

Purpose

The purpose of this exercise is to review files and configurations associated with user accounts.

Preparation

Start your GCP instance and connect to it using the SSH link.

Assignment

Keep a Word document with the answers to the following questions.

Look at your users (15 points)

Look at the contents of the file `/etc/passwd`. In your Word document:

```
conway198799@gcelab2: ~ - Google Chrome
ssh.cloud.google.com/projects/willie-conway-cs369-f2-2019/zones/us-central1-c/instances/gcelab2?authuser=0&hl=en_US&q
Connected, host fingerprint: ssh-rsa 0 13:65:74:EE:9F:0C:71:49:47:58:4D:12:60:6B
:86:5E:85:66:87:E9:C6:7D:BD:FC:D7:71:BB:9F:3E:6D:3F:4B
Linux gcelab2 4.9.0-11-amd64 #1 SMP Debian 4.9.189-3+deb9u1 (2019-09-20) x86_64

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 Nov 21 17:40:01 2019 from 74.125.42.227
conway198799@gcelab2:~$ cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-timesync:x:100:102:systemd Time Synchronization,,,:/run/systemd:/bin/false
systemd-network:x:101:103:systemd Network Management,,,:/run/systemd/netif:/bin/false
systemd-resolve:x:102:104:systemd Resolver,,,:/run/systemd/resolve:/bin/false
systemd-bus-proxy:x:103:105:systemd Bus Proxy,,,:/run/systemd:/bin/false
_apt:x:104:65534::/nonexistent:/bin/false
uidd:x:105:109::/run/uidd:/bin/false
ntp:x:106:110::/home/ntp:/bin/false
sshd:x:107:65534::/run/sshd:/usr/sbin/nologin
conway198799:x:1000:1001::/home/conway198799:/bin/bash
cs373johnceigas:x:1001:1002::/home/cs373johnceigas:/bin/bash
wc:x:1002:1003::/home/wc:/bin/bash
conway198799@gcelab2:~$
```

(Screenshot output of the file `/etc/passwd`.)

1. List the entire line with your account. What is your home directory? What is your user id? What is your group id? You are a non-system user. Are there any other non-system users? How can you tell?

conway198799:x:1000:1001::/home/conway198799:/bin/bash

1 2 3 4 5 6

(Fig.01:/etc/passwd file format)

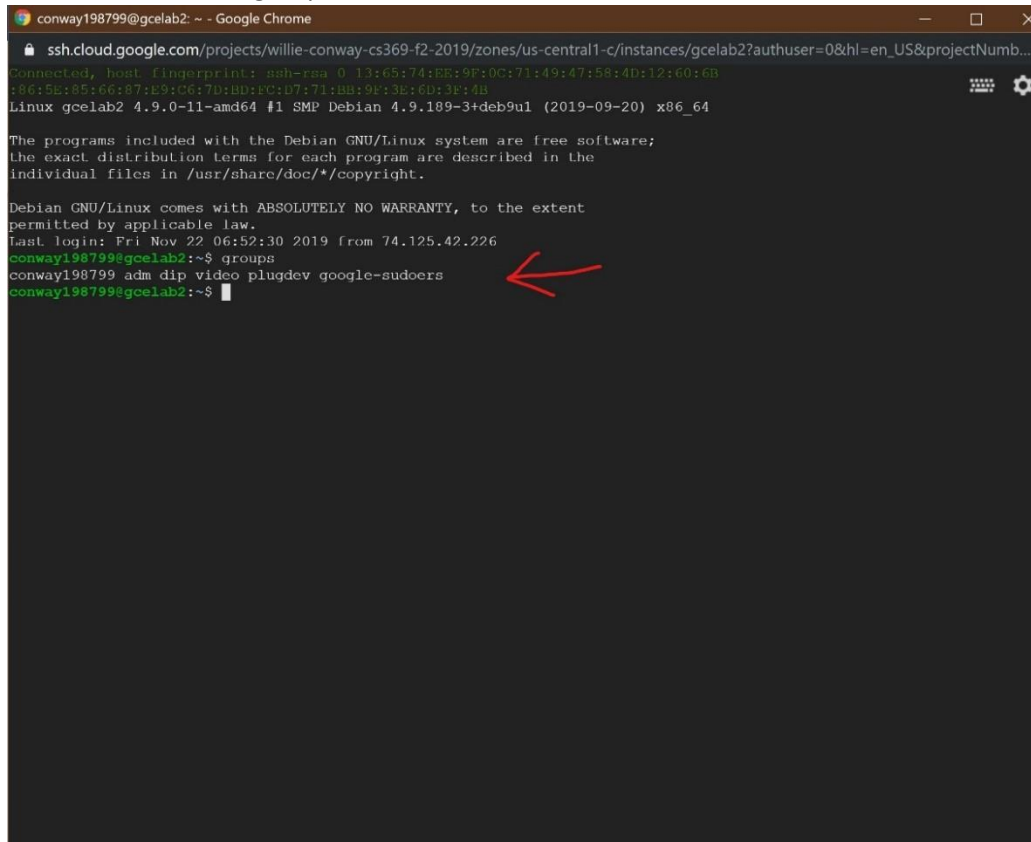
1. **Username:** First field indicates the name of the user which is used to login.
2. **Password:** The X denotes encrypted password which is actually stored inside /shadow file. If the user does not have a password, then the password field will have an *(asterisk).
3. **User ID (UID):** Every user must be allotted a user ID (UID). UID 0 (zero) is kept for root user and UIDs 1-99 are kept for further predefined accounts, UID 100-999 are kept by the system for the administrative purpose. UID 1000 is almost always the first non-system user, usually an administrator. If we create a new user on our Ubuntu system, it will be given the UID of 1001.
4. **Group ID (GID):** It denotes the group of each user; like as UIDs, the first 100 GIDs are usually kept for system use. The GID of 0 relates to the root group and the GID of 1000 usually signifies the users. New groups are generally allotted GIDs begins from 1000.
5. **Home directory:** Denotes the path of the user's home directory, where all the files and programs are stored. If there is no specified directory, then / becomes user's directory.
6. **Command/shell:** It denotes the full path of the default shell that executes the command (by the user) and displays the results.

(According to the above figure, my home directory is the absolute path /home/conway198799. My User ID (UID) is 1000 and the Group ID (GID) is 1001. According to the screenshot, there is a total of three non-system users (conway198799, cs373johncigas and wc). UID 1000 is almost always the first non-system user, usually an administrator. I'm the first non-system user of my SSH, username conway198799. When I authorized to share my SSH with username cs373johncigas through GCP, they were given the User ID (UID) 1001. When I used a third-party tool to access my SSH instance with putty using the username wc, I was given the User ID (UID) 1002.)

(Each of these users are part of a user group. The GID of 0 relates to the root group and the GID of 1000 usually signifies the users. New groups are generally allotted GIDs begins from 1000. The username conway198799 is the first member of the group with a Group ID (GID) of 1001. The username cs373johncigas is the second member of the group with

a Group ID (GID) of 1002. The username wc is the third member of the group with a Group ID (GID) of 1003.)

