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| Chapter #04 exercises & Advanced Exercises |
| Homework |
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**Exercises :**

**Q1): Is each of the following an absolute pathname, a relative pathname, or a simple filename?**

(a). milk\_co

Sol: Filename

(b). correspond/business/milk\_co

Sol: not any of the above but a secretary’s directories.

(c). /home/max

Sol: absolute pathname.

(d). /home/max/literature/promo

Sol: absolute pathname.

(f). letter.0610

Sol: filename

**Q2): List the commands you can use to perform these operations:**

(a): Make your home directory the working directory

Sol: 'cd' command is used without any target; it always puts you in your home directory which by default becomes the working directory.

(b): Identify the working directory

Sol: The pwd (print working directory) command displays the pathname of the working directory.

**Q3): If the working directory is /home/max with a subdirectory named literature, give three sets of commands that you can use to create a subdirectory named classics under literature. Also give several sets of commands you can use to remove the classics directory and its contents.**

**Sol:** $ pwd

/home/max

$ ls

names temp

(As there is no literature directory so use mkdir to create literature directory in /home/max)

$ mkdir literature

The following commands show two methods to create the “classics” directory as a child of the “literature” directory.

First method:

$ pwd

/home/max

$ mkdir literature/classics

Second Method:

$ mkdir /home/max/literature/classics

There is an option in mkdir utility -p that helps user to create multiple directories in single command.

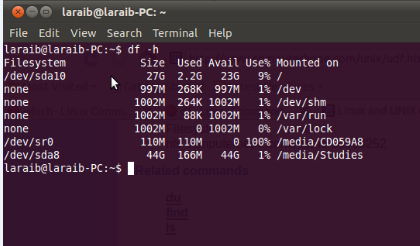
So we can also create literature and classics as its child directory using command:

$ mkdir -p /home/max/literature/classics.

**Q4): The df utility displays all mounted file systems along with information about each. Use the df utility with the –h (human-readable) option to answer the following questions.**

(a): How many file systems are mounted on your Linux system?

Sol: This command df -h displays the sizes in an easy to read format as shown in the figure below. It shows the list of all the mounted files and available and used memory as well.



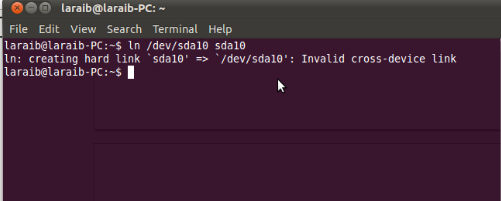
The figure there are 3 mounted filesystems.

(b): Which filesystem stores your home directory?

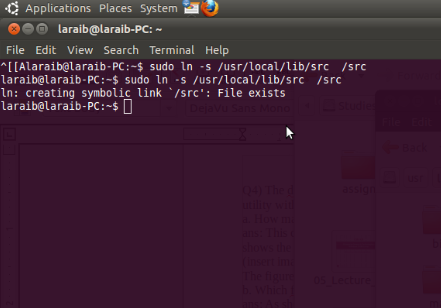
Sol: As shown in the above figure / is mounted on /dev/sda10 file system.

(c): Assuming that your answer to exercise 4a is two or more, attempt to create a hard link to a file on another file system. What error message do you get? What happens when you attempt to create a symbolic link to the file instead?

Sol: while creating hard link results in error “Invalid cross-device link ” as shown in figure:



Symbolic link can be created easily without any error message as shown in figure below.



