AMS 209 Homework#1

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Question#1:

I am currently using a Windows 10 Operating System (OS). To make a Linux OS available on my machine, I downloaded Virtual Box (Ubuntu) as can be seen in Figure 1. Figure 2 shows the newly installed Ubuntu on my machine being opened.

Fig. 1. Image verifying that Virtual Box (Ubuntu) has been installed.
Fig. 2. Images of the open Virtual Box. To the left, the Oracle Virtual Box Manager used to set up Virtual Box display, see storage information, and many other properties of the Ubuntu machine. The image on the right appears by hitting start (Green arrow) on the manager to start the machine. This is the desktop image with nothing there currently.

**Question#2:**

I have practiced using the basic Linux commands on Ubuntu, and this practice has prepared me to do questions 3 and 4. Completion of these tasks presents evidence for the practice. First, I learned to access the manual using the man command followed by the command that I want to learn more about. For example, man cp tells me more about the command for copying files. Some other important commands are ls, mv, rm, cat, touch, find, sort, mkdir, cd, pwd, and rmdir for listing files in a directory, moving files or renaming files, print the filename rather than a page at a time, create an empty file, find a file, sort entries in a file, make a new directory, change directory, tell what directory you are currently in, and remove a directory, respectively. For further information, I also read and watched the recommended articles and visual tutorials.
**Question#3:**

Following the steps on the course website, I was able to set up a Bitbucket account and clone the course repository from the remote Bitbucket repository to my laptop. I used Ubuntu, which provided me with a Linux OS on my Windows 10 64 Bit Toshiba laptop. First, I had an issue where virtual box said that I did not have permission to access or download any files. To solve this problem, I used the sudo su command. This prompted me to enter my password, and since then I have been able to have permission to perform the tasks needed to complete this homework. I installed Git, which represents one of the DVCS (Distributed Version Control System) tools that can transfer code from my laptop to my Bitbucket account. Here is the command that I used to install Git on Ubuntu:

```
root@christina-VirtualBox:/home/christina# apt-get install git
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following extra packages will be installed:
  git-man liberror-perl
Need to get 3,306 kB of archives.
After this operation, 21.9 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
```

Please refer to the bio.txt document created and posted on my Bitbucket repository with the appropriate commits/check-ins. Here, I will now outline the steps that I took to solve this problem. First, I had to configure the username and email address using the following commands:

```
root@christina-VirtualBox:/home/christina#
git config --global user.name "Christina Findley"

root@christina-VirtualBox:/home/christina#
git config --global user.email "cfindley@ucsc.edu"
```

Then, I proceed to create a directory called ams209 and move into this directory using the cd command.

```
christina@christina-VirtualBox:
mkdir ams209

root@christina-VirtualBox:
 cd ams209
```
Inside of the ams209 directory, I create two separate directories. The first is called ams209_christinafindley, which is where I cloned my repository, and the second is ams209-fall-2016, which is where I cloned the course repository from Dr. Dongwook Lee.

```
christina@christina-VirtualBox:~/ams209$
$ mkdir ams209-christinafindley

christina@christina-VirtualBox:~/ams209$
$ mkdir ams209-fall-2016
```

Here are the commands to clone the course repo:

```
christina@christina-VirtualBox:~/ams209/ams209-christinafindley$
$ cd ../ams209-fall-2016/

christina@christina-VirtualBox:~/ams209/ams209-fall-2016$
$ git clone https://bitbucket.org/dongwook159/ams209-fall-2016.git .
Cloning into 'ams209-fall-2016'...
remote: Counting objects: 364, done.
remote: Compressing objects: 100% (325/325), done.
remote: Total 364 (delta 139), reused 198 (delta 36)
Receiving objects: 100% (364/364), done.
Resolving deltas: 100% (139/139), done.
Checking connectivity... done.
```

Similarly, here is the code to clone my Bitbucket repo:

```
christina@christina-VirtualBox:~/ams209/ams209-christinafindley$
$ git clone https://bitbucket.org/cfindley/ams209-christinafindley.git .
Cloning into '.'.
warning: You appear to have cloned an empty repository.
Checking connectivity... done.
```

```
christina@christina-VirtualBox:~/ams209/ams209-christinafindley$
$ mkdir homework
```

Note that I also make a directories inside of the directory christina called homework. The homework for this class is submitted in the homework directory.

