

Jonathan Nusantara jan265 HW1

1. Read the Cornell academic integrity agreement. Take the Cornell academic integrity quiz, Post a screenshot of your quiz results.

User with netid jan265 has completed the Cornell University Plagiarism Exercises and received a score of 12/12.

2. Using the guide on Canvas, format your 16 GByte SD card and load the appropriate Linux Raspbian kernel on the card. Once you have loaded Raspbian onto the SD Card, make a backup image on your laptop. Bring the SD card to Lab1 for use in the class Raspberry Pi 3 kit. Be prepared to show the backup image to your TA.

Done. Will show TA during LAB,

3. Explain Linux file permissions. What is permission 777 and why might this be dangerous. What is permission 644 and what would it allow users to do with your file? What is permission 700 and what does this allow users to do with your file?

Since Linux is multi-user OS, it has permissions to control the security. Each file has three user-based permission: owner, group, and all users. Each user can then be permitted to read, write, and/or execute the content.

Permission 777 means that the owner, group, and others have the permission to read, write, and execute the content of the file.



The digit is the decimal from an 8-bit representation:



So, setting permission 777 is dangerous as anyone can now read, write, or execute. Basically, anyone can add malicious code to your file/server.

Permission 644 means that only the owner can read and write, everyone else can only read, and none can execute.

Permission 700 means that only you can read, write and execute. Everyone else cannot do anything and do not have access to it.

4. Log into the ece5725-f20 server. Using the appropriate commands, display your userid, display the current directory, display the current date and time, create a ‘test’ directory, list files in your directory. Change the permissions of your home directory so that:

- You, as the owner, have full permissions
- All other users can access (‘cd into’) your directory
- All other users can read from your directory
- No one else can write into your directory

Change your default password (to something you will remember!) Attach a screenshot of outputs from all of the above commands (on a single screen).

```
Last login: Thu Sep 10 18:54:13 on ttys001
The default interactive shell is now zsh.
To update your account to use zsh, please run `chsh -s /bin/zsh`.
For more details, please visit https://support.apple.com/kb/HT208050.
(base) Jonathans-MBP:~ Jonathan$ ssh jan265@132.236.79.205
[jan265@132.236.79.205's password:
Linux ece5725-f20 5.4.51-v7l+ #1327 SMP Thu Jul 23 11:04:39 BST 2020 armv7l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Thu Sep 10 18:54:33 2020 from 216.59.73.10
[jan265@ece5725-f20:~ $ id
uid=1025(jan265) gid=1001(students) groups=1001(students)
[jan265@ece5725-f20:~ $ pwd
/home/jan265
[jan265@ece5725-f20:~ $ date
Thu 10 Sep 2020 06:55:56 PM EDT
[jan265@ece5725-f20:~ $ mkdir test
[jan265@ece5725-f20:~ $ ls
test
[jan265@ece5725-f20:~ $ chmod 755 /home/jan265
[jan265@ece5725-f20:~ $ passwd
Changing password for jan265.
[Current password:
[New password:
[Retype new password:
Password unchanged
[New password:
[Retype new password:
passwd: password updated successfully
jan265@ece5725-f20:~ $ ]
```

5. Within the test directory created in Question 3, create a file named HW1.txt containing your netid, First and Last Name on a single line. Change the permissions of this file so that no-one can execute it, and only you can read and write it. Attach a screenshot showing the file in the appropriate directory (including the permissions you have set) and also a display of the file contents.

```
[jan265@ece5725-f20:~/test $ pwd
/home/jan265/test
[jan265@ece5725-f20:~/test $ touch HW1.txt
[jan265@ece5725-f20:~/test $ echo "jan265 Jonathan Nusantara" > HW1.txt
[jan265@ece5725-f20:~/test $ chmod 600 /home/jan265/test/HW1.txt
[jan265@ece5725-f20:~/test $ ls -l HW1.txt
-rw----- 1 jan265 students 26 Sep 10 22:21 HW1.txt
[jan265@ece5725-f20:~/test $ ls -d
*
[jan265@ece5725-f20:~/test $ ls -l
total 4
-rw----- 1 jan265 students 26 Sep 10 22:21 HW1.txt
[jan265@ece5725-f20:~/test $ cat HW1.txt
jan265 Jonathan Nusantara
[jan265@ece5725-f20:~/test $ readlink -f HW1.txt
/home/jan265/test/HW1.txt
```

6. What were two key events that led to the proliferation of early Unix systems and paved the way for the eventual development of Linux? (Hint; we discussed 4 events in class)

① Steve Jobs fired : BSD → NEXT computer → MACH kernel
 ↓
 Mac OS

② Linus Torvalds : wrote his own OS using MINIX

7. Explain the function of the ‘df’ command. Using the ece5725-f20 server, show the output of this command and explain the size settings for the /home/netid entry. Use the appropriate flags on the df command to show the data in a readable format. Attach a screenshot of your results.

The command ‘df’ stands for ‘disk free’, which is used to display the information regarding the total and available space. We can see the /home/netid entry listed as /dev/sda1, which is mounted on /home. We can see that there is 916GB of total space, 136MB used, 870GB available, and 1% of space used.