2. Show the result of the groups command.



```
conway198799@gcelab2: ~ - Google Chrome
ssh.cloud.google.com/projects/willie-conway-cs369-f2-2019/zones/us-central1-c/instances/gcelab2?authuser=0&hl=en_US&projectNumb...
Connected, host fingerprint: ssh-rsa 0 13:65:74:EE:9F:0C:71:49:47:58:4D:12:60:6B
:86:5E:85:66:87:E9:C6:7D:BD:FC:D7:71:BB:9F:3E:6D:3F:4B
Linux gcelab2 4.9.0-11-amd64 #1 SMP Debian 4.9.189-3+deb9u1 (2019-09-20) x86_64

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: Fri Nov 22 06:52:30 2019 from 74.125.42.226
conway198799@gcelab2:~$ groups
conway198799 adm dip video plugdev google-sudoers
conway198799@gcelab2:~$
```

A red arrow points to the output of the `groups` command, which lists the groups for the user `conway198799`: `adm dip video plugdev google-sudoers`.

(The Linux groups command prints the names of the primary and any supplementary groups for each given username, or the current process if no names are given. If more than one name is given, the name of each user is printed before the list of that user's groups and the username is separated from the group list by a colon. See screenshot below.)

```
conway198799@gcelab2: ~ - Google Chrome
ssh.cloud.google.com/projects/willie-conway-cs369-f2-2019/zones/us-central1-c/instances/gcelab2?authuser=0&hl=en_US&projectNumb...
Connected, host fingerprint: ssh-rsa 0 13:65:74:EE:9F:0C:71:49:47:58:4D:12:60:6B
:86:5E:85:66:87:E9:C6:7D:BD:FC:D7:71:BB:9F:3E:6D:3F:4B
Linux gcelab2 4.9.0-11-amd64 #1 SMP Debian 4.9.189-3+deb9u1 (2019-09-20) x86_64

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: Fri Nov 22 06:52:30 2019 from 74.125.42.226
conway198799@gcelab2:~$ groups
conway198799 adm dip video plugdev google-sudoers
conway198799@gcelab2:~$ groups | wc -w
6
conway198799@gcelab2:~$ groups conway198799
conway198799 : conway198799 adm dip video plugdev
conway198799@gcelab2:~$
```

(Using the Linux groups command with username conway198799.)

Since you have an account on your instance, you have an entry in /etc/passwd, and you also have an entry in /etc/shadow. View this file.

```
conway198799@gcelab2: ~ - Google Chrome
ssh.cloud.google.com/projects/willie-conway-cs369-f2-2019/zones/us-central1-c/instances/gcelab2?authuser=0&hl=en_US&projectNu...
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: Fri Nov 22 06:52:30 2019 from 74.125.42.226
conway198799@gcelab2:~$ groups
conway198799 adm dip video plugdev google-sudoers
conway198799@gcelab2:~$ groups | wc -w
6
conway198799@gcelab2:~$ groups conway198799
conway198799 : conway198799 adm dip video plugdev
conway198799@gcelab2:~$ cat /etc/shadow
cat: /etc/shadow: Permission denied
conway198799@gcelab2:~$ sudo cat /etc/shadow
root:*:18183:0:99999:7:::
daemon:*:18183:0:99999:7:::
bin:*:18183:0:99999:7:::
sys:*:18183:0:99999:7:::
sync:*:18183:0:99999:7:::
games:*:18183:0:99999:7:::
man:*:18183:0:99999:7:::
lp:*:18183:0:99999:7:::
mail:*:18183:0:99999:7:::
news:*:18183:0:99999:7:::
uucp:*:18183:0:99999:7:::
proxy:*:18183:0:99999:7:::
www-data:*:18183:0:99999:7:::
backup:*:18183:0:99999:7:::
list:*:18183:0:99999:7:::
irc:*:18183:0:99999:7:::
gnats:*:18183:0:99999:7:::
nobody:*:18183:0:99999:7:::
systemd-timesync:*:18183:0:99999:7:::
systemd-network:*:18183:0:99999:7:::
systemd-resolve:*:18183:0:99999:7:::
systemd-bus-proxy:*:18183:0:99999:7:::
_apt:*:18183:0:99999:7:::
uidd:*:18183:0:99999:7:::
ntp:*:18183:0:99999:7:::
sshd:*:18183:0:99999:7:::
conway198799:*:18198:0:99999:7:::
cs373johnsigas:*:18199:0:99999:7:::
wc:*:18220:0:99999:7:::
conway198799@gcelab2:~$
```

(Using Linux command `sudo` to bypass permissions, then using Linux `cat` command to open and display file `/etc/shadow`.)

3. List the line for your account. What does the password field contain? What does this mean? Explain why this seems like a contradiction.

conway198799:*:18198:0:99999:7:::

The diagram shows the entry 'conway198799:*:18198:0:99999:7:::' with vertical lines separating it into six fields. Arrows point from each field to a number below it: 1 for 'conway198799', 2 for '*', 3 for ':18198', 4 for ':0', 5 for ':99999', and 6 for ':7:::'.

(Fig.02:/etc/shadow file format)

- 1.Username: It is your login name.
- 2.Password: It is your encrypted password. The password should be minimum 8-12 characters long including special characters, digits, lower case alphabetic and more.
3. Last password change (lastchanged): The date of the last password change, expressed as the number of days since Jan 1, 1970.
4. Minimum: The minimum number of days required between password changes i.e. the number of days left before the user is allowed to change their password
5. Maximum: The maximum number of days the password is valid (after that user is forced to change their password)
6. Warn: The number of days before password is to expire that user is warned that their password must be changed.

(The password file contains an asterisk(*).If the user does not have a password, then the password field will have an asterisk(*). If the password field contains some string that is not a valid result of crypt(3), for instance ! or *, the user will not be able to use a Unix password to log in (but the user may log in the system by other means). This field may be empty, in which case no passwords are required to authenticate as the specified login name. However, some applications which read the /etc/shadow file may decide not to permit any access at all if the password field is empty.)

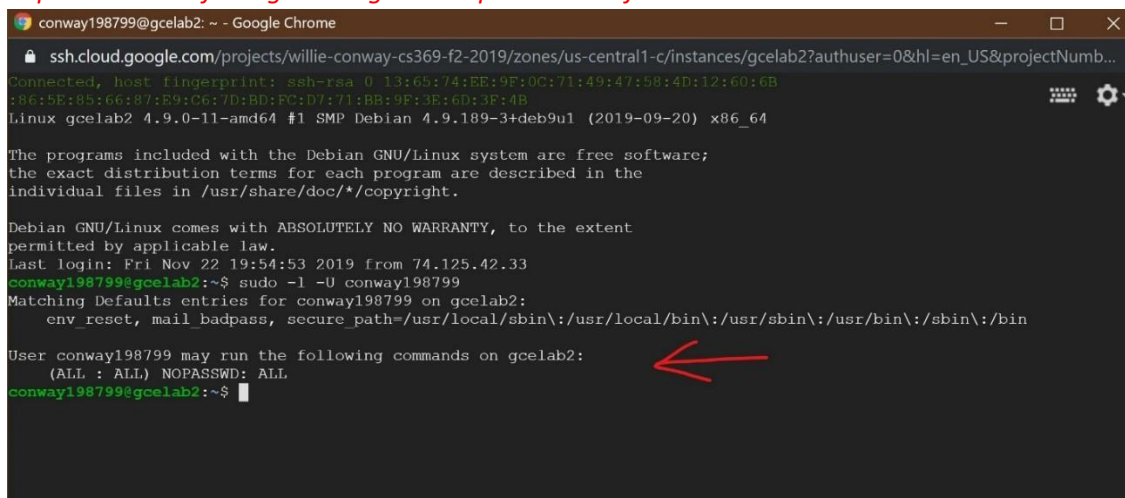
(This happens to be a contradiction, because we have a server which is accessible via SSH. There is a user in /etc/passwd who has a valid login shell. The same user has an asterisk(*) in the second field of the /etc/shadow file. The asterisk(*) in the location of the hash password, in the /etc/shadow file effectively disables all password based logins as no user input will ever result in

a hash value of (*). However, the user can still login with their SSH keys. The reason is to set an invalid shell is to prevent interactive login sessions from working, block sudo users and similar from working.)

