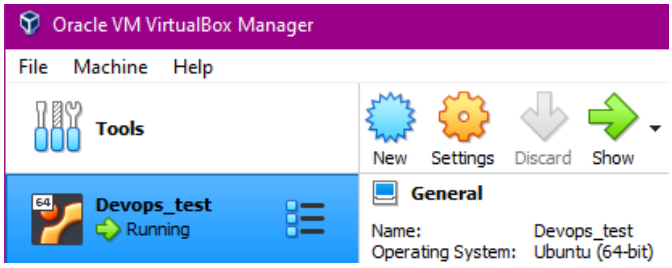
Day 1. Unit 1: Set up Lab

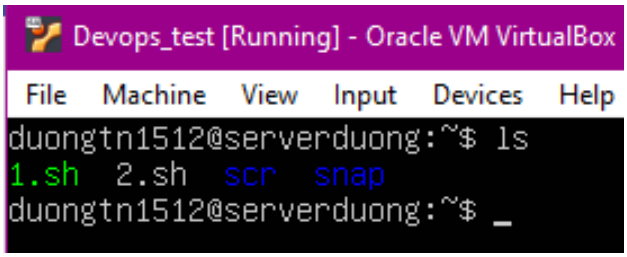
Assignment : Install Ubuntu on Vmware/Virtualbox - Install Vmware/Virtualbox on laptop/PC.

- Download Ubuntu iso and install.

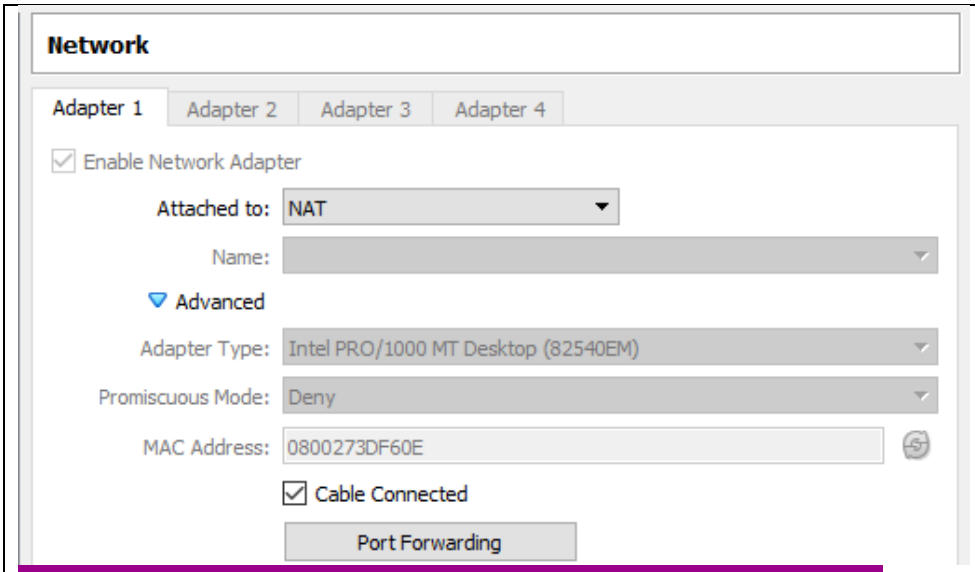
Ubuntu iso

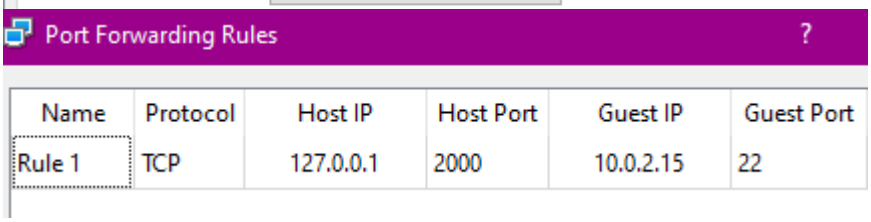
Install Ubuntu on VirtualBox





- Config network connect to internet





Show ip address

ip addr

```
duongtn1512@serverduong:~$ ip addr | grep inet
    inet 127.0.0.1/8 scope host lo
    inet6 ::1/128 scope host
    inet 10.0.2.15/24 metric 100 brd 10.0.2.255 scope global dynamic enp0s3
    inet6 fe80::a00:27ff:fe3d:f60e/64 scope link
duongtn1512@serverduong:~$ ping google.com
PING google.com (172.217.24.78) 56(84) bytes of data.
64 bytes from sin10s06-in-f78.1e100.net (172.217.24.78): icmp_seq=1 ttl=112 time=53.6 ms
64 bytes from hkg07s33-in-f14.1e100.net (172.217.24.78): icmp_seq=2 ttl=112 time=58.9 ms
```

- Show the current date and time, show the calendar for the previos month, current month and next month.

Show the current date and time

```
duongtn1512@serverduong:~$ date
Thu Jul 13 08:48:42 PM UTC 2023
```

Show the calendar for the previos month

```
duongtn1512@serverduong:~$ cal -1 -B1
     June 2023              July 2023
Su Mo Tu We Th Fr Sa  Su Mo Tu We Th Fr Sa
             1  2  3                     1
 4  5  6  7  8  9 10   2  3  4  5  6  7  8
11 12 13 14 15 16 17   9 10 11 12 13 14 15
18 19 20 21 22 23 24  16 17 18 19 20 21 22
25 26 27 28 29 30     23 24 25 26 27 28 29
                      30 31
```

Show the current month and next month

```
duongtn1512@serverduong:~$ cal -1 -A1
     July 2023            August 2023
Su Mo Tu We Th Fr Sa  Su Mo Tu We Th Fr Sa
                   1            1  2  3  4  5
 2  3  4  5  6  7  8   6  7  8  9 10 11 12
 9 10 11 12 13 14 15  13 14 15 16 17 18 19
16 17 18 19 20 21 22  20 21 22 23 24 25 26
23 24 25 26 27 28 29  27 28 29 30 31
30 31
```

- Look up the man page for the command.