**Part (a)** I generated and edited a text file named bio.txt that includes all of the requested information
using a text editor called gedit:

```
chris@christina-VirtualBox:~/ams209/ams209-christinafindley/homework$
$ gedit bio.txt

chris@christina-VirtualBox:~/ams209/ams209-christinafindley/homework$
$ 1s
bio.txt
```

**Part (b):** In order to sent files to the repo, one needs to add, commit, and push it towards the repo using git add, git commit, and git push. Once the git commit line is entered, I can add a comment and check-in with the desired comment: my first check in to my own repo on mm/dd/yy as part of homework 1. Refer to the code below for these three steps:

```
chris@christina-VirtualBox:~/ams209/ams209-christinafindley/homework$
$ git status
On branch master
Your branch is up-to-date with 'origin/master'.
Untracked files:
  (use "git add <file>..." to include in what will be committed)

  bio.txt

nothing added to commit but untracked files present (use "git add" to track)
```

```
chris@christina-VirtualBox:~/ams209/ams209-christinafindley/homework$
$ git add bio.txt

chris@christina-VirtualBox:~/ams209/ams209-christinafindley/homework$
$ git commit

chris@christina-VirtualBox:~/ams209/ams209-christinafindley/homework$
$ git push
Counting objects: 1, done.
Delta compression using up to 2 threads.
Compressing objects: 100% (1/1), done.
Writing objects: 100% (1/1), 497 bytes | 0 bytes/s, done.
Total 1 (delta 1), reused 0 (delta 0)
To https://cfindley@bitbucket.org/cfindley/ams209-christinafindley.git
  6ed2a4d.. master -> master
```

**Parts (c) and (d):** Edit the file as before by typing gedit bio.txt as before in part (a). Once it is edited to
have the types of OS and machine information, repeat the git add, git commit, and git push commands.

In order to check-in, I added the following comment: "I am checking in my updated bio.txt to the repo again. Thank you." Note that a profile picture can only not be added to .txt files and can only be used in rich text files. Thus, in class Dr. Dongwook Lee said that we could check in a picture separately into Bitbucket, which is the option that I chose to do, or convert bio.txt into a pdf file (bio.pdf) and add a picture.

**Question #4**

Using the cd command, I moved into the directory ams209-fall-2016 and found the file index.rst that was cloned from the course repo. First, I used the cd command to move back into the directory ams209-christinafindley, and then into the directory homework. Here, I copied the directory from the cloned repo into the homework folder using

```
root@christina-VirtualBox:/hoe/christina/ams209-christinafindley/homework#
cp -R .././ams209-fall-2016
```

Next, I changed directories into the copied directory and used the mv command to move the index.rst file into the homework directory. Lastly, I deleted the directory of files not needed as shown below:

```
root@christina-VirtualBox:/hoe/christina/ams209-christinafindley/homework#
cd ams209-fall-2016

root@christina-VirtualBox:/hoe/christina/ams209-christinafindley/homework#
mv index.rst ../

root@christina-VirtualBox:/hoe/christina/ams209-christinafindley/homework#
cd ../

root@christina-VirtualBox:/hoe/christina/ams209-christinafindley/homework#
rm -r ams209-fall-2016

root@christina-VirtualBox:/hoe/christina/ams209-christinafindley/homework#
ls
bio.txt index.rst profile_pic.jpg
```

**Part a:** The following Linux command line will produce a file roster.txt that includes the list of the
students (not including the instructor) with first name, last name, and department.

```
root@christina-VirtualBox:/hoe/christina/ams209/christinafindley/homework#
cat index.rst | tail -19 | grep -o '^[^*]?' > roster.txt
```

```
root@christina-VirtualBox:/hoe/christina/ams209/christinafindley/homework#
ls
bio.txt index.rst profile_pic.jpg roster.txt
```

