

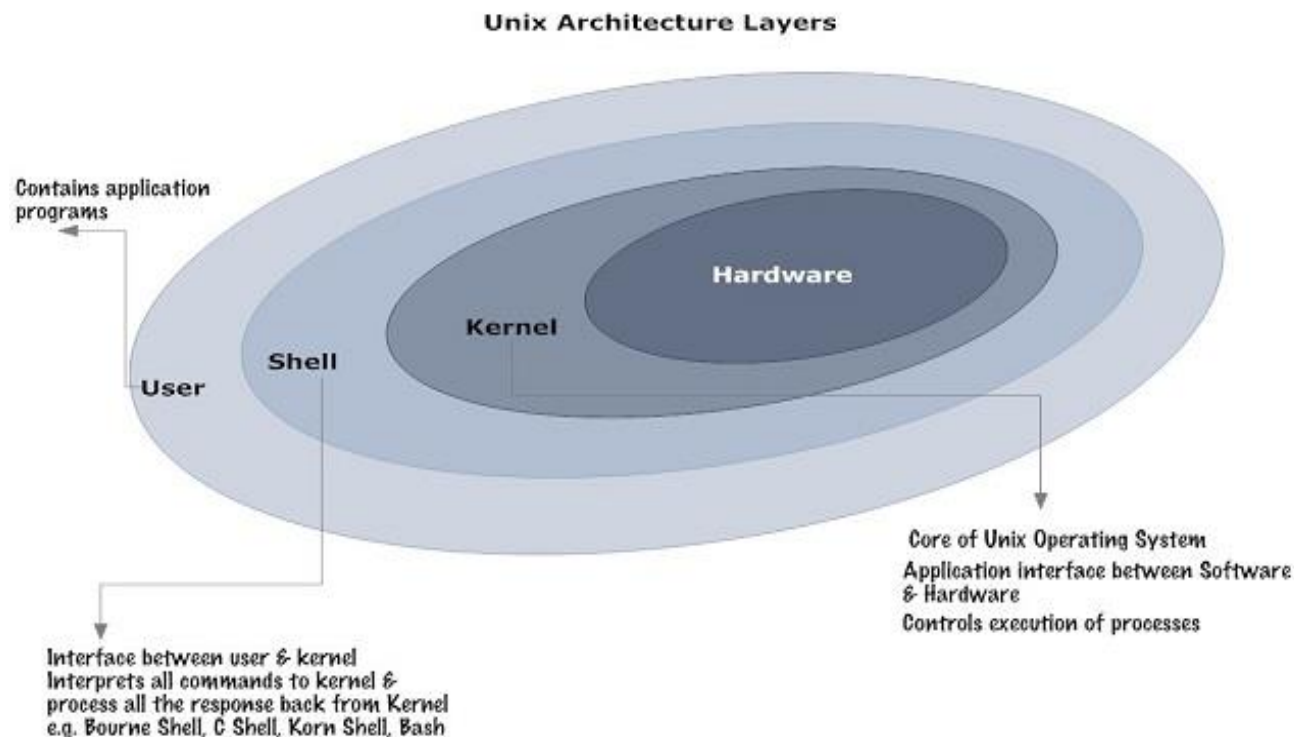
LINUX Fundamentals



All About “UNIX”

Basics & History of UNIX

- History of UNIX® dates back to 1969. It has developed and evolved through a number of different versions and environments. Most modern UNIX variants known today are licensed versions of one of the original UNIX editions. Sun's Solaris, Hewlett-Packard's HP-UX, and IBM's AIX® are all flavors of UNIX that have their own unique elements and foundations.
- Basic structure of Unix operating system**



Key Features and General Characteristics

- **Multitasking && Multiuser** : Most versions of UNIX allows multiple users to log onto the system & each run multiple tasks. This is standard for most modern OS.
- **Free Applications and Even a Free Operating System** : OFF all of the applications available under UNIX, many of them are free. The compilers and interpreters that we use in most of the programming courses here at UMBC can be downloaded free of charge. Most of the development that we do in programming courses is done under the Linux OS.
- **Less Resource Intensive** : UNIX installations tend to be much less demanding on system resources. In many cases, the old family computer that can barely run Windows is more than sufficient to run the latest version of Linux.

Talking about linux

- **Linux** is a generic term referring to Unix-like graphical user interface (GUI) based computer operating systems.

- **Powerful -**
 - Runs on multiple hardware platforms
 - Users like its speed and stability
 - No requirement for latest hardware.

- **Linux** is an operating system kernel, and UNIX is a certification for operating systems..