We use command man man

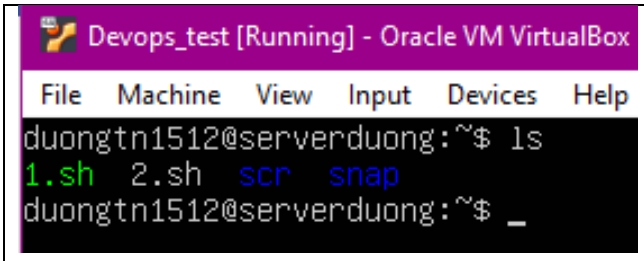
man man

```
MAN(1)                          Manual pager utils                          MAN(1)

NAME
       man - an interface to the system reference manuals

SYNOPSIS
       man [man options] [[section] page ...] ...
       man -k [apropos options] regexp ...
       man -K [man options] [section] term ...
       man -f [whatis options] page ...
       man -l [man options] file ...
       man -w|-W [man options] page ...

DESCRIPTION
       man is the system's manual pager.  Each page argument given to man is normally the name of
       a program, utility or function.  The manual page associated with each of  these  arguments
       is then found and displayed.  A section, if provided, will direct man to look only in that
       section of the manual.  The default action is to search in all of the  available  sections
       following  a pre-defined order (see DEFAULTS), and to show only the first page found, even
       if page exists in several sections.
```

When you run the "man" command followed by the name of a command, such as "man ls", it will display the corresponding manual page for that command. The manual page contains information on how to use the command, its options, syntax, examples, and other related information.

Objectives:

- ✓ Install Ubuntu OS successful



- ✓ Connect to Ubuntu from your machine via SSH

Connect to Ubuntu from host window 10 machine via SSH through port forward 2000

```
PS C:\Users\ADMIN\OneDrive\Desktop> ssh -p 2000 duongtn1512@127.0.0.1
duongtn1512@127.0.0.1's password:
Welcome to Ubuntu 22.04.2 LTS (GNU/Linux 5.15.0-76-generic x86_64)
```

Enter password of user want to connect

```
Last login: Thu Jul 13 20:48:17 2023 from 10.0.2.2
duongtn1512@serverduong:~$ ls
1.sh  2.sh  scr  snap
duongtn1512@serverduong:~$ pwd
/home/duongtn1512
```

- ✓ Update your Ubuntu

Using sudo apt-get update and sudo apt-get upgrade to update our Ubuntu machine

sudo apt-get update

```
duongtn1512@serverduong:~$ sudo apt-get update | sudo apt-get upgrade
[sudo] password for duongtn1512:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
The following packages have been kept back:
  initramfs-tools initramfs-tools-bin initramfs-tools-core
0 upgraded, 0 newly installed, 0 to remove and 3 not upgraded.
```

sudo apt-get upgrade

```
duongtn1512@serverduong:~$ sudo apt-get upgrade
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
The following packages have been kept back:
  python3-debian
The following packages will be upgraded:
  initramfs-tools initramfs-tools-bin initramfs-tools-core ubuntu-advantage-tools
4 upgraded, 0 newly installed, 0 to remove and 1 not upgraded.
```

End result

```
Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
duongtn1512@serverduong:~$
```

Technical Requirements:

- Know Virtualization, OS and network

Day 1. Unit 2: Work with Files and Directories

Assignment : Manage files and directories

- Create, copy, move files and directories, use tree, locate command.

Create new directories

mkdir

```
duongtn1512@serverduong:~$ ls
1.sh  2.sh  scr  snap
duongtn1512@serverduong:~$ mkdir new_floder
duongtn1512@serverduong:~$ ls
1.sh  2.sh  new_floder  scr  snap
```

Create new file

touch

```
duongtn1512@serverduong:~$ cd new_floder
duongtn1512@serverduong:~/new_floder$ touch file_1.txt
duongtn1512@serverduong:~/new_floder$ ls
file_1.txt
duongtn1512@serverduong:~/new_floder$
```

Copy file

cp

```
duongtn1512@serverduong:~/new_floder$ ls
file_1.txt
duongtn1512@serverduong:~/new_floder$ cp file_1.txt file_2.txt
duongtn1512@serverduong:~/new_floder$ ls
file_1.txt  file_2.txt
```

Move filem

mv

```
duongtn1512@serverduong:~$ ls
1.sh  2.sh  file_3.txt  new_floder  scr  snap
duongtn1512@serverduong:~$ mv file_3.txt new_floder
duongtn1512@serverduong:~$ ls new_floder
file_1.txt  file_2.txt  file_3.txt
```

Using tree command

tree

```
duongtn1512@serverduong:~$ tree new_floder
new_floder
├── file_1.txt
├── file_2.txt
└── file_3.txt

0 directories, 3 files
```

Using locate command
locate

```
duongtn1512@serverduong:~$ ls
1.sh  2.sh  new_floder  scr  snap
duongtn1512@serverduong:~$ locate 1.sh
/home/duongtn1512/1.sh
/home/duongtn1512/scr/1.sh
/usr/src/linux-headers-5.15.0-76/tools/testing/selftests/net/forwarding/router_vid_1.sh
/usr/src/linux-headers-5.15.0-76/tools/testing/selftests/zram/zram01.sh
/var/lib/dpkg/info/libvolume-key1.shlibs
```

- Show the fulll path name of your home directory.

Using echo ~ or pwd to show the fulll path name of your home directory
echo ~
pwd

```
duongtn1512@serverduong:~$ echo ~
/home/duongtn1512
duongtn1512@serverduong:~$ pwd
/home/duongtn1512
```

- Change permission file/directory (read, write, execute).

```
# Permission numbers are:
# 0 = --- // No Permission
# 1 = --x // Execute
# 2 = -w- // Write
# 3 = -wx // Write, Execute
# 4 = r-- // Read
# 5 = r-x // Read, Execute
# 6 = rw- // Read, Write
# 7 = rwx // Read, Write, Execute
# Change permission directory
chmod <numbers> new_floder
```

```
duongtn1512@serverduong:~$ ls -lr
total 20
drwx------ 3 duongtn1512 duongtn1512 4096 Jul 10 18:01 snap
drwxrwxr-x 2 duongtn1512 duongtn1512 4096 Jul 10 18:29 scr
drwxrwxr-x 2 duongtn1512 duongtn1512 4096 Jul 13 21:19 new_floder
-rw-rw-r-- 1 duongtn1512 duongtn1512    1 Jul 12 13:11 2.sh
-rwxr--r-- 1 duongtn1512 duongtn1512   17 Jul 12 13:18 1.sh
duongtn1512@serverduong:~$ chmod 777 new_floder
duongtn1512@serverduong:~$ ls -lr
total 20
drwx------ 3 duongtn1512 duongtn1512 4096 Jul 10 18:01 snap
drwxrwxr-x 2 duongtn1512 duongtn1512 4096 Jul 10 18:29 scr
drwxrwxrwx 2 duongtn1512 duongtn1512 4096 Jul 13 21:19 new_floder
-rw-rw-r-- 1 duongtn1512 duongtn1512    1 Jul 12 13:11 2.sh
-rwxr--r-- 1 duongtn1512 duongtn1512   17 Jul 12 13:18 1.sh
```

