
# School of Innovation, Design and Technology

## Bachelor of Information Technology

## CS6502 – Linux System Administration

*Practical Assessment 1* – 30%

Trimester 1, 2024

SUBMIT: May 1st @ 13:00 Hrs (1pm)

Prepared by: Dr Bryce Antony 2024

Student Name: _Andrew Graff 2231290_____

Hi Class

This assessment contains 50 tasks.
There are 5 Sections.
The First THREE Sections are divided into two parts.
Each section begins on a new page.

The Marks for each section are indicated.
(Also shown in the Marking Schedule on page 11)

Your answers will be considered using the following criteria:

- Your understanding of the topic
- Your Explanation
- Your evidence of learning
- Your presentation quality

(As shown in the Marking Rubric on page 12)

You must submit this assessment as an original piece of work that you have completed and, by submitting this assessment, confirm that no part has been completed by a person or persons (real or artificial) other than yourself.

Any student submitting this assessment with any part completed by, or from, another source will receive zero marks for the entire assessment and will be subject to Faculty disciplinary process.

You are required to complete the following tasks within your Ubuntu Virtual Box Appliance (Ubuntu 22.04.4 LTS) that you have created during the lab sessions.

You can, if you like, create a new appliance using the Ubuntu 22.04.4 LTS iso available for download here: Ubuntu 22.04.4 LTS (Jammy Jellyfish)

The completed Task sheet (this document) is to be submitted to Moodle before:

- 13:00 (1pm) May 1st 2024.

If there is a general problem identified, I will notify everyone via Moodle Announcement.

**Please follow the instructions below.**

Please begin by inserting your full Student Name at the top of this page (Marks will be deducted if you do not complete this task)

Please insert a Screenshot in the spaces indicated, and answer questions as required.

The explanations may require clear, legible and concise Screenshots that demonstrate that you have achieved the tasks given.

I recommend that you use Greenshot for the Screenshot capture and editing, which is available here: Windows Download

Please save this document when you have completed the tasks, and convert to a PDF with the following file name convention:

YourStudentFirstName_YourStudentLastname_CS6502.pdf

(*Replace YourStudentFirstName with the first name that you are enrolled under, and YourStudentLastName with the Last name that you are enrolled under)*

Marks will be deducted if you do not follow the naming convention

Anyone sending me a file that is called: "YourStudentFirstName_YourStudentLastName_CS6502.pdf" will be awarded zero marks for this assessment.

The tasks are to be complete using the CLI (Command Line Interface).

Do NOT use any GUI interface.

Note: For the purpose of this assessment, the Terminal (CLI) as launched from the Ubuntu Desktop is not considered a GUI interface.

Have you inserted your name at the top of page 2?

Thank you,
Regards
Dr Bryce Antony

Contents:

# *Contents*

## Section One: Manage Users and Groups. (20 / 100 Marks)

LO 3: Explain and perform administrative and troubleshooting tasks including, but not limited to, management of users, groups, printing services, managing Linux processes, file and folder permissions, log management, backup and basic security tasks through command line.

Section One / Part A: ` 10 Marks

1) **Use the command line to create five users, along with their home directories:**
    - <your1stname>1
    - <your1stname>2
    - <your1stname>3
    - <your1stname>4
    - <your1stname>5

***Do not set the users as '<your1stname>', please use you first name that you are enrolled with in this paper.***
***Do not include the 'Greater than', or 'less than' symbol.***
***Examples are: john1 and jane1.***
***When I use <your1stname>1 below, I am referring to john1, or jane1 as given in the previous example.***
***Do not use any other person's name***

Note: These accounts will be used in later activities.

2) **Set each user with the password: password**

3) **Create the following five groups:**
    - math
    - sports
    - HR
    - IT
    - marketing

4) **Place each user you created above into a different group.**

5) **Give <your1stname>1 root / superuser privileges.**

Section One / Part B 10 Marks

**Explain** each of the steps you have followed to complete the Tasks 1 – 5 given above.
The explanation will include:

6) The commands used, including flags.
    sudo useradd -s /bin/bash -m andrew1
    sudo passwd andrew1
    sudo groupadd math
    sudo usermod -aG math andrew1
    grep andrew1 /etc/passwd
    sudo nano /etc/passwd

7) Screenshots demonstrating the command input and the result.

