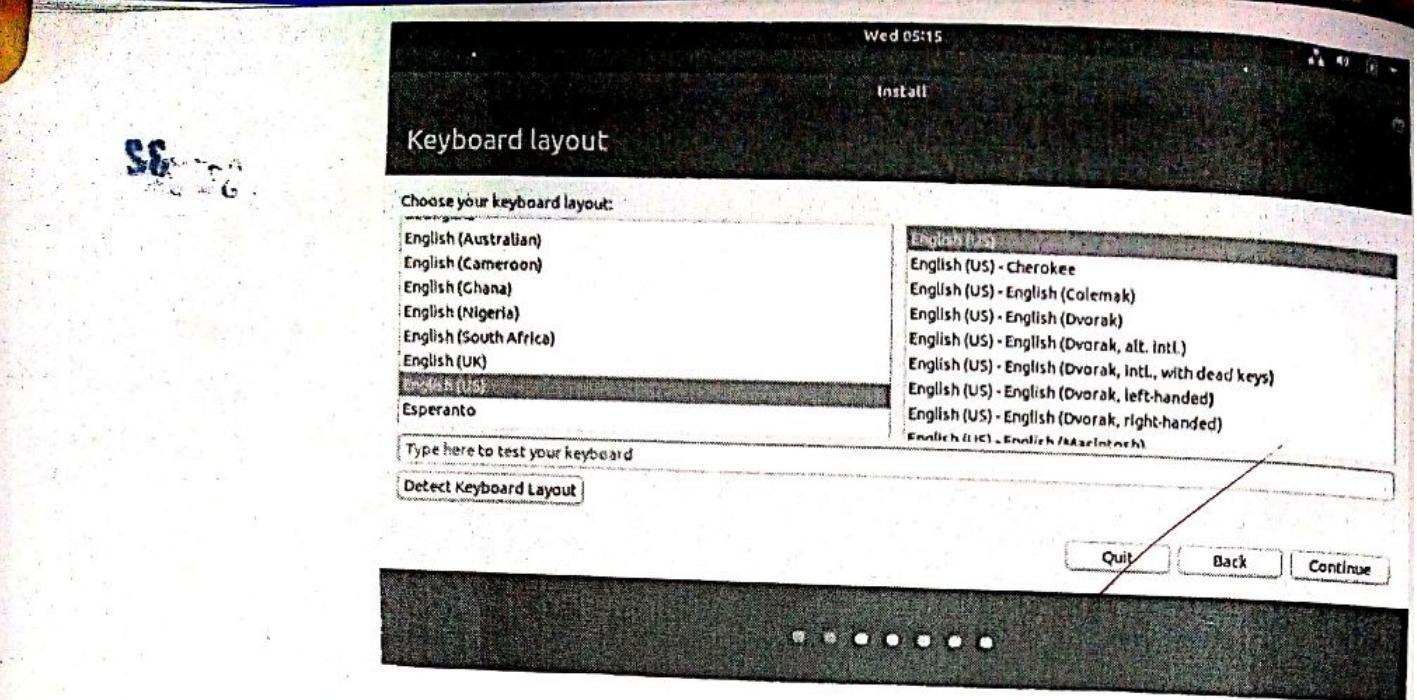
## 3. Begin the installation.

- Depending on your previous selections, you can now verify that you have chosen the way in which you would like to install Ubuntu.
- The installation process will begin when you click the Insta Now button.
- Ubuntu needs about 4.5 GB to install, so add a few extra GB to allow for your files.

## 4. Select your location.

- If you are connected to the internet, this should be done automatically. Check your location is correct and click 'forwarded' to proceed. If you are unsure of your time zone type the name of the town you are in or click on the map and we will help you find it.
- Tip: If you are having problems connecting to the internet use the menu in top-right hand corner to select a network.





## 5. Select your preferred Keyboard layout

Click on the language option you need. If you're not sure, click the 'Detect Keyboard Layout' button for help.

## 6. Enter your login and password details

## 7. Learn more about Ubuntu while the system installs...

## 8. That's it.

All that's left is to restart your computer and start enjoying Ubuntu!

### b) Customization of desktop.

#### Accessing Appearance settings.

- To access Appearance settings in Ubuntu, let's click on User menu at the top right corner, on the top Menu bar and select System settings...
- A window will pop-up with All settings divided into personal, Hardware and System options icons. Let's first select the Appearance icon.