Change permission file

chmod <numbers> 2.sh

```
duongtn1512@serverduong:~$ ls -l
total 20
-rwxr--r-- 1 duongtn1512 duongtn1512   17 Jul 12 13:18 1.sh
-rw-rw-r-- 1 duongtn1512 duongtn1512    1 Jul 12 13:11 2.sh
drwxrwxr-x 2 duongtn1512 duongtn1512 4096 Jul 13 21:29 new_floder
drwxrwxr-x 2 duongtn1512 duongtn1512 4096 Jul 10 18:29 scr
drwx------ 3 duongtn1512 duongtn1512 4096 Jul 10 18:01 snap
duongtn1512@serverduong:~$ chmod 766 2.sh
duongtn1512@serverduong:~$ ls -l
total 20
-rwxr--r-- 1 duongtn1512 duongtn1512   17 Jul 12 13:18 1.sh
-rwxrw-rw- 1 duongtn1512 duongtn1512    1 Jul 12 13:11 2.sh
drwxrwxr-x 2 duongtn1512 duongtn1512 4096 Jul 13 21:29 new_floder
drwxrwxr-x 2 duongtn1512 duongtn1512 4096 Jul 10 18:29 scr
drwx------ 3 duongtn1512 duongtn1512 4096 Jul 10 18:01 snap
```

- Compress, extract files and directories with zip, tar, 7z, …

Compress files and directories with zig]p

```
duongtn1512@serverduong:~$ ls
1.sh  2.sh  new_floder  scr  snap
duongtn1512@serverduong:~$ zip archive.zig new_floder
  adding: new_floder/ (stored 0%)
duongtn1512@serverduong:~$ ls
1.sh  2.sh  archive.zig  new_floder  scr  snap
```

Extrac file and directories with zip

```
duongtn1512@serverduong:~$ unzip archive.zig
Archive:  archive.zig
duongtn1512@serverduong:~$ ls
1.sh  2.sh  archive.zig  new_floder  scr  snap
duongtn1512@serverduong:~$
```

- Edit file by vim, nano.

Edit file using nano

```
duongtn1512@serverduong:~$ ls
1.sh  2.sh  archive.zig  new_floder  scr  snap
duongtn1512@serverduong:~$ cat 1.sh
#!bin/bash
```

nano 1.sh

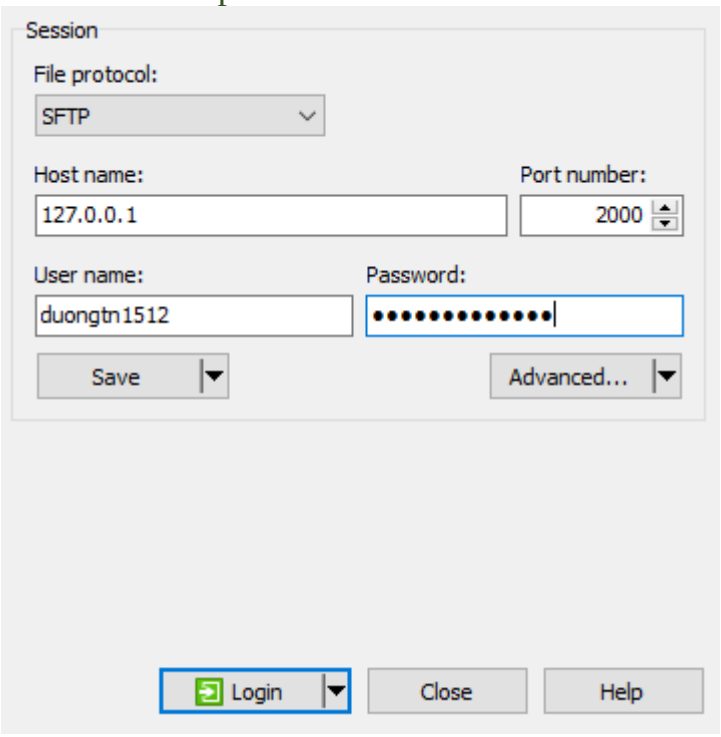
```
  GNU nano 6.2
#!bin/bash
echo Hello world
echo Time is
date
```