Creating accounts using sudo (root privileges) and useradd command -s (flag to set the login shell to /bin/bash) -m (flag creates user home directory) and username “andrew1”

```
user@UbuntuCS6502:~$ sudo useradd -s /bin/bash -m andrew1
user@UbuntuCS6502:~$ sudo useradd -s /bin/bash -m andrew2
user@UbuntuCS6502:~$ sudo useradd -s /bin/bash -m andrew3
user@UbuntuCS6502:~$ sudo useradd -s /bin/bash -m andrew4
user@UbuntuCS6502:~$ sudo useradd -s /bin/bash -m andrew5
```

Create password for the newly created accounts using passwd command

```
user@UbuntuCS6502:~$ sudo passwd andrew5
New password:
BAD PASSWORD: The password fails the dictionary check - it is
 a dictionary word
Retype new password:
passwd: password updated successfully
```

Creating new groups using groupadd command

```
user@UbuntuCS6502:~$ sudo groupadd math
user@UbuntuCS6502:~$ sudo groupadd sports
user@UbuntuCS6502:~$ sudo groupadd HR
user@UbuntuCS6502:~$ sudo groupadd IT
user@UbuntuCS6502:~$ sudo groupadd marketing
```

Adding users to a created group using usermod command and -a -G or -aG (a = append and g = group, so adding andrew1 to group math)

```
user@UbuntuCS6502:~$ sudo usermod -aG math andrew1
user@UbuntuCS6502:~$ sudo usermod -aG sports andrew2
user@UbuntuCS6502:~$ sudo usermod -aG HR andrew3
user@UbuntuCS6502:~$ sudo usermod -aG IT andrew4
user@UbuntuCS6502:~$ sudo usermod -aG marketing andrew5
```

8) Output of files such as /etc/passwd and demonstrate that the home directories and groups have been successfully added.

```
andrew1:x:1005:1006::/home/andrew1:/bin/bash
andrew2:x:1006:1007::/home/andrew2:/bin/bash
andrew3:x:1007:1008::/home/andrew3:/bin/bash
andrew4:x:1008:1009::/home/andrew4:/bin/bash
andrew5:x:1009:1010::/home/andrew5:/bin/bash
```

```
math:x:1011:
sports:x:1012:
HR:x:1013:
IT:x:1014:
marketing:x:1015:
```

9) Show that <your1stname>1 has superuser privileges.

Below we can see andrew1 is part of root user and math groups (indicating superuser privileges)

```
user@UbuntuCS6502:~$ groups andrew1
andrew1 : root math
```

We can also see the UID (User ID) is 0 and GID (Group ID) is 0 which is root user privileges

Username (andrew1) : x (password in passwd file) : 0 (value of User Identifier) and : 0 : (value of Group Identifier) :: /home/andrew1 (home directory) : /bin/bash (login shell for root user)

```
andrew1:x:0:0::/home/andrew1:/bin/bash
andrew2:x:1006:1007::/home/andrew2:/bin/bash
andrew3:x:1007:1008::/home/andrew3:/bin/bash
andrew4:x:1008:1009::/home/andrew4:/bin/bash
andrew5:x:1009:1010::/home/andrew5:/bin/bash
```

10) Include an output of your command history file that shows the use of each of the commands that you have explained.

```
393  sudo useradd -s /bin/bash -m andrew1
394  sudo useradd -s /bin/bash -m andrew2
395  sudo useradd -s /bin/bash -m andrew3
396  sudo useradd -s /bin/bash -m andrew4
397  sudo useradd -s /bin/bash -m andrew5
398  sudo passwd andrew1
399  sudo passwd andrew2
400  sudo passwd andrew3
401  sudo passwd andrew4
402  sudo passwd andrew5
```

```
417  sudo groupadd math
418  sudo groupadd sports
419  sudo groupadd HR
420  sudo groupadd IT
421  sudo groupadd marketing
```

```
425  sudo usermod -aG andrew1
426  sudo usermod -aG math andrew1
427  sudo usermod -aG sports andrew2
428  sudo usermod -aG HR andrew3
429  sudo usermod -aG IT andrew4
430  sudo usermod -aG marketing andrew5
```

History >> file.txt

## Section 2: Manage Files and Backups. (30 / 100 Marks)

LO 3: Explain and perform administrative and troubleshooting tasks including, but not limited to, management of users, groups, printing services, managing Linux processes, file and folder permissions, log management, backup and basic security tasks through command line.

Section One / Part A 20 Marks

11) **Create directories for each department (**math, sports, HR, IT, marketing**) at the root of the filesystem**.

12) **Configure standard Linux permissions and ownership such that each group only has access to its own departmental directories**.

13) **Use Octal permissions to permit one user (and only one user) account to have read permission to the /IT directory.**

14) **Add another one of your existing user accounts to the sports group**.

