

Guide to UNIX Using Linux Fourth Edition

Chapter 2 Solutions

Answers to the Chapter 2 Review Questions

1. Your company is discussing plans to migrate desktop and laptop users to Linux. One concern raised by the users is whether Linux supports the use of CDs and DVDs for both work files and for listening to music. Which of the following is an appropriate answer?
Answer: c. Linux supports both the UDF and iso9660 file systems for CD and DVD use.
2. You receive a message that you've successfully backed up hda2 on your Linux system. What is hda2?
Answer: b. the second partition on your main hard disk
3. You have purchased a special monitor for your computer and the instructions tell you to make a minor modification to the inittab file. Where would you locate this file on a typical Linux system?
Answer: d. /etc
4. You're frantically trying to get ready for a meeting and want to access a file in your home directory, but you are currently working in a public directory open to all users. What command can you enter to instantly go to your home directory?
Answer: a. `cd`
5. Your new colleague asks which partitions vendors recommend setting up on a Linux system. Which of the following partitions do you include in your response? (Choose all that apply.)
Answer: b. root, c. swap, and d. /boot
6. You have mounted a remote network drive and now you want to unmount that drive. Which of the following commands do you use? (Choose all that apply.)
Answer: b. `umount`
7. When you connect a printer via a USB port on your Linux computer, which type of device special file is used to handle streams of data sent to and from the printer?
Answer: a. character special file
8. Some of the users in your company create and delete so many files that they have problems with fragmented disks. Which of the following new features in the ext4 file system help to reduce fragmentation problems?
Answer: d. extents
9. In UNIX and Linux systems, what source of extra memory space is used when working on tasks and files that exceed the RAM capacity on chips in the computer?
Answer: b. swap partition
10. You are always scheduled for two or three meetings each day and need to keep an eye on the time. What PS1 variable parameter can you set in order to have your command prompt display the current time?
Answer: a. `\t`
11. You have been working in several directories for the past hour and right now you don't remember which directory you're in currently. What command can you use to show your current working directory?
Answer: c. `pwd`

12. A member of your department has given you permissions to view the contents of the accounting directory under his home directory. The name of his home directory is bramirez. Which of the following commands should you use to display the contents of the accounting directory?
Answer: c. ls /home/bramirez/accounting
13. It's late and you have been working all day to finish a report. Before you go home you want to copy several files including your report file. What copy command should you use to ensure that you don't inadvertently copy an older report file over the newer report file you've been working on for the last four hours?
Answer: a. cp -u
14. Which of the following are file systems supported by UNIX and Linux operating systems? (Choose all that apply.)
Answer: a. NTFS, b. vfat, d. ufs, and e. ext
15. You are helping a friend who is new to Linux. You want to determine which entries under her home directory are directories instead of files. When you perform a long listing of the home directory's contents, what do you use to distinguish a directory from a file?
Answer: d. The very first character in the line for an entry will be "d" for directory or "-" for an ordinary file.
16. Your boss is planning to do some house cleaning by deleting several old files. However, she mentions that she doesn't want to delete an important file inadvertently. What command can she use so that she is prompted to make sure she wants to delete a particular file?
Answer: d. rm -i
17. You are curious about the error and system logs kept by your operating system. In what main directory under the root (/) would you most likely find these logs?
Answer: a. /var
18. A friend of yours is trying to make more space on his hard disk drive and is considering deleting the /lib directory because he has heard it mostly contains games that he doesn't use. What is your recommendation?
Answer: d. Keep the /lib directory because it holds security information, shared library images, kernel modules and other important files.
19. Which of the following are permissions that can be granted to a file? (Choose all that apply.)
Answer: b. write, c. execute, and e. read
20. Which of the following commands enable(s) you to set permissions on a directory after you create it? (Choose all that apply.)
Answer: c. chmod
21. You have created many notes to yourself that end in .txt. Which of the following commands enables you to list all of the .txt files in your home directory while you are in the Bash shell?
*Answer: b. ls *.txt*
22. Short answer: Where is virtual memory located?
Answer: Virtual memory is located on disk, such as in swap space.
23. Short answer: When you see the permissions rwx--x--x associated with a file, what permissions are granted?
Answer: The permissions that are granted are: owner has read, write, and execute; group has execute; and others have execute.

24. Short answer: Your boss wants to use the command to view hidden files and also wants to know how to find them among other files. What do you tell her?
Answer: The command to view hidden files is `ls -a`. In the resulting list of files, the hidden files are the files that start with a dot (.) in front of the file name..
25. Short answer: You have many files that begin with the word “account” and that end with two digits to designate a year, such as account00, account 01, and so on. What is the command that enables you to view all of these files that start with account?
Answer: The `ls account??` command will display all of the files that start with account.