Ctrl x + y to save new edited file

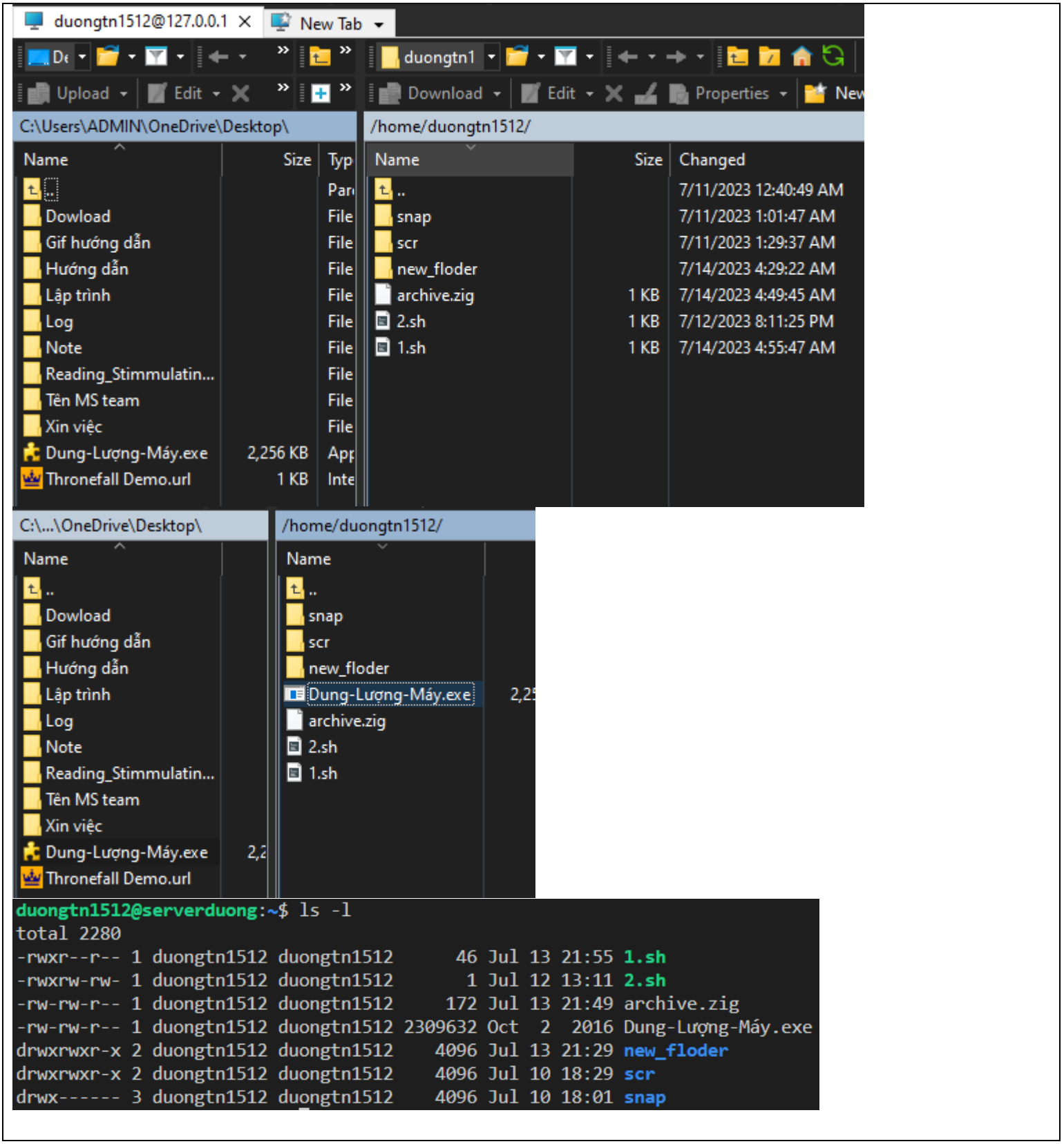
```
duongtn1512@serverduong:~$ cat 1.sh
#!bin/bash
echo Hello world
echo Time is
date
```

- Use winscp transfer files from other machine to Ubuntu.

Install winscp and conect to Ubuntu server running with port forward -p 2000



To transfer files hold a left click on a file and drag it to the machine you want to place



Objectives:

- ✓ Manage files and directories.
- ✓ Use common editor competently.
- ✓ Transfer file to Ubuntu.

Technical Requirements:

- Know compress and extract tool.

- Know winscp tool.

Day 2. Unit 3: System Management

Assignment 1: Managing software, system and network

- Using apt, apt-get, dpkg, … manage package update, install, remove software (nginx, apache2, sql, …).

We using apt-get update and upgrade our system

```
Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
duongtn1512@serverduong:~$
```

We start to install nginx

sudo apt-get install nginx

```
duongtn1512@serverduong:~$ sudo apt-get install nginx
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  fontconfig-config fonts-dejavu-core libdeflate0 libfontconfig1 libgd3 libjbig0 libjpeg-turbo8 libjpeg8
  libnginx-mod-http-geoip2 libnginx-mod-http-image-filter libnginx-mod-http-xslt-filter libnginx-mod-mail
  libnginx-mod-stream libnginx-mod-stream-geoip2 libtiff5 libwebp7 libxpm4 nginx-common nginx-core
Suggested packages:
  libgd-tools fcgiwrap nginx-doc ssl-cert
The following NEW packages will be installed:
  fontconfig-config fonts-dejavu-core libdeflate0 libfontconfig1 libgd3 libjbig0 libjpeg-turbo8 libjpeg8
  libnginx-mod-http-geoip2 libnginx-mod-http-image-filter libnginx-mod-http-xslt-filter libnginx-mod-mail
  libnginx-mod-stream libnginx-mod-stream-geoip2 libtiff5 libwebp7 libxpm4 nginx nginx-common nginx-core
0 upgraded, 20 newly installed, 0 to remove and 1 not upgraded.
```

Adjusting the Firewall

List the application configurations that ufw knows how to work with using

sudo ufw app list

```
duongtn1512@serverduong:~$ sudo ufw app list
Available applications:
  Nginx Full
  Nginx HTTP
  Nginx HTTPS
  OpenSSH
duongtn1512@serverduong:~$
```

We allow Nginx HTTP on port 80

sudo ufw allow ‘Nginx HTTP’

```
duongtn1512@serverduong:~$ sudo ufw allow 'Nginx HTTP'
Rules updated
Rules updated (v6)
```

We enable trafic on port 80 and check for status conection

sudo ufw enable

sudo ufw status

```
duongtn1512@serverduong:~$ sudo ufw enable
Command may disrupt existing ssh connections. Proceed with operation (y|n)? y
Firewall is active and enabled on system startup
duongtn1512@serverduong:~$ sudo ufw status
Status: active

To                         Action      From
--                         ------      ----
Nginx HTTP                 ALLOW       Anywhere
Nginx HTTP (v6)            ALLOW       Anywhere (v6)
```