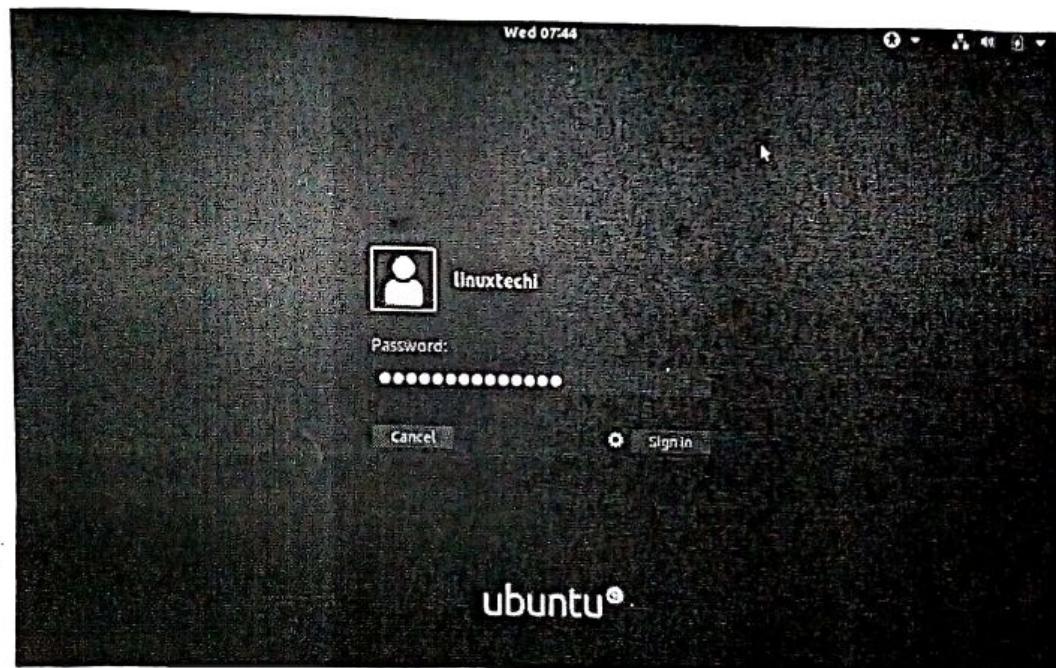
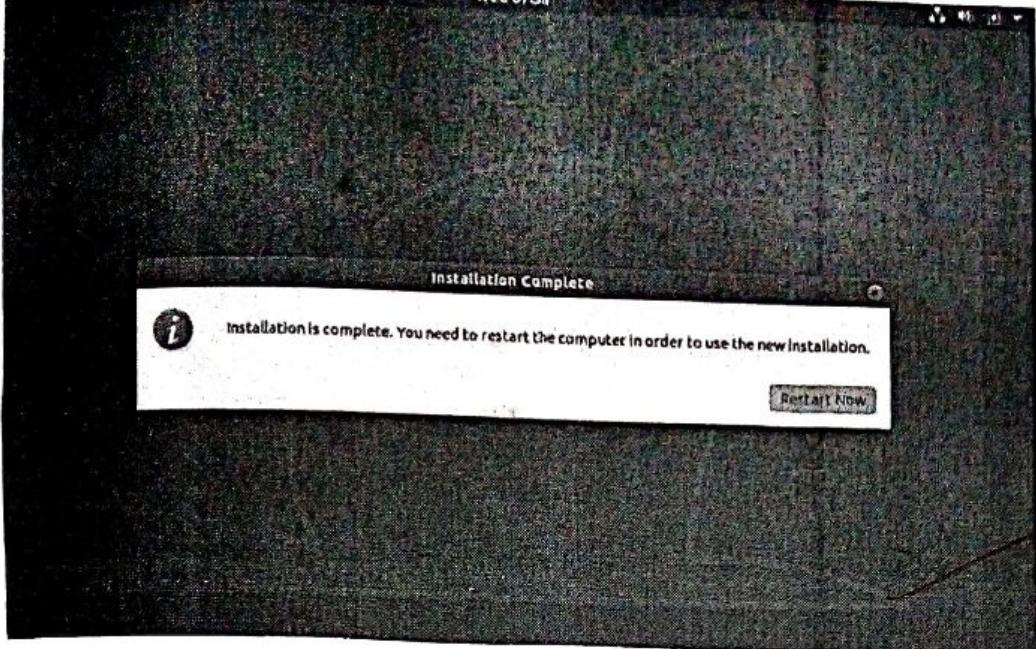
## 88

### Changing Wallpaper picture

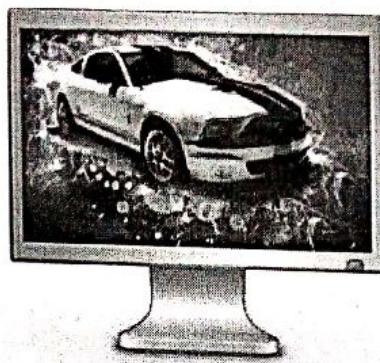
- On the left side of Background part, you can see your current wallpaper.
- On the right side is part where we can select one of Ubuntu wallpapers. Clicking on any thumbnail our wallpaper will be changed right way, with a fading effect.
- If you want to select wallpaper from your picture folder, click the dropdown menu above thumbnails and select the pictures folder.
- You will see all the picture in your Pictures folders as thumbnails, where you can select them as your wallpaper.
- To add wallpaper that is in another folder, just click the plus icon below the thumbnails and then in pop-up window, select the path to our custom folder and choose the picture inside of it

### Changing Ubuntu theme

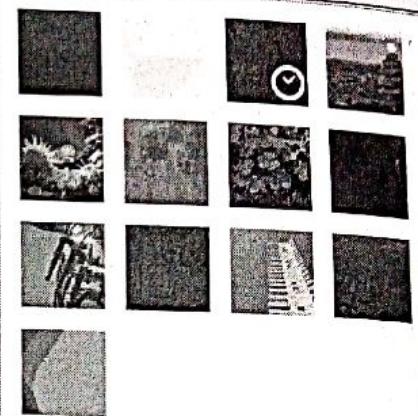
- Ubuntu also has an option to change Desktop theme, which in one click will change the entire way your computer looks.
- To do that, click on the drop-down menu below the wallpaper thumbnails, and choose between Ambience, Radiance or High Contrast.
- Ambience is a light theme that looks a bit more Mac-like, while Radiance is the darker brown theme used in Ubuntu by default.



Look Behaviour

**Background**

Current background (1366 x 768)

**Wallpapers**

Ambiance (default)

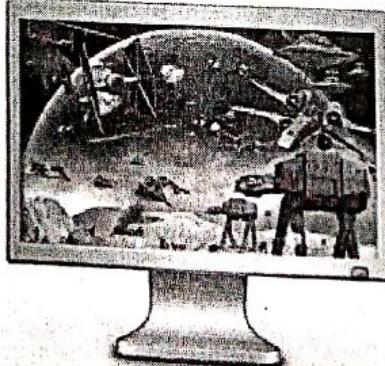
**Theme****Launcher icon size**

48

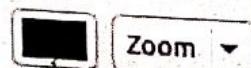
**Appearance**

All Settings Appearance

Look Behaviour

**Background**

star-wars-wallpaper-10.jpg (1920 x 1080)

**Pictures Folder**

Ambiance (default)

