CIT 371 Lab 5: Simple File System Commands

This lab can be done using the Web Console or SSH/PuTTY. See the VM Access document for more information on accessing your VMs.

This lab is an introduction to Linux file commands. Log in to Coivcenter, start your VM1 VM (CentOS6) if needed. Log in to your VM as Student and open a terminal window.

1. Paths
   1. Type **cd /**, the topmost level (root) of Linux. To move into a subdirectory, type **cd *dir*** as in **cd etc**. To continue to move down, type **cd *subdir***. Try this by typing **cd sysconfig** and then **cd networking**. Return to / (**cd /**). Now type **cd etc/sysconfig/modules**. To move up a directory, type **cd ..** Do this three times. *Where are you?* Type **cd home/Student**. You can also get to your home directory with cd ~. Type **ls**. *How would you reach the directory FILES?* Do so. *From FILES, how would you reach the directory DUMMY-DIRECTORY?* Enter the command. When paths start with no slash, they are known as *relative* paths and can take you up (with ..) or down from your current location. Paths that start with / are *absolute* paths.
      1. **We are back in the / directory. Cd FILES. To enter the DUMMY-DIRECTROY us cd .. and then cd DUMMY-DIRECTORY.**
   2. From DUMMY-DIRECTORY, we want to return to modules from 1a. Using an absolute path is easier. Type **cd /etc/sysconfig/modules**. *From here, how do you reach DUMMY-DIRECTORY using an absolute path? From DUMMY-DIRECTORY, how would you reach /usr/bin* *using a relative path?* The absolute path is /usr/bin. From /usr/bin, you want to go to Student’s FILES directory. *How would you do this using an absolute path?*
      1. **Cd ~DUMMY-DIRECTORY/**
      2. **Cd ../../../usr/bin**
      3. **Cd ~/FILES**
   3. One environment variable is called PATH, defined in the script /etc/profile and appended in /etc/bashrc and .bashrc\_profile. *What is stored in PATH? How did you find that out?*
      1. **PATH is a system wide environment and startup programs, for the login setup. I found out its not a good idea to change this file unless you know what you are doing.**
   4. When you enter a command, if the command’s executable program is not stored in the current directory, all directories in PATH are tested in order until it finds the program. To discover where a command is, use *which*, as in **which wc**. *Where is wc stored? Where is pwd stored?* Try **which useradd**. This fails because you do not have permission to execute useradd. Try **whereis useradd**. *How did this result differ from which useradd?* Notice that whereis does not rely on your PATH variable. Try **whereis wc**. Notice whereis gives you man page locations too.
      1. **/usr/bin/wc . /bin/pwd . It tells you the absolute path of how to get there but we do not have access to this as stated above.**
2. Basic file system commands
   1. touch creates an empty text file, cd to ~Student and type **touch test1.txt**. Type **ls –l**. *What is test1.txt’s size?* Type **touch test2.txt test3.txt test4.txt**.
      1. **0 bytes.**
   2. cp copies from one location to another. From ~Student, type **ls FILES**.Let’s copy sales.txt to the current directory. Type **cp FILES/sales.txt .** (the period means “copy the file to the current directory”). *Did it work?* We can copy multiple files at a time using wildcards. Type **cp FILES/\*.txt .** Type **ls**, *did it work?* Remember that ending period is needed here to mean “current directory”.
      1. **Yes. Yes this worked too.**
   3. If we copy a file whose name already exists at the destination, what happens? Type **echo hi >> aa6.bbc** to create aa6.bbc. Type **cp DUMMY-DIRECTORY/aa6.bbc .** which copies it to the current directory. Type **cat aa6.bbc**. *Which file is this, the original (which says “hi”) or the one from the DUMMY-DIRECTORY (which was empty)?* Repeat the echo instruction to recreate aa6.bbc with the word “hi” and then retype the cp command but add the option **–i**. *What happens? Explain why you should use –i with cp.*
      1. **The original one is empty. It gives you the permission to overwrite what is in the file. You want to do this so you can double check your work and make what you typed in is what you want to happen.**
   4. Option –r performs a *recursive* copy. cd to DUMMY-DIRECTORY. Type **cp –r directory3 temp**. The recursively copy copies everything including subdirectories and their contents. Notice the subdirectory temp is created as it did not exist. Explore the contents of temp. *What do you find in temp (including subdirectory contents)?*
      1. **You find the aa5.ABC directory with both the c1 and c2 directory.**
   5. mv moves one or more files to a new directory or renames a single file. Wildcards can indicate multiple files but only if the destination is a directory (we use wildcards to move, not rename). To rename a file, specify the file and its new name (the name can be of a different directory). Type **mv temp ..** (2 periods). *What does this instruction do?* cd to /home/Student. *Is temp there? Are the contents the same as before?* Type **mv temp temp2**. *How does this instruction differ from mv temp ..?* cd to DUMMY-DIRECTORY, type **ls**. Recall in the last lab, you changed the name of the 4 files ending in .txt to all end in .dat. We want to change their names back to .txt. Enter the command **mv \*.dat \*.txt**. *What happened? Why didn’t it work?* (we won’t actually change these filenames)