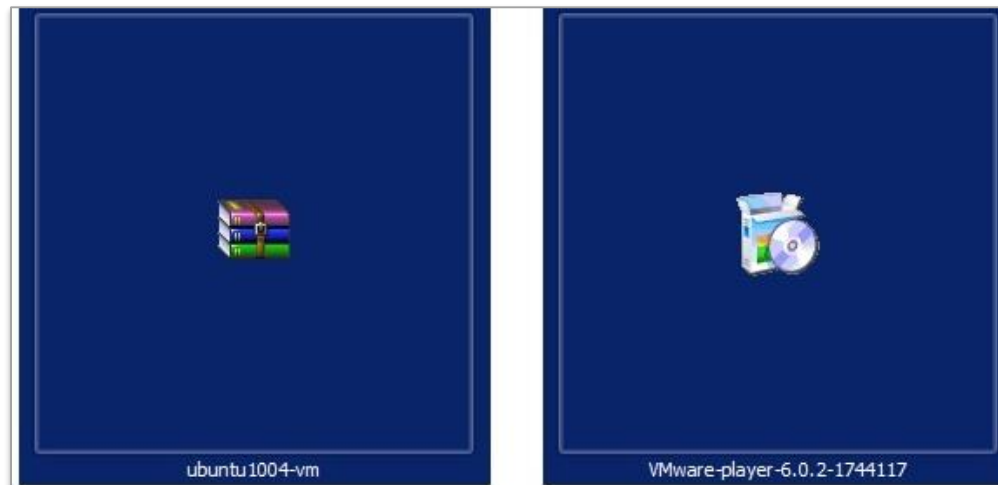
Some glimpse about Linux

- A fully-networked 32/64-Bit Unix-like Operating System.
- Multi-user, Multitasking, Multiprocessor
- Has the X Windows GUI
- Coexists with other Operating Systems
- Runs on multiple platforms
- Includes the Source Code

Installing UBUNTU <LINUX VERSION>

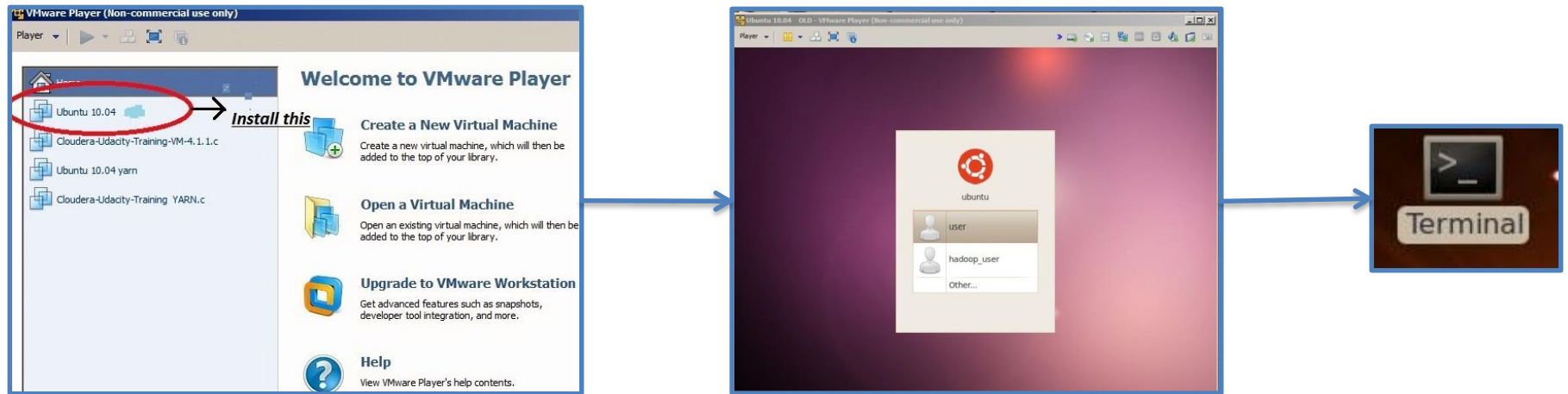
Before Installing

- We need the following things before keeping hands on The UNIX like environment , i.e. through Ubuntu
- **Ubuntu image** for VMware
- **VMware player** for running Ubuntu.

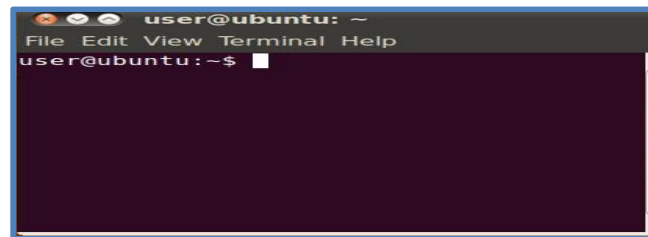


Installing UBUNTU....