48

**Theme****Launcher icon size**

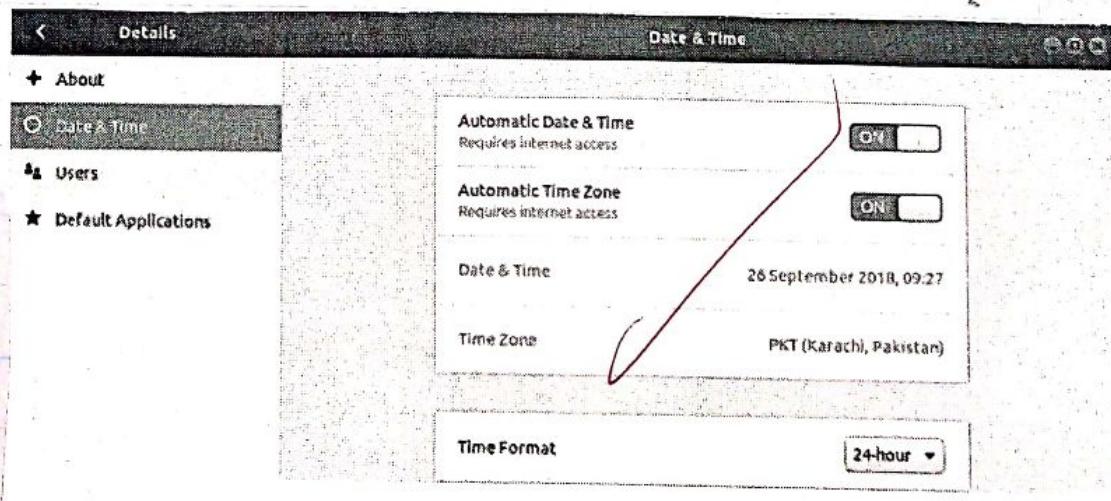
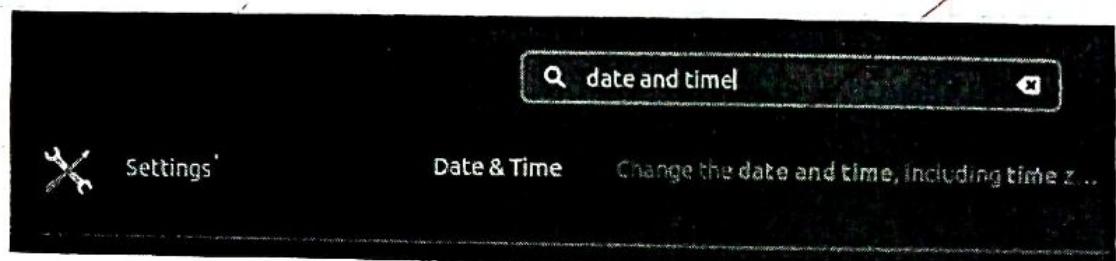
c) Screen Resolution :

Change the size or rotation of the screen.

- You can change how big (or how detailed) things appears on the screen by changing the screen resolution.
  - You can change which way up things appear (for example, if you have a rotating display) by changing the rotation.
1. Click the icon on the very right of the menu bar and select system settings.
  2. Open screen Display.
  3. If you have multiple displays and they are not mirrored, you can have different settings on each display, select a display in the preview area.
  4. Select your desired resolution and rotation
  5. Click Apply. The new settings will be applied for 30 seconds before reverting back. That way, if you cannot see anything with new settings.

d) Time Settings change the time zone of your system.

- If you are currently in Indian time. How does the displayed time change?
- After noting the time change, change the time zone back to your local time zone.
- Just click on the clock on top bar and choose Time and date settings, once the Time and date window opens, choose Manually, so you can change the time and date manually; otherwise choose your time zone from the map, and choose automatic.



10/12

Aim: Installing and removing software.

- o] Install gcc package, verify that it runs and then remove it.

Step 1:

First type 'gcc -v' to know if you have already installed gcc compiler or not. If the output is blank then it means that you don't have gcc installed.

Step 2:

Type 'sudo apt-get install gcc'. After typing the following command installation will take place.

Step 3:

Type 'sudo apt-get install build-essential'. This will install

Now to uninstall GCC Compiler:

In GCC 5.1.0, although there is no top-level uninstall target, some directories do have it, in particular gcc, so you can do

Type : cd build /gcc  
sudo make uninstall

This does not remove everything that was installed, but it removes major executables like gcc, g++, cpp... contained in that directory.

8/8/12

Aim : Utilization of grep, man commands.

Documentation :

a) Finding info documentation from the command line:

Bring up the info page for the grep command. Bring up the usage section.

Ans To find info about any command 'info' command is used the syntax of info command is "info (command name)".

syntax : ~\$ info (command name)

We are going to find the info about the 'group' command.

Open the terminal (ctrl + ALT + T) & type: info group.

After typing this command following output will be displayed onto your screen

You can also scroll through pages using (space = up) &  
(backspace = down) Keys.

~~Another more summarized form of showing info is the 'man' command. The command is same as 'info', but required data.~~

b) Finding man pages from the cmd line. Bring up to main page for the 'ls' command scroll down to the example section.

Ans) To use the 'man' command simply type  
'man (command name)'.

Now we are going to find the manual for 'ls' command.

Type 'man ls' and see what is coming

c) Finding man pages by topic what man pages are available that document file compression.

Ans 'Tar', 'Zip' are some man pages which are available for document file compression simply type

~~man zip  
man tar~~

- d) finding man pages by section from the cmd line bring up the man page for the printf lib. function which manual page section are library function found.
- e) The number corresponds to what section of the manual page is from ; 1 is user command, while 8 is user command, while 8 is sys admin stuff. The man page for man itself. explain it \$ list the std only.

There are certain terms that have different pages in different section (eg. 'print') as a command appears in section 1. as a command appears in section 3 ; in cases like that you can pass the section no. to the man before the page name to choose which one you want or use man a to show every matching page in a row.

You can tell what section a term falls in with 'man+' (equivalent to a proper command). It will also substring matches too. so you need to use term" to limit it.

- f) command line help list the available options for the mkdir command. How can you do this?

\$ mkdir -m a=rwx directory name,

PP  
10/10

## practical-4

Command line operations:

- a) Install new package on your system

sudo apt-get install [package name]

- b) Remove the package installed

sudo apt-get remove [package name]

- c) Find the password file in / using find command.

✓ # find / -name passwd  
· /usr/share/doc/nss-ldap-253/pam.d/passwd  
· /usr/bin/passwd  
· /etc/gam.d/passwd  
· /etc/passwd

→ Find the directory passwd file under root and one level down.

✓ # find / -maxdepth 2 -name passwd.  
· /etc/passwd

→ Find the passwd file under root and 2 level down.

