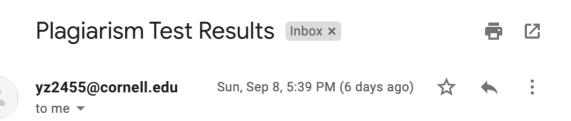NetId: yz2455
Name: Yue Zhang
Lab section: Monday
Submission date: September 14, 2019

1. Cornell academic integrity quiz:

Plagiarism Test Results Inbox ×

yz2455@cornell.edu Sun, Sep 8, 5:39 PM (6 days ago)
to me ▾

User with netid yz2455 has completed the Cornell University Plagiarism Exercises
and received a score of 12/12.

2. Already set up SD card and backup it on my laptop.

3. Login to ece5725-f19 server:
ssh yz2455@132.236.79.175

```
Last login: Sat Sep 14 14:40:30 on ttys000
 ~> ssh yz2455@132.236.79.175
The authenticity of host '132.236.79.175 (132.236.79.175)' can't be established.
ECDSA key fingerprint is SHA256:uVJOYPKZGrkqX8bFzUqDbLJgaD9ZCe3DH20UO9Guvdc.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '132.236.79.175' (ECDSA) to the list of known hosts.
yz2455@132.236.79.175's password:
Linux ece5725-f19 4.19.58-v7+ #1245 SMP Fri Jul 12 17:25:51 BST 2019 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.
```

Display my user id:
```
[yz2455@ece5725-f19:~ $ whoami
 yz2455
```

Display the current directory:
```
[yz2455@ece5725-f19:~ $ pwd
 /home/yz2455
```

Display current date and time:

```
yz2455@ece5725-f19:~ $ date
Sat Sep 14 14:48:42 EDT 2019
yz2455@ece5725-f19:~ $ time

real    0m0.000s
user    0m0.000s
sys     0m0.000s
```

Creat a "test" directory and list file in this directory:
```
[yz2455@ece5725-f19:~ $ mkdir test
[yz2455@ece5725-f19:~ $ pwd
 /home/yz2455
[yz2455@ece5725-f19:~ $ ls
 test
```

Change the permission of home directory:
```
yz2455@ece5725-f19:~ $ chmod -R 755 test
yz2455@ece5725-f19:~ $ ls -l
total 4
drwxr-xr-x 2 yz2455 students 4096 Sep 14 14:50 test
```

Change my default password:
```
yz2455@ece5725-f19:~ $ passwd
Changing password for yz2455.
Current password:
New password:
Retype new password:
passwd: password updated successfully
```

4. Creat HW1.txt in test directory:
```
yz2455@ece5725-f19:~ $ cd test/
yz2455@ece5725-f19:~/test $ touch HW1.txt
yz2455@ece5725-f19:~/test $ ls
HW1.txt
```

Content of HW1.txt:
```
[yz2455@ece5725-f19:~/test $ cat HW1.txt
[yz2455@ece5725-f19:~/test $ echo "yz2455 Yue Zhang" >>HW1.txt
[yz2455@ece5725-f19:~/test $ cat HW1.txt
 yz2455 Yue Zhang
```

Permissions:
```
[yz2455@ece5725-f19:~/test $ chmod 640 HW1.txt
[yz2455@ece5725-f19:~/test $ ls -l
 total 4
 -rw-r----- 1 yz2455 students 17 Sep 14 15:54 HW1.txt
```

5. What were two key events that led to the proliferation of early Unix and paved way for the eventual development of Linux?

The first key event is that Ken Thompson and Dennis Ritchie used C instead of B language to rewrite Unix.

The second key event is that Richard Stallman founded GNU(GNU's Not Unix) operating system, which is Unix-like but differs from Unix by being free software and containing no Unix code. It is free software that enables users to share and modify their system.

6. 777:
The first 7 means 1 (User can read) 1 (User can write) 1 (User can execute), binary 111 equals decimal 7.
The second 7 means 1 (Group can read) 1 (Group can write) 1 (Group can execute).
The third 7 means 1 (Others can read) 1 (Others can write) 1(Others can execute).
Because others cannot only read and execute your files, but also they can write and change your files, which is really dangerous.