**Q5): Suppose you have a file that is linked to a file owned by another user. How can you ensure that changes to the file are no longer shared?**

**Sol:** When you own a file, you can use the chmod (change mode) utility to change access permissions for that file.

**Q6):** **You should have read permission for the /etc/passwd file. To answer the**

**following questions, use cat or less to display /etc/passwd. Look at the fields of information in /etc/passwd for the users on your system**

**Sol:** ./etc/passwd file has the following format:

username:passwd:UID:GID:full\_name:directory:shell

**a)**colon “:” is used is used to separate fields in /etc/passwd.

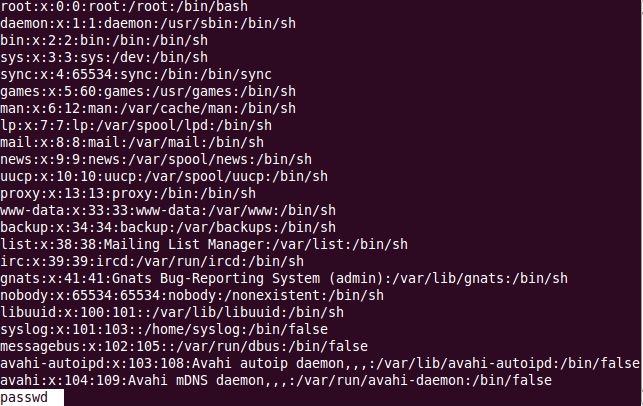
**b)**username,password,userID, GroupID, userID info,fullname are the fieldsused to describe each user.

c)The first field in snapshot shows different users on local system.

d) following are the 4 different login shells are in use on system,

* /bin/bash
* /bin/sh
* /bin/sync
* /bin/false

**e) Yes,** system uses shadow passwords as x character indicates that encrypted password is stored in /etc/shadow file.



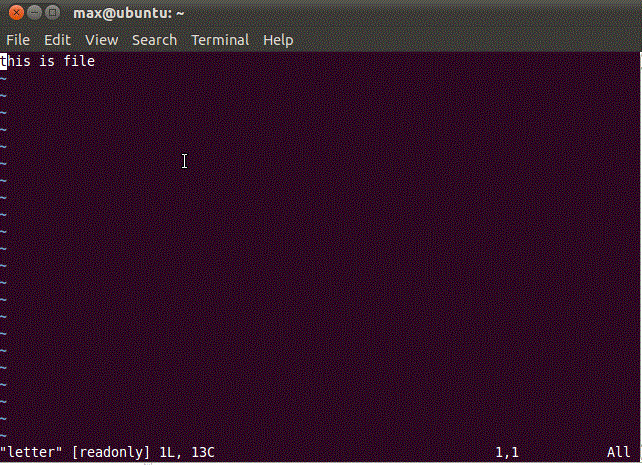
**Q7)If /home/zach/draft and /home/max/letter are links to the same file and**

**the following sequence of events occurs, what will be the date in the opening**

**of the letter?**

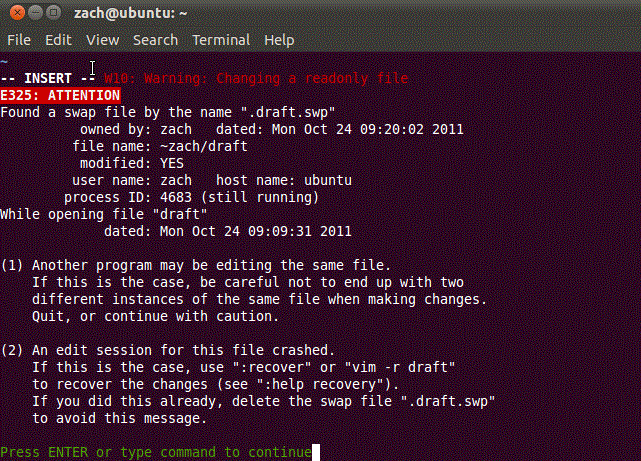
1. **Max gives the command vim letter.**

Vim editor will be open for letter .



