Week 1 Laboratory Note

Learning Objectives

Students would learn how:

- To install Virtual Box on a computer system.
- To install a Linux operating system within the virtual box environment.
- To install software (Visual Studio Code) on Linux operating systems.
- To work with basic Linux commands.

Requirement

Download the latest Desktop version of Virtual Box from https://www.virtualbox.org/wiki/Downloads

Download the latest Desktop version of Ubuntu from http://www.ubuntu.com/download/desktop

Download the latest version of Visual Studio Code from https://code.visualstudio.com/download

Access the installation guide from https://www.makeuseof.com/install-ubuntu-virtualbox/

Linux Command

There are different commands in Linux. These commands perform different functions.

Hardware Operations

- Display bootup messages:

dmesg

- Display memory usage details:

free -h

- Display information about block devices:

lsblk

- Display CPU details:

cat /proc/cpuinfo

- Outline hardware configuration details:

lshw

- Display disk data details:

hdparm -i /dev/disk

- Display hardware information as stated in BIOS:

dmidecode

- Display USB devices using tree-like format:

lsusb -tv

- Display PCI devices using tree-like format:

lspci -tv

- Execute read-speed test on device/disk:

hdparm -tT /dev/[device]

File Commands

- List files in the directory:

ls

- List all files including hidden files:

ls -a

- Display current directory:

pwd

- Create a new directory:

mkdir [directory name]

- Remove a file:

rm [file name]

- Remove a directory recursively:

rm -r [directory name]

- Remove a directory without requiring confirmation recursively:

rm -rf [directory name]

- Copy the contents of one file to another file:

cp [file name 1] [file name 2]

- Copy the contents of one file to a second file recursively:

cp -r [directory name 1] [directory name 2]

- Rename [file name 1] to [file name 2] with the command:

mv [file name 1] [file name 2]

- Create a new file using touch:

touch [file name]

- Display the contents of a file:

more [file name]

cat [file name]

- Append file contents to another file:

cat [file name 1] >> [file name 2]

- Display the first 10 lines of a file with head command:

head [file name]

- Display the last 10 lines of a file with tail command:

tail [file_name]

- Encrypt a file:

gpg -c [file_name]

- Decrypt a file:

gpg [file_name.gpg]

- Show the number of words, lines, and bytes in a file using wc:

wc

- List number of lines/words/characters in each file in a directory with the xargs command:

ls | xargs wc

- Overwrite a file to prevent its recovery, then delete it:

shred -u [filename]

Package Installation

There are different ways to install a package.

- Install a package using the APT package manager:

apt install [package name]

- Install an .rpm package from a local file:

rpm -i [package name.rpm]

- Remove an .rpm package:

rpm -e [package name.rpm]

- Install software from source code:

tar zxvf [source_code.tar.gz]

cd [source_code]

./configure

make

make install

- Install a package using the DNF package manager:

dnf install [package name.rpm]

- List all installed packages with yum:

yum list installed

- Display package information and summary:

yum info [package name]

- Find a package by a related keyword:

yum search [keyword]

- Install a package using the YUM package manager:

yum install [package name.rpm]

System Management and Information

- Display system information using uname:

uname -r

- Display how long the system has been running, including load average:

uptime

- See system hostname:

hostname

- Show the IP address of the system:

hostname -i

- List system reboot history:

last reboot

- See current time and date:

date

- Query and change the system clock with:

timedatectl

- Show current calendar (month and day):

cal

- List logged in users:

w

- See which user you are using:

whoami

- Show information about a particular user:

finger [username]

- Shut Down the system immediately:

shutdown now

File Permission

- Assign read, write, and execute permission to everyone:

chmod 777 [file name]

- Give read, write, and execute permission to owner, and read and execute permission to group and others:

chmod 755 [file name]

- Assign full permission to owner, and read and write permission to group and others:

chmod 766 [file name]

- Change the ownership of a file:

chown [user] [file name]

- Change the owner and group ownership of a file:

chown [user]:[group] [file name]

Exercise

- Go to the /etc directory and list the content.
- Check the rest of the filesystem tree using cd, ls, pwd and cat.
    - Including /bin, /usr/bin, /sbin, /tmp and /boot.
- Return to $home directory.
- Create a directory with name “folder_1”
- Navigate into the folder.
- Create a file with name “test_1”.
- Open the file and put some content (not in the terminal)
- Copy the file “test_1” to “test_2” in the same directory.
- Return back to home directory
- Create another directory called “folder_2”.
- Copy “test_1” from “folder_1” to “test_1” in “folder_2”
- Compare “test_1” in “folder_2” to “test_2” in "folder_1”
- Schedule a system shutdown to the next 10 minutes.
- Put on the system again.
- List all the directories and files that you created.