644:
The first 6 means 1(User can read) 1(User can write) 0(User cannot execute).
The second 4 means 1(Group can read) 0(Group cannot write) 0(Group cannot execute).
The third 4 means 1(Others can read) 0(Others cannot write) 0(Others cannot execute).
This permission allows user to read and write, allow Group to read, and allow others to read.

700:
The first 7 means 1 (User can read) 1 (User can write) 1 (User can execute).
The second 0 means 0 (Group cannot read) 0 (Group cannot write) 0 (Group cannot execute).
The third 0 means 0 (Others cannot read) 0 (Others cannot write) 0 (Others cannot execute).
It allows user to read, write and execute, doesn't allow Group and Others to do anything.

7. Output of df command:

```
[yz2455@ece5725-f19:~/test $ df
Filesystem      1K-blocks      Used Available Use% Mounted on
/dev/root       14989596  3109872  11222392  22% /
devtmpfs          469544        0    469544   0% /dev
tmpfs             474152        0    474152   0% /dev/shm
tmpfs             474152    47972    426180  11% /run
tmpfs               5120        4      5116   1% /run/lock
tmpfs             474152        0    474152   0% /sys/fs/cgroup
/dev/mmcblk0p1    258096    40961    217135  16% /boot
/dev/sda1      960378896   186188 911338336   1% /home
tmpfs              94828        0     94828   0% /run/user/1000
tmpfs              94828        0     94828   0% /run/user/1066
tmpfs              94828        0     94828   0% /run/user/1052
tmpfs              94828        0     94828   0% /run/user/1028
```

According to the format, the size settings for /home entry is 960378896 1k-blocks, which is 916G.

Human readable format:
```
[yz2455@ece5725-f19:~/test $ df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/root        15G  3.0G   11G  22% /
devtmpfs        459M     0  459M   0% /dev
tmpfs           464M     0  464M   0% /dev/shm
tmpfs           464M   47M  417M  11% /run
tmpfs           5.0M  4.0K  5.0M   1% /run/lock
tmpfs           464M     0  464M   0% /sys/fs/cgroup
/dev/mmcblk0p1  253M   41M  213M  16% /boot
/dev/sda1       916G  182M  870G   1% /home
tmpfs            93M     0   93M   0% /run/user/1000
tmpfs            93M     0   93M   0% /run/user/1066
tmpfs            93M     0   93M   0% /run/user/1052
tmpfs            93M     0   93M   0% /run/user/1028
tmpfs            93M     0   93M   0% /run/user/1023
```

8. Search for the processes my own:
```
yz2455@ece5725-f19:~/test $ ps -ef|grep yz2455=yz2455
yz2455   16487 12159  0 18:52 pts/3    00:00:00 grep --color=auto yz2455=yz2455
```

Total number of running processes:
```
yz2455@ece5725-f19:~/test $ ps aux|wc -l
157
```

9. Advantages of Raspberry Pi over laptop:
   1) It is much cheaper and more convenient to bring with you compared with laptops.
   2) GPIO on Raspberry Pi allows users to connect it with sensors and external components and interact with them programmatically using a language such as python.

Disadvantages of Raspberry Pi versus laptop:
1) Raspberry Pi is more fragile than laptop, if we connect pins by fault, we will damage the board.
2) Raspberry Pi is not as fast as CPU processing, and it's memory is limited compared with laptops.

10. Top command is used to show dynamic real-time processes of the system.
Htop allows users to interactively monitor the system's vital resources or server's processes in the real time.

Differences:
1) Using htop you can scroll the list vertically and horizontally to see all processes and complete command lines.
2) Htop starts faster than top
3) In htop you don't need to kill a process by typing the process number

Htop is preferable to use, because of the differences above, such as in htop we don't need to kill a process by typing the process number, and we can scroll the list vertically and horizontally to see all processes.