15) **Use each of these two user's accounts to create one file each in the /sports directory**.

16) Create a file named ***LinksTest.txt*** in the /opt directory, and then create a symbolic link to it in the /math directory called ***link***.

17) Use Vim to **add the following line of text** to the file LinksTest.txt through the /opt/LinksTest.txt path "This is the line that I have added".

18) **Create 5 files in the /tmp directory:** 1.txt, 2.txt, 3.txt, 4.txt, 5.txt.

19) **Use tar and gzip to bundle and compress the files**.

20) **Extract these files to <your1stname>1's home directory from your tarball.**

Section Two / Part B 10 Marks

**Explain** each of the steps you have followed to complete the Tasks 6 – 15 given above.
The explanation will include:

21) The commands used, including flags.
mkdir (make directory), chown (change ownership), chmod (setting file permissions), (770 and 740: rwx, rwx, o and rwx, r, o) usermod (modify/change user), -a (append), -G (group), touch, ln (links), -s (shell), vim (vi text editor), tar (tape archiver), -czvf (c: create), (z: compress/gzip), (v: verify), (f: filename), -C (change directory)

22) Screenshots demonstrating the command input and the result.

Making directories to the root

```
user@UbuntuCS6502:~$ sudo mkdir /math
user@UbuntuCS6502:~$ sudo mkdir /sports
user@UbuntuCS6502:~$ sudo mkdir /HR
user@UbuntuCS6502:~$ sudo mkdir /IT
user@UbuntuCS6502:~$ sudo mkdir /marketing
```

Creating ownership of file directories to its group

```
user@UbuntuCS6502:~$ sudo chown :math /math
user@UbuntuCS6502:~$ sudo chown :sports /sports
user@UbuntuCS6502:~$ sudo chown :HR /HR
user@UbuntuCS6502:~$ sudo chown :IT /IT
user@UbuntuCS6502:~$ sudo chown :marketing /marketing
```

Setting file permissions to directories

```
user@UbuntuCS6502:~$ sudo chmod 770 /math
user@UbuntuCS6502:~$ sudo chmod 770 /sports
user@UbuntuCS6502:~$ sudo chmod 770 /HR
user@UbuntuCS6502:~$ sudo chmod 770 /IT
user@UbuntuCS6502:~$ sudo chmod 770 /marketing
```

Modifying permissions for andrew4 to only have read permissions to IT directory

```
user@UbuntuCS6502:~$ sudo usermod -aG IT andrew4 | sudo chmod 740 /IT
```

Adding another account to the sports group

```
user@UbuntuCS6502:~$ sudo usermod -aG sports andrew5
```

Using two accounts (andrew3 and andrew5) to create a file in the sports directory

```
andrew3@UbuntuCS6502:~$ touch /sports/fileone
andrew5@UbuntuCS6502:~$ touch /sports/filetwo
```

Creating a text file and linking the math directory

```
user@UbuntuCS6502:~$ sudo touch /opt/LinksTest.txt
user@UbuntuCS6502:~$ sudo ln -s /opt/LinksTest.txt /math/link
user@UbuntuCS6502:~$ vim /opt/LinksTest.txt
user@UbuntuCS6502:~$ vim /opt/LinksTest.txt
user@UbuntuCS6502:~$ sudo vim /opt/LinksTest.txt
```

Using vim to add below text

```
This is the line I have added
```

Creating 5 files in directory and using tar and gzip to bundle and compress files

```
user@UbuntuCS6502:~$ touch /tmp/{1..5}.txt
user@UbuntuCS6502:~$ tar -czvf files.tar.gz /tmp/{1..5}.txt
tar: Removing leading `/' from member names
/tmp/1.txt
tar: Removing leading `/' from hard link targets
/tmp/2.txt
/tmp/3.txt
/tmp/4.txt
/tmp/5.txt
```

Extracted files to andrew1 home directory

```
user@UbuntuCS6502:~$ sudo tar -xzvf files.tar.gz -C /home/andrew1
tmp/1.txt
tmp/2.txt
tmp/3.txt
tmp/4.txt
tmp/5.txt
```

23) One screenshot demonstration that the permissions have been set, (For example, the sports group has access to the /sports directory but not to other departments' directories.)

```
root@UbuntuCS6502:~# ls -l /sports
total 0
-rw-rw-r-- 1 andrew3 andrew3 0 Apr 30 19:00 fileone
-rw-rw-r-- 1 andrew5 andrew5 0 Apr 30 19:06 filetwo
```

```
math:x:1011:andrew1
sports:x:1012:andrew2,andrew3,andrew5
HR:x:1013:andrew3
IT:x:1014:andrew4
marketing:x:1015:andrew5
```