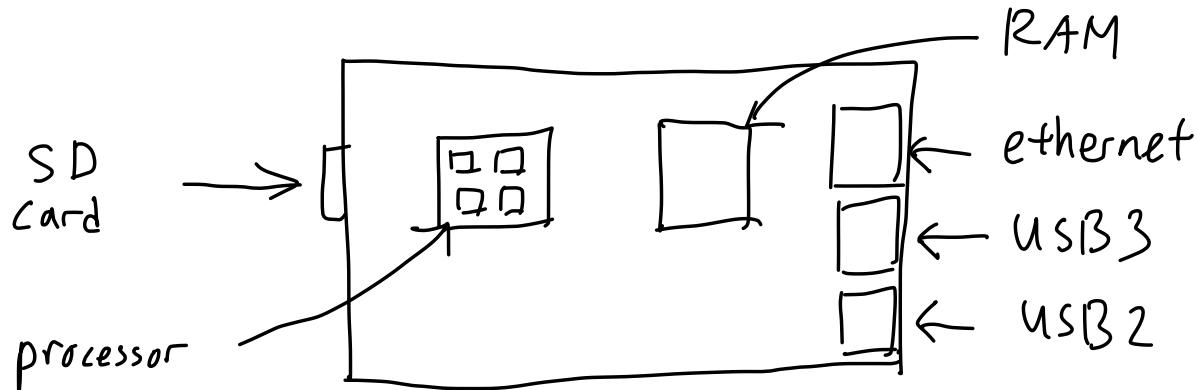
The flag that shows the data in readable format is ‘-h’, which allows the data to be human readable, such as displaying memory as MB and GB.

```
[jan265@ece5725-f20:~ $ pwd
/home/jan265
[jan265@ece5725-f20:~ $ df
Filesystem      1K-blocks    Used Available Use% Mounted on
/dev/root        14992756  3314208   11020440  24% /
devtmpfs          823904       0    823904   0% /dev
tmpfs            956000       0    956000   0% /dev/shm
tmpfs            956000    41544   914456   5% /run
tmpfs             5120        4     5116   1% /run/lock
tmpfs            956000       0    956000   0% /sys/fs/cgroup
/dev/mmcblk0p1    258095    55838   202258  22% /boot
/dev/sda1        960380644  138280  911387904  1% /home
tmpfs           191200       0   191200   0% /run/user/1000
tmpfs           191200       0   191200   0% /run/user/1048
tmpfs           191200       0   191200   0% /run/user/1025
[jan265@ece5725-f20:~ $ df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/root        15G  3.2G   11G  24% /
devtmpfs         805M    0    805M   0% /dev
tmpfs            934M    0    934M   0% /dev/shm
tmpfs            934M    41M   894M   5% /run
tmpfs            5.0M   4.0K   5.0M   1% /run/lock
tmpfs            934M    0    934M   0% /sys/fs/cgroup
/dev/mmcblk0p1    253M    55M   198M  22% /boot
/dev/sda1        916G  136M   870G  1% /home
tmpfs           187M    0    187M   0% /run/user/1000
tmpfs           187M    0    187M   0% /run/user/1048
tmpfs           187M    0    187M   0% /run/user/1025
```

8. Run the ps command on the class server, pipe the output into another command to search for the processes you own (processes with your userid=netid). Also, run a ps command to count the total number of running processes. Attach a screenshot of your results.

```
jan265@ece5725-f20:~ $ ps -alef | grep jan265
4 S root      2221  469  0  80  0 - 3059 -      18:40 ?          00:00:00 sshd: jan265 [priv]
4 S jan265    2227      1  0  80  0 - 3677 do_epo 18:40 ?          00:00:00 /lib/systemd/systemd --user
5 S jan265    2230  2227  0  80  0 - 8627 -      18:40 ?          00:00:00 (sd-pam)
5 S jan265    2245  2221  0  80  0 - 3059 -      18:40 ?          00:00:00 sshd: jan265@pts/1
0 S jan265    2248  2245  0  80  0 - 2122 do_wai 18:40 pts/1    00:00:00 -bash
4 S root      2587  469  0  80  0 - 3059 -      18:55 ?          00:00:00 sshd: jan265 [priv]
5 S jan265    2598  2587  0  80  0 - 3059 -      18:55 ?          00:00:00 sshd: jan265@pts/2
0 S jan265    2601  2598  0  80  0 - 2122 poll_s 18:55 pts/2    00:00:00 -bash
0 R jan265    8001  2248  0  80  0 - 2447 -      22:57 pts/1    00:00:00 ps -alef
0 S jan265    8002  2248  0  80  0 - 1837 pipe_w 22:57 pts/1    00:00:00 grep --color=auto jan265
jan265@ece5725-f20:~ $ ps -alef | wc -l
147
```

9. Components of the Raspberry Pi can be viewed as similar to those in a server or a laptop. Identify the Raspberry Pi components that correspond to a laptop disk, laptop memory and the laptop processor. What are some advantages of the Raspberry Pi over the laptop. What are some disadvantages of the raspberry Pi versus the Laptop?



The SD card on a RaspberryPi corresponds to the disk on a laptop. The RAM memory labelled above corresponds to the memory in a laptop. The quad-core processor on the RaspberryPi corresponds to the processor in a laptop.

The advantage of the RPi over laptop is that it is inexpensive, low power, small size thus portable, and good amount of memory and processing power for the price.

The disadvantage of RPi to laptop is cannot run x86 OS like windows, it may not have sufficient processing power for heavier applications, does not come with battery unlike laptops, need external display, and easy to fry/short circuit.

10. What is the difference between the top and htop command? Which one is preferable to use? Why?

The ‘top’ command will show the list of top CPU usage and the Linux processes. It gives a real-time view of the system. On the other hand, ‘htop’ command is very similar to ‘top’, but is interactive, display in colors, and allows output scrolling. Additionally, it has information about the cores. ‘htop’ is the more preferred one, because as explained above, it is more interactive. So it is easier and nicer to use.