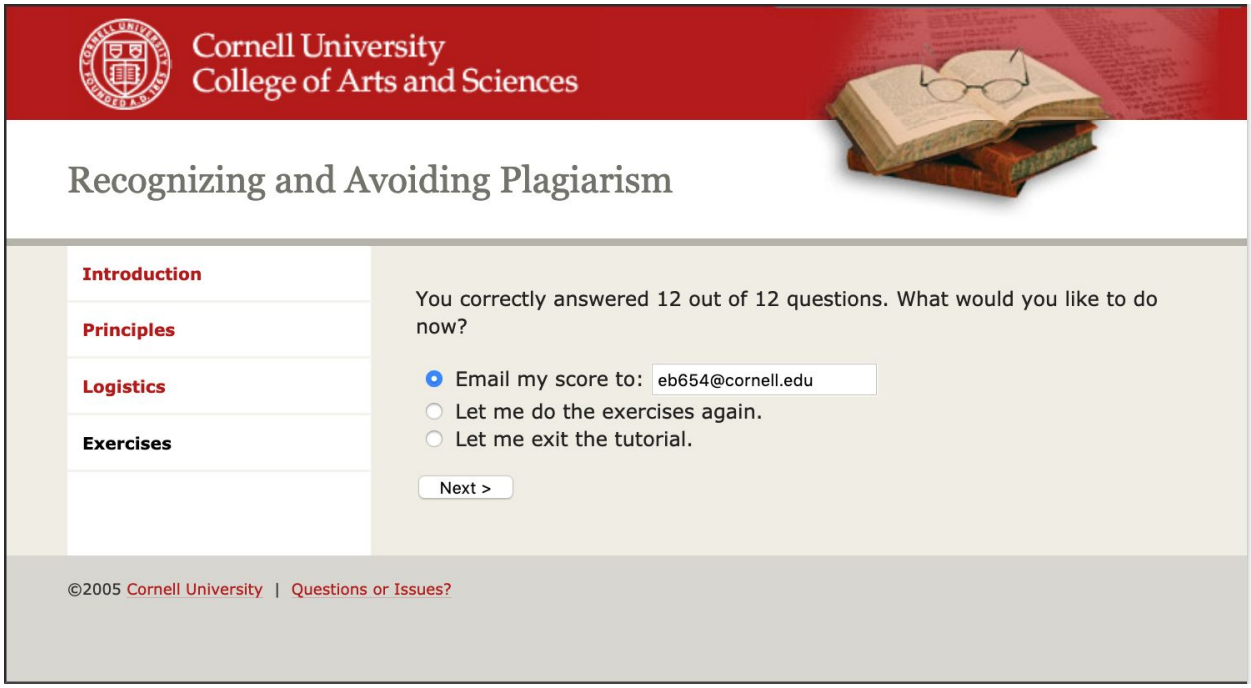
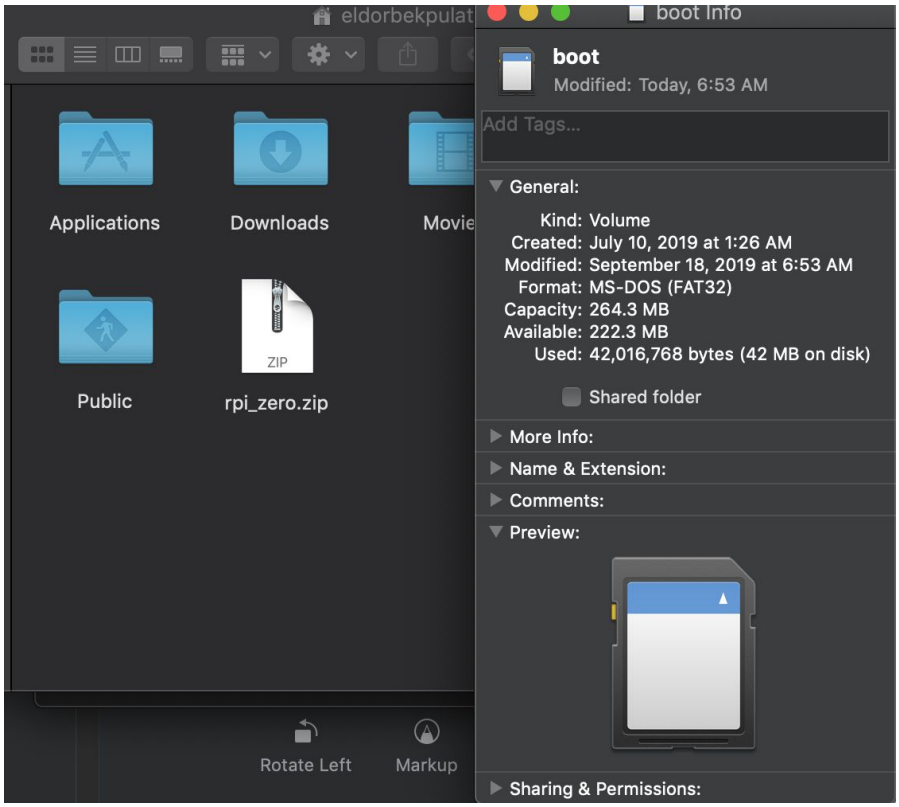
Homework #1
Eldor Bekpulatov (eb654)

