

# Introduction to Linux

## (Exercises)

### Getting Help:

1. Verify that the manual pages have been installed on your system  
**man**
2. Create new man pages for your system  
**apt install manpages-dev manpages-posix-dev -y**
3. In one line, get a description of the 'alias' command  
**whatis alias**
4. Get help information about the 'df' command and scroll through it, up or down, at will  
**info df**
5. Display examples of how to use the 'sort' command.  
**info sort**
6. Using the information from the previous command, sort the output from 'compgen -c' in reverse order.  
**compgen -c | sort -r**

### System & Process Management:

1. List all processes running on the computer by all users  
**ps aux**
2. List processes in real time. Sort them in descending order by the amount of memory being used  
**top** (Use Shift + F to modify field settings)
3. Display the kernel and operating system version information  
**uname -a**
4. Show all active connections to the computer  
**w**
5. Find out how long the system has been running  
**uptime**
6. Run the 'cat' command in the background  
**cat &**
7. Identify its process number and kill it  
**ps > kill -9 <PID>**
8. Open a web browser and terminate it using its process name  
**killall -9 <browser name>**
9. Display the sentence, 'This is a test', on the screen using a variable  
**variable1="This is a test" & echo \$variable1**
10. Create a new file named 'test.txt' which has the line, 'This is a test'  
**echo "This is a test" > test.txt**
11. List all files in the current directory and show the contents of the 'test.txt' file, using a single statement  
**ls ; cat test.txt**
12. Display a list of all commands you have run in the current session  
**history**

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### Managing Files and Folders:

1. Create two directories in your home directory named 'tmp1' and 'tmp2'  
**cd ; mkdir tmp1 tmp2**
2. Move to the tmp1 directory and create an empty file named 'test1'  
**cd tmp1 ; touch test1**
3. Without using an editor, add the statement, 'This is a test', three times to the file  
**echo "This is a test" >> test1 ; echo "This is a test" >> test1 ; echo "This is a test" >> test1**
4. Copy the 'test1' file to 'test1.backup' in the same directory  
**cp test1 test1.backup**
5. Copy the contents of the .bashrc file in your home directory to 'test1', without overwriting the previous content  
**cat ~/.bashrc >> test1**
6. Copy all lines in 'test1' that have the word 'alias' to a new file in the 'tmp1' directory called 'test2'  
**cat test1 | grep -i "alias" > test2**
7. Copy the file 'test2' to 'test3' in the same directory  
**cp test2 test3**
8. Copy the last ten (10) lines of 'test1' to 'file1'  
**tail -n 10 test1 > file1**
9. Copy the first three lines of 'test2' to 'file2'  
**head -n 3 test2 > file2**
10. Copy 'file1' and 'file2' to the 'tmp2' directory  
**cp file\* ../tmp2**
11. Delete the original 'file1' and 'file2' files from 'tmp1'  
**rm file1 file2**
12. Modify the permissions for 'file1' and 'file2' in the 'tmp2' directory so they cannot be modified without root  
**chmod -w ../tmp2/file\***
13. Create a hard link between 'test3' in the 'tmp1' folder and a new file in the 'tmp2' folder with the same name  
**ln test3 ../tmp2/test3**
14. Add the line 'This is another test' to 'test3' in 'tmp1' and verify that the linked file in 'tmp2' is updated  
**echo "This is another test" >> test3 ; cat ../tmp2/test3**
15. Display the last 3 lines in 'test3'  
**tail -n 3 test3**
16. Compress and archive all files in your home directory to ~/backup.tar.gz, if the name begins with 'test'  
**find ~ -type f -name "test\*" | tar -czvf ~/backup.tar.gz -T -**
17. Verify the contents of backup.tar.gz without extracting the files  
**tar -ztfv ~/backup.tar.gz**
18. Copy all files in 'tmp1' to 'tmp2' if the name includes the word 'backup'  
**find . -type f -name "\*backup\*" -exec cp {} ../tmp2 \;**
19. Change your current working directory to the root folder (/)  
**cd /**
20. Do a search for all files in your home directory with names that include the word 'test'  
**find ~ -type f -name "\*test\*"**
21. From your home directory, create a new file ('findtest') that includes the command from the previous step  
**echo "find ~ -type f -name "\*test\*" > ~/findtest**
22. Make the new file from the previous step executable and test it  
**chmod +x ~/findtest ; ~/findtest**