We checking systemd init system to make sure the service is running

systemctl status nginx

```
duongtn1512@serverduong:~$ systemctl status nginx
● nginx.service - A high performance web server and a reverse proxy server
     Loaded: loaded (/lib/systemd/system/nginx.service; enabled; vendor preset: enabled)
     Active: active (running) since Fri 2023-07-14 07:59:25 UTC; 10min ago
       Docs: man:nginx(8)
    Process: 14562 ExecStartPre=/usr/sbin/nginx -t -q -g daemon on; master_process on; (code=exited, status=0/SUCCESS)
    Process: 14564 ExecStart=/usr/sbin/nginx -g daemon on; master_process on; (code=exited, status=0/SUCCESS)
   Main PID: 14665 (nginx)
      Tasks: 2 (limit: 1602)
     Memory: 4.6M
        CPU: 115ms
     CGroup: /system.slice/nginx.service
             ├─14665 "nginx: master process /usr/sbin/nginx -g daemon on; master_process on;"
             └─14668 "nginx: worker process" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" >

Jul 14 07:59:25 serverduong systemd[1]: Starting A high performance web server and a reverse proxy server...
Jul 14 07:59:25 serverduong systemd[1]: Started A high performance web server and a reverse proxy server.
lines 1-16/16 (END)
```

To stop nginx

sudo systemctl stop nginx

```
duongtn1512@serverduong:~$ sudo systemctl stop nginx
duongtn1512@serverduong:~$ systemctl status nginx
○ nginx.service - A high performance web server and a reverse proxy server
     Loaded: loaded (/lib/systemd/system/nginx.service; enabled; vendor preset: enabled)
     Active: inactive (dead) since Fri 2023-07-14 08:16:37 UTC; 14s ago
```

To start nginx

sudo systemctl start nginx

```
duongtn1512@serverduong:~$ sudo systemctl start nginx
duongtn1512@serverduong:~$ systemctl status nginx
● nginx.service - A high performance web server and a reverse proxy server
     Loaded: loaded (/lib/systemd/system/nginx.service; enabled; vendor preset: enabled)
     Active: active (running) since Fri 2023-07-14 08:18:29 UTC; 3s ago
```

Making configuration changes, Nginx can often reload without dropping connections

sudo systemctl reload nginx

```
duongtn1512@serverduong:~$ sudo systemctl reload nginx
duongtn1512@serverduong:~$ systemctl status nginx
● nginx.service - A high performance web server and a reverse proxy server
     Loaded: loaded (/lib/systemd/system/nginx.service; enabled; vendor preset: enabled)
     Active: active (running) since Fri 2023-07-14 08:18:29 UTC; 1min 23s ago
```

To remove nginx we remove it with out nginx config file

sudo apt remove nginx nginx-common nginx-core

```
duongtn1512@serverduong:~$ sudo apt remove nginx nginx-common nginx-core
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer requ
  fontconfig-config fonts-dejavu-core libdeflate0 libfontconfig1 libgd3 li
  libwebp7 libxpm4
Use 'sudo apt autoremove' to remove them.
The following packages will be REMOVED:
```

Delete unwanted libs installed by the Nginx

sudo apt autoremove

```
duongtn1512@serverduong:~$ sudo apt autoremove
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages will be REMOVED:
  fontconfig-config fonts-dejavu-core libdeflate0 libfontconfig1
  libwebp7 libxpm4
0 upgraded, 0 newly installed, 11 to remove and 1 not upgraded.
After this operation, 5,940 kB disk space will be freed.
```

Verify that /etc/nginx/ and /usr/share/nginx/ are empty

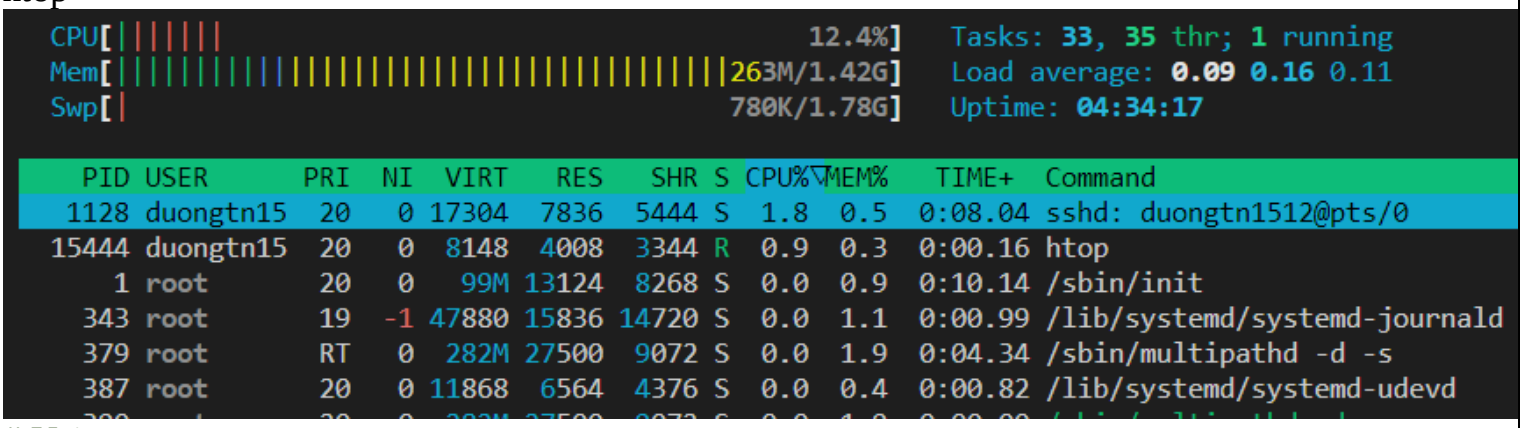
ls -l /etc/nginx/ /usr/share/nginx/

```
duongtn1512@serverduong:~$ ls -l /etc/nginx/ /usr/share/nginx/
ls: cannot access '/usr/share/nginx/': No such file or directory
/etc/nginx/:
```

- Managing system (task, service, …) use tool: ps, top, htop, kill, grep process.