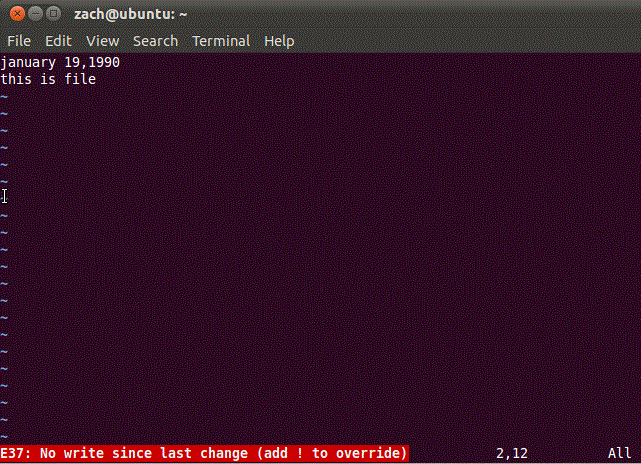
**b)Zach gives the command vim draft.**

Then I did login zach and gave command vim draft , editing pad opened but zach had a warning that another program editing the same file.

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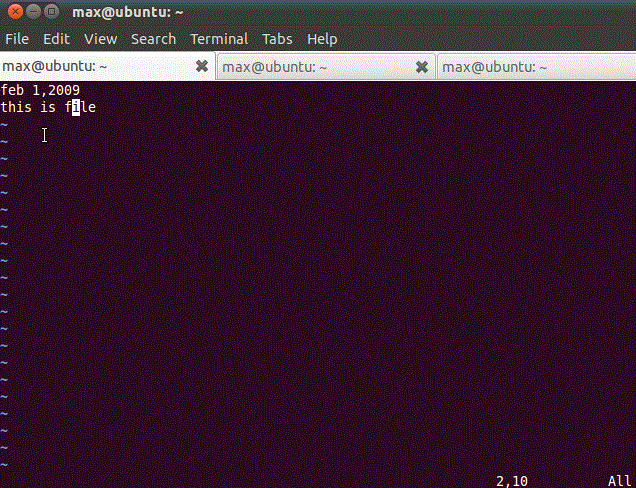
**c. Zach changes the date in the opening of the letter to January 31, 2009, writes the file, and exits from vim.**

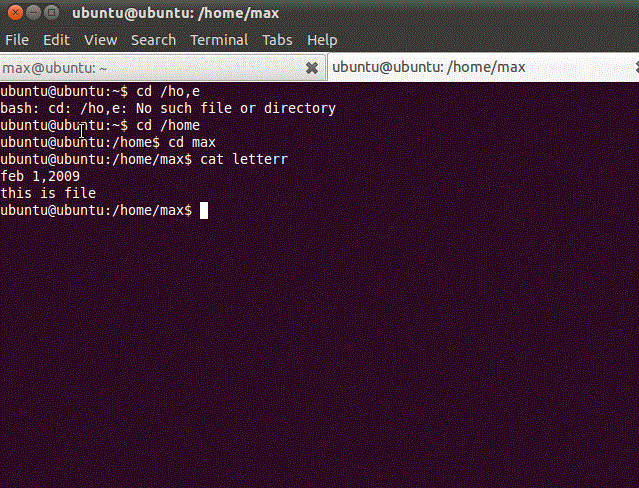
After editing press escape and write:wq ddraft.txt for save and exit.



**d. Max changes the date to February 1, 2009, writes the file, and exits from vim.**

Max made changes to file save and exit and when he gave command to list the contents then the date got displayed.





**Q8)** **Suppose a user belongs to a group that has all permissions on a file named**

**jobs\_list, but the user, as the owner of the file, has no permissions.**

**Describe which operations, if any, the user/owner can perform on**

**jobs\_list. Which command can the user/owner give that will grant the**

**user/owner all permissions on the file?**

**Sol):**

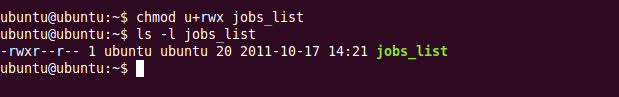
Initially user/owner is not able to perform any actions on file.

By using following command

**Chmod u+rwx jobs\_list**

User/ owner will be able to do any operations in file.

The chmod command is used to change the permissions of a file or directory whereas job\_list is the name of file.