1. Post a screenshot of your quiz results.



2. Load the appropriate Linux Raspbian kernel on the card.



3. Log into the ece5725-f19 server.

```
eb654@ece5725-f19:~ $ users
eb654 pi
eb654@ece5725-f19:~ $ pwd
/home/eb654
eb654@ece5725-f19:~ $ date
Wed 18 Sep 2019 06:30:17 AM EDT
eb654@ece5725-f19:~ $ mkdir test
eb654@ece5725-f19:~ $ ls -l
total 4
drwxr-xr-x 2 eb654 students 4096 Sep 18 06:30 test
eb654@ece5725-f19:~ $ chmod 744
chmod: missing operand after '744'
Try 'chmod --help' for more information.
eb654@ece5725-f19:~ $ cd ..
eb654@ece5725-f19:/home $ ls
ach238  bl569   cy428   gw284   jc3362  jw2533  kss223      m
acn55   bp424   cya6    gx55    jdg272  jw2597  kw573       m
ajh322  bw499   dap263  hg446   jf832   keb278  kzy2        n
al2367  by277   eb654   ics9    jfs9    kl928   lgs73       p
arm293  cl2535  fl427   ja643   jjm467  kl943   lost+found  p
bh377   cnz5    fmr32   jc3345  jl3945  km853   mfx2        p
eb654@ece5725-f19:/home $ chmod 744 eb654
eb654@ece5725-f19:/home $ ls -l
total 420
drwxr-xr-x  5 ach238 students  4096 Sep 17 11:05 ach238
drwxr-xr-x  8 acn55  students  4096 Sep 17 14:01 acn55
drwxrwxrwx  2 ajh322 students  4096 Sep 17 15:23 ajh322
drwxr-xr-x  5 al2367 students  4096 Sep 17 20:02 al2367
drwxrwxrwx  4 arm293 students  4096 Sep 18 00:12 arm293
drwxr-xr-x  4 bh377  students  4096 Sep 17 22:46 bh377
drwxr-xr-x  6 bl569  students  4096 Sep 15 18:47 bl569
drwxrwxrwx  4 bp424  students  4096 Sep 18 00:08 bp424
drwxr-xr-x  5 bw499  students  4096 Sep 15 19:26 bw499
drwxr-xr-x  5 by277  students  4096 Sep 16 14:14 by277
drwxr-xr-x  5 cl2535 students  4096 Sep 15 17:34 cl2535
drwxrwxrwx  4 cnz5   students  4096 Sep 18 02:07 cnz5
drwxrwxrwx  2 cy428  students  4096 Sep 17 15:25 cy428
drwxr-xr-x  6 cya6   students  4096 Sep 17 23:32 cya6
drwxr-xr-x  5 dap263 students  4096 Sep 16 11:13 dap263
drwxr--r--  4 eb654  students  4096 Sep 18 06:30 eb654
drwxr-xr-x  6 fl427  students  4096 Sep 17 13:34 fl427
drwxrwxrwx  4 fmr32  students  4096 Sep 17 11:07 fmr32
drwxr-xr-x  6 gw284  students  4096 Sep 14 15:35 gw284
drwxr--r--  6 gx55   students  4096 Sep 15 19:07 gx55
```