The first part (cat index.rst) will be processed and display the information given in index.rst. The vertical lines are piping so you can use multiple commands in one commands line. The tail -19 part ensures that as the cat command is processed, it will only print the last 19 lines of index.rst, which has the list of students with an asterisk in front. The grep command is used to find all of the asterisks and not display them using cat. The redirection command > stores the result in a file called roster.txt. Using the command more roster.txt will display that the command worked correctly as shown in Figure 3.
Fig. 3. Images showing the contents of roster.txt. It lists all of the students in AMS209 by last name, first name, and department only.

Part b: Of course, one can use a text editor like Vi, Emacs, or Gedit to open roster.txt and count the number of lines (ie number of students in the class). This is tedious. In the terminal, type

\[
\text{root@christina-VirtualBox:/hoe/christina/ams209-christinafindley/homework# wc -l roster.txt}
\]

19 roster.txt

the \text{wc} command originally stood for word count to count the words in a file, but using the \text{wc -l} with it will count the number of lines in a file. Since roster.txt has only one student per line, the number of lines will tell me how many students are in the class, and the terminal displays 19. There are 19 students.

Part c:

In order to produce a list of students last names and first names only and store it in a file roster2.txt in reverse alphabetical order, use the following:

\[
\text{root@christina-VirtualBox:/hoe/christina/ams209-christinafindley/homework# cat roster.txt | sed 's/, AMS//g' | sed 's/, CMPE//g' | sed 's/, CMPS//g' | sed 's/, MATH/ /g' | sed 's/, SciCAM/ /g' | sed 's/, BME/ /g' | sed 's/, EE/ /g' | sed 's/, TIM/ /g' | sort -r > roster2.txt}
\]

The \text{cat} command is processed to display the last name, first name, and department from roster.txt. Together with piping, the \text{sed} command is used to delete all of the different department names separately (AMS, CMPE, CMPS, MATH, SciCAM, BME, EE, and TIM). The \text{sort} command puts in alphabetical order, but \text{sort -r} puts in reverse alphabetical order. Lastly, the information is stored in roster2.txt using the redirection `>`. Using the command \text{more roster2.txt} will display that the command worked correctly as shown in Figure 3.
Fig. 4. Images showing the contents of roster.txt. It lists all of the students in AMS209 by last name and first name only in reverse alphabetical order.

Part d:

Process and display the data from roster.txt using the cat command. Use piping and the grep command to grab all the AMS students. Use redirection to save into a file rosterAMS.txt. That is, type

```
root@christina-VirtualBox:/home/christina/ams209-christinafindley/homework# cat roster.txt | grep AMS > rosterAMS.txt
```

To count the number of AMS students or number of lines, type

```
root@christina-VirtualBox:/home/christina/ams209-christinafindley/homework# wc -l rosterAMS.txt
4 rosterAMS.txt
```

There are four AMS students in the class. Use the more rosterAMS.txt command to ensure that it is
indeed working properly as shown in Figure 5.

Fig. 5. Images showing the contents of rosterAMS.txt. It lists all of the AMS students in AMS209 by last name and first name only.

**Part e:**

To produce a list of SciCAM students in reverse alphabetical order, type

```
root@christina-VirtualBox:/home/christina/ams209/christinafindley/homework# cat roster.txt | grep SciCAM | sort -r > rosterAMS.txt
```

The cat command finds all the student last names, first names, and departments. The grep command will grab all the lines/students with SciCAM in it. The sort -r command will sort it in reverse alphabetical order. Lastly, redirection using > will store this information in a file called rosterSciCAM.txt. Use the more rosterSciCAM.txt command to ensure that it is indeed working properly as shown in Figure 6.

Note that I have pushed all of these text files to the BitBucket.
Fig. 6. Images showing the contents of rosterSciCAM.txt. It lists all of the SciCAM students in AMS209 by last name and first name only in reverse alphabetical order.