- 1ST Install VMware and then install UBUNTU on it .
- **Terminal** : Place where commands are written...



- Terminal shows the **name of current logged in user** and that particular user can make changes in his Environment only as in windows..



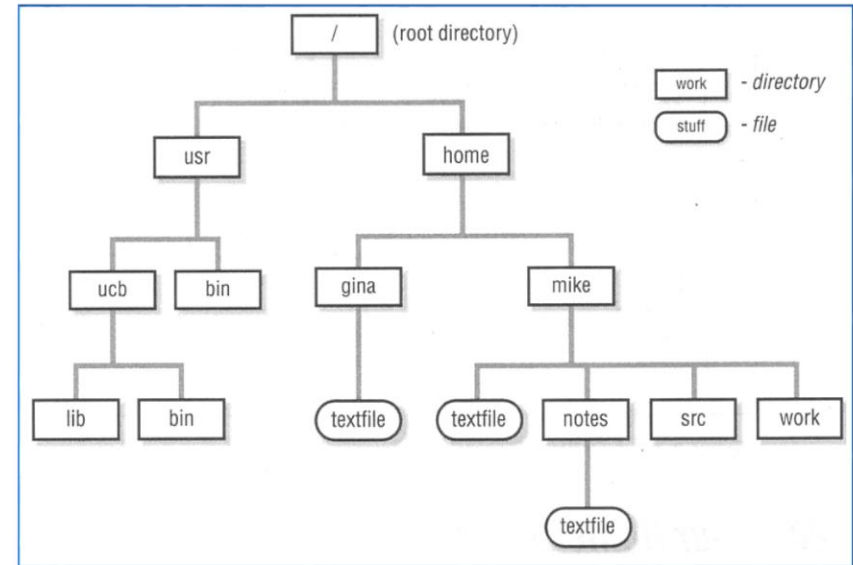
LINUX Structure & some basic commands

- /symbolizes ROOT
- Under root a folder named home is there
- which contains Info. About every logged user
- **List of commands & there uses with screen shots**

I. **pwd:** Tells the present working.

```

user@ubuntu: ~
File Edit View Terminal Help
user@ubuntu:~$ pwd
/home/user
user@ubuntu:~$
  
```



II. **ls :** lists all the file under current directory.

—ls -a: lists all the hidden files too.

```

user@ubuntu: ~
File Edit View Terminal Help
user@ubuntu:~$ ls
Desktop  Downloads  examples.desktop  Pictures  Templates  workspace
Documents  eclipse  Music  Public  Videos
user@ubuntu:~$ ls -a
.          Downloads  .ICEauthority  .pulse-cookie
..         eclipse     .icons          .recently-used.xbel
.bash_history  .esd_auth  .local          .sudo_as_admin_successful
.bash_logout  examples.desktop  .mozilla        Templates
.bashrc       .gconf     Music           .themes
.cache        .gconfd    .nautilus       .thumbnails
.config       .gnome2    .openoffice.org .update-notifier
.dbus        .gnome2_private  Pictures        Videos
Desktop      .gvfs      .profile        workspace
.dmrc       .gtk-bookmarks  Public          .xsession-errors
Documents    gvfs         .pulse          .xsession-errors.old
user@ubuntu:~$
  
```

LINUX Structure & some basic commands (Cont..)

III. mkdir dir name : creating a file/folder .

```

user@ubuntu: ~
File Edit View Terminal Help
user@ubuntu:~$ ls
Desktop  Downloads  examples.desktop  Pictures  Templates  workspace
Documents eclipse    Music            Public   Videos
user@ubuntu:~$ pwd
/home/user
user@ubuntu:~$ mkdir /home/user/hadoop
user@ubuntu:~$ ls
Desktop  Downloads  examples.desktop  Music  Public  Videos
Documents eclipse    hadoop           Pictures Templates workspace
user@ubuntu:~$

```

****dir. created****

IV. clear:- clears the terminal.

```

user@ubuntu: ~
File Edit View Terminal Help
-? -help      print this help message
-X           print help on non-standard options
-ea[:<packagename>...[:<classname>]
-enableassertions[:<packagename>...[:<classname>]
-enableassertions[:<packagename>...[:<classname>]
-enableassertions[:<packagename>...[:<classname>]
-disableassertions[:<packagename>...[:<classname>]
-disableassertions[:<packagename>...[:<classname>]
-disableassertions[:<packagename>...[:<classname>]
-esa | -enablesystemassertions
-enable system assertions
-dsa | -disablesystemassertions
-disable system assertions
-agentlib:<libname>[=<options>]
-load native agent library <libname>, e.g. -agentlib:hprof
-see also, -agentlib:jdwp=help and -agentlib:hprof=help
-agentpath:<pathname>[=<options>]
-load native agent library by full pathname
-javaagent:<jarpath>[=<options>]
-load Java programming language agent, see java.lang.instrument
-splash:<imagepath>
-show splash screen with specified image
See http://www.oracle.com/technetwork/java/javase/documentation/index.html for more details.
user@ubuntu:~$ clear

```

```

user@ubuntu: ~
File Edit View Terminal Help
user@ubuntu:~$

```

LINUX Structure & some basic commands (Cont..)