We'll explore this topic in more detail in the next assignment.

4. What command did you have to issue before you could read the file /etc/shadow? What does this command let you do in general? Not all users on a system will be able to issue this command. From what you've seen so far in this lab, what gives you the permission to issue the command?

The command I used to access the /etc/shadow file was the Linux sudo command. The sudo command allows you to run programs with the security privileges of another user (by default, as the superuser). It prompts you for your personal password and confirms your request to execute a command by checking a file, called sudoers, which the system administrator configures. All users can read the /etc/passwd and /etc/shadow files, however they should not be able to change the fields. The owner of the /etc/shadow file is usually the user root. The group is often set to an administrative group, like shadow. Other users are not allowed to read the file directly, to prevent them from gathering hashes passwords of others.



```
conway198799@gcelab2: ~ - Google Chrome
ssh.cloud.google.com/projects/willie-conway-cs369-f2-2019/zones/us-central1-c/instances/gcelab2?authuser=0&hl=en_US&projectNumb...
Connected, host fingerprint: ssh-rsa 0 13:65:74:EE:9F:0C:71:49:47:58:4D:12:60:6B
:86:5E:85:66:87:E9:C6:7D:BD:FC:D7:71:BB:9F:3E:6D:3F:4B
Linux gcelab2 4.9.0-11-amd64 #1 SMP Debian 4.9.189-3+deb9u1 (2019-09-20) x86_64

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: Fri Nov 22 19:54:53 2019 from 74.125.42.33
conway198799@gcelab2:~$ sudo -l -U conway198799
Matching Defaults entries for conway198799 on gcelab2:
    env_reset, mail_badpass, secure_path=/usr/local/sbin\:/usr/local/bin\:/usr/sbin\:/usr/bin\:/sbin\:/bin

User conway198799 may run the following commands on gcelab2:
    (ALL : ALL) NOPASSWD: ALL
conway198799@gcelab2:~$
```

(I used the Linux sudo -l -U command to check the sudo access for the user conway198799. If the user can run a few or all commands with sudo, you should be able to see the following output. As you can see, the user conway198799 is granted all privileges to use sudo. The line (ALL : ALL) NOPASSWD: ALL means that the user can use all sudo privileges and that no password is required to use sudo for the user.)

The reason conway198799 has the permission to use the Linux sudo command, is because the user was granted administrative privileges through root. Since conway198799 was added as a new user to the system, root had to decide if the user should be able to perform administrative tasks through sudo. If the user you created will be your primary user on the system, you usually want to enable sudo privileges so that you can do routine configuration and maintenance. To add these privileges to our new user, we need to add the new user to the sudo group. By default, users who belong to the sudo group are allowed to use the sudo command.


```
conway198799@gcelab2: ~ - Google Chrome
ssh.cloud.google.com/projects/willie-conway-cs369-f2-2019/zones/us-central1-c/instances/gcelab2?authuser=0&hl=en_US&projectNumb...
Connected, host fingerprint: ssh-rsa 0 13:65:74:EE:9F:0C:71:49:47:58:4D:12:60:6B
:86:5E:85:66:87:E9:C6:7D:BD:FC:D7:71:BB:9F:3E:6D:3F:4B
Linux gcelab2 4.9.0-11-amd64 #1 SMP Debian 4.9.189-3+deb9u1 (2019-09-20) x86_64

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: Sat Nov 23 04:45:11 2019 from 74.125.42.97
conway198799@gcelab2:~$ groups
conway198799 adm dip video plugdev google-sudoers
conway198799@gcelab2:~$
```

(In the screenshot, when we use the Linux `groups` command, we can see that user `conway198799` is a user of the `google-sudoers` group.)

Look at your configuration files (10 points)

5. List all the files in your home directory, including the hidden ones. Show the command you used and the output.

```
conway198799@gcelab2: ~ - Google Chrome
ssh.cloud.google.com/projects/willie-conway-cs369-f2-2019/zones/us-central1-c/instances/gcelab2?authuser=0&hl=en_US&projectNumb...
Connected, host fingerprint: ssh-rsa 0 13:65:74:EE:9F:0C:71:49:47:58:4D:12:60:6B
:86:5E:85:66:87:E9:C6:7D:BD:FC:D7:71:BB:9F:3E:6D:3F:4B
Linux gcelab2 4.9.0-11-amd64 #1 SMP Debian 4.9.189-3+deb9u1 (2019-09-20) x86_64

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: Sat Nov 23 04:45:11 2019 from 74.125.42.97
conway198799@gcelab2:~$ groups
conway198799 adm dip video plugdev google-sudoers
conway198799@gcelab2:~$ ls -la
total 144
drwxr-xr-x 4 conway198799 conway198799 4096 Nov 20 00:04 .
drwxr-xr-x 5 root root 4096 Nov 20 02:42 ..
-rw-r--r-- 1 conway198799 conway198799 10360 Nov 23 05:06 .bash_history
-rw-r--r-- 1 conway198799 conway198799 220 May 15 2017 .bash_logout
-rw-r--r-- 1 conway198799 conway198799 3526 May 15 2017 .bashrc
-rw-r--r-- 1 conway198799 conway198799 81920 Nov 15 08:47 CCSC.tar
-rw-r--r-- 1 conway198799 conway198799 2416 Nov 14 18:32 default
-rw-r--r-- 1 conway198799 conway198799 1188 Nov 5 23:06 gcelab2.py
-rw-r--r-- 1 conway198799 conway198799 722 Nov 6 04:30 gcelab3.py
-rw-r--r-- 1 conway198799 conway198799 1 Oct 30 02:26 index.nginx-debian.html
drwxr-xr-x 2 conway198799 conway198799 4096 Oct 30 00:53 .nano
-rw-r--r-- 1 conway198799 conway198799 895 Nov 5 17:28 output.txt
-rw-r--r-- 1 conway198799 conway198799 675 May 15 2017 .profile
drwx-r--r-- 2 conway198799 conway198799 4096 Nov 23 05:10 .ssh
-rw-r--r-- 1 conway198799 conway198799 2455 Nov 19 02:59 .viminfo
conway198799@gcelab2:~$
```

(Using Linux `ls -la` command to list long format including hidden files for my `/home/conway198799` directory.)

```
conway198799@gcelab2: ~ - Google Chrome
ssh.cloud.google.com/projects/willie-conway-cs369-f2-2019/zones/us-central1-c/instances/gcelab2?authuser=0&hl=en_US&projectNumb...
Connected, host fingerprint: ssh-rsa 0 13:65:74:EE:9F:0C:71:49:47:58:4D:12:60:6B
:86:5E:85:66:87:E9:C6:7D:BD:FC:D7:71:BB:9F:3E:6D:3F:4B
Linux gcelab2 4.9.0-11-amd64 #1 SMP Debian 4.9.189-3+deb9u1 (2019-09-20) x86_64

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: Sat Nov 23 18:51:28 2019 from 74.125.177.161
conway198799@gcelab2:~$ man .ssh
No manual entry for .ssh
conway198799@gcelab2:~$ ls -la
. .bash_history .bashrc default gcelab3.py .nano .profile .viminfo
.. .bash_logout CCSC.tar gcelab2.py index.nginx-debian.html output.txt .ssh
conway198799@gcelab2:~$ Connected, host fingerprint: ssh-rsa 0 13:65:74:EE:9F:0C:71:49:47:58:4D:12:60:6B:86:5E:85:66:
87:E9:C6:7D:BD:FC:D7:71:BB:9F:3E:6D:3F:4B
Linux gcelab2 4.9.0-11-amd64 #1 SMP Debian 4.9.189-3+deb9u1 (2019-09-20) x86_64

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: Sat Nov 23 18:52:50 2019 from 74.125.42.225
conway198799@gcelab2:~$
```

(Using Linux `ls -la` command to list all files including hidden files for my `/home/conway198799` directory.)