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### Networking:

1. Run a command that displays the IP configuration of the local computer  
**ip address show <network device> | grep inet**
2. Run a command that displays only your public Internet IP address  
**curl ifconfig.me**
3. Create aliases for each of the first two commands and test them  
**alias ip="ip address show | grep inet ; alias iip="curl ifconfig.me"**
4. Verify Internet connectivity between your computer and github.com  
**ping github.com -c4**
5. Save the IP address of github.com to a new file named /tmp/github.ip  
**ping github.com -c1 | grep icmp > /tmp/github.ip**
6. List the IP routers between your computer and github.com  
**mtr github.com**
7. Create a secure shell connection to your computer and establish super user credentials  
**ssh localhost**
8. Add the IP address 8.8.8.8 as one of your DNS servers (**Note:** Always backup config files before modification)  
**echo "nameserver 8.8.8.8" >> /etc/resolv.conf**
9. Configure name resolution so that your first name can be used as your computer name  
Modify /etc/hosts file localhost information: **127.0.0.1 localhost <first name>**
10. Create a list of all open port numbers on your computer and put them in a file named /tmp/openports  
**netstat -tulpn > /tmp/openports**
11. For each open port number below 100, find the name of the service it is used for  
**cat /etc/services | grep "22/tcp"**
12. In the /etc directory, review the content of the 'hosts' file, then rename it to 'hosts.old'  
**cp hosts hosts.old**
13. Download the 'hosts' file from <http://raw.githubusercontent.com/StevenBlack/hosts/master/>  
**wget http://raw.githubusercontent.com/StevenBlack/hosts/master/hosts**
14. Review the content of the new 'hosts' file  
**cat hosts**
15. Verify you still have Internet connectivity by using a web browser to connect to a website  
**(Open Firefox or another browser)**
16. Close the secure shell connection and verify you are in your previous session  
**exit**
17. Download the 'Linux\_Command\_Reference.pdf' file using the path,  
<http://raw.githubusercontent.com/neiltucker/bootcamp1q/main/>, to your home directory  
**wget http://raw.githubusercontent.com/neiltucker/bootcamp1q/main/Linux\_Command\_Reference.pdf**
18. Verify the file downloaded successfully and you can view it from the GUI  
**(Open the file with Document Viewer or another PDF application)**

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### Managing Applications:

1. Update and upgrade the application packages on your system  
**apt update -y | apt upgrade -y**
2. List all packages installed on the system  
**apt list --installed**
3. Remove unnecessary library dependencies from the system  
**apt autoremove --purge**
4. Install Apache web server on your system  
**apt-get install apache2**
5. Verify that the service is set to auto-start and verify that it is running  
**systemctl enable apache2 ; systemctl status apache2**
6. Test connectivity to the default website  
**In a web browser on the computer, go to http://127.0.0.1**
7. Using the configuration files in /etc/apache2, locate the website files  
**ls -la /etc/apache2/sites-available/\*.conf**
8. Locate the DocumentRoot folder and modify the default website page with one that you create yourself  
**cp /var/www/html/index.html index.html.backup ; cp <my file> /var/www/html/index/html**
9. Test connectivity to the new website page  
**Open page in web browser**
10. Disable the apache2 service  
**systemctl disable apache2**
11. Create a user account named student2 and make sure it has a home folder and uses the bash shell  
**useradd -m -s /bin/bash student2**
12. Assign a password of 'Password1' to student2  
**passwd student2**
13. Test the login account of student2 and verify the home directory and shell settings  
**su – student2**
14. Attempt to elevate student2 to super user to verify the account does not have those privileges  
**sudo su**
15. Logout student2 to return to your original account  
**exit**
16. Run visudo to give student2 root privileges  
**visudo**
17. Visudo opens /etc/sudoers file. Find the line for root. Add an identical line for student2. Save & exit  
**student2 ALL=(ALL:ALL) ALL** (Note: never try to save the file if there are any errors detected in it)
18. Login as student2  
**su – student2**
19. Verify that student2 is now able to use super user privileges  
**sudo su**