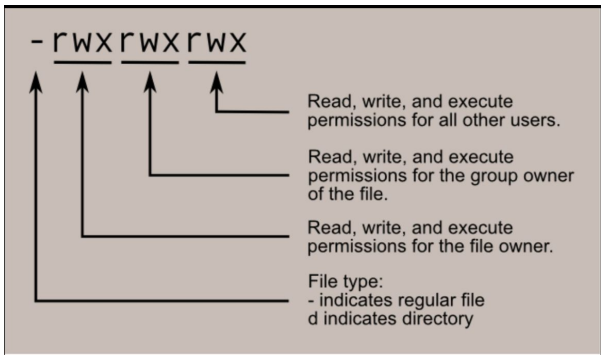
4. Attach a screenshot showing the file in the appropriate directory.

```
eb654@ece5725-f19:/home $ cd eb654
eb654@ece5725-f19:~ $ cd test
eb654@ece5725-f19:~/test $ touch homework1.txt
eb654@ece5725-f19:~/test $ echo Eldor Bekpulatob eb654 > homework1.txt
eb654@ece5725-f19:~/test $ cat homework1.txt
Eldor Bekpulatob eb654
eb654@ece5725-f19:~/test $ tree
.
└── homework1.txt

0 directories, 1 file
eb654@ece5725-f19:~/test $ chmod 744 homework1.txt
eb654@ece5725-f19:~/test $ ls -l
total 4
-rwxr--r-- 1 eb654 students 23 Sep 18 06:39 homework1.txt
eb654@ece5725-f19:~/test $
```

5. What were two key events that led to the proliferation of early Unix systems and paved the way for the eventual development of Linux?
   Government regulations that mandated that AT&T provide the UNIX source code to public upon request. This allowed for anyone with relation to computer science knowledge to add onto the OS.
   Development of a high language C. This allowed vast variety of developers to contribute that didn't need to learn Assembly. Also having the OS written in C made it a much more portable system. This allowed for many machines to run the system without too much overhead.

6. Explain Linux file permissions.
   The best way to explain the file permissions is through this image below.



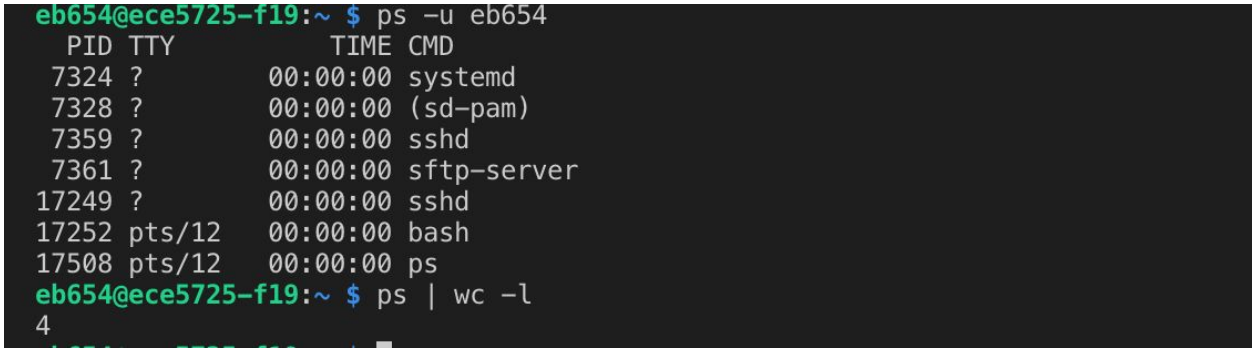
   Each of the three rwx groups can be represented through 3-bit binary.
   For example, r-x can represent 101, and r-- can represent 100. Each of these 3-bit binaries correspond to a hexadecimal numbers ranging from 0-7. So, when we talk about `chmod 777`, we are essentially talking about each of the three user groups having read, write, and execute permissions.
   '700' corresponds to 'rwx --- ---'.
   '644' corresponds to 'rw- r-- r--'.

7. Explain the function of the 'df' command.
   `df` is a command used to display the amount of available disk space.
   `-h` is flag to format the output in a human readable format.

```
eb654@ece5725-f19:/home $ 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  291M  870G   1% /home
tmpfs            93M     0   93M   0% /run/user/1000
tmpfs            93M     0   93M   0% /run/user/1003
tmpfs            93M     0   93M   0% /run/user/1038
eb654@ece5725-f19:/home $
```

   The `/home` directory is located in external drive (dev/sda1). That is why the directory size available is 900+ gb.

8. Run the ps command.



9. 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?
   Disk - MicroSD slot
   Memory - SoC 1GB RAM
   Processor - SoC 1.2 GHz processor
   Advantages of Raspberry Pi include lightweight development platform that can handle Operating System of which many are already familiar with. Also, Raspberry Pi can provide a much more bare-bone interface with the hardware. It has 40 GPIO pins that can be easily programmed it interface devices with Python. In terms of cost effectiveness and configurability Raspberry Pi's win. Laptops, on the other hand, are much more costly and complicated machines, which can be useful when running big programs.

10. What is the difference between the top and htop command? Which one is preferable to use? Why?
    `top` and `htop` are both used to list the processes using the cpu the most. The difference between them is that `htop` has much more human friendly interface with buttons and a small progress bar that shows the cpu utilization in each of the cores. I think `htop` is preferable to use, because it has much more functionalities builtin in terms of interface.