6. Compare the *contents* of the files you found with the *contents* of the files described in the text. Briefly describe any additions or deletions.

(Linux Fundamentals Chapter 30 user profiles briefly information of Logged on users who have a number of preset aliases, variables, and functions. The shell uses a number of startup files that are executed, whenever the shell is invoked.) **system profile**

```
conway198799@gcelab2: ~ - Google Chrome
ssh.cloud.google.com/projects/willie-conway-cs369-f2-2019/zones/us-central1-c/instances/gcelab2?authuser=0&hl=en_US&p
Connected, host fingerprint: ssh-rsa 0 13:65:74:EE:9F:0C:71:49:47:58:4D:12:60:6B
:86:5E:85:66:87:E9:C6:7D:BD:FC:D7:71:BB:9F:3E:6D:3F:4B
Linux gcelab2 4.9.0-11-amd64 #1 SMP Debian 4.9.189-3+deb9u1 (2019-09-20) x86_64

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.

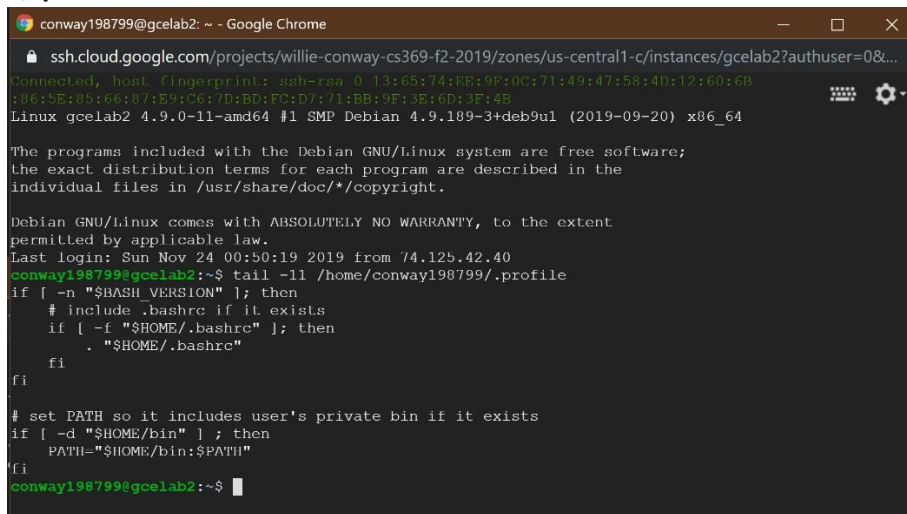
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Sun Nov 24 00:01:28 2019 from 74.125.42.226
conway198799@gcelab2:~$ ls -la
. .bash_history .bashrc default gcelab3.py .nano .profile .viminfo
.. .bash_logout CCSC.tar gcelab2.py index.nginx-debian.html output.txt .ssh
conway198799@gcelab2:~$ grep PATH /etc/profile
PATH="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin"
PATH="/usr/local/bin:/usr/bin:/bin:/usr/local/games:/usr/games"
export PATH
conway198799@gcelab2:~$
```


(This screenshot shows the use of the Linux `grep` command to show `PATH` manipulation in `/etc/profile` on Debian. The root user can use this script to set aliases, functions, and variables for every user on the system. The bash shell will verify the existence of `/etc/profile` and source it if it exists. This appears to be the same as the text.)

~/.bash_profile and ~/.bash_login

(The `~/.bash_profile` is missing. When this file exists in the home directory, then bash will source it. On Debian Linux 9 (stretch) this file does not exist by default. When `.bash_profile` does not exist, then bash will check for `~/.bash_login` and source it. The `~/.bash_login` file is missing. Debian does not have this file by default. As you can see, neither of these files are located in my `/home/conway198799` directory.)

~/.profile

A terminal window titled 'conway198799@gcelab2: ~ - Google Chrome' showing the output of the command 'tail -11 /home/conway198799/.profile'. The output displays the first 11 lines of the .profile file, which includes Debian GNU/Linux system information, login details, and the initial PATH configuration.

```
ssh.cloud.google.com/projects/willie-conway-cs369-f2-2019/zones/us-central1-c/instances/gcelab2?authuser=0&...
Connected, host fingerprint: ssh-rsa 0 13:65:74:EE:9F:0C:71:49:47:58:4D:12:60:6B
:86:5E:85:66:87:E9:C6:7D:BD:FC:D7:71:BB:9F:3E:6D:3F:4B
Linux gcelab2 4.9.0-11-amd64 #1 SMP Debian 4.9.189-3+deb9u1 (2019-09-20) x86_64

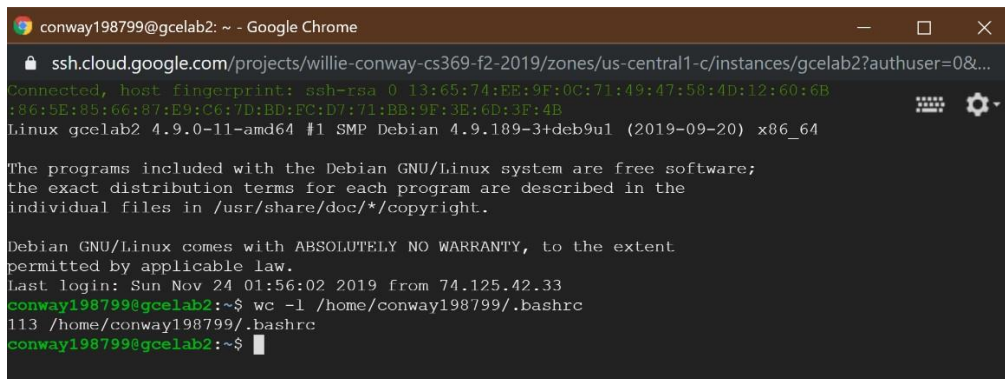
The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Sun Nov 24 00:50:19 2019 from 74.125.42.40
conway198799@gcelab2:~$ tail -11 /home/conway198799/.profile
if [ -n "$BASH_VERSION" ]; then
    # include .bashrc if it exists
    if [ -f "$HOME/.bashrc" ]; then
        . "$HOME/.bashrc"
    fi
fi

# set PATH so it includes user's private bin if it exists
if [ -d "$HOME/bin" ] ; then
    PATH="$HOME/bin:$PATH"
fi
conway198799@gcelab2:~$
```

(When neither `~/.bash_profile` and `~/.bash_login` exist, then bash will verify the existence of `~/.profile` and execute it. On Debian this script can execute `~/.bashrc` and will add `$HOME/bin` to the `$PATH` variable. The content appears as the same in the text.)