24) Output of files (such as /etc/passwd) to demonstrate that the home directories and groups have been successfully added.

```
andrew1:x:0:0::/home/andrew1:/bin/bash
andrew2:x:1006:1007::/home/andrew2:/bin/bash
andrew3:x:1007:1008::/home/andrew3:/bin/bash
andrew4:x:1008:1009::/home/andrew4:/bin/bash
andrew5:x:1009:1010::/home/andrew5:/bin/bash
math:x:1011:andrew1
sports:x:1012:andrew2,andrew3,andrew5
HR:x:1013:andrew3
IT:x:1014:andrew4
marketing:x:1015:andrew5
```

25) An output of your command history file that shows the use of each of the commands that you have explained.

## Section 3: Scripts (30 / 100 Marks)

LO 1: Explain the fundamental elements of the Linux/Unix systems.

LO 2: Install, configure, and manage a workstation including partitioning, managing software and devices, Linux desktop and shell environments through the command line.

Section 3 / Part A 20 Marks

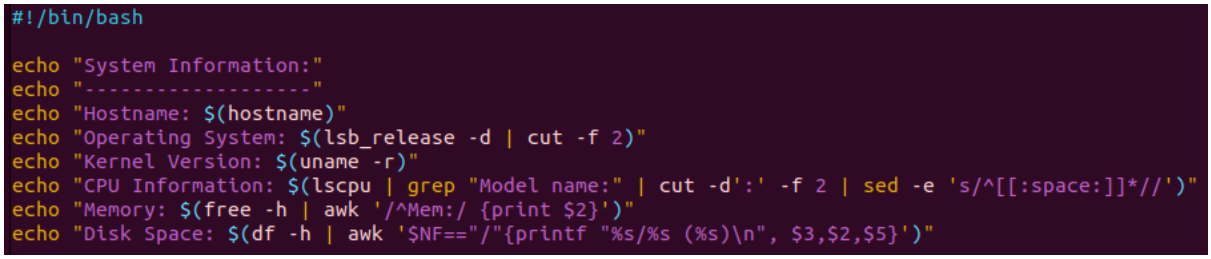
**Use Vim to create / edit these scripts. (Please, do not use a GUI editor or nano.)**

26) **Create a bash script file called "sys.sh" using the following information: (Cut and paste the following into your Vim editor)**

```
#!/bin/bash

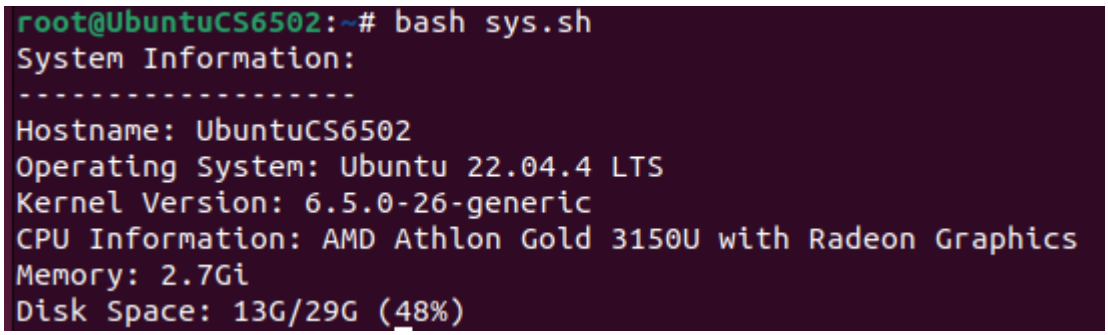
echo "System Information:"
echo "--------------------"
echo "Hostname: $(hostname)"
echo "Operating System: $(lsb_release -d | cut -f 2)"
echo "Kernel Version: $(uname -r)"
echo "CPU Information: $(lscpu | grep "Model name:" | cut -d':' -f 2 | sed -e 's/^[[:space:]]*//')"
echo "Memory: $(free -h | awk '/^Mem:/ {print $2}')"
echo "Disk Space: $(df -h | awk '$NF=="/"{printf "%s/%s (%s)\n", $3,$2,$5}')"
```

Insert a Screenshot of t**he Vim editor before saving the file** here:




27) **Run the sys.sh script** (If the script does not run, there will be a simple and logical reason behind this. Please don't email me to ask why.)