Using htop

htop



Using ps -a

ps -a

```
duongtn1512@serverduong:~$ ps -a
    PID TTY          TIME CMD
    841 tty1     00:00:00 bash
   1065 tty1     00:00:00 pager
  14959 pts/0    00:00:00 systemctl
  14960 pts/0    00:00:00 pager
  15447 pts/0    00:00:00 ps
```

To check process using grep

ps aux | grep <process_name>

```
duongtn1512@serverduong:~$ ps aux | grep bash
duongtn+     841  0.0  0.3   8740  5168 tty1     S+   03:53   0:00 -bash
duongtn+    1129  0.0  0.3   8732  5380 pts/0    Ss   04:03   0:00 -bash
duongtn+   15449  0.0  0.1   6608  2252 pts/0    S+   08:29   0:00 grep --color=auto bash
```

To kill a process

kill <opstion> <PID process>

```
duongtn1512@serverduong:~$ ps -a
    PID TTY          TIME CMD
    841 tty1     00:00:00 bash
   1065 tty1     00:00:00 pager
  14959 pts/0    00:00:00 systemctl
  14960 pts/0    00:00:00 pager
  15464 pts/0    00:00:00 ps
duongtn1512@serverduong:~$ kill -9 841
duongtn1512@serverduong:~$ ps -a
    PID TTY          TIME CMD
  14959 pts/0    00:00:00 systemctl
  14960 pts/0    00:00:00 pager
  15467 pts/0    00:00:00 ps
```

- Managing network (IP, port, display network, domain,…) use tool: netstat, …

Using netstat

Display all listening ports:

netstat -tuln

```
duongtn1512@serverduong:~$ netstat -tuln
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN
tcp        0      0 127.0.0.53:53           0.0.0.0:*               LISTEN
tcp6       0      0 :::22                   :::*                    LISTEN
udp        0      0 127.0.0.53:53           0.0.0.0:*
udp        0      0 10.0.2.15:68            0.0.0.0:*
```

Show all active network connections:

netstat -an

```
duongtn1512@serverduong:~$ netstat -an
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN
tcp        0      0 127.0.0.53:53           0.0.0.0:*               LISTEN
tcp        0      0 10.0.2.15:22            10.0.2.2:60756          ESTABLISHED
tcp6       0      0 :::22                   :::*                    LISTEN
udp        0      0 127.0.0.53:53           0.0.0.0:*
udp        0      0 10.0.2.15:68            0.0.0.0:*
raw6       0      0 :::58                   :::*                    7
Active UNIX domain sockets (servers and established)
Proto RefCnt Flags       Type       State         I-Node   Path
unix  2      [ ]         DGRAM                    20917    /run/user/1000/systemd/notify
unix  2      [ ACC ]     STREAM     LISTENING     20920    /run/user/1000/systemd/private
unix  2      [ ACC ]     STREAM     LISTENING     20928    /run/user/1000/bus
```

Display network statistics for each protocol:

netstat -s

```
duongtn1512@serverduong:~$ netstat -s
Ip:
    Forwarding: 2
    7326 total packets received
    2 with invalid addresses
    0 forwarded
    0 incoming packets discarded
    7324 incoming packets delivered
    4876 requests sent out
    20 outgoing packets dropped
Icmp:
    40 ICMP messages received
    0 input ICMP message failed
    ICMP input histogram:
        destination unreachable: 40
```

Show the routing table:

netstat -r

```
duongtn1512@serverduong:~$ netstat -r
Kernel IP routing table
Destination     Gateway         Genmask         Flags   MSS Window  irtt Iface
default         10.0.2.2        0.0.0.0         UG        0 0          0 enp0s3
10.0.2.0        0.0.0.0         255.255.255.0   U         0 0          0 enp0s3
10.0.2.2        0.0.0.0         255.255.255.255 UH        0 0          0 enp0s3
192.168.0.1     10.0.2.2        255.255.255.255 UGH       0 0          0 enp0s3
```

Display process ID (PID) associated with each network connection:

netstat -p

```
duongtn1512@serverduong:~$ netstat -p
(Not all processes could be identified, non-owned process info
 will not be shown, you would have to be root to see it all.)
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State       PID/Program name
tcp        0      0 10.0.2.15:ssh           10.0.2.2:60756          ESTABLISHED -
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type       State         I-Node   PID/Program name     Path
unix  2      [ ]         DGRAM                    20917    833/systemd          /run/user/1000/systemd/notify
unix  3      [ ]         DGRAM      CONNECTED     18028    -                    /run/systemd/notify
unix  2      [ ]         DGRAM                    18045    -                    /run/systemd/journal/syslog
unix  9      [ ]         DGRAM      CONNECTED     18054    -                    /run/systemd/journal/dev-log
unix  9      [ ]         DGRAM      CONNECTED     18056    -                    /run/systemd/journal/socket
```

Show network connections for a specific port:

netstat -an | grep <port_number>

```
duongtn1512@serverduong:~$ netstat -an | grep 22
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN
tcp        0      0 10.0.2.15:22            10.0.2.2:60756          ESTABLISHED
tcp6       0      0 :::22                   :::*                    LISTEN
unix  3      [ ]         STREAM     CONNECTED     20922
```

Objectives:

- ✓ Manage package software
- ✓ Control process and network

Technical Requirements:

- Know process system

- Know network Questions to answer:

Assignment 2: Manage user & group permission, file permission

- Show all user who are currently logged in, use the utility that displays user's name

```
# To show all users who are currently logged in, you can use the
w
```

```
duongtn1512@serverduong:~$ w
 09:20:50 up  5:28,  1 user,  load average: 0.05, 0.04, 0.00
USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
duongtn1 pts/0    10.0.2.2         Thu20    0.00s  0.43s  0.00s w
```

- Show the ID number of the terminal that you are using

```
# To show the ID number of the terminal we are using
tty
```

```
duongtn1512@serverduong:~$ tty
/dev/pts/0
duongtn1512@serverduong:~$
```

```
# Our id is 0
```

- Show your user ID

```
# To show the user ID of the current user, we can use the id
id -u
```

```
duongtn1512@serverduong:~$ id -u
1000
duongtn1512@serverduong:~$ id
uid=1000(duongtn1512) gid=1000(duongtn1512) groups=1000(duongtn1512),4(adm),24(cdrom),27(sudo),30(dip),46(plugdev),110
(lxd)
```

```
# ID of the current user are 1000
```

- Check group of username

```
# To check the group of a specific username, we can use the
groups <username>
```

```
duongtn1512@serverduong:~$ groups duongtn1512
duongtn1512 : duongtn1512 adm cdrom sudo dip plugdev lxd
duongtn1512@serverduong:~$
```