# find / -maxdepth 3 -name passwd.  
· /usr/bin/passwd  
· /etc/gam.d/passwd  
· /etc/passwd.

- 1) Find the password file b/w sub-directories level 2 & 4 - ~~42~~
- # find -maxdepth 3 -maxdepth 5 -name password  
~/usr/bin/password  
~/etc/pam.d/password.
- d) Create a symbolic link to the file you found in next step.
- # ln -s file1 file2
- e) Create an empty file example.txt & move it to /tmp directory using relative pathname.
- # touch example.txt  
# mv example.txt /tmp  
~~7/22~~
- f) Delete the file moved to /tmp in previous step by absolute method
- # rm /tmp/example.txt
- g) Find the location of ls, ps, bash commands.
- # whereis ls
- ls: /bin/ls /usr/share/man/man1/ls.1.gz
- # whereis ps
- ps: /bin/ps /usr/share/man/man1/ps.1.gz
- # whereis bash
- bash: /bin/bash /etc/bash.bashrc /usr/share/man/man1/bash.1.gz

13/3

```
jeba@jeba-VirtualBox:~$ df -k
Filesystem      1K-blocks    Used Available Use% Mounted on
udev                494436       0   494436  0% /dev
tmpfs               102416   3676   98740  4% /run
/dev/sda1        7092728 3383372  3326024 51% /
tmpfs                512076    216   511860  1% /dev/shm
tmpfs                 5120       4    5116  1% /run/lock
tmpfs                512076       0   512076  0% /sys/fs/cgroup
tmpfs                102416     48   102368  1% /run/user/1000
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox:~$ mount
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime)
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
udev on /dev type devtmpfs (rw,nosuid,relatime,size=494436k,nr_inodes=123609,mode=755)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,noexec,relatime,errors=remount-ro,data=ordered)
/dev/sda1 on / type ext4 (rw,relatime,errors=remount-ro,data=ordered)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev,noexec,relatime,size=5120k)
tmpfs on /run/lock type tmpfs (rw,nosuid,nodev,noexec,relatime,mode=755)
cgroup on /sys/fs/cgroup/systemd type cgroup (rw,nosuid,nodev,noexec,relatime,xattr,release_agent=/lib/systemd/systemd-cggroups-agent,namesystemd_nsroot=/)
pstore on /sys/fs/pstore type pstore (rw,nosuid,nodev,noexec,relatime)
cgroup on /sys/fs/cgroup/cpuacct type cgroup (rw,nosuid,nodev,noexec,relatime,epuset,nsroot=/)
cgroup on /sys/fs/cgroup/net_cls,net_prio type cgroup (rw,nosuid,nodev,noexec,relatime,net_cls,net_prio,nsroot=/)
cgroup on /sys/fs/cgroup/pids type cgroup (rw,nosuid,nodev,noexec,relatime,pids,nsroot=/)
cgroup on /sys/fs/cgroup/freezer type cgroup (rw,nosuid,nodev,noexec,relatime,freezer,nsroot=/)
cgroup on /sys/fs/cgroup/cpu,cpuacct type cgroup (rw,nosuid,nodev,noexec,relatime,cpd,cpuacct,nsroot=/)
cgroup on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,devices,nsroot=/)
cgroup on /sys/fs/cgroup/memory type cgroup (rw,nosuid,nodev,noexec,relatime,memory,nsroot=/)
cgroup on /sys/fs/cgroupblkio type cgroup (rw,nosuid,nodev,noexec,relatime,blkio,nsroot=/)
cgroup on /sys/fs/cgroup/perf_event type cgroup (rw,nosuid,nodev,noexec,relatime,perf_event,nsroot=/)
cgroup on /sys/fs/cgroup/hugetlb type cgroup (rw,nosuid,nodev,noexec,relatime,hugetlb,nsroot=/)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=32,pgrp=1,timeout=0,minproto=5,maxproto=5,direct)
hugetlbfss on /dev/hugepages type hugetlbfss (rw,relatime)
```

```
jeba@jeba-VirtualBox:~$ ls
Desktop  Downloads  Music  Pictures  Public  Videos
Documents examples desktop jj  Pictures  Templates
jeba@jeba-VirtualBox:~$ cd jeb
jeba@jeba-VirtualBox:~/jeb$ cat ..gg.txt
cat: ..gg.txt: No such file or directory
jeba@jeba-VirtualBox:~/jeb$ cat gg.txt
cat: gg.txt: No such file or directory
jeba@jeba-VirtualBox:~/jeb$ cat rgg.txt
welcome
Linux
^C
jeba@jeba-VirtualBox:~/jeb$ touch dd.txt
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt  gg.txt
jeba@jeba-VirtualBox:~/jeb$ cp gg.txt dd.txt
jeba@jeba-VirtualBox:~/jeb$ cat dd.txt
welcome
Linux
jeba@jeba-VirtualBox:~/jeb$ cat dd.txt
welcome
Linux
jeba@jeba-VirtualBox:~/jeb$
```

```
jeba@jeba-VirtualBox:~/jeb$ touch ss.txt
jeba@jeba-VirtualBox:~/jeb$ mv gg.txt ss.txt
jeba@jeba-VirtualBox:~/jeb$ cat gg.txt
cat: gg.txt: No such file or directory
jeba@jeba-VirtualBox:~/jeb$ cat ss.txt
welcome
Linux
jeba@jeba-VirtualBox:~/jeb$
```

Aim: File Operations.

1) Explore mounted file systems on your computer

→ df -k

2) What are the different ways of exploring mounted file system on Linux?

→ mount

3) Copying text from files.

→ cp command, mv command

4) Archiving and backup the work directory using tar, gzip and bzip2 commands

Ans: cp ~~cvs~~ gzip filename.txt  
Bzip2 filename.bct

5) use diff command to create diff of two files

As: diff filename1 filename2

6) use patch command to patch a file. And analyze the patch command again.