~/.bashrc

A terminal window titled 'conway198799@gcelab2: ~ - Google Chrome' showing the output of the command 'wc -l /home/conway198799/.bashrc'. The output displays the first 113 lines of the .bashrc file, which includes Debian GNU/Linux system information, login details, and the initial PATH configuration.

```
ssh.cloud.google.com/projects/willie-conway-cs369-f2-2019/zones/us-central1-c/instances/gcelab2?authuser=0&...
Connected, host fingerprint: ssh-rsa 0 13:65:74:EE:9F:0C:71:49:47:58:4D:12:60:6B
:86:5E:85:66:87:E9:C6:7D:BD:FC:D7:71:BB:9F:3E:6D:3F:4B
Linux gcelab2 4.9.0-11-amd64 #1 SMP Debian 4.9.189-3+deb9u1 (2019-09-20) x86_64

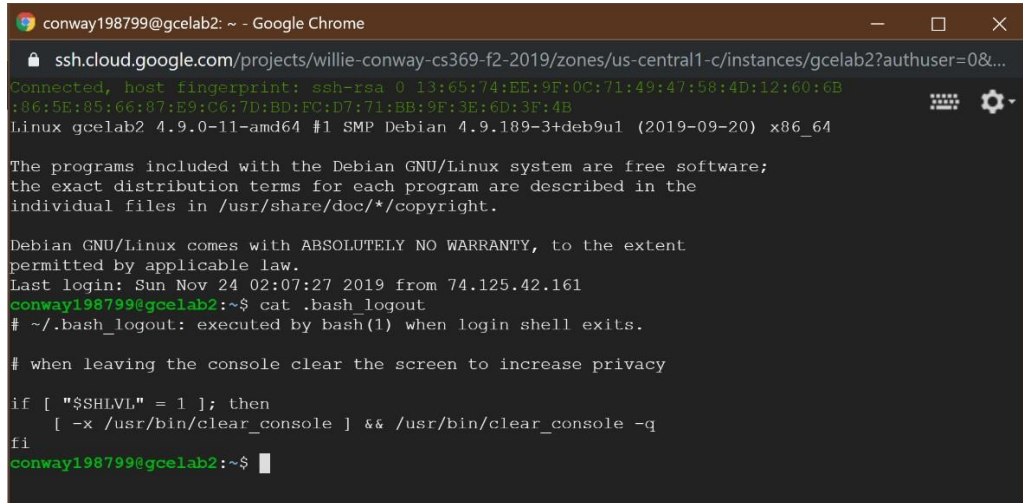
The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Sun Nov 24 01:56:02 2019 from 74.125.42.33
conway198799@gcelab2:~$ wc -l /home/conway198799/.bashrc
113 /home/conway198799/.bashrc
conway198799@gcelab2:~$
```

(The `~/.bashrc` script is often sourced by other scripts. Let us take a look at what it does by default. On Debian this script is quite a bit longer and configures `$PS1`, some history variables

and a number of active and inactive aliases. This appears to be the same in the text, with the exception of extra lines added to the file. The `wc` (word count) command in UNIX is a command line utility for printing newline, word and byte counts for files. It can return the number of lines in a file, the number of characters in a file and the number of words in a file. It can also be combined with pipes for general counting operations. So, there's 113 lines instead of 110.)

`~/bash_logout`

A screenshot of a terminal window titled "conway198799@gcelab2: ~ - Google Chrome". The terminal shows the output of the command `cat .bash_logout`. The output includes SSH host fingerprint information, system details (Linux gcelab2 4.9.0-11-amd64 #1 SMP Debian 4.9.189-3+deb9u1 (2019-09-20) x86_64), a notice about Debian GNU/Linux being free software, the last login time (Sun Nov 24 02:07:27 2019 from 74.125.42.161), and the contents of the `~/.bash_logout` file. The file's content includes a comment about clearing the screen for privacy and a shell script that checks if the screen should be cleared and then runs `/usr/bin/clear_console -q`. The prompt `conway198799@gcelab2:~$` is visible at the bottom.

```
ssh.cloud.google.com/projects/willie-conway-cs369-f2-2019/zones/us-central1-c/instances/gcelab2?authuser=0&...
Connected, host fingerprint: ssh-rsa 0 13:65:74:EE:9F:0C:71:49:47:58:4D:12:60:6B
:86:5E:85:66:87:E9:C6:7D:BD:FC:D7:71:BB:9F:3E:6D:3F:4B
Linux gcelab2 4.9.0-11-amd64 #1 SMP Debian 4.9.189-3+deb9u1 (2019-09-20) x86_64

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: Sun Nov 24 02:07:27 2019 from 74.125.42.161
conway198799@gcelab2:~$ cat .bash_logout
# ~/.bash_logout: executed by bash(1) when login shell exits.

# when leaving the console clear the screen to increase privacy

if [ "$SHLVL" = 1 ]; then
    [ -x /usr/bin/clear_console ] && /usr/bin/clear_console -q
fi
conway198799@gcelab2:~$
```

(When exiting `bash`, it can execute `~/.bash_logout`. Debian use this opportunity to clear the console screen. This appears to be the same as the text.)

~/.bash_history

```
conway198799@gcelab2: ~ - Google Chrome
ssh.cloud.google.com/projects/willie-conway-cs369-f2-2019/zones/us-central1-c/instances/gcelab2?authuser=0&...
Connected, host fingerprint: ssh-rsa 0 13:65:74:EE:9F:0C:71:49:47:58:4D:12:60:6B
:86:5E:85:66:87:E9:C6:7D:BD:FC:D7:71:BB:9F:3E:6D:3F:4B
Linux gcelab2 4.9.0-11-amd64 #1 SMP Debian 4.9.189-3+deb9u1 (2019-09-20) x86_64

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: Sun Nov 24 02:24:54 2019 from 74.125.177.162
conway198799@gcelab2:~$ head -20 /home/conway198799/.bash_history
sudo su-
su -
sudo
sudo su -
sudo
ls -a /var/www/html
nano index.nginx-debian.html
ls /var/www/html
sudo
nano index.nginx-debian.html
sudo
nano index.nginx-debian.html
find /var/www/html *.txt
nano Website/index.nginx-debian.html
nano /var/www/index.nginx-debian.html
sudo
vim index.nginx-debian.html
mv index.nginx-debian.html index.nginx.html
sudo
ls -a /var/www/html
conway198799@gcelab2:~$ tail -20 /home/conway198799/.bash_history
sudo ~/.bashrc
sudo cat ~/.bashrc
tail -40 /home/conway198799/.bashrc
ls -a
grep PATH /etc/profile
tail -11 /home/conway198799/.bash_login
cat /home/conway198799/.bash_login
cat .bash_history
cat .bash_history
cat /home/conway198799/.bash_profile
wc -l /home/conway198799/.bashrc
tail -11 /home/conway198799/.profile
wc -l /home/conway198799/.bashrc
wc -l /home/conway198799/.bashrc
wc -l /home/conway198799/.bashrc
tail -f /home/conway198799/.bashrc
head -40 /home/conway198799/.bashrc
tail -30 /home/conway198799/.bashrc
head -70 /home/conway198799/.bashrc
tail -40 /home/conway198799/.bashrc
conway198799@gcelab2:~$
```

(The `~/.bash_history` file is created by Bash, a Unix-based shell program commonly used on Linux operating systems; stores a history of user commands entered at the command prompt; used for viewing old commands that have been executed. I used Linux's `head` and `tail` commands to print out the first 20 lines and last 20 lines of the contents, as this content to this file is quite lengthy. This happens to be an additional hidden file that's added to my `/home/conway198799` directory. This is not shown in the text.)