Hands-On Projects Tips and Solutions for Chapter 2

Project 2-1

In this project, students determine the file systems that can be mounted in a Linux system.

In Step 2, the file systems are likely to include some or any of the following (note that there are many more than discussed in the text, because the text is intended to cover the basic options and not all possibilities, including those for devices):

- adfs
- affs
- autofs
- coda
- coherent
- cramfs
- devpts
- efs
- ext
- ext2
- ext3
- hfs
- hpfs
- iso9660
- jfs
- minix
- msdos
- ncpfs
- nfs
- ntfs
- proc
- qnx4
- ramfs
- reiserfs
- romfs
- smbfs
- sysv
- tmpfs
- udf
- ufs
- umsdos
- vfat
- xenix
- xfs
- xiafs

In Step 3, the file systems that students see will depend on how their system is set up. Typical examples of mounted file systems are:

- ext3
- proc
- usbdevfs (for usb devices)
- devpts (for devices)
- tmpfs (for temporary storage)

Project 2-2

This project enables students to mount and unmount a CD. They will need access to the root account and a CD that can be mounted and read.

In Step 6 of the first set of steps, to mount a floppy (depending on the floppy device), students would use the following command after inserting the floppy disk:

```
mount -t vfat /dev/fd0 /mnt/floppy (or replace mnt with media)
```

To unmount the floppy they would use:

```
umount /mnt/floppy (or replace mnt with media)
```

Project 2-3

Students first view the contents of the PS1 variable and then they configure it to show the day of the week, date, and time, then show the current working directory,, and finally to show the full path to their home directory.

In Step 6, students should find that the prompt goes back to the default before they started configuring the PS1 variable.

Project 2-4

For this project, students practice using the *pwd* command.

In Step 2, students should report their working directory, such as their home directory.

Project 2-5

Students begin by changing the prompt to display their working directory. Then they practice using the *cd* command.

Project 2-6

For this project, students use the *cd* command to compare absolute and relative paths.

Project 2-7

In this project, students navigate using the dot and dot dot conventions.

Project 2-8

This project enables students to practice using the *ls* command.

In Step 1 of the third set of steps, students display the contents of the */dev* file. They should note that a “c” in the first position of the first column indicates a character special file.

Project 2-9

In this project, students practice using the * and ? wildcards with the *ls* command.

Project 2-10

Students create two directories and a file in each directory for this project, which enables them to use the *mkdir* and *cat* commands. Ensure that the students keep the files they create for use in later projects.

Project 2-11

This project has the students create a simple telephone database to practice using multiple commands: *cd*, *mkdir*, *cp*, and *cat*.

Project 2-12

In this project, students practice setting permissions on directories and files to make them available for access by general users. Students use the subdirectory and the file they created in Hands-on Project 2-11.

Discovery Exercises

1. Use the *ls* command to list the contents of the root file system directory (*/*) on your system.
Answer: Students should type *ls /* to view the contents of the root directory.
2. Use the *ls -l* command to view the contents of the root file system directory (*/*).
Answer: Students should type *ls -l /* to view the contents of the root directory.
3. Determine the inode value for the */etc* directory.
Answer: The command to determine the inode value is *ls -li /*.
4. Make */etc* your current working directory and then go back to your home directory
Answer: Students should type *cd /etc* and then type *cd* to return to their home directories.
5. Make the root file system directory your current working directory. What command can you use to verify that you are in the root file system directory? Return to your home directory.
Answer: Students should first type *cd /* to go to the root directory and then type *pwd* to verify that is their current working directory. Last, they use *cd* to go back to their home directory.
6. The file *info.txt* is in the *help* directory, which is a subdirectory of the */dev* directory. What is the absolute path to *info.txt*?
Answer: The full path is: */dev/help/info.txt*.

