**1. Which commands can you use to determine who is logged in on a specific terminal?**

who or w

**Which command shows you which terminal you are giving the command from?**

w

**2. Give a command that displays a long listing of the files in /bin in reverse chronological order.**

$ ls –ltr /bin

**Give the command again but this time display the output one screen at a time.**

$ ls –ltr /bin | less

**3. What happens when you give the following commands if the file named done already exists?**

**$ cp to\_do done:** this command copy the file done to to\_do

**$ mv to\_do done:** this command rename the file done to to\_do

Either command overwrites done with the contents of to\_do.

**4. List the first 20 lines in /etc/services that describe TCP ports.**

$ grep tcp /etc/services | head -20

5. **How can you find the phone number for Ace Electronics in a file named phone that contains a list of names and phone numbers?**

$ grep "Ace Electronics" phone

**Which command can you use to display the entire file in alphabetical order?**

$ sort phone

**How can you display the file without any adjacent duplicate lines?**

$ uniq phone

**How can you display the file without any duplicate lines?**

$ sort –u phone

**6. What happens when you use diff to compare two binary files that are not identical? (You can use gzip to create the binary files.) Explain why the diff output for binary files is different from the diff output for ASCII files.**

When the files are different, diff shows a message that files differ; when the files are the same, there is no message. The diff utility compares ASCII files on a line-by-line basis; it is not designed to compare binary files on a byte-by-byte basis. Use cmp to compare binary files.

**7. What is the result of giving the which utility the name of a command that resides in a directory that is not in your search path?**

The which utility displays a message saying that the command you are looking for is not in the list of directories in your search path. For example,

$ which me

/usr/bin/which: no me in (/usr/lib64/qt -3.3/bin: /usr/local/sbin: /usr/bin: /usr/sbin: /bin: /sbin: /home/aplustudent/ .local/bin: /home/aplustudent/bin)

**8. Are any of the utilities discussed in this chapter located in more than one directory on the local system? If so, which ones?**

No. However, some commands which are built into a shell have counterparts that exits as executable file, such as echo.

**9. Experiment by calling the file utility with the names of files in /usr/bin. How many different types of files are there?**

Approximately 20.

10. **Which command can you use to look at the first few lines of a file named status.report?**

head ($ head status.report)

**Which command can you use to look at the end of the file?**

tail ($ tail status.report)

**11. Display only the names of the last ten services listed in /etc/services. (Hint: the services are listed in the first column.)**

$ cut –f1 /ect/services | tail

**12. Display a long listing of the files in the /etc/pam.d directory hierarchy that are links.**

$ find /etc/pam.d –type l | xargs ls -l

**13. Display a count of the number of words in the /etc/passwd file.**

$ wc –w /etc/passwd

**14. Display the /etc/passwd file, replacing all colons (:) with TABs.**

$ cat /etc/passwd | tr ‘:’ ‘\t’

**Display the /etc/services file, substituting one SPACE for each occurrence of multiple SPACEs.**

$ cat /etc/services | tr –s ‘ ’

15. **Change the modification time of /bin/bash to the system time. What happens? Why?**

$ touch /bin/bash

Touch: cannot touch ‘/bin/bash’: Permission denied because this file is created by root and cannot be changed.

**Copy /bin/bash to the working directory, display its modification time, and then change its modification time to the system time. Display the modification time of your copy of bash and the system time. Change its modification time to January 5, 2018 at 2:34 PM and display its modification time.**

$ cp /bin/bash bash1

$ ls –l bash1

$ touch bash1

$ ls –l bash1

$ touch –d ‘5 January 2018 14:34’ bash1

**16. Copy /bin/bash to the working directory and make two copies so you have three identical files: bash1, bash2, and bash3. Compress bash1 using gzip and bash2 using bzip2. Do not change bash3.**

$ gzip bash1

$ bzip2 bash2

$ ls -l bash\*

-rwxr-xr-x. 1 aplustudent aplustudent 491547 Jan 5 2018 bash1.gz

-rwxr-xr-x. 1 aplustudent aplustudent 466775 Feb 26 03:10 bash2.bz2

-rwxr-xr-x. 1 aplustudent aplustudent 1051464 Feb 26 03:10 bash2

**Which utility does the best job of compressing the file?**

bzip2

**Which does the worst?**

gzip

**How big is bash2.bz2 compared to bash3?**

Bash3 is bigger than bash2.bz2

**17. Re-create the colors.1 and colors.2 files used in the example on page 228. Test your files by running diff -u on them. Does diff display the same results as in the figure?**

-u option doesn't display any redundant information. It will show pink, purple and blue.

**18. Try giving these two commands:**

**$ echo cat**

**$ cat echo**

**Explain the differences between the output of each command.**

$ echo cat: cause echo to display the characters c, a and t.

$ cat echo: use cat to copy the contents of a file named echo. If there is no file named echo, it will display an error message.

**19. Repeat exercise 5 using the file phone.gz, a compressed version of the list of names and phone numbers. Consider more than one approach to answer each question and explain how you made your choices.**

First option: use gunzip to decompress the file. Then, use the same commands as exercise 5.

Second option: use zcat and a pipe to display the results without creating an intermediate file.

$ zcat phone.gz | grep "Ace Electronics"

$ zcat phone.gz | sort

$ zcat phone.gz | uniq

$ zcat phone.gz | sort -u

The different depends on the size of the file. If phone.gz is large, the first option will be faster because more size means you should use more CPU (processor) time. If it is small, the second one will use less hard disk storage, or vice versa.

**20. Find or create files that**

**a. gzip compresses by more than 80 percent.**

The gzip utility compresses most text files by more than 80 percent.

**b. gzip compresses by less than 10 percent.**

The gzip utility compresses most files that are already compressed. Such as jpeg files, by less than 10 percent.

**c. Get larger when compressed with gzip.**

The gzip utility expands a file that has already been compressed with gzip. to compress a gzipped file a second time, you shoud remove the .gz filename extension.

**d. Use ls -l to determine the sizes of the files in question. Can you characterize the files in a, b, and c?**

Files with repeated information or inefficiently stored information can be compressed the most. Files that have been compressed already store information efficiently and can be compressed only a small amount, not at all, or expanded.