~/.viminfo

```
conway198799@gcelab2: ~ - Google Chrome
ssh.cloud.google.com/projects/willie-conway-cs369-f2-2019/zones/us-central1-c/instances/gcelab2?authuser=0&hl=en_US&projectNumb...
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Sun Nov 24 03:06:10 2019 from 74.125.42.228
conway198799@gcelab2:~$ head -40 /home/conway198799/.viminfo
# This viminfo file was generated by Vim 8.0.
# You may edit it if you're careful!

# Viminfo version
|1,4

# Value of 'encoding' when this file was written
*encoding=utf-8

# hlsearch on (H) or off (h):
~h
# Command Line History (newest to oldest):
:q
|2,0,1574132370,, "q"
:wq
|2,0,1572399791,, "wq"

# Search String History (newest to oldest):

# Expression History (newest to oldest):

# Input Line History (newest to oldest):

# Debug Line History (newest to oldest):

# Registers:
"q      CHAR      0
~kb~kb~kb
~kb~kb~kb"1,0,1574132256,"

# File marks:
'0 1 0 ~/cat
|4,48,1,0,1572988714,"~/cat"
'1 1 36 ~/index.nginx-debian.html
|4,49,1,36,1572399791,"~/index.nginx-debian.html"

# Jumplist (newest first):
~' 1 0 ~/cat
|4,39,1,0,1572988714,"~/cat"
conway198799@gcelab2:~$
```

(The default location for the viminfo file is ~/.viminfo. The viminfo file is used to store the command line history, search string history, input-line history, contents of non-empty registers, marks for several files, file marks (pointing to locations in files), the buffer list, and global variables. The contents to this file is quite lengthy so I used the Linux head command to print the first 20 lines. This appears to be a hidden file and an additional file to my /home/conway198799 directory. This file is not shown in the text.)

.nano and .ssh

(If nano is started for the first with sudo then a root owned directory named .nano is created in the user's \$HOME directory. SSH keys are typically configured in an authorized_keys file in .ssh subdirectory in the user's home directory. Typically, a system administrator would first create a key using ssh-keygen and then install it as an authorized key on a server. These are additional hidden directories. Neither of these are shown in the text.)

(The other files are from previous assignment exercises.)

7. Issue the alias command and show the results.

```
conway198799@gcelab2: ~ - Google Chrome
ssh.cloud.google.com/projects/willie-conway-cs369-f2-2019/zones/us-central1-c/instances/gcelab2?authuser=0&hl=en_US&pr
Connected, host fingerprint: ssh-rsa 0 13:65:74:EE:9F:0C:71:49:47:58:4D:12:60:6B
:86:5E:85:66:87:E9:C6:7D:BD:FC:D7:71:BB:9F:3E:6D:3F:4B
Linux gcelab2 4.9.0-11-amd64 #1 SMP Debian 4.9.189-3+deb9u1 (2019-09-20) x86_64

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: Sun Nov 24 03:55:03 2019 from 74.125.177.32
conway198799@gcelab2:~$ alias
alias ls='ls --color=auto'
conway198799@gcelab2:~$
```

*(Using Linux **alias** command. Thier appears to be only one alias created.)*

Add your own alias that will get established every time you open a new shell window. Edit the appropriate file to uncomment one of the predefined aliases. Save the file. Reissue the alias command. You shouldn't see your new alias. This is because these configuration files are normally only sourced once when you log in or create a new shell. After you make a change, you can certainly log out and in again, though this is overkill. You just need to issue the source command instead.

```
conway198799@gcelab2: ~ - Google Chrome
ssh.cloud.google.com/projects/willie-conway-cs369-f2-2019/zones/us-central1-c/instances/gcelab2?authuser=0&hl=en_US&projectNumb...
Connected, host fingerprint: ssh-rsa 0 13:65:74:EE:9F:0C:71:49:47:58:4D:12:60:6B
:86:5E:85:66:87:E9:C6:7D:BD:FC:D7:71:BB:9F:3E:6D:3F:4B
Linux gcelab2 4.9.0-11-amd64 #1 SMP Debian 4.9.189-3+deb9u1 (2019-09-20) x86_64

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: Sun Nov 24 06:34:50 2019 from 74.125.42.99
conway198799@gcelab2:~$ alias
alias ls='ls --color=auto'
conway198799@gcelab2:~$ nano ~/.bashrc
```

*(In order to create a alias you have to edit the **~/.bashrc** file, since it contains the aliases. Your **~/.bashrc** file is located in your user directory. Open it in your favorite text editor. I used **nano** editor to edit the file.)*


```
conway198799@gcelab2: ~ - Google Chrome
ssh.cloud.google.com/projects/willie-conway-cs369-f2-2019/zones/us-central1-c/instances/gcelab2?authuser=0&hl=en_US
GNU nano 2.7.4 File: /home/conway198799/.bashrc

case "$TERM" in
xterm*|rxvt*)
PS1="\[\e]0;${debian_chroot:+($debian_chroot)}\u@h: \w\a\]$PS1"
;;
*)
;;
esac

# enable color support of ls and also add handy aliases
if [ -x /usr/bin/dircolors ]; then
test -r ~/.dircolors && eval "$(dircolors -b ~/.dircolors)" || eval "$(dircolors -b)"
alias ls='ls --color=auto'
#alias dir='dir --color=auto'
#alias vdir='vdir --color=auto'

#alias grep='grep --color=auto'
#alias fgrep='fgrep --color=auto'
#alias egrep='egrep --color=auto'
fi

# colored GCC warnings and errors
#export GCC_COLORS='error=01;31:warning=01;35:note=01;36:caret=01;32:locus=01:quote=01'

# some more ls aliases
alias ll='ls -l'
#alias la='ls -A'
#alias l='ls -CF'

# Alias definitions.
# You may want to put all your additions into a separate file like
# ~/.bash_aliases, instead of adding them here directly.
# See /usr/share/doc/bash-doc/examples in the bash-doc package.

if [ -f ~/.bash_aliases ]; then
. ~/.bash_aliases
fi

# enable programmable completion features (you don't need to enable
# this, if it's already enabled in /etc/bash.bashrc and /etc/profile
# sources /etc/bash.bashrc).
if ! shopt -oq posix; then
if [ -f /usr/share/bash-completion/bash_completion ]; then