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```
jeba@jeba-VirtualBox:~/jeb$ bzip2 ss.txt
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt ss.txt.bzz
jeba@jeba-VirtualBox:~/jeb$ cat ss.txt.bzz
BZh91AY&SY>[REDACTED]
'Jew$See[REDACTED]1 jeba@jeba-VirtualBox:~/jeb$ gzip dd.txt
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt.gz ss.txt.bzz
jeba@jeba-VirtualBox:~/jeb$ cat dd.txt.gz
[REDACTED]dd.txt>[REDACTED]eXzjeba@jeba-VirtualBox:~/jeb$
```

```
jeba@jeba-VirtualBox:~/JebS ls
dd.txt.gz aa.txt.gz
jeba@jeba-VirtualBox:~/JebS cat >aa.txt
hello world
^C
jeba@jeba-VirtualBox:~/JebS cat >bb.txt
this is linux^C
jeba@jeba-VirtualBox:~/JebS diff aa.txt bb.txt
1d0
< hello world
jeba@jeba-VirtualBox:~/JebS cat >bb.txt
this is Linux
^C
jeba@jeba-VirtualBox:~/JebS diff aa.txt bb.txt
1c1
< hello world
^C
> this is Linux
jeba@jeba-VirtualBox:~/JebS gzip aa.txt
jeba@jeba-VirtualBox:~/JebS gzip bb.txt
jeba@jeba-VirtualBox:~/JebS diff aa.txt.gz bb.txt.gz
Binary files aa.txt.gz and bb.txt.gz differ
```

```
jeba@jeba-VirtualBox:~/jeb$ cat >hi.txt
hi
hi
hi
^C
jeba@jeba-VirtualBox:~/jeb$ cat >hii.txt
hello
hello
hello
hello
^C
jeba@jeba-VirtualBox:~/jeb$ diff -u hi.txt hii.txt >sam.patch
jeba@jeba-VirtualBox:~/jeb$ patch ,sam.patch
^C
jeba@jeba-VirtualBox:~/jeb$ patch <sam.patch
patching file hi.txt
jeba@jeba-VirtualBox:~/jeb$ cat sam.patch
--- hi.txt      2020-01-08 22:14:55.462569834 +0530
+++ hii.txt     2020-01-08 22:15:16.259898738 +0530
@@ -1,3 +1,3 @@
-hi
-hi
-hi
+hello
+hello
+hello
jeba@jeba-VirtualBox:~/jeb$ █
```

```
jeba@jeba-VirtualBox:~$ who
jeba@jeba-VirtualBox:~$ who
jeba    tty7          2020-01-15 20:32 (:0)
jeba@jeba-VirtualBox:~$ whoami
jeba
jeba@jeba-VirtualBox:~$ who -l
jeba@jeba-VirtualBox:~$ who -l
LOGIN   tty1          2020-01-15 20:30
jeba@jeba-VirtualBox:~$ █
```

```
jeba@jeba-VirtualBox:~$ w
20:35:04 up 4 min, 1 user, load average: 0.70, 0.79, 0.38
USER     TTY      FROM           LOGIN@   IDLE   JCPU   PCPU WHAT
jeba     tty7      :0            20:32    4:28   8.19s  0.33s /sbin/upstart -
jeba@jeba-VirtualBox:~$ w -s
20:35:14 up 4 min, 1 user, load average: 0.60, 0.77, 0.37
USER     TTY      FROM           LOGIN@   IDLE   JCPU   PCPU WHAT
jeba     tty7      :0            4:38    /sbin/upstart --user
jeba@jeba-VirtualBox:~$ w -h
jeba     tty7      :0            20:32    4:44   8.67s  0.33s /sbin/upstart -
jeba@jeba-VirtualBox:~$ w -f
20:36:12 up 5 min, 1 user, load average: 0.41, 0.69, 0.37
USER     TTY      LOGIN@   IDLE   JCPU   PCPU WHAT
jeba     tty7      20:32    5:36   9.00s  0.33s /sbin/upstart --user
```

```
jeba@jeba-VirtualBox:~$ sudo cat /etc/shadow
[jsudo] password for jeba:
root:$1$18240$0:99999:7:::
daemon:$*:$1$16911$0:99999:7:::
bin:$*:$1$16911$0:99999:7:::
sys:$*:$1$16911$0:99999:7:::
sync:$*:$1$16911$0:99999:7:::
games:$*:$1$16911$0:99999:7:::
man:$*:$1$16911$0:99999:7:::
lp:$*:$1$16911$0:99999:7:::
mail:$*:$1$16911$0:99999:7:::
news:$*:$1$16911$0:99999:7:::
```

```
jeba@jeba-VirtualBox:~$ sudo cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
```

Aim: USE Environment

a) which account you are logged in? How do you find out?

→ who command & whoami

b) Display /etc/shadow file using cat command and understand the importance of shadow file .How it's different than password file

→ cat /etc/shadow

• with the password file, each field in the shadow file is also separated with ":" colon character and are as follows:

• Username, up to 8 characters, case-sensitive, usually all lowercase.

A direct match to the username in the /etc/passwd file

• password, 13 character encrypted - A blank entry (eg.:) indicates a password is not required to log in (usually a bad idea) and a "?" entry (eg.: ?:) indicates the account has been disabled.

• The number of days before password may be changed  
(0 indicates it may be changed at any time)

• The number of days after which password must be changed  
(9999 indicates user can keep his or her password unchanged for many, many years)

• The number of days to warn user of an expiring password  
(7 for a full week)

• The number of days after password expires that account is disabled

- The no. of days since january 1, 1970 that an account has been disabled.
- A reversed field for possible future use.

Each field in a passwd entry is separated with ":" colon characters, and are as follows:

- Username, up to 8 characters. Case-sensitive, usually all lowercase.
- An "x" in the password file, passwords are stored in the "/etc/shadow" file.
- Numeric user id. This is assigned by the "adduser" script. Unix uses this field, plus the following group field, to identify which files belong to user.
- Numeric group id. Red Hat uses group id's in a fairly unique manner for enhanced file security. Usually the group id will match the user id.
- Full name of user. I'm not sure what the maximum length for this field is, but try to keep it reasonable (under 30 characters).
- User's home directory. Usually named username (e.g. /home/smit). All user's personal files, web pages, mail forwarding, etc. will be stored here.
- User's "shell account". Often set to "/bin/bash" to provide access to the bash shell (my personal favorite shell).