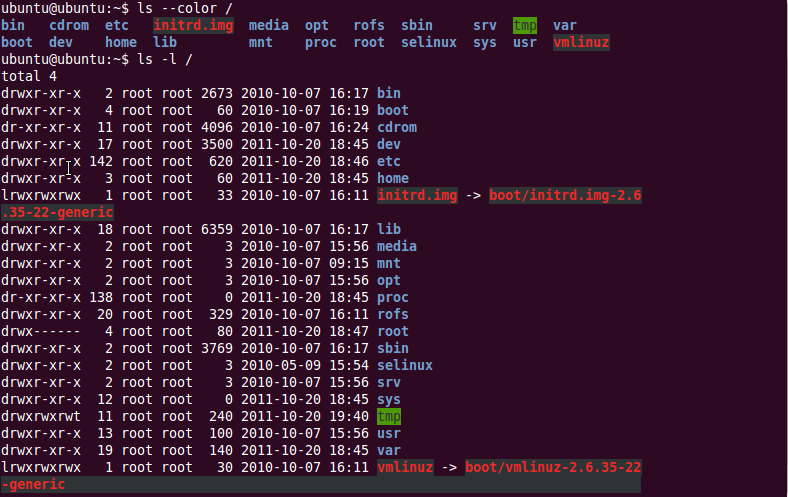
**Q9) Does the root directory have any subdirectories you cannot search as an**

**ordinary user? Does the root directory have any subdirectories you cannot**

**read as a regular user? Explain.**

**Sol:**

First command shows the subdirectories in root directory.2nd command shows that regular users may read e the file(d for directory,r-x for read and execute) except root subdirectory. (drwx------)



**Q10) Assume you are given the directory structure shown in Figure 4-2 on**

**page 79 and the following directory permissions:**

**d--x--x--- 3 zach pubs 512 Mar 10 15:16 business**

**drwxr-xr-x 2 zach pubs 512 Mar 10 15:16 business/milk\_co**

**For each category of permissions—owner, group, and other—what happens**

**when you run each of the following commands? Assume the working**

**directory is the parent of correspond and that the file cheese\_co is readable**

**by everyone.**

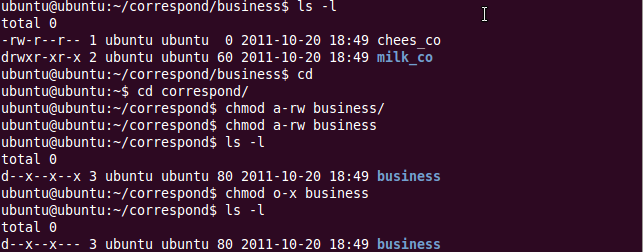
**a. cd correspond/business/milk\_co**

**b. ls –l correspond/business**

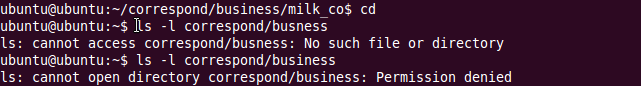
**c. cat correspond/business/cheese\_co**

**Sol:**

Permissions on correspond/business/milk\_co directory and business directory

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a,b)permission denied error displays,



**c)**ascheese\_co is readable so it gives result,

**10nnn.PNG**

**Advanced Exercises:**

**Q11): What is an inode? What happens to the inode when you move a file within a filesystem?**

**Sol:**

An inode is a data structure, stored on disk that defines a file’s existence and is identified by an inode number. A directory relates each of the filenames it stores to an inode.

Inodes store information about files and folders, such as file ownership, access mode and file type.On some file systems the maximum number of inodes is made fixed at the time of creation of the file system so it gives a limit to the maximum number of files in the file system.