      1. **“we cannot stat ‘temp’: No such file or directory. Temp is also not here, same instructions as before. The instructions do not differ they are the same.\*.txt is not a directory, it didn’t change.**
   6. cd to ~Student. rm removes files and has the syntax **rm *filename(s)***. Type **rm aa6.bbc**. Type **ls**. *Is the file gone?* Wildcards can be used with rm. From step 2c, you copied three .txt files from FILES to ~Student. From ~Student, type **rm \*.txt**. Type **ls** to make sure they are gone. For safety purposes, it is wise to use the option –i with rm (this forces the interpreter to ask for permission before deleting a file). cd to FILES, type **rm –i \*.txt**. Answer ‘n’ to each prompt. *How could you ensure that whenever you type rm, the –i option is used without having to necessarily type rm –i?*
      1. **Yes the file is gone. I would set up an alias that would require rm to have rm -i.**
   7. From step 2d, you copied directory3, moved it to ~Student and renamed it temp2. cd to temp2. Type **rm \***. This should erase all items in temp. *What happens?* rm deletes files, not directories; rmdir deletes directories. Type **rmdir c1**. *What happens?* The recursive option of rm, rm –r, deletes everything. Type **rm –r \***. *What happens?* cd to ~Student. Type **ls**. Even though its contents are gone, temp2 still exists. Delete temp2 using rmdir. *What command did you enter?*
      1. **It couldn’t erase the items. The directory wasn’t empty so it couldn’t be removed. It is able to delete the files. Rmdir temp2.**
   8. There is also mkdir to create a new (empty) directory. From ~Student, type **mkdir new**. Type **ls –l.** *What size is this directory (even though it is empty)? Does new’s permissions match either of DUMMY-DIRECTORY and/or FILES?*
      1. **4096 bytes. News permissions matches the FILES but not the DUMMY-DIRECTORY.**
3. Examining files’ contents: we’ve already used cat, more and less
   1. head and tail display the first and last 10 lines of a file. Options –n # and –c # allow you to inspect the first/last # lines or bytes of a file. For instance, tail –c 100 outputs the last 100 bytes of the specified file and head –n 5 outputs the first five lines. Change directory to /etc. Type **cat passwd**, **head passwd** and **tail passwd**. You can also use head –n -# to output all but the last # lines and tail –n +# to output all but the first # lines. *What command would you enter to list all of the passwd file starting at line 6?*
      1. **Cat passwd, tail -n +5**
   2. **file** outputs information about files. While in /etc, type **file a\***. This outputs information about files starting with ‘a’ in /etc that start with the letter ‘a’. *What types of entities do you find?* Repeat using **–i**. *How does the information about the file type differ?*
      1. **Alsa, ipa, java, pcmcia, samba. You don’t just get “directory” you are able to see more for example, it says “ application/x-directory; charset=binary”.**
4. Other file commands
   1. cd to ~Student. To compare files, use either diff or cmp. Type **cat << quit > temp1.txt** to create a new file, repeat this with temp2.txt where temp2.txt is the same except for 2 or 3 differences (have one item in temp1 that is not in temp2 and vice versa, and one other difference say a change in spelling). Make sure there are at least 3 differences between the files. Type **cmp temp1.txt temp2.txt**. *What is the output?* Type **diff temp1.txt temp2.txt**. *How does diff’s output differ from cmp’s?*
      1. **Differ: byte 21, line 4. It shows you the actual lines and what is different. For example it shows me how I spelled Reece and REECE different.**
   2. Type **cp FILES/addresses.txt .** split splits one file into multiple files. The format of the command is **split –l *#* *file* *prefix*** which splits *file* into several files, each with # lines and each file’s is of the form *prefix* followed by two letters (aa, ab, ac, etc). We will create 3 files from addresses.txt using addresses as the prefix. Type **split –l 3 addresses.txt addresses**. The new files are named addressesaa, addressesab, addressesac (there would be additional names if we used a number larger than 3). Look at these new files. *How many addresses are stored in each?* Repeat the previous command adding **–d** after **–l** **3**. Look at the files now. *What does –d do?* Delete all of these addresses files from ~Student. *What command did you use?*
      1. **For the addressesaa, addressesab, addressesac files there were 3,3,2. -d copies everything over and changed the addresses00, addresses01, addresses02, making them numbers. Rm addresses??**

Shut down your VM if desired. Disconnect from the VM if you are using it. Remember to submit your lab report.