```
jeba@jeba-VirtualBox: ~  
jeba@jeba-VirtualBox:~$ pwd  
/home/jeba  
jeba@jeba-VirtualBox:~$ █
```

```
jeba@jeba-VirtualBox: ~  
jeba@jeba-VirtualBox:~$ history  
1 who  
2 whoami  
3 who -l  
4 clear  
5 w  
6 w -s  
7 w -h  
8 w -f  
9 clear  
10 cat /etc/shadow  
11 sudo cat /etc/shadow  
12 clear  
13 sudo cat /etc/passwd  
14 pwd  
15 clear  
16 history  
jeba@jeba-VirtualBox:~$ :3  
who -l 2020-01-15 20:30 780 ld=tty1  
LOGIN      tty1          2020-01-15 20:30  
jeba@jeba-VirtualBox:~$ █
```

```
jeba@jeba-VirtualBox:~$ alias m="mkdir new"  
jeba@jeba-VirtualBox:~$ m  
jeba@jeba-VirtualBox:~$ ls  
Desktop  Downloads  Music  Pictures  Templates  
Documents examples.desktop  jj  new  Public  Videos  
jeba@jeba-VirtualBox:~$ █
```

- c) Get your current working directory  
→ pwd.
- d) Explore different ways of getting command history, how to run previously executed command without typing it  
→ history  
! line number
- e) Create alias to most commonly used commands.  
→ alias to label = "command"

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## practical - 7

a) Create, modify, search and navigate a file in editor

i) Creating a file:

To create a file, on the terminal type vi followed by filename.

ii) Modifying the file:

To modify a file, on the vi editor, type 'o'.

iii) Search in a file:

To find a word (forward search) press / followed by the word to search.

iv) Navigate:

Movement in four directions.

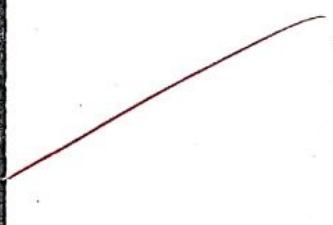
Key	Action
K	Moves cursor up
j	Moves cursor down
h	Moves cursor left
l	Moves cursor right

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```
jeba@jeba-VirtualBox: ~  
Hello  
This is my Linux example  
Welcome  
Welldone  
This is Vi Editor  
Thank you  
I  
:g/my/s//our/gc
```

```
jeba@jeba-VirtualBox: ~  
Hello  
This is my Linux example  
Welcome  
Welldone  
This is Vi Editor  
Thank you
```

```
jeba@jeba-VirtualBox: ~  
Hello  
This is our Linux example  
Welcome  
Welldone  
This is Vi Editor  
Thank you
```



```
jeba@jeba-VirtualBox: ~  
1 Hello  
2 This is our Linux example  
3 Welcome  
4 Welldone  
5 This is VI Editor  
6 Thank you  
  
:set hlsearch
```



```
jeba@jeba-VirtualBox: ~  
1 Hello  
2 This is your Linux example  
3 Welcome  
4 Welldone  
5 This is VI Editor  
6 Thank you  
  
:set nu
```

## Word Navigation

Key	Action :
b	Moves back to the beginning of the word
e	Moves forward to the end of the word
w	Moves forward to the beginning of the word
0(zero)	Moves to first character of a line
\$	Moves to end of line

## Scrolling:

Key	Action
ctrl + f	Scrolls forward
ctrl + b	Scrolls backward
ctrl + d	Scrolls half page
ctrl + u	Scrolls half page backward

5) learn all essential commands like search/replace, highlight, show line numbers.

### i) Replace

symbol : /g (word to be replaced) s // new word (ge)

### ii) ~~Highlight~~

~~use set hisearch~~

ii) Highlight  
use set hsearch

iii) Show the line number  
use set

jeba@jeba-VirtualBox: ~  
jeba@jeba-VirtualBox:~\$ sudo useradd user1  
[sudo] password for jeba:  
jeba@jeba-VirtualBox:~\$ sudo passwd user1  
Enter new UNIX password:  
Retype new UNIX password:  
passwd: password updated successfully  
jeba@jeba-VirtualBox:~\$

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# Please consider adding local content in /etc/sudoers.d/ instead of  
# directly modifying this file.  
# See the man page for details on how to write a sudoers file.  
#  
Defaults env\_reset  
Defaults mail\_badpass  
Defaults secure\_path="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin"  
# Host alias specification  
# User alias specification  
# Cmnd alias specification  
# User privilege specification  
root ALL=(ALL:ALL) ALL

jeba@jeba-VirtualBox: ~  
jeba@jeba-VirtualBox:~\$ sudo userdel user1  
[sudo] password for jeba:  
jeba@jeba-VirtualBox:~\$ su user1  
No passwd entry for user 'user1'  
jeba@jeba-VirtualBox:~\$

jeba@jeba-VirtualBox:~\$ sudo chage -E 25/01/2020 -m 10 -M 90 -I 30 -W 30 user1  
jeba@jeba-VirtualBox:~\$ sudo chage -l user1  
Last password change : Jan 21, 2020  
Password expires : Apr 20, 2020  
Password inactive : May 20, 2020  
Account expires : Jan 01, 2022  
Minimum number of days between password change : 10  
Maximum number of days between password change : 90  
Number of days of warning before password expires : 30  
jeba@jeba-VirtualBox:~\$

Q2

```
jeba@jeba-VirtualBox:~$ su user1
Password:
user1@jeba-VirtualBox:/home/jeba$ mkdir folder1
mkdir: cannot create directory 'folder1': Permission denied
user1@jeba-VirtualBox:/home/jeba$ sudo mkdir folder1
[sudo] password for user1:
user1 is not in the sudoers file. This incident will be reported.
```

```
jeba@jeba-VirtualBox:~$ sudo chage user1
Changing the aging information for user1
Enter the new value, or press ENTER for the default

Minimum Password Age [0]: 100
Maximum Password Age [99999]: 200
Last Password Change (YYYY-MM-DD) [2020-01-20]: 2020-01-21
Password Expiration Warning [7]: 5
Password Inactive [-1]:
Account Expiration Date (YYYY-MM-DD) [-1]: 2020-01-31
Last password change
Password expires : Jan 21, 2020
Password inactive : Aug 08, 2020
Account expires : never
Minimum number of days between password change : Jan 31, 2020
Maximum number of days between password change : 100
Number of days of warning before password expires : 200
jeba@jeba-VirtualBox:~$
```



jeba@jeba-VirtualBox: ~

```
Last password change
Password expires : Jan 20, 2020
Password inactive : never
Account expires : never
Minimum number of days between password change : never
Maximum number of days between password change : 0
Number of days of warning before password expires : 99999
: 7
```

## Aim: Linux security

- a) Use of sudo to change user privileges to root  
(create an user named user1)

To give some root privileges edit /etc/sudoers using visudo.  
Enter new line as highlighted below.

- b) Identify operations that requires sudo privileges

- c) Modify expiration date for new user using password aging.

- E : Expiration Date
- m : Minimum number of days before password change
- M : Number of days password is valid.
- I : Account inactive
- W : Number of days of warning before a password change is required.