- Change user, group file's permission (read, write, execute)

```
# Permission numbers are:
# 0 = --- // No Permission
# 1 = --x // Execute
# 2 = -w- // Write
# 3 = -wx // Write, Execute
# 4 = r-- // Read
# 5 = r-x // Read, Execute
# 6 = rw- // Read, Write
```

7 = rwx // Read, Write, Execute
Change permission directory
chmod <numbers> new_floder

```
duongtn1512@serverduong:~$ ls -lr
total 20
drwx------ 3 duongtn1512 duongtn1512 4096 Jul 10 18:01 snap
drwxrwxr-x 2 duongtn1512 duongtn1512 4096 Jul 10 18:29 scr
drwxrwxr-x 2 duongtn1512 duongtn1512 4096 Jul 13 21:19 new_floder
-rw-rw-r-- 1 duongtn1512 duongtn1512    1 Jul 12 13:11 2.sh
-rwxr--r-- 1 duongtn1512 duongtn1512   17 Jul 12 13:18 1.sh
duongtn1512@serverduong:~$ chmod 777 new_floder
duongtn1512@serverduong:~$ ls -lr
total 20
drwx------ 3 duongtn1512 duongtn1512 4096 Jul 10 18:01 snap
drwxrwxr-x 2 duongtn1512 duongtn1512 4096 Jul 10 18:29 scr
drwxrwxrwx 2 duongtn1512 duongtn1512 4096 Jul 13 21:19 new_floder
-rw-rw-r-- 1 duongtn1512 duongtn1512    1 Jul 12 13:11 2.sh
-rwxr--r-- 1 duongtn1512 duongtn1512   17 Jul 12 13:18 1.sh
```

Change permission file
chmod <numbers> 2.sh

```
duongtn1512@serverduong:~$ ls -l
total 20
-rwxr--r-- 1 duongtn1512 duongtn1512   17 Jul 12 13:18 1.sh
-rw-rw-r-- 1 duongtn1512 duongtn1512    1 Jul 12 13:11 2.sh
drwxrwxr-x 2 duongtn1512 duongtn1512 4096 Jul 13 21:29 new_floder
drwxrwxr-x 2 duongtn1512 duongtn1512 4096 Jul 10 18:29 scr
drwx------ 3 duongtn1512 duongtn1512 4096 Jul 10 18:01 snap
duongtn1512@serverduong:~$ chmod 766 2.sh
duongtn1512@serverduong:~$ ls -l
total 20
-rwxr--r-- 1 duongtn1512 duongtn1512   17 Jul 12 13:18 1.sh
-rwxrw-rw- 1 duongtn1512 duongtn1512    1 Jul 12 13:11 2.sh
drwxrwxr-x 2 duongtn1512 duongtn1512 4096 Jul 13 21:29 new_floder
drwxrwxr-x 2 duongtn1512 duongtn1512 4096 Jul 10 18:29 scr
drwx------ 3 duongtn1512 duongtn1512 4096 Jul 10 18:01 snap
```

Objectives:

- ✓ Manage user and group
- ✓ Manage file's permission

Day 3. Unit 4: Shell Scripts

Assignment 1: Write scripts

- Config crontab auto create, remove file, run scripts update, shutdown machine.

# We fist install crontab and after that we config it by using crontab -e command
sudo apt-get install cron
crontab -e

```
GNU nano 6.2                                /tmp/crontab.RGkeJk/crontab *
# Edit this file to introduce tasks to be run by cron.
#
# Each task to run has to be defined through a single line
# indicating with different fields when the task will be run
# and what command to run for the task
#
# To define the time you can provide concrete values for
# minute (m), hour (h), day of month (dom), month (mon),
# and day of week (dow) or use '*' in these fields (for 'any').
#
# Notice that tasks will be started based on the cron's system
# daemon's notion of time and timezones.
#
# Output of the crontab jobs (including errors) is sent through
# email to the user the crontab file belongs to (unless redirected).
#
# For example, you can run a backup of all your user accounts
# at 5 a.m every week with:
# 0 5 * * 1 tar -zcf /var/backups/home.tgz /home/
#
# For more information see the manual pages of crontab(5) and cron(8)
#
# m h  dom mon dow   command
```

Config crontab to auto create newfile1.txt at 9h00’ and second newfile1.txt at 18h00’

0 9,18 * * * touch /home/duongtn1512/cron_test/newfile1.txt

Config crontab to auto wirte into newfile1.txt at 9h30’ and second newfile1.txt at 18h30’

30 9,18 * * * echo "Hello duong" >> /home/duongtn1512/cron_test/newfile1.txt

Config crontab to auto remove newfile1.txt at 10h00’ and second newfile1.txt at 19h00’

0 10,19 * * * rm /home/duongtn1512/cron_test/newfile1.txt

```
# For more information see the manual pages of crontab(5) and cron(8)
#
# m h  dom mon dow   command
0 9,18 * * * touch /home/duongtn1512/cron_test/newfile1.txt
30 9,18 * * * echo "Hello duong" >> /home/duongtn1512/cron_test/newfile1.txt
0 10,19 * * * rm /home/duongtn1512/cron_test/newfile1.txt
```

Result

```
duongtn1512@serverduong:~$ ls
1.sh  2.sh  archive.zig  cron_test  new_floder  scr  snap
duongtn1512@serverduong:~$ tree cron_test
cron_test
└── newfile1.txt

0 directories, 1 file
duongtn1512@serverduong:~$ cat cron_test/newfile1.txt
Hello duong
```

Make a cron job to create a auto update script every day at 12hPM

0 12 * * * /home/duongtn1512/script/auto_update.sh

Run that script at every 12h30’ and 18h30’

30 12,18 * * * /home/duongtn1512/script/auto_update.sh

Auto shutdown machine at 20h00’

0 20 * * * /sbin/shutdown now

```
0 12 * * * /home/duongtn1512/script/auto_update.sh
0 20 * * * /sbin/shutdown now



^G Help          ^O Write Out     ^W Where Is      ^K Cut
^X Exit          ^R Read File     ^\ Replace       ^U Paste
```