7. Change to the /dev directory. Next, access your home directory using a tilde (~) in the command that you employ.
Answer: Students should first enter `cd /dev` to go to the /dev directory. Next, they should enter `cd ~` to return to their home directory.
8. Determine whether there are any hidden files in the /home directory.
Answer: Use the command `ls -a /home`. Typically, students will find there are no hidden files in /home.
9. Make a directory under your home directory called documents. Next make a directory under the documents directory called spreadsheets. What is the absolute path for the spreadsheets directory?
Answer: First, students should use `cd` or `pwd` to make sure they are in their home directory (use `cd` to change to the home directory). Next, they should enter `mkdir documents`. Next, they can use `cd documents` and type `mkdir spreadsheets`. The absolute path is `/home/username/documents/spreadsheets`.
10. Make certain you are in your home directory. Use a relative path to make your new documents directory the current working directory. Next, use a relative path to make the spreadsheets directory your current working directory. Now, use a command with dots in it to make the documents directory your current working directory.
Answer: First, enter `cd documents` and then enter `cd spreadsheets`. Next, enter `cd ..` to move back to the documents directory.
11. With your home directory as your current directory, use the command to remove read, write, and execute permissions from group and others for the spreadsheets directory. Next, verify that your change has taken place.
Answer: The command students can use is: `chmod go-rwx ~/documents/spreadsheets`. To verify their work, students should enter `ls -l ~/documents`.
12. Use the `cat` command to create a two-line file in your home directory called datainfo. On the first line enter 144 and on the second line enter 288. After the file is created, copy it from your home directory to the spreadsheets directory you created.
Answer: To create the datainfo file, students can first use the `cd` command to make sure they are in their home directory. Next, they should type `cat > datainfo`, enter the two lines and type Ctrl+d. Finally, to copy the file they enter `cp datainfo ~/documents/spreadsheets`.
13. Determine the default permissions on the datainfo file your created. Next, set the permissions on the datainfo file so that the owner, group, and others can read and execute the file (otherwise leave the default settings as is).
Answer: Students can use the `ls -l` command, such as `ls -l ~/documents/spreadsheets` to determine the default permissions (-rw-rw-r--). To set the permissions enter `chmod ugo+rx ~/documents/spreadsheets`.
14. Append the current month's calendar to the datainfo file that is in your home directory. Next copy your changed datainfo file over the older datainfo file in the spreadsheets directory, but use the copy option that prompts you before you overwrite the file in the spreadsheets directory. Check the contents of the datainfo file in the spreadsheets directory to make certain your copy was successful.
Answer: Make sure you are in your home directory. Enter `cal >> datainfo`. To copy the new file over the old one, with a verification prompt, enter `cp -i datainfo ~/documents/spreadsheets`. Last, to verify the contents of the file enter, (such as from the home directory) `cat ~/documents/spreadsheets/datainfo` (or students might use the `more` or `less` commands instead of `cat`).

15. Make the spreadsheets directory your working directory. Make copies of the datainfo file in the spreadsheets directory, so that one copy is named myinfo and one is named datadata. Next, use a wildcard character to list all files that start with “data.” Use a wildcard character to list all files that end with “info.” Use a wildcard character combination to list all files that have “ata” as the second, third, and fourth characters.

Answer: One way to change directories is to type `cd documents` and then `cd spreadsheets`. Enter `cp datainfo myinfo` and then `cp datainfo datadata`. Enter `ls data*` to list the files starting with data. Enter `ls *info` to list the files ending with info. Enter `ls ?ata*` to list the files with “ata” as the second, third, and fourth characters.

16. Make certain you are in your home directory. Change your command prompt so that it shows your current working directory with an exclamation point, such as *mydirectory!* Change to the spreadsheets and then to the documents directory and notice how the prompt changes

Answer: Enter `cd` to go to the home directory. Enter `PS1="!w"!` to change the command prompt. Use the `cd documents` and then `cd spreadsheets` commands to go to the documents directory and then the spreadsheets directory and notice that the command prompt changes to show that directory. Use `cd ..` to go to the documents directory and verify the prompt.

17. Change to your home directory. Use the `rmdir` command to delete the spreadsheets directory. What happens?

Answer: Students should see an error message that the directory is not empty.

18. Delete the datainfo files in both your home directory and in the spreadsheets directory. Also, delete the myinfo and datadata files in the spreadsheets directory.

Answer: Enter `rm ~/documents/spreadsheets/datainfo` and enter `rm datainfo` from the home directory, for example, to delete both instances of the file. Enter `rm ~/documents/spreadsheets/myinfo` and then enter `rm ~/documents/spreadsheets/datadata`.

19. Change to your home directory. Delete the spreadsheets directory and then delete the documents directory.

Answer: Type `cd`. Enter `rmdir ~/documents/spreadsheets` and then enter `rmdir documents`.

20. Create a directory called secure under your home directory. Next, using the octal permission format, set security on the secure directory so that you have all permissions and no one else has any permissions.

Answer: Type `mkdir secure` and press Enter. Next type `chmod 700 secure` and press Enter.