Insert a screenshot that **shows the output of the script** here:



28) **Very briefly** (1 – 2 Sentences, 15 word sentences max) **Explain** what task the script is performing, (This can be described in 1 sentence) Here:

By typing in bash sys.sh it will display a script showing system information.

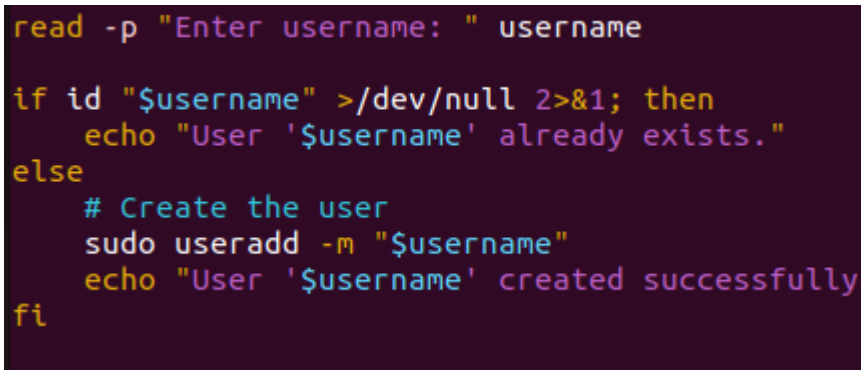
29) **Create** a bash script file called **"user.sh"** using the following information**:**
(Cut and paste the following into your Vim editor) Don't miss the final 'fi**'**

```
#!/bin/bash

read -p "Enter username: " username

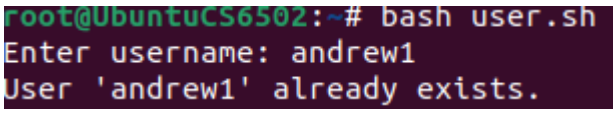
if id "$username" >/dev/null 2>&1; then
   echo "User '$username' already exists."
else
   # Create the user
   sudo useradd -m "$username"
   echo "User '$username' created successfully."
fi
```

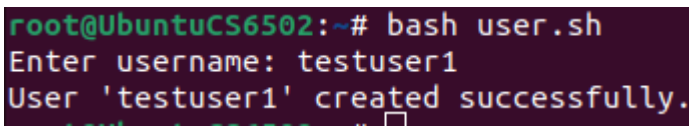
Insert a Screenshot of t**he Vim editor before saving the file** here:




30) **Run the user.sh script twice**
use <your1stname>1 that you created above as the first script run
and *testuser1* as the second script run.

Insert a screenshot that **shows the output of both script runs** here: (2 screenshots please)




31) **Explain** each step of the user.sh bash script here**:**
(1 sentence, of no more than 15 words, for **each** step)

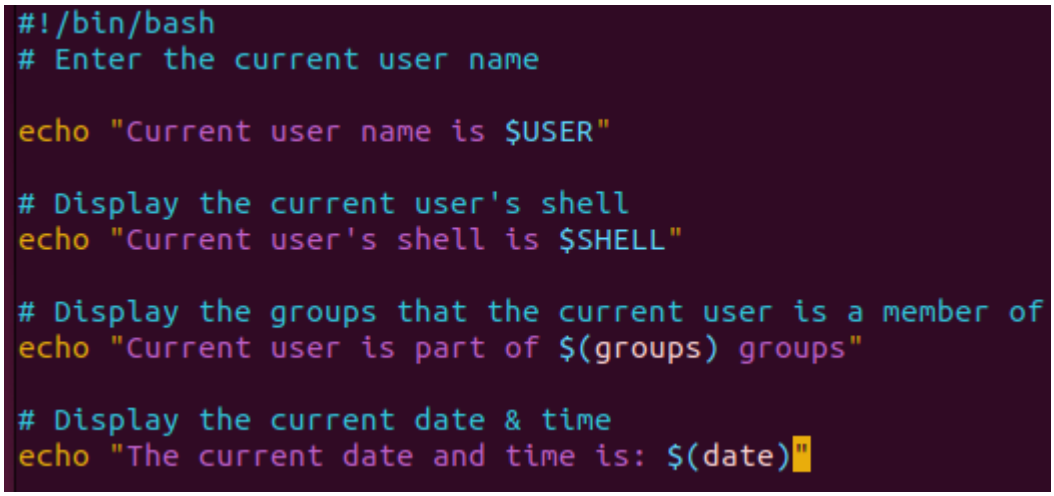
Script asks for a username, checks to see if username exists, a message is displayed if so, otherwise enter a new username and message to confirm user has been created successfully,