V. **cd dest.name** :- changing the directory

```

user@ubuntu: /
File Edit View Terminal Help
user@ubuntu:~$ cd /usr/
user@ubuntu:/usr$ ls
bin  games  include  lib  local  sbin  share  src
user@ubuntu:/usr$ cd ..
user@ubuntu:/$

```

Creating, Copying & Deleting a file

- Creating a File :-- for creating a file there are various editors available such as VI ,gedit.

```

user@ubuntu: ~/hadoop
File Edit View Terminal Help
user@ubuntu:~$ cd /home/user/hadoop
user@ubuntu:~/hadoop$ vi Test.txt
  
```

```

user@ubuntu: ~
File Edit View Terminal Help
~
~
~
~
  
```

- Command:** vi filename. extension
- extension -- .txt,.sh
- Copying a file:-- cp source dest. name

```

user@ubuntu: ~/hadoop
File Edit View Terminal Help
india is great
i am fine
:wq
  
```

```

user@ubuntu: ~/hadoop
File Edit View Terminal Help
user@ubuntu:~/Desktop$ cd
user@ubuntu:~$ cd /home/user/
user@ubuntu:~$ ls
Desktop  Downloads  examples.desktop  Music  Public  Videos
Documents  eclipse  hadoop  Pictures  Templates  workspace
user@ubuntu:~$ cd hadoop/
user@ubuntu:~/hadoop$ ls
Test.txt
user@ubuntu:~/hadoop$ cp Test.txt /home/user/Desktop
  
```

```

user@ubuntu:~/Desktop$ ls
3 & 4_MapReducer  hadoop-eclipse-plugin-1.2.1.jar.zip
aircel.jar        nautilus-computer.desktop
Data_File.txt     Subscriber
eclipse-jee-indigo-SR2-linux-gtk.tar.gz  Test.txt
gnome-terminal.desktop  UN.txt
user@ubuntu:~/Desktop$
  
```

Creating, Copying & Deleting a file (Cont..)

- To Delete a File : `rm filename`

```

user@ubuntu:~/Desktop$ ls
3_&_4_MapReducer      hadoop-eclipse-plugin-1.2.1.jar_.zip
aircel.jar             nautilus-computer.desktop
Data_File.txt          Subscriber
eclipse-jee-indigo-SR2-linux-gtk.tar.gz  Test.txt
gnome-terminal.desktop UN.txt
user@ubuntu:~/Desktop$ rm Test.txt
user@ubuntu:~/Desktop$ ls
3_&_4_MapReducer      hadoop-eclipse-plugin-1.2.1.jar_.zip
aircel.jar             nautilus-computer.desktop
Data_File.txt          Subscriber
eclipse-jee-indigo-SR2-linux-gtk.tar.gz  UN.txt
gnome-terminal.desktop
user@ubuntu:~/Desktop$

```

File removed.....

Creating, Copying & Deleting a file (Cont..)

- **rmdir filename** : removing a directory

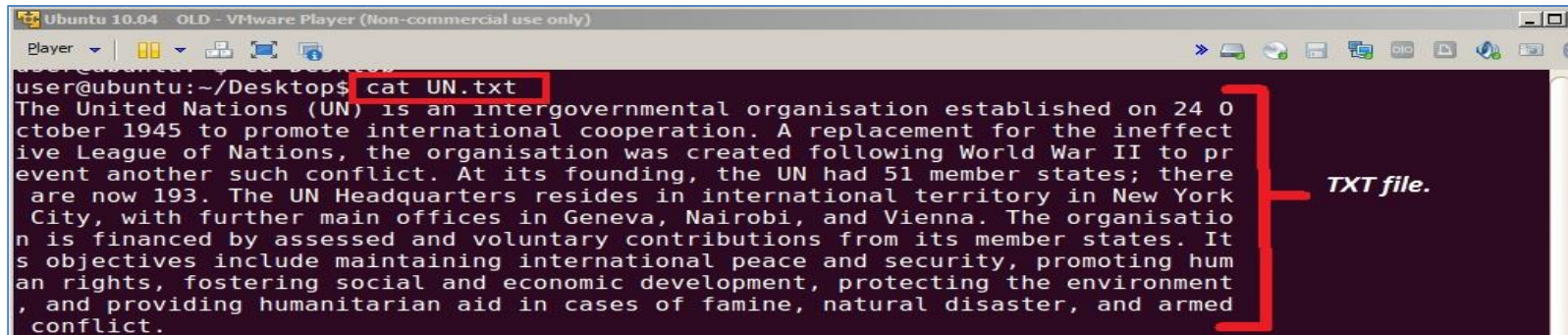
```

user@ubuntu: ~
File Edit View Terminal Help
user@ubuntu:~$ ls
Desktop      Downloads  examples.desktop  Music      Public      Videos
Documents    eclipse    hadoop            Pictures   Templates   workspace
user@ubuntu:~$ rmdir hadoop
                                     directory Removed
user@ubuntu:~$ ls
Desktop      Downloads  examples.desktop  Pictures    Templates   workspace
Documents    eclipse    Music             Public      Videos