- d) Delete newly added user

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### Aim: Network Management

- a) Get IP address of your machine using ifconfig
- b) Get IP bcast of your machine
- c) Use ping to check the network connectivity to remote machines
- d) Use of dig command.
- e) Troubleshooting network using tracert, route command
- f) Use of arp command
- g) Use of host command
- h) Use of netstat command and nmap command.

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jeba@jeba-VirtualBox: ~

```
jeba@jeba-VirtualBox:~$ ifconfig  
enp0s3      Link encap:Ethernet  HWaddr 08:00:27:0e:6b:69  
              inet  addr: 10.0.2.15   Bcast: 10.0.2.255   Mask: 255.255.255.0  
              inet6 addr: fe80::c0cd:53a0:d5a3:848e/64 Scope:Link  
                  UP BROADCAST RUNNING MULTICAST  MTU: 1500 Metric: 1  
                  RX packets: 2 errors: 0 dropped: 0 overruns: 0 frame: 0  
                  TX packets: 73 errors: 0 dropped: 0 overruns: 0 carrier: 0  
                  collisions: 0 txqueuelen: 1000  
                  RX bytes: 1180 (1.1 KB)  TX bytes: 8518 (8.5 KB)  
  
lo          Link encap:Local Loopback  
              inet  addr: 127.0.0.1   Mask: 255.0.0.0  
              inet6 addr: ::1/128 Scope:Host  
                  UP LOOPBACK RUNNING  MTU: 65536 Metric: 1  
                  RX packets: 53240 errors: 0 dropped: 0 overruns: 0 frame: 0  
                  TX packets: 53240 errors: 0 dropped: 0 overruns: 0 carrier: 0  
                  collisions: 0 txqueuelen: 1  
                  RX bytes: 4225072 (4.2 MB)  TX bytes: 4225072 (4.2 MB)
```

```
jeba@jeba-VirtualBox:~$ ping www.google.com
PING www.google.com (172.217.31.196) 56(84) bytes of data.
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=1 ttl=54 time=97.8 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=2 ttl=54 time=82.0 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=3 ttl=54 time=84.8 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=4 ttl=54 time=87.1 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=5 ttl=54 time=93.5 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=6 ttl=54 time=86.9 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=7 ttl=54 time=98.0 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=8 ttl=54 time=90.9 ms
^Z
[1]+ Stopped ping www.google.com
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox:~$ traceroute www.google.com
traceroute to www.google.com (172.217.166.100), 30 hops max, 60 byte packets
 1  10.0.2.2 (10.0.2.2)  0.190 ms  0.143 ms  0.151 ms
 2  * * *
 3  10.0.2.2 (10.0.2.2)  68.568 ms  68.486 ms  68.405 ms
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox:~$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref Use Iface
default         10.0.2.2      0.0.0.0       UG    100   0    0 enp0s3
10.0.2.0        *             255.255.255.0 U     100   0    0 enp0s3
link-local      *             255.255.0.0   U     1000  0    0 enp0s3
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox:~$ arp
Address          HWtype  HWaddress           Flags Mask Iface
10.0.2.2        ether    52:54:00:12:35:02  C     0    enp0s3
3
```

```
jeba@jeba-VirtualBox:~$ host -v
host 9.10.3-P4-Ubuntu
jeba@jeba-VirtualBox:~$
```

jeba@jeba-VirtualBox:~		netstat			Foreign Address			State	
Proto	Recv-Q	Send-Q	Local Address	Type	State	I-Node	Path		
Active Internet connections (w/o servers)									
Proto	Recv-Q	Send-Q	Local Address	Type	State	I-Node	Path		
Active UNIX domain sockets (w/o servers)									
Proto	RefCnt	Flags		Type	State	I-Node	Path		
unix	2	[ ]		DGRAM		42149	/run/user/1000/system		
d/notify						9694	/run/systemd/journal/		
unix	2	[ ]		DGRAM		9695	/run/systemd/journal/		
syslog						9704	/run/systemd/journal/		
unix	16	[ ]		DGRAM		9684	/run/systemd/notify		
dev-log						44042	@/tmp/dbus-CymTeI7AQG		
unix	7	[ ]		DGRAM		43331	@/tmp/dbus-CymTeI7AQG		
socket						42988	@/tmp/dbus-CMGGc6G7P5		
unix	3	[ ]		STREAM	CONNECTED	42690	/run/systemd/journal/		
unix	3	[ ]		STREAM	CONNECTED	13242			
unix	3	[ ]		STREAM	CONNECTED	43113	/run/systemd/journal/		
unix	3	[ ]		STREAM	CONNECTED	43013			
unix	3	[ ]		STREAM	CONNECTED	42925			
stdout									
unix	3	[ ]							
stdout									
unix	3	[ ]							
unix	3	[ ]							

```
jeba@jeba-VirtualBox:~$ nmap www.google.com
```

Starting Nmap 7.01 ( https://nmap.org ) at 2020-01-20 22:51 IST  
Nmap scan report for www.google.com (216.58.196.68)  
Host is up (0.044s latency).  
Other addresses for www.google.com (not scanned): 2404:6800:4007:811::2004  
rDNS record for 216.58.196.68: bom05s11-in-f4.1e100.net  
Not shown: 998 filtered ports

PORT	STATE	SERVICE
80/tcp	open	http
443/tcp	open	https

Nmap done: 1 IP address (1 host up) scanned in 20.32 seconds  
jeba@jeba-VirtualBox:~\$

## Aim: shell scripting

### Basics of shell scripting

- To get a shell, you need to start a terminal.
- To see what shell you have, run: echo \$SHELL
- In Linux, the dollar sign (\$) stands for shell variable.
- The echo command just returns whatever you type in.
- #!/bin/bash - It is called Shebang. It is written at top of a shell script and it passes the instruction to the program /bin/bash

Echo \$SHELL

- Vi filename.sh

```
#!/bin/bash
```

```
echo "This is Linux!"
```

- chmod 777 filename.sh

```
.I filename.sh
```

Step to write and execute a shell script.