32) **Using Vim, create a simple bash script that displays as an output:**

- The current user name.
- The current user's shell.
- The groups that the current user is a member of
- The current date & time

Use remarks within the script to document each step.
The output must display a description of the result (such as: 'The current Date & Time is: <output of the current date and time>')

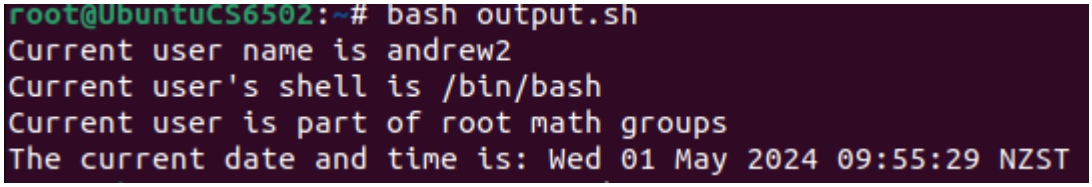
33) Insert Screenshot of **your script within the Vim editor** before saving here:




34) Cut and paste a **copy of your script** here:

#!/bin/bash
# Enter the current user name
echo "Current user name is $USER"
# Display the current user's shell
echo "Current user's shell is $SHELL"
# Display the groups that the current user is a member of
echo "$USER is part of $(groups) groups"
# Display the current date & time
echo The current date and time is: $(date)"

35) Insert Screenshot of your **nicely formatted output** here:



Section 3 / Part B 10 Marks

**The Linux Shell:**

36) **Explain** the purpose of using a "dot slash" (./) in front of a script when executing it?

Dot means current directory and the slash is a path separator. Using dot slash in front of a script is giving the full path to the bash script.

37) **Explain** the purpose of "sh-bang" (such as #!/bin/bash) at the head of a script?

Prupose of sh-bang at the head of a script #! Is used to specify the interpreter which here is bash. This helps how the script will be executed.

38) **Describe** the role of the shell in Linux.

The role of shell in linux is an interface to read and executes commands from the user

39) **Explain** the purpose, and how does it interact with the user and the system?

The shell will pick up commands entered by the user and the system, these are actioned by the command interpreters in which the shell processes these. The shell serves as an interface between user and system.

40) **Explain** the differences between TWO types of shells (e.g., Bash, Tcsh, Zsh) and the significance of shell scripting.

Two types of shells are C shell and and the Korn shell. Differences between these shells C Shell has a different syntax closer to C programming and Korn Shell is a superset of the Bourne shell and script extension is .ksh and c shell is .csh. The significance of shell scripting helps with automation, efficiency and allowing to make custom scripts.

## Section 4: Linux Operating System (10 / 100 Marks)

LO 1: Explain the fundamental elements of the Linux/Unix systems.

41) **Linux Kernel:**
Describe the role of the Linux kernel in the operating system. Include in your explanation how it interacts with the hardware of a computer and the software applications running on it.

The role of the Linux kernel in the operating system is to provide proper functioning for the system. It is a core operating system, and this is essential to ensure all devices are working correctly. Kernal interacts with the hardware of the computer and software application by several layers of abstraction. There are device drivers which is used by Linux. System calls is what Linux uses to interact with the software.

42) **File System Hierarchy:**
Explain the Linux file system hierarchy, focusing on the structure and purpose of the root directory (/) and its immediate subdirectories (e.g., /bin, /etc, /home, /var). How does this structure support system organization and security?

The Linux File System Hierarchy is where all the files are stored on a file system. There is an organisation of these files in a tree directory. The root directory is at the top as per a tree and branches flow out (subdirectories) these resemble an inverted tree. Every file and directory is under the root directory.

The immediate subdirectories /bin, /etc, /home, /var means each subdirectory will have its own storing place along with setting, personal files, configs etc (/home) and (/var) has variable data between boots (databases, log files, mails etc), (/etc) has configuration files used by system services, (.bin) command binaries need to be available in single user mode files are stored here).

This structure supports system organization by having files and directories sorted in way that It is easier to access to locate resources. Strict file permissions and access controls in Linus ensure security as well as having files separate from each other files (each directory has its own data).

43) **System Organisation and Security:**
Discuss how the File System Hierarchy Structure supports system organisation and security.

There is flexibility in the File System Structure, where you can customise user needs and ensure all files are kept separate from user data. You can specify user access to files which support the security of the files. Home directories are private. It's a clear structure of how system files and user data are organised along with the noted access control for security.