```

(Uncommenting one of alias from the #some more ls aliases area. I decided to choose alias ll='ls -l'. After uncommenting the file, I save the changes with Ctrl+O, then exit the file with Ctrl+X.)

```
conway198799@gcelab2: ~ - Google Chrome
ssh.cloud.google.com/projects/willie-conway-cs369-f2-2019/zones/us-central1-c/instances/gcelab2?authuser=0&hl=en_US&projectNumb...
Connected, host fingerprint: ssh-rsa 0 13:65:74:EE:9F:0C:71:49:47:58:4D:12:60:6B
:86:5E:85:66:87:E9:C6:7D:BD:FC:D7:71:BB:9F:3E:6D:3F:4B
Linux gcelab2 4.9.0-11-amd64 #1 SMP Debian 4.9.189-3+deb9u1 (2019-09-20) x86_64

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: Sun Nov 24 06:34:50 2019 from 74.125.42.99
conway198799@gcelab2:~$ alias
alias ls='ls --color=auto'
conway198799@gcelab2:~$ nano ~/.bashrc
conway198799@gcelab2:~$ alias
alias ls='ls --color=auto'
```

(Issued the Linux alias command once more, unfortunately the file appeared to not update. I could login/logout, however there is simpler Linux command solution called source to activate the changes.)

```
conway198799@gcelab2: ~ - Google Chrome
ssh.cloud.google.com/projects/willie-conway-cs369-f2-2019/zones/us-central1-c/instances/gcelab2?authuser=0&hl=en_US&projectN
Connected, host fingerprint: ssh-rsa 0 13:65:74:EE:9F:0C:71:49:47:58:4D:12:60:6B
:86:5E:85:66:87:E9:C6:7D:BD:EC:D7:71:BB:9F:3E:6D:3F:4B
Linux gcelab2 4.9.0-11-amd64 #1 SMP Debian 4.9.189-3+deb9u1 (2019-09-20) x86_64

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: Sun Nov 24 06:34:50 2019 from 74.125.42.99
conway198799@gcelab2:~$ alias
alias ls='ls --color=auto'
conway198799@gcelab2:~$ nano ~/.bashrc
conway198799@gcelab2:~$ alias
alias ls='ls --color=auto'
conway198799@gcelab2:~$ source ~/.bashrc
conway198799@gcelab2:~$ alias
alias ll='ls -l'
alias ls='ls --color=auto'
conway198799@gcelab2:~$
```

(The **source** is a shell built-in command which is used to read and execute the content of a file(generally set of commands), passed as an argument in the current shell script. I used the Linux command source to update the ~/.bashrc file to execute the changes right away. After, I performed the **alias** command to see my uncommented alias ll='ls -l'.

```
conway198799@gcelab2: ~ - Google Chrome
ssh.cloud.google.com/projects/willie-conway-cs369-f2-2019/zones/us-central1-c/instances/gcelab2?authuser=0&hl=en_US&projectNumb...
GNU nano 2.7.4 File: /home/conway198799/.bashrc Modified
# some more ls aliases
alias ll='ls -l'
#alias la='ls -A'
#alias l='ls -CF'

# Alias definitions.
# You may want to put all your additions into a separate file like
# ~/.bash_aliases, instead of adding them here directly.
# See /usr/share/doc/bash-doc/examples in the bash-doc package.

if [ -f ~/.bash_aliases ]; then
    . ~/.bash_aliases
fi

# enable programmable completion features (you don't need to enable
# this, if it's already enabled in /etc/bash.bashrc and /etc/profile
# sources /etc/bash.bashrc).
if ! shopt -oq posix; then
    if [ -f /usr/share/bash-completion/bash_completion ]; then
        . /usr/share/bash-completion/bash_completion
    elif [ -f /etc/bash_completion ]; then
        . /etc/bash_completion
    fi
fi
alias rm='rm -i'
```

(To create my own alias, I decided to edit the Linux **rm -i** command. This command is responsible for removing files and directories, the -i command is added to prompt the user before removal of the file or

directory. To do this, I added `alias rm='rm -i'` to the end of the `~/.bashrc` file. After, used `Ctrl +O` to save the file and `Ctrl + X` to exit the file.)

```
conway198799@gcelab2: ~ - Google Chrome
ssh.cloud.google.com/projects/willie-conway-cs369-f2-2019/zones/us-central1-c/instances/gcelab2?authuser=0&hl=en_US&projectNu
Connected, host fingerprint: ssh-rsa 0 13:65:74:EE:9F:0C:71:49:47:58:4D:12:60:6B
:86:5E:85:66:87:E9:C6:7D:BD:FC:D7:71:BB:9F:3E:6D:3F:4B
Linux gcelab2 4.9.0-11-amd64 #1 SMP Debian 4.9.189-3+deb9u1 (2019-09-20) x86_64

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: Mon Nov 25 00:09:13 2019 from 74.125.42.228
conway198799@gcelab2:~$ nano ~/.bashrc
conway198799@gcelab2:~$ source ~/.bashrc
conway198799@gcelab2:~$ alias
alias ll='ls -l'
alias ls='ls --color=auto'
alias rm='rm -i'
conway198799@gcelab2:~$
```

(Used `source` to activate the changes in the `~/.bashrc` file, the Linux `alias` command to check if my new `rm` alias was added.)