Nothing really happens when we move a file in the file system. The inode contains data about where that file exists within the directory / folder. So the data of the inode is just updated with the new location

**Q12): What does the .. entry in a directory point to? What does this entry point to in the root (/) directory?**

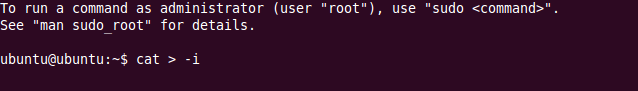
**Sol:**

In the directory “..” indicates to the root directory. In case of parent directory there is no root directory so “..” indicates to itself.

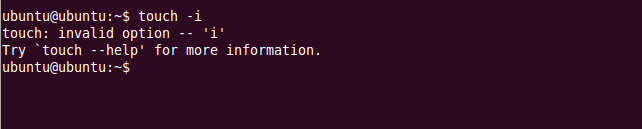
**Q 13)** **How can you create a file named –i? Which techniques do not work, and**

**why do they not work? How can you remove the file named –i?**

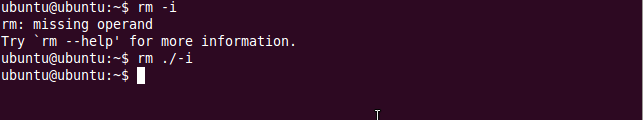
**Sol:**

cat command is used to create file named –i 

Touch command is also used to create empty text files but if we use touch command to create file named “-i” ,it gives error.



By giving command rm –i,it gives error so following snapshot shows the command to delete the file named –i,



**Q14) Suppose the working directory contains a single file named andor. What**

**error message do you get when you run the following command line?**

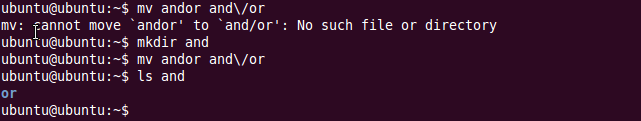
**$ mv andor and\/or**

**Under what circumstances is it possible to run the command without producing**

**an error?**

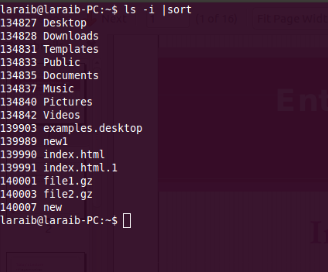
**Sol:**

fisrt of all I created the directory named “andor” in working directory.following error displayed when I gave the command because no and/or directory was there,so I created “and” directory and then move the already created directory to avoid error.



**Q15): The ls –i command displays a filename preceded by the inode number of the file (page 107). Write a command to output inode/filename pairs for the files in the working directory, sorted by inode number. (Hint: Use apipe.)**

**Sol:**



**Q16)** **Do you think the system administrator has access to a program that can**

**decode user passwords? Why or why not?**

**Sol:**

generally the system administrator has not access to a program that can decode user passwords ,he is the one who assign password to users.he can decode the weak password by using password cracking utilities of linux.these are **crack** and **John the ripper** (both are password cracking ).command for installing **John the ripper.**

sudo apt-get install john

**Q17): Is it possible to distinguish a file from a hard link to a file? That is, given a filename, can you tell whether it was created using an ln command? Explain.**

**Sol:**

There is no way to distinguish between the original file from hard link to a file. These are the same file having two links to the same "inode”. You can also observe that inode numbers are the same from both original file and hard link by using this command:

ls -i originalFileName hardlinkToFile.

You can delete the original file after creating its hard link. If you delete the original file after creating its hard link, the data will stay there until at least one link is available.

**Q18): Explain the error messages displayed in the following sequence of commands:**

**Sol:**

$ ls -l

total 1

drwxrwxr-x

2 max pubs 1024 Mar

$ ls dirtmp

$ rmdir dirtmp

rmdir: dirtmp: Directory not empty

(this error indicates that the directory dirtmp is not empty directory there are further subdirectories in it so we cannot delete it.)

$ rm dirtmp/\*

rm: No match.

(this error indicates that in dirtmp there are subdirectories which further have child directories and files in this case if there is an empty directory in dirtmp then that empty directory will be deleted but the directories having further subdirectories won’t be deleted )..

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