- Learn about variable, funtion, conditionals, Input, Output to write scripts.

```
# variable
echo “Enter your name:”
read name
echo “So you are ${name} ”
```

```
duongtn1512@serverduong:~$ cat 2.sh
echo “Enter your name:”
read name
echo “So you are ${name} ”

duongtn1512@serverduong:~$ ./2.sh
“Enter your name:”
Duong
“So you are Duong ”
```

```
# Conditionals to check if input number is odd or even
echo "Input a random number:"
read number

if (( number % 2 == 0 )); then
   echo "$number is even."
else
   echo "$number is odd."
fi
```

```
duongtn1512@serverduong:~$ cat 2.sh
echo "Input a random number:"
read number

if (( number % 2 == 0 )); then
    echo "$number is even."
else
    echo "$number is odd."
fi
duongtn1512@serverduong:~$ ./2.sh
Input a random number:
67
67 is odd.
```

```
# Loop to print numbers from 1 to 10
for (( i=1; i<=10; i++ )); do
```

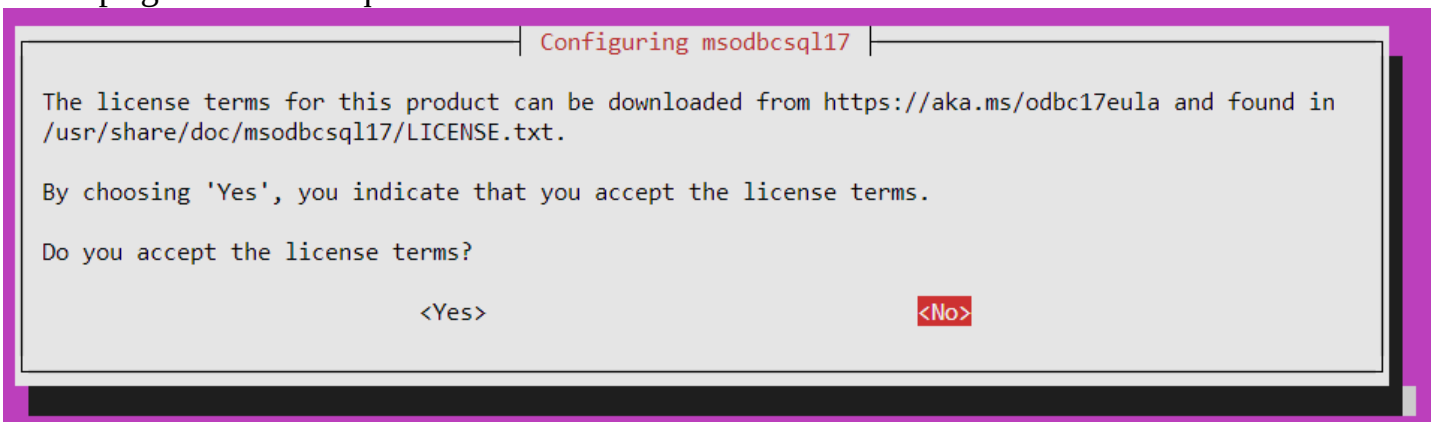
```
    echo "$i"
done
```

```
duongtn1512@serverduong:~$ cat 2.sh

for (( i=1; i<=10; i++ )); do
    echo "$i"
done
duongtn1512@serverduong:~$ ./2.sh
1
2
3
4
5
6
7
8
9
10
```

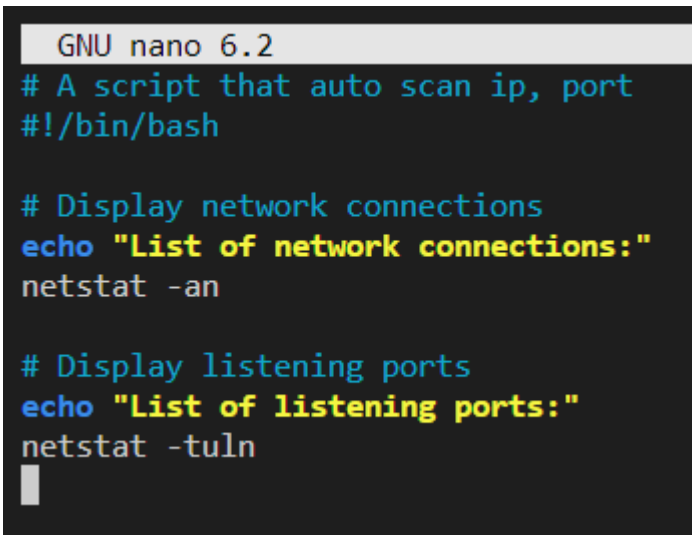
- Write scripts install, set up service, auto scan ip, port, …

```
# A script to install and set up the SQL service
#!/bin/bash

#Add Microsoft SQL Server repository
sudo apt install wget curl
# For Microsoft SQL server 2019 version
sudo add-apt-repository "$(wget -qO- https://packages.microsoft.com/config/ubuntu/20.04/mssql-server-2019.list)"
# Add public GPG Key
wget -qO- https://packages.microsoft.com/keys/microsoft.asc | sudo tee /etc/apt/trusted.gpg.d/microsoft.asc

# Install SQL
sudo apt-get update
sudo apt-get install -y mssql-server

# Configure the MSSQL server
sudo /opt/mssql/bin/mssql-conf setup

# To check the status of SQL service, whether it is working without any error or not.
systemctl status mssql-server --no-pager

# Open the default TCP port 1433 used by the SQL in your firewall.
sudo ufw allow 1433

# Install SQL Server command-line tools
curl https://packages.microsoft.com/config/ubuntu/20.04/prod.list | sudo tee /etc/apt/sources.list.d/msprod.list

# Run system update
```

```
sudo apt update

# Install MSSQL command tools
sudo apt-get install mssql-tools unixodbc-dev
```




```
# A script that auto scan ip, port
#!/bin/bash

# Display network connections
echo "List of network connections:"
netstat -an

# Display listening ports
echo "List of listening ports:"
netstat -tuln
```




```
List of listening ports:
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN
tcp        0      0 127.0.0.53:53           0.0.0.0:*               LISTEN
tcp6       0      0 :::22                   :::*                    LISTEN
udp        0      0 127.0.0.53:53           0.0.0.0:*
udp        0      0 10.0.2.15:68            0.0.0.0:*
```

Objectives:

- ✓ Use crontab do assignment job.
- ✓ Write scripts do job auto.

Technical Requirements:

- Have knownledge about programing.