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CSCI 4113

1. Once the virtual machine has finished booting, use the command **pwd** to print the current (or **p**resent) **w**orking **d**irectory.

/root

1. How many files does the *home directory* contain?  A simple way to find out is to use the **ls** command.

ls shows 1 file (not including hidden files).

1. How many *hidden* files does the *home directory* contain?  With no arguments, the **ls** command doesn’t show hidden files.  Look at the man page for **ls** by running the command ‘**man ls**’.  You can navigate in the man page by using the up and down keys.  
     
   HINT: *Hidden* files in Unix/Linux have names starting with “.”.  For example, “**.bash\_history**” is a *hidden* file.

ls –a shows 5 hidden files.

1. In what directory would you expect to find the **cp** command?

Whereis cp: /usr/bin/cp

1. Where is the command to make a directory (**mkdir)** located on the filesystem?  What command did you use to find **mkdir**?  Give an alternative to the command you initially used to find **mkdir**.

Whereis mkdir: /usr/bin/mkdir

Can also use which mkdir.

1. Use the **mkdir** command to create a new directory under the root user’s home directory (i.e. **/root/**).  Name it anything you’d like.  Use the **touch** command to create a file under that new directory.  What does the new file contain?

It contains nothing.

1. By default, the **rm** command will not remove directories.  You can use the flag *-r* to tell the **rm** command to remove recursively; i.e., remove all files & directories under the target directory (and the target directory itself).  What happens when you run the command “**rm**” without -rf to remove the directory you created in #6?  What happens when you run the command “**rm -rf**” to remove the directory you created in #6?

Using rm tmp does nothing. Using rm –rf tmp removes the tmp directory.

1. Print the contents of **/etc/passwd**, which contains the list of users on the system in a very specific format.  This format is:  
           username:password\_hash:user\_id\_number:group\_id\_number:full\_name:home\_directory:default\_shell  
     
   Write a *command pipeline* to print a list of just usernames here:

Echo | Cut –d: -f1 /etc/passwd

1. Write a *command* *pipeline* of the **cat**, **cut**, and **tail** commands to print only the username of the last user in **/etc/passwd** here:

Tail –n1 /etc/passwd | cut –d: -f1 | cat

1. Combine the **cat**, **cut**, and **sort** commands to print only the usernames, sorted alphabetically, in descending order.  Write the *command pipeline* here:

Cut –d: -f1 /etc/passwd | sort –r | cat

1. Is the Debian Almquist Shell (**dash**) available on this virtual machine?  Is the Fish shell (**fish**) available?  List two ways below to check the availability of a shell.

No and no.

Chsh –l and cat /etc/shells both print a list of available shells.

1. What is the current value of the $PATH environment variable?  How would you append the directory **/usr/local/bin**?

Echo $PATH gives usr/local/sbin:/usr/local/bin:/sbin:/bin:/usr/sbin:/root/bin

PATH=$PATH:/usr/local/bin export PATH

1. Issue this command and explain the result. “> time; date >> time; cat < time**”**

The current system time and date were input into a created file called time, stored at location / and then displayed using cat.

1. Take a [snapshot of the virtual machine](https://www.google.com/url?q=http://www.howtogeek.com/150258/how-to-save-time-by-using-snapshots-in-virtualbox/&sa=D&ust=1472228402255000&usg=AFQjCNGFo9KRgZhyeU9C4erx_S3oXvQ3dg), then run the command “**rm / -rf**” on your virtual machine.  What happened?  Restart the virtual machine (you may have to click Machine, then Reset).  Does it boot?

Rm / -rf gives a message that it is dangerous to operate recursively on /, and says to use –no-preserve-root to override the failsafe.

Rm / -rf –no-preserve-root attempts to delete all files in the filesystem, but is unable to because of permissions “Operations not permitted”.

After rebooting, it appears there appears to be a problem with the GRUB bootloader: “error file ‘ ‘ not found. Entering rescue mode…” It appears that at least some OS dependent files were deleted, since the OS can no longer be booted.