44) **Process Management:**
Discuss how Linux manages processes. Include in your answer an explanation of process states (running, sleeping, stopped, zombie), how Linux creates and terminates processes, and the significance of process IDs (PID).

Linux manages processes by using a Linux kernel as we discussed earlier. The Linux kernel will manage multitasking capabilities, where the CPU is used to execute and switch between processes.

Linux Process States: Running: Process is ready to run, Sleeping: Process waiting for resource to be available, Stopped: Process has been stopped and Zombie: Dead process.

Process creating and termination is used by system call where the computer program will request a service from the OS. The significance of PID is being able to identify what process you want to be eliminated without interrupting multiple processes.

45) **Permissions and Ownership:**
Explain the Linux system of permissions and ownership. How does Linux control access to files and directories? Include in your explanation the concepts of user, group, and others, as well as the read, write, and execute permissions.

Linux system of permissions and ownership is handled with permissions. These permissions are set for three categories: user, group, others. The concepts of the three categories are the users of the system in three different groups. Linux can control access by setting RWX permissions using commands such as chown (changing ownership), chmod (change permissions). R read is permission to read files only, W write is for writing permissions and X for executing permissions.

## Section 5: Basic Security Tasks and Log Management (10 / 100 Marks)

LO 3: Explain and perform administrative and troubleshooting tasks including, but not limited to, management of users, groups, printing services, managing Linux processes, file and folder permissions, log management, backup and basic security tasks through command line.

Your supervisor has come to you and asked that all files have '**777**' permissions

46) **Explain** what you would say to your supervisor regarding the request that all files have '777' permissions and why this may be a bad idea.

777 means the file has read, write and execute permissions for all users. This means the files could be accessed by anyone and poses great security risk.

### System Updates and Patch Management:

47) **Explain** the process of checking for and applying system updates in Linux using the command line.
    - Include the commands used.

sudo apt update
sudo apt upgrade
sudo apt full-grade

48) **Explain** what function the commands perform.
    - Include screenshots to support your explanation.

sudo apt update (searches for list of available updates)

```
root@UbuntuCS6502:~# sudo apt update
Hit:1 http://nz.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://nz.archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Hit:3 http://nz.archive.ubuntu.com/ubuntu jammy-backports InRelease
Get:4 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Fetched 229 kB in 2s (116 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
55 packages can be upgraded. Run 'apt list --upgradable' to see them.
```

49) **Explain** why keeping the system updated is critical for security?

Keeping the system updated ensures we have any vulnerabilities patched and a cleaner up-to date system running. This will reduce the risks of any attacks or unauthorized access to computer where potential patches have been fixed in the upgrade.

50) **Explain** the purpose of the auth.log file.
- Include an output from the file showing the process of a root login.