```

Creating, Copying & Deleting a file (Cont..)

- **cat command** : It can be used for the following purposes under Linux:
 - Display text files on screen.

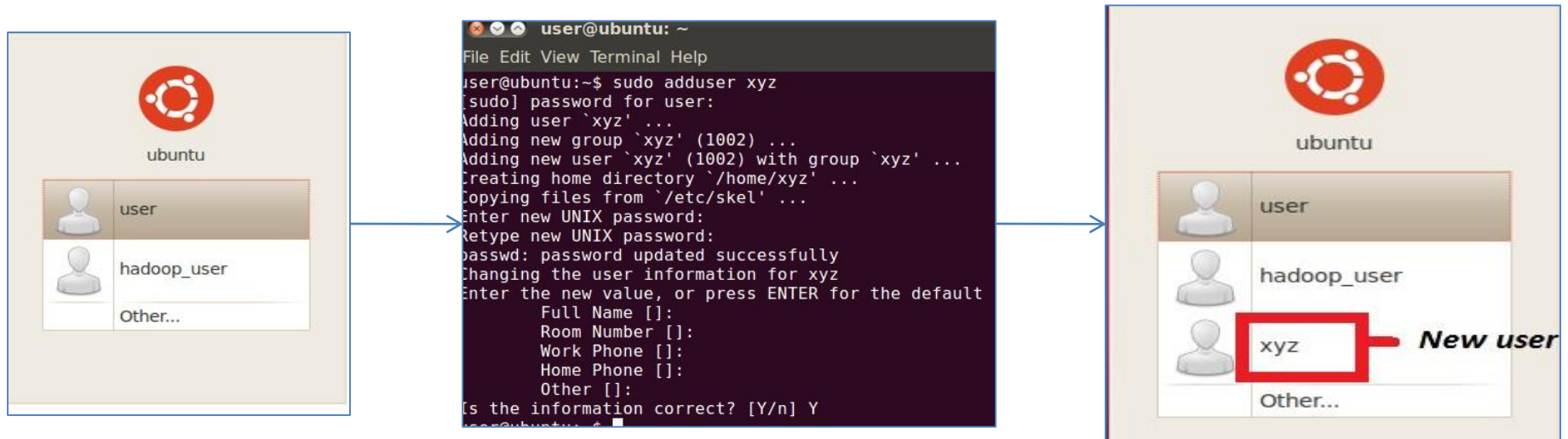


```

user@ubuntu:~/Desktop$ cat UN.txt
The United Nations (UN) is an intergovernmental organisation established on 24 October 1945 to promote international cooperation. A replacement for the ineffective League of Nations, the organisation was created following World War II to prevent another such conflict. At its founding, the UN had 51 member states; there are now 193. The UN Headquarters resides in international territory in New York City, with further main offices in Geneva, Nairobi, and Vienna. The organisation is financed by assessed and voluntary contributions from its member states. Its objectives include maintaining international peace and security, promoting human rights, fostering social and economic development, protecting the environment, and providing humanitarian aid in cases of famine, natural disaster, and armed conflict.
  
```


Creating, Copying & Deleting a file (Cont..)

- Adding and removing new user:-- `sudo adduser Newusername`



Creating, Copying & Deleting a file (Cont..)

- **Removing a User** :-- `sudo userdel Newusername..`and the user will be deleted.
- **Switching to different user** :-- `su username.`
 - then the required password of that user needs to be given.



```

user@ubuntu: ~
File Edit View Terminal Help
user@ubuntu:~$ su hadoop_user
Password:
hadoop_user@ubuntu:/home/user$ su user
Password:
su: Authentication failure
hadoop_user@ubuntu:/home/user$ su user
Password:
user@ubuntu:~$
  
```

- **Extracting a TAR file:**
 - I. `tar -zxvf yourfile.tar.`
 - II. `tar -xvf yourfile.tar`

Assignments

Assignment 1

Ques 1: Display your current directory?