Shell script is just a simple text file with .sh extension, having executable permission.

```
tcsc@tcsc-VirtualBox: ~
tcsc@tcsc-VirtualBox: $ echo $SHELL
/bin/bash
tcsc@tcsc-VirtualBox:~$
```

```
tcsc@tcsc-VirtualBox: ~
#!/bin/bash
echo "THIS IS LINUX!"
```

"linux.sh" [New File]

```
tcsc@tcsc-VirtualBox: ~
tcsc@tcsc-VirtualBox: $ vi linux.sh
tcsc@tcsc-VirtualBox: $ chmod 777 linux.sh
tcsc@tcsc-VirtualBox: $ ./linux.sh
THIS IS LINUX!
tcsc@tcsc-VirtualBox:~$
```

```
tcsc@tcsc-VirtualBox: ~  
#!/bin/bash  
echo "Enter your name:"  
read name  
echo "My name is: $name"
```

:wq

```
tcsc@tcsc-VirtualBox: ~  
tcsc@tcsc-VirtualBox: $ vi ubuntu.sh  
tcsc@tcsc-VirtualBox: $ chmod 777 ubuntu.sh  
tcsc@tcsc-VirtualBox: $ ./ubuntu.sh  
'Enter your name:  
TANVI  
My name is: TANVI  
tcsc@tcsc-VirtualBox: $
```

```
tcsc@tcsc-VirtualBox: ~
```

```
#!/bin/bash  
a=100  
b=25  
sum=$((a+b))  
echo "Sum is:$sum"
```

bm:

- a) open terminal
- b) Navigate to the place where you want to create script using `cd` command
- c) Touch `filename.sh`
- d) `Vi filename.sh` [You can use your favorite editor, to edit the script]
- e) `chmod 777 filename.sh` (for making the script executable)
- f) `sh filename.sh` or `.filename.sh` (for running the script)

~~Program to display your name.~~

```
#!/bin/bash
Echo "Enter your name"
Read name
Echo "My name is: $name"
```

~~Program to find the sum of two variables~~

```
vi filename.sh
#!/bin/bash
a=100
b=25
sum=$((a+b))
Echo "sum is : $sum"
```

Program to find the sum of two no. (values passed during execution)

### Sed

Sed command or stream Editor is very powerful utility offered by Linux system. It is mainly used for text substitution, find & replace but it can perform other text manipulations like insertion, deletion, search, etc. With Sed, we can edit complete file without actually have to open it.

Consider the following text file.

- 1) Displaying particular text of a file.
- 2) Display all except some lines.
- 3) Deleting a line.
- 4) Search and Replacing a string.
- 5) Replace a string on a particular line.

To replace a string on a particular line, use line 'w' with 'c' option.

```
tcsc@tcsc-VirtualBox:~  
tcsc@tcsc-VirtualBox:~$ vi linux2.sh  
tcsc@tcsc-VirtualBox:~$ chmod 777 linux2.sh  
tcsc@tcsc-VirtualBox:~$ ./linux2.sh  
Sum is:125  
tcsc@tcsc-VirtualBox:~$
```

```
tcsc@tcsc-VirtualBox:~  
#!/bin/bash  
sum=$(( $1+$2 ))  
echo "sum is:$sum"  
"lin.sh" 3 lines, 46 characters
```

```
tcsc@tcsc-VirtualBox:~$ vi lin.sh  
tcsc@tcsc-VirtualBox:~$ chmod 777 lin.sh  
tcsc@tcsc-VirtualBox:~$ ./lin.sh 50 70  
sum is:120  
tcsc@tcsc-VirtualBox:~$
```

```
tcsc@tcsc-VirtualBox:~
```

```
subjects offered in cs  
datastructure  
database management  
linux  
python  
green tech  
softskill  
stats  
calclus  
computer basic
```

```
:wq
```

```
tcsc@tcsc-VirtualBox:~
```

```
tcsc@tcsc-VirtualBox:~$ vi cs.txt  
tcsc@tcsc-VirtualBox:~$ sed -n 3,5p cs.txt  
database management  
linux  
python  
tcsc@tcsc-VirtualBox:~$
```

```
tcsc@tcsc-VirtualBox:~$ sed 3,5d cs.txt  
subjects offered in cs  
datastructure  
green tech  
softskill  
stats  
calclus  
computer basic  
tcsc@tcsc-VirtualBox:~$
```

```
tcsc@tcsc-VirtualBox:~
```

```
tcsc@tcsc-VirtualBox:~$ vi linux.sh  
tcsc@tcsc-VirtualBox:~$ chmod 777 linux.sh  
tcsc@tcsc-VirtualBox:~$ ./linux.sh  
THIS IS LINUX!  
tcsc@tcsc-VirtualBox:~$
```

6) Add a line after / before the matched string.  
To add a new line with some content every pattern match, use option 'o'.

To add a new line with some content before every pattern match, use option 'i'.

7) To change a whole line with matched pattern.

To change a whole line to a new line when a each pattern matches, use option 't'.

8) Appending lines

To add some content before every line with sed, use \* and \$ as follows.

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```
tcsc@tcsc-VirtualBox:~$ sed 's/cs/computer/' cs.txt
subjects offered in computer
datastructure
database management
linux
python
green tech
softskill
stats
calclus
computer basic
```

```
tcsc@tcsc-VirtualBox:~$ sed '6 s/cs/computer system /' cs.txt
subjects offered in cs
datastructure
database management
linux
python
green tech
softskill
stats
calclus
computer basic
```

```
tcsc@tcsc-VirtualBox:~$ sed '/cs/i "this is linux"' cs.txt
>this is linux"
subjects offered in cs
datastructure
database management
linux
python
green tech
softskill
stats
calclus
computer basic
tcsc@tcsc-VirtualBox:~$
```

```
tcsc@tcsc-VirtualBox:~$ sed '/linux/c "this is linux"' cs.txt
subjects offered in cs
datastructure
database management
>this is linux"
python
green tech
softskill
stats
calclus
computer basic
```

```
tcsc@tcsc-VirtualBox: $ sed -e 's/.*/Thanks &/' cs.txt
Thanks subjects offered in cs
Thanks datastructure
Thanks database management
Thanks linux
Thanks python
Thanks green tech
Thanks softskill
Thanks stats
Thanks calculus
Thanks computer basic
```

```
tcsc@tcsc-VirtualBox:~$ sed '/cs/a "this is linux"' cs.txt
subjects offered in cs
>this is linux"
datastructure
database management
linux
python
green tech
softskill
stats
calculus
computer basic
tcsc@tcsc-VirtualBox:~$
```

✓  
B9  
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