8. Document in which file you added your alias, and show that it now works.

```
conway198799@gcelab2: ~ - Google Chrome
ssh.cloud.google.com/projects/willie-conway-cs369-f2-2019/zones/us-central1-c/instances/gcelab2?authuser=0&hl=en_US&projectNumb...
Connected, host fingerprint: ssh-rsa 0 13:65:74:EE:9F:0C:71:49:47:58:4D:12:60:6B
:86:5E:85:66:87:E9:C6:7D:BD:FC:D7:71:BB:9F:3E:6D:3F:4B
Linux gcelab2 4.9.0-11-amd64 #1 SMP Debian 4.9.189-3+deb9u1 (2019-09-20) x86_64

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.

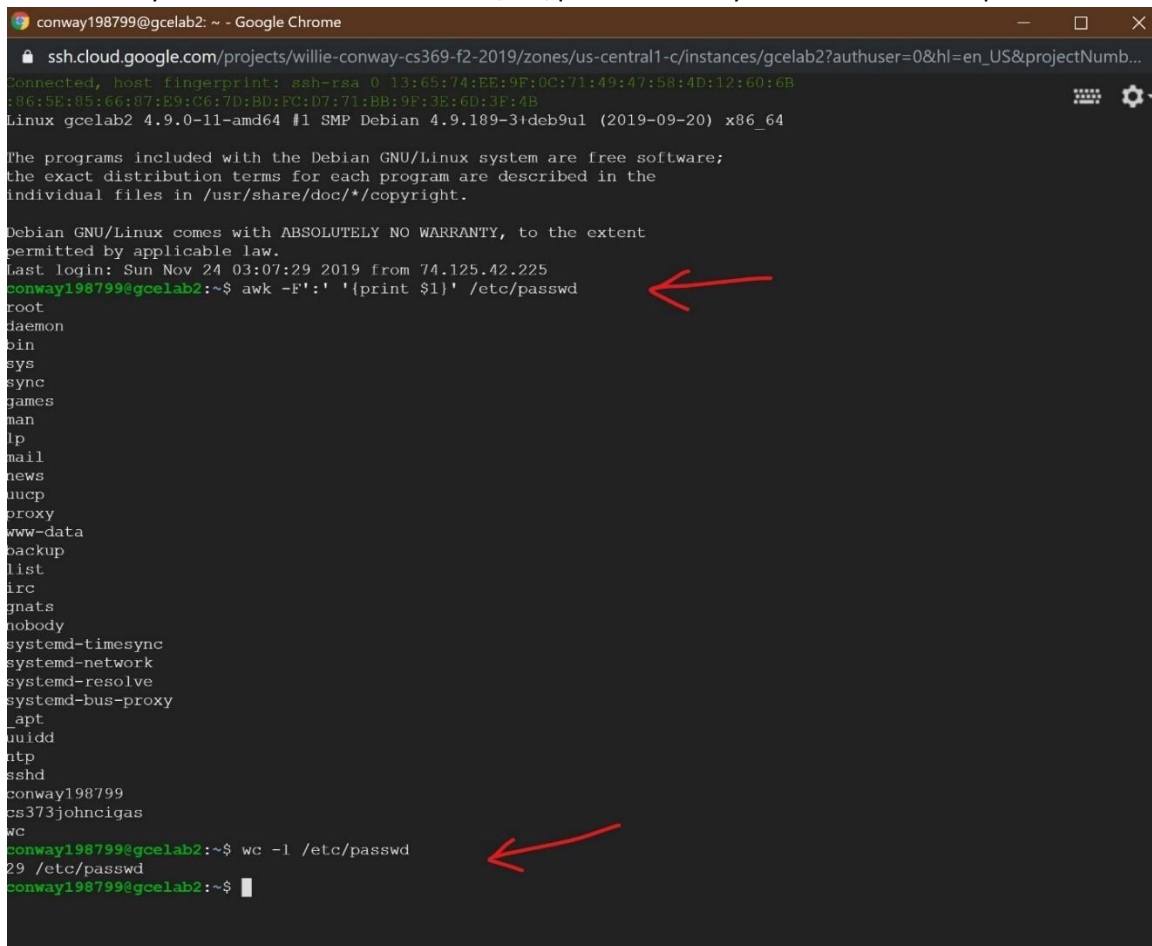
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Mon Nov 25 00:09:13 2019 from 74.125.42.228
conway198799@gcelab2:~$ nano ~/.bashrc
conway198799@gcelab2:~$ source ~/.bashrc
conway198799@gcelab2:~$ alias
alias ll='ls -l'
alias ls='ls --color=auto'
alias rm='rm -i'
conway198799@gcelab2:~$ ls
CCSC.tar  default  gcelab2.py  gcelab3.py  index.nginx-debian.html  output.txt
conway198799@gcelab2:~$ nano Hello
conway198799@gcelab2:~$ ls
CCSC.tar  default  gcelab2.py  gcelab3.py  Hello  index.nginx-debian.html  output.txt
conway198799@gcelab2:~$ rm Hello
rm: remove regular file 'Hello'? Y
conway198799@gcelab2:~$ ls
CCSC.tar  default  gcelab2.py  gcelab3.py  index.nginx-debian.html  output.txt
conway198799@gcelab2:~$ ll
total 100
-rw-r--r-- 1 conway198799 conway198799 81920 Nov 15 08:47 CCSC.tar
-rw-r--r-- 1 conway198799 conway198799 2416 Nov 14 18:32 default
-rw-r--r-- 1 conway198799 conway198799 1188 Nov 5 23:06 gcelab2.py
-rw-r--r-- 1 conway198799 conway198799 722 Nov 6 04:30 gcelab3.py
-rw-r--r-- 1 conway198799 conway198799 1 Oct 30 02:26 index.nginx-debian.html
-rw-r--r-- 1 conway198799 conway198799 895 Nov 5 17:28 output.txt
conway198799@gcelab2:~$
```

(The file which I added my aliases to was the `~/.bashrc` file. The screenshot shows my created `alias rm='rm -i'` by entering `rm` to activate the Linux `rm -i` command, and uncommented `alias ll='ls -l'` by entering just `ll`, to activate the Linux `ls -l` command. This Linux command uses a long listing format to list the file contents in the directory. To show the process of the alias `rm`, I had to create the file `Hello` with nano editor, then delete the file using the `rm` alias. The Linux `ls` command shows where the file was stored, as it was listed amongst the present files in the home

directory, to the file being deleted/remove from the directory. You can see that the system prompts the user to answer yes or no before moving forward with deletion/removal.)

Utility program (7 points)

9. Write a Linux command or series of commands, or a python program that prints a count of the number of system user accounts listed in `/etc/passwd`. Show your code and its output.



```
conway198799@gcelab2: ~ - Google Chrome
ssh.cloud.google.com/projects/willie-conway-cs369-f2-2019/zones/us-central1-c/instances/gcelab2?authuser=0&hl=en_US&projectNumb...
Connected, host fingerprint: ssh-rsa 0 13:65:74:EE:9F:0C:71:49:47:58:4D:12:60:6B
:86:5E:85:66:87:E9:C6:7D:BD:FC:D7:71:BB:9F:3E:6D:3F:4B
Linux gcelab2 4.9.0-11-amd64 #1 SMP Debian 4.9.189-3+deb9u1 (2019-09-20) x86_64

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: Sun Nov 24 03:07:29 2019 from 74.125.42.225
conway198799@gcelab2:~$ awk -F':' '{print $1}' /etc/passwd
root
daemon
bin
sys
sync
games
man
lp
mail
news
uucp
proxy
www-data
backup
list
irc
gnats
nobody
systemd-timesync
systemd-network
systemd-resolve
systemd-bus-proxy
_apt
uidd
ntp
sshd
conway198799
cs373johncigas
wc
conway198799@gcelab2:~$ wc -l /etc/passwd
29 /etc/passwd
conway198799@gcelab2:~$
```

(In order to complete this exercise, I had to count the number of users that were disclosed in the `/etc/passwd` file. I just want a list of the names, so that it would make the counting a lot easier. To do so, I needed to separate the rest of the content. To do this, I needed to use the Linux `awk` command. `Awk` is a scripting language used for manipulating data and generating reports. The `awk` command programming language requires no compiling, and allows the user to use variables, numeric functions, string functions, and logical operators. `Awk` is a utility that enables a programmer to write tiny but effective programs in the form of statements that define text patterns that are to be searched for in each line of a document. The `-F` command acts as a field separator for the input field. Since I only wanted the first field of the users, which is the usernames, I use `{print $1}` to let the system know that I wanted the first field from the `/etc/passwd` file.)

(Next, I use the Linux `wc` (word count) command to count and list the number of user accounts within the file `/etc/passwd` file.)

Reflection

At the end of your Words document, include the answers to the following questions:

1. In a sentence or two, what did you learn? *This was difficult exercise to accomplish as there was a lot to learn. This was my first time creating a permanent alias, editing a bash file. Usually when it comes to editing important system files, I usually try to avoid since I'm not aware of what I was doing. Using Linux is becoming more fascinating as I complete these exercises because I'm becoming more familiar with commands and finding out much more about what each file purpose is.*
2. In a sentence or two, what did you like about this project? *Although utilizing the `awk` command wasn't part of the subject I really thought of it as a unique way of coding, that I was able to achieve a simple task with one line. In this project I was learning as I was going, so maybe I wrote more than what I was expected. I like to document everything, because I like to see the process and it makes following the task simple.*
3. In a sentence or two, what did you find confusing or would like to see done differently regarding this project? *I'm still a little confused about question 6, not sure if I did it correctly or not. It seemed like it was asking me to just compare the Debian files in Chapter 30 of Linux fundamentals – user profile to the similar and additional or missing files that were in my `/home/conway198799` directory. Not being sure, I decided to review every file from text that was explained in Linux fundamentals chapter 30 and compare if I had those files or not in my home directory. I also notified the additional files that appeared to be hidden. I was aware of my previous assignment files, so I didn't list them. I think the wording just confused me.*