Sol: Type pwd

Ques 2: Change to the /etc directory?

Sol:

```
user@ubuntu:~$ cd /etc
user@ubuntu:/etc$ ls
acpi                group-              passwd-
adduser.conf        grub.d             pcmcia
```

Ques 3: Now change to your home directory using only three key presses?

Sol:

```
user@ubuntu:/etc$ cd
user@ubuntu:~$
```

Assignment 1 (Cont..)

Ques 4: Go to the root directory & list the contents of the root directory?

Sol:

```
user@ubuntu:~$ cd /
user@ubuntu:/$ ls
bin      dev      initrd.img  media  proc  selinux  tmp
boot     etc      lib         mnt    root  srv      usr
```

Ques 5: Stay where you are, and list the contents of /bin and /sbin ?

Sol:

```
user@ubuntu:/$ ls /bin /sbin
/bin:
bash      dumpkeys  mountpoint
bunzip2   echo      mt
```

```
/sbin:
acpi_available  fsck.vfat
alsa            fstab-decode
```

Assignment 1 (Cont..)

Ques 6: List all the files (including hidden files) in your home directory?

Sol:

```
user@ubuntu:/$ ls -al ~
total 180
drwxr-xr-x 31 user user 4096 2014-07-19 19:33 .
drwxr-xr-x  5 root root 4096 2014-07-19 19:21 ..
-rw-r--r--  1 user user 2890 2014-07-19 19:30 .bash_history
-rw-r--r--  1 user user  220 2010-04-29 19:41 .bash_logout
-rw-r--r--  1 user user  310 2010-04-29 19:41 .bashrc
```

Ques 7: Create a directory testdir in your home directory?

Sol:

```
user@ubuntu:~$ mkdir ~testdir
user@ubuntu:~$ ls
Desktop      eclipse      Music        Templates
Documents    examples.desktop  Pictures     ~testdir
Downloads    hadoop       Public       Videos
```

Assignment 1 (Cont..)

Ques 8: Create in one command the directories ~/dir1/dir2/dir3 (dir3 is a subdirectory from dir2, and dir2 is a subdirectory from dir1)

Sol:

```
mkdir: cannot create directory ~/dir1/dir2/dir3
user@ubuntu:~$ mkdir -p ~/dir1/dir2/dir3
user@ubuntu:~$ ls
```

Desktop	Downloads	eclipse	hadoop	Pictures
dir1			Music	Public
Documents	examples.desktop	~p		Templates

Ques 9: Remove the directory testdir

Sol:

```
user@ubuntu:~$ rmdir ~testdir
user@ubuntu:~$ ls
```

Desktop	Documents	eclipse	hadoop	~p	Public	Videos
dir1	Downloads	examples.desktop	Music	Pictures	Templates	workspace

Assignment 2

Ques 1: How to create a directory and entering files into it?

Sol:

```
user@ubuntu:~$ mkdir HELLO
user@ubuntu:~$ cd HELLO
user@ubuntu:~/HELLO$ cd ..
user@ubuntu:~$ cd HELLO
```

```
user@ubuntu:~/HELLO$ vi today.txt
user@ubuntu:~/HELLO$ vi today.txt
user@ubuntu:~/HELLO$ vi yesterday.txt
user@ubuntu:~/HELLO$ ls
today.txt  yesterday.txt
```

Ques 2: Rename today.txt to hi ?

Sol:

```
user@ubuntu:~/HELLO$ mv today.txt hi
user@ubuntu:~/HELLO$ ls
hi  yesterday.txt
user@ubuntu:~/HELLO$ cd
```


Assignment 2 (Cont..)

Ques 3: Create a directory called testbackup and copy all files from HELLO into it?

Sol:

```
user@ubuntu:~$ mkdir testbackup ; cp -r HELLO testbackup
user@ubuntu:~$ cd testbackup/
user@ubuntu:~/testbackup$ ls
HELLO
```

Ques 4: Use one command to remove the directory testbackup and all files into it?

Sol:

```
user@ubuntu:~$ rm -rf testbackup
user@ubuntu:~$ ls
Desktop      Downloads      hadoop  ~p      Templates
dir1         eclipse        HELLO   Pictures Videos
Documents   examples.desktop Music    Public   workspace
```

Assignment 2 (Cont..)