The purpose of a auth.log file is it stores information about status requests and authentication activity. We see login attempts so this will provide a way to identity any unauthorized access.

```
May  1 10:17:01 UbuntuCS6502 CRON[8317]: pam_unix(cron:session): session opened for user root(uid=0) by (uid=0)
May  1 10:17:01 UbuntuCS6502 CRON[8317]: pam_unix(cron:session): session closed for user root
May  1 10:30:01 UbuntuCS6502 CRON[8332]: pam_unix(cron:session): session opened for user root(uid=0) by (uid=0)
May  1 10:30:01 UbuntuCS6502 CRON[8332]: pam_unix(cron:session): session closed for user root
May  1 11:17:01 UbuntuCS6502 CRON[8349]: pam_unix(cron:session): session opened for user root(uid=0) by (uid=0)
May  1 11:17:01 UbuntuCS6502 CRON[8349]: pam_unix(cron:session): session closed fo
r user root
May  1 11:30:01 UbuntuCS6502 CRON[8360]: pam_unix(cron:session): session opened for user root(uid=0) by (uid=0)
May  1 11:30:01 UbuntuCS6502 CRON[8360]: pam_unix(cron:session): session closed for user root
May  1 12:16:23 UbuntuCS6502 gdm-password]: pam_unix(gdm-password:auth): authentication failure; logname= uid=0 euid=0 tty=/dev/tty1 r
user= rhost=  user=user
May  1 12:16:28 UbuntuCS6502 gdm-password]: gkr-pam: unlocked login keyring
May  1 12:16:36 UbuntuCS6502 sudo:     root : TTY=pts/0 ; PWD=/home/andrew1 ; USER=root ; COMMAND=/usr/bin/apt update
May  1 12:16:36 UbuntuCS6502 sudo: pam_unix(sudo:session): session opened for user root(uid=0) by (uid=0)
May  1 12:16:46 UbuntuCS6502 sudo: pam_unix(sudo:session): session closed for user root
May  1 12:17:01 UbuntuCS6502 CRON[8834]: pam_unix(cron:session): session opened for user root(uid=0) by (uid=0)
May  1 12:17:01 UbuntuCS6502 CRON[8834]: pam_unix(cron:session): session closed for user root
May  1 12:18:39 UbuntuCS6502 pkexec: pam_unix(polkit-1:session): session opened for user root(uid=0) by (uid=1000)
May  1 12:18:39 UbuntuCS6502 pkexec[8850]: user: Executing command [USER=root] [TTY=unknown] [CWD=/home/user] [COMMAND=/usr/lib/update
-notifier/package-system-locked]
May  1 12:23:54 UbuntuCS6502 gdm-password]: gkr-pam: unlocked login keyring
May  1 12:28:02 UbuntuCS6502 sudo:     root : TTY=pts/0 ; PWD=/home/andrew1 ; USER=root ; COMMAND=/usr/bin/less /var/log/auth.log
May  1 12:28:02 UbuntuCS6502 sudo: pam_unix(sudo:session): session opened for user root(uid=0) by (uid=0)
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Congratulations, you have finished the 1st Practical Assessment for CS6502.

Please convert this document to PDF, save the PDF document with the correct file naming convention and submit to moodle.

File Naming Convention: YourStudentFirstName_YourStudentLastName_CS6502.pdf

(*Replace YourStudentFirstName with the first name that you are enrolled under, and YourStudentLastName with the Last name that you are enrolled with)*

By submitting this work, I acknowledge that the contents are my own work, and have not been copied from, or provided by any other person (real or artificial)

Thank you.

Marking Schedule:

| | |
|---|---|
| Section One / Part A: | 10 Marks |
| Section One / Part B | 10 Marks |
| Section Two / Part A | 20 Marks |
| Section Two / Part B | 10 Marks |
| Section Three / Part A | 20 Marks |
| Section Three / Part B | 10 Marks |
| Section Four / Part A | 10 Marks |
| Section Five / Part A | 10 Marks |

# Marking Rubric

| | 90 + | 80- 89 | 70- 79 | 60- 69 | 50- 59 | 0- 49 |
|---|---|---|---|---|---|---|
| Understanding | Demonstrates an excellent understanding of the topic with comprehensive and insightful explanations. | Very good understanding of the topic with no significant inaccuracies. | Good understanding of the topic. Minor inaccuracies may be present but do not detract significantly from the overall explanation. | Shows a fair understanding of the topic but includes some inaccuracies. | Demonstrates a basic understanding of the topic with significant inaccuracies. | Incomplete / Irrelevant |
| Explanation | Offers in-depth explanations with high-level critical thinking and synthesis of information. All parts of the question are addressed thoroughly and accurately. | Provides detailed and accurate explanations of concepts. Discussion is thoughtful and demonstrates a high level of comprehension. | Explanation is clear and covers most critical components with adequate detail. Minor areas may lack depth. | Provides an explanation with some detail, but the discussion lacks depth or contains some errors. Not all critical components are covered thoroughly. | Attempts to explain concepts but lacks clarity and detail. Key components of the answer are missing or incorrect. | Incomplete / Irrelevant |
| Demonstration of Learning | Excellent use of suitable concepts, terminology, and theory. Evidence of deep learning, with concepts applied creatively and effectively in new contexts. | Very good application of suitable concepts, terminology, and theory. Shows the ability to critically analyse and apply concepts in various contexts. | Good application of suitable concepts and terminology. Demonstrates the ability to link concepts to practical examples or theoretical aspects effectively. | Demonstrates a moderate use of suitable concepts and terminology but may not apply them correctly or effectively in all areas. | Shows minimal effort in applying suitable concepts or using terminology. The explanation is overly simplistic or partially irrelevant. | Incomplete / Irrelevant |
| Quality of Presentation | Exceptional presentation quality. The text is well-structured, compelling, and free of grammatical or spelling errors. Clear evidence of proofreading and refinement. | Presentation is very well organized, clear, and concise. Grammar and spelling are almost flawless. | Well-organized and clear presentation. Minor grammatical or spelling errors that do not detract from the overall clarity. | Presentation is somewhat organized and understandable, but errors in grammar or spelling occasionally hinder clarity. | Presentation is disorganized or unclear, making it difficult to understand the student's points. Numerous grammatical or spelling errors that distract from the content. | Incomplete / Irrelevant |