**Day 1. Unit 1: Set up Lab**

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

- Download Ubuntu iso and install.

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| Ubuntu iso    Install Ubuntu on VirtualBox |

- Config network connect to internet

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| # Show ip address  ip addr |

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

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| --- |
| # Show the current date and time    # Show the calendar for the previos month    # Show the current month and next month |

- Look up the man page for the command.

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| # We use command man man  man man    # 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

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* Connect to Ubuntu from your machine via SSH

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| # Connect to Ubuntu from host window 10 machine via SSH through port forward 2000    # Enter password of user want to connect |

* Update your Ubuntu

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| # Using sudo apt-get update and sudo apt-get upgrade to update our Ubuntu machine  sudo apt-get update    sudo apt-get upgrade    # End result |

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.

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| # Create new directories  mkdir  # Create new file  touch    # Copy file  cp    # Move filem  mv    # Using tree command  tree    # Using locate command  locate |

- Show the fulll path name of your home directory.

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

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

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| # 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    # Change permission file  chmod <numbers> 2.sh |

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

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| # Compress files and directories with zig]p    # Extrac file and directories with zip |

- Edit file by vim, nano.

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| # Edit file using nano    nano 1.sh    # Ctrl x + y to save new edited file |

- Use winscp transfer files from other machine to Ubuntu.

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| # 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, …).

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| # We using apt-get update and upgrade our system    # We start to install nginx  sudo apt-get install nginx    # Adjusting the Firewall  # List the application configurations that ufw knows how to work with using  sudo ufw app list    # We allow Nginx HTTP on port 80  sudo ufw allow ‘Nginx HTTP’    # We enable trafic on port 80 and check for status conection  sudo ufw enable  sudo ufw status    # We checking systemd init system to make sure the service is running  systemctl status nginx    # To stop nginx  sudo systemctl stop nginx    # To start nginx  sudo systemctl start nginx    # Making configuration changes, Nginx can often reload without dropping connections  sudo systemctl reload nginx    # To remove nginx we remove it with out nginx config file  sudo apt remove nginx nginx-common nginx-core    # Delete unwanted libs installed by the Nginx  sudo apt autoremove    # Verify that /etc/nginx/ and /usr/share/nginx/ are empty  ls -l /etc/nginx/ /usr/share/nginx/ |

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

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| # Using htop  htop    # Using ps -a  ps -a    # To check process using grep  ps aux | grep <process\_name>    # To kill a process kill <opstion> <PID process> |

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

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| # Using netstat  # Display all listening ports:  netstat -tuln    # Show all active network connections:  netstat -an    # Display network statistics for each protocol:  netstat -s    # Show the routing table:  netstat -r    # Display process ID (PID) associated with each network connection:  netstat -p    # Show network connections for a specific port:  netstat -an | grep <port\_number> |

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

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

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

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| # To show the ID number of the terminal we are using  tty    # Our id is 0 |

- Show your user ID

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| # To show the user ID of the current user, we can use the id  id -u    # ID of the current user are 1000 |

- Check group of username

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

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

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| # 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    # Change permission file  chmod <numbers> 2.sh |

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.

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

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

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| # variable  echo “Enter your name:”  read name  echo “So you are ${name} ”    # Conditionals to check if input number is odd or even  echo "Input a random number:"  read number  if (( number % 2 == 0 )); then  echo "$number is even."  else  echo "$number is odd."  fi    # Loop to print numbers from 1 to 10  for (( i=1; i<=10; i++ )); do  echo "$i"  done |

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

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| # 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 |

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| # 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 |

Objectives:

* Use crontab do assignment job.
* Write scripts do job auto.

Technical Requirements:

- Have knownledge about programing.