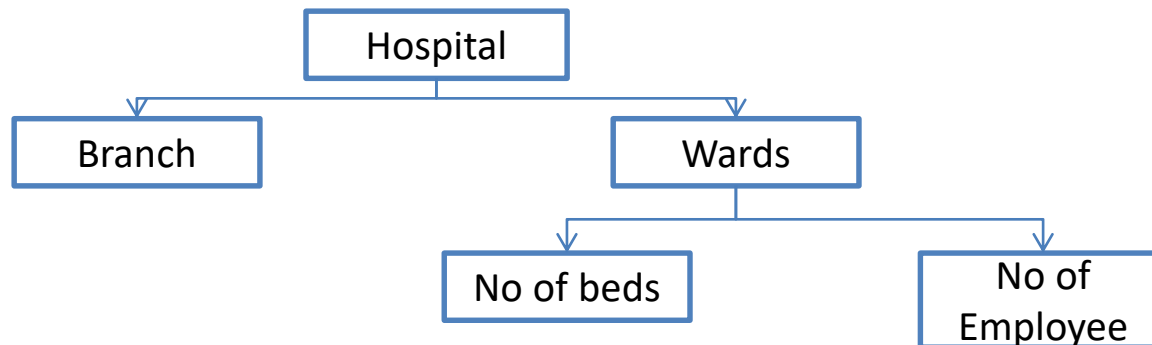
Ques 5: Switch to Root from normal user and vice-versa and create a directory on desktop?

Sol:

```
user@ubuntu:~$ su root
Password:
root@ubuntu:/home/user# su user
user@ubuntu:~$ cd Desktop
user@ubuntu:~/Desktop$ mkdir disk
user@ubuntu:~/Desktop$ ls
3_&_4_MapReducer  eclipse-jee-indigo-SR2-linux-gtk.tar.gz  Subscriber
aircel.jar         gnome-terminal.desktop                  UN.txt
Data_File.txt     hadoop-eclipse-plugin-1.2.1.jar_.zip
disk              nautilus-computer.desktop
```

Ques 6: Check out your :-

- Directory you created on Desktop by moving into it.
- Create a sub directory as the fig given below under normal user.



- Copy the No.of employee folder in to No of beds folder

Assignment 2 (Cont..)

Sol:

```
user@ubuntu:~/Desktop$ mkdir disk
user@ubuntu:~/Desktop$ ls
3_&_4_MapReducer  eclipse-jee-indigo-SR2-linux-gtk.tar.gz  Subscriber
aircel.jar         gnome-terminal.desktop                  UN.txt
Data_File.txt     hadoop-eclipse-plugin-1.2.1.jar_.zip
disk              nautilus-computer.desktop
user@ubuntu:~/Desktop$ cd disk/
```

```
user@ubuntu:~/Desktop$ tree hospital
hospital
├── branch
├── ward
│   ├── no.ofbed
│   └── no.ofemployee
4 directories, 0 files
```

Assignments as home Works

- **Ques 1: Make a file named Hadoop under a directory Project on Desktop?**
- **Ques 2: Delete this file after copying it to another directory names yarn?**
- **Que 3: Opening vi editor and typing something in it and saving it?**
- **Ques 4: Opening a previously saved text file and edit using gedit?**
- **Ques 5: Adding new user to Ubuntu?**
- **Ques 6: Getting used to all the Commands told in the Session?**

Commands Contd....

Ques 7: Display the first 12 lines of `/etc/services`.

Sol:

```
user@ubuntu:~$ head -12 /etc/services
# Network services, Internet style
#
# Note that it is presently the policy of IANA to assign a single well-known
# port number for both TCP and UDP; hence, officially ports have two entries
# even if the protocol doesn't support UDP operations.
#
# Updated from http://www.iana.org/assignments/port-numbers and other
# sources like http://www.freebsd.org/cgi/cvsweb.cgi/src/etc/services .
# New ports will be added on request if they have been officially assigned
# by IANA and used in the real-world or are needed by a debian package.
# If you need a huge list of used numbers please install the nmap package.
```

Ques 8: Display the last line of `/etc/passwd` ?

Sol:

```
user@ubuntu:~$ tail -1 /etc/passwd
hadoop_user:x:1001:1001:,,,:/home/hadoop_user:/bin/bash
user@ubuntu:~$ cat
```

Commands Contd....

Ques 9: Use cat to create a file named number.txt that looks like this

Sol:

```
user@ubuntu:~$ cat > number.txt
one
two
three
fouruser@ubuntu:~$ cp number.txt count.txt
user@ubuntu:~$ cat count.txt
```

Ques 10: Use cp to make a backup of this file to count.txt. and Display count.txt, but with all lines in reverse order (the last line first)?

Sol:

```
user@ubuntu:~$ cat > number.txt
one
two
three
fouruser@ubuntu:~$ cp number.txt count.txt
user@ubuntu:~$ tac count.txt
fourthree
two
```


Commands Contd....

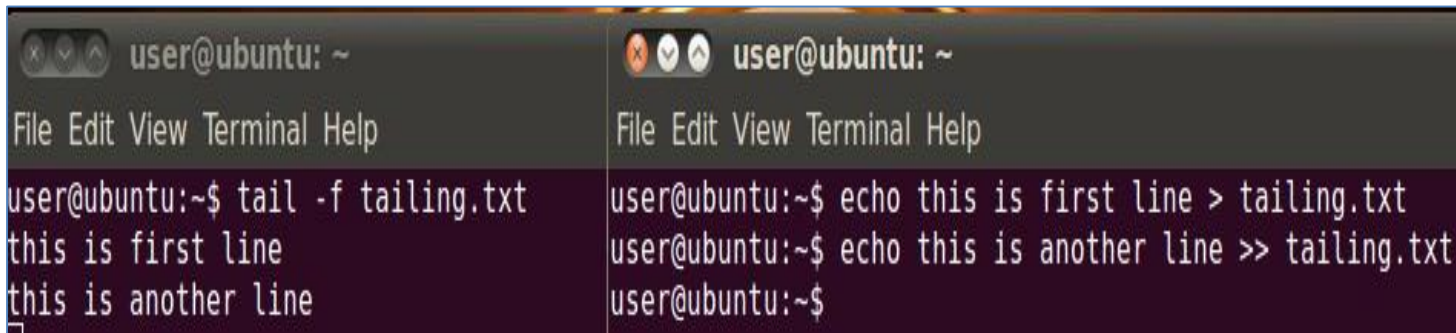
Ques 11: Use ls to find the biggest file in /etc ?

Sol:

```
user@ubuntu:~$ ls -lrs /etc
total 1088
4 -rw-r--r-- 1 root root 645 2010-04-15 03:59 zsh_command_not_found
4 drwxr-xr-x 2 root root 4096 2010-04-29 18:58 xulrunner-1.9.2
4 drwxr-xr-x 2 root root 4096 2010-04-29 19:14 xul-ext
4 drwxr-xr-x 2 root root 4096 2010-04-29 18:58 xml
4 drwxr-xr-x 6 root root 4096 2010-04-29 19:10 xdg
4 drwxr-xr-x 10 root root 4096 2010-04-29 19:18 X11
4 drwxr-xr-x 2 root root 4096 2010-04-29 19:09 wpa_supplicant
4 -rw-r--r-- 1 root root 1343 2007-01-09 13:39 wodim.conf
8 -rw-r--r-- 1 root root 4496 2010-01-06 09:02 wgetrc
```

Ques 12: Open two terminal windows (or tabs) and make sure you are in the same directory in both Type echo this is the first line > tailing.txt in the first terminal, then issue tail -f tailing.txt in the second terminal. Now go back to the first terminal and type echo This is another line >> tailing.txt (note the double >>), verify that the tail -f in the second terminal shows both lines. Stop the tail -f with Ctrl-C.

Sol:

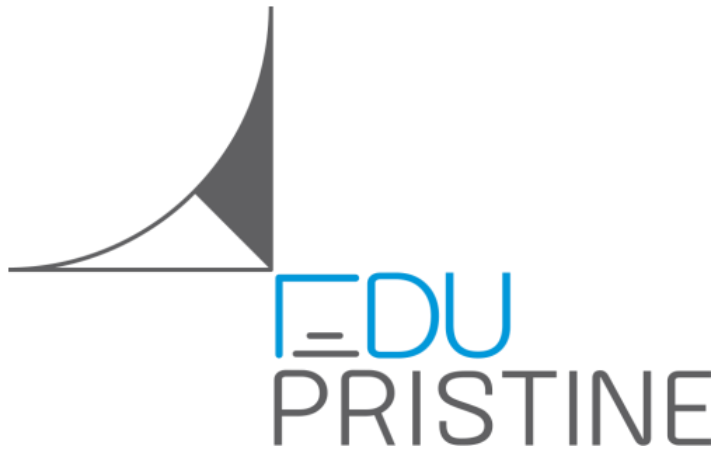


```
user@ubuntu: ~
File Edit View Terminal Help
user@ubuntu:~$ tail -f tailing.txt
this is first line
this is another line

user@ubuntu: ~
File Edit View Terminal Help
user@ubuntu:~$ echo this is first line > tailing.txt
user@ubuntu:~$ echo this is another line >> tailing.txt
user@ubuntu:~$
```

Extra Quiz

- **Ques :** Use cat to create a file named tailing.txt that contains the contents of tailing.txt followed by the contents of /etc/passwd.



Thank You!

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