Laboratory Experiment II

The Linux Directory Structure

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INTRODUCTION

This experiment involves working in the Linux shell and the concept of directory tree structuring. It includes navigating through the file structure and working with files and directories.

Four parts make up this experiment:

Part I—deals with creating files and directories, changing directories, and displaying directory contents.

Part II—works on various directory listing options and the comparison between the list command options.

Part III—helps you understand the contents of the root directory.

Part IV—determines the best way to remove a directory.

1
LABORATORY SHEETS

LABORATORY EXPERIMENT II

LEHMAN COLLEGE
Of the City University of New York

Experiment 2: The Directory Structure

Objective: To study the concept of directory tree structuring

Procedure: Part I.

1. Login to your working directory.
2. Make a subdirectory under your working directory.
   - Use your name as the subdirectory name with a "01" at the end of your name.
     I.e. "your name"01.
   - Use the mkdir command to create the directory. i.e. mkdir john01
3. Make another subdirectory under your home directory and use 02 at the end of your name
4. Change directory to the "your name"01 directory.
5. Create a file in the "your name"01 directory.
6. Return to your home directory.

   How did you return to your home directory?

   NOTE: You were just given instruction to perform functions. You find the commands needed to perform the functions.
7. Enter the command ls -l.

   How do you tell a directory from an ordinary file?
8. Enter the command ls.

   How do you tell a directory from an ordinary file?

Sheet 1-1 Experiment procedures (Part I).

Part II.

1. Type the command ls -1.
2. Type the command ls -al.

   What do you notice between the two commands? Did you notice any new files or directories?
3. Type the commands ls -F.

   What do you notice about the command?
4. Copy the file from "your name"01 to the directory "your name"02.
5. Change directory to "your name"02.
6. Copy the file from your home directory to the present directory.

   How did you perform this task? How did you perform the task in step 4? Explain, in detail, as to whether you used relative or absolute path movement. Explain the difference between the two.

Sheet 1-2 Experiment procedures (Part II).

Part III.

1. Change directory to the root directory. i.e. cd /.
2. Type the command ls -al.
3. Explain and discuss the files and directories you find.

Sheet 1-3 Experiment procedures (Part III).

Part IV.

1. Return to your home directory
2. Type the command rm "your name"02. What happened?
3. Type the command rm -r "your name"02. What happened?
4. Explain, in detail, the difference between rm and rm -r commands.

Sheet 1-4 Experiment procedures (Part IV).

Procedures

The procedures on this page represent the tasks to complete, in four parts. Some tasks require simple explanations, while others need a more detailed analysis.

In the next section, each sheet is revisited for clarity.

2
DATA SHEETS

LABORATORY EXPERIMENT II

Procedures—Part I.

1. Login to your working directory.
2. Make a subdirectory under your working directory.
   - Use your name as the subdirectory name with a "01" at the end of your name. I.e. "your name"01.
   - Use the mkdir command to create the directory. i.e. mkdir john01
3. Make another subdirectory under your home directory and use 02 at the end of your name
4. Change directory to the "your name"01 directory.
5. Create a file in the "your name"01 directory.
6. Return to your home directory.

   How did you return to your home directory?

   NOTE: You were just given instruction to perform functions. You find the commands needed to perform the functions.

7. Enter the command ls -l.

   How do you tell a directory from an ordinary file?

8. Enter the command ls.

   How do you tell a directory from an ordinary file?

Sheet 2-1 Experiment procedures (Part I).

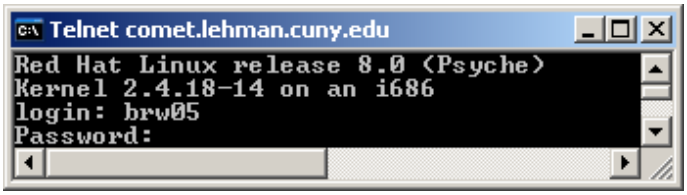
Results

This section contains results to the procedures presented on the laboratory sheets in the previous section. The Analysis section provides in-depth explanations to various questions.

Part I

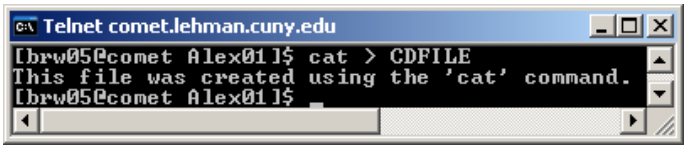
Below are results for Part I (**Sheet 2-1**) of the experiment.

1. I logged into my working directory using my current username and password shown in **Output 2-1**.



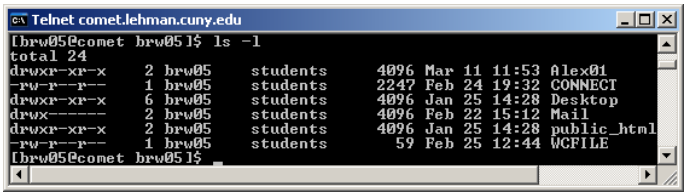
Output 2-1 Login screen (including password prompt).

2. **mkdir** *Alex01*
3. **mkdir** *Alex02*
4. **cd** *Alex01*
5. I utilized the **cat** command to create a file (**Output 2-2**).



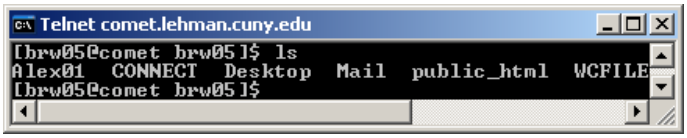
Output 2-2 Utilizing **cat** to create a file.

6. **cd $HOME**
7. **Output 2-3** displays results of the **ls -l** command.



Output 2-3 Results of the **ls -l** command (issued in home directory).

8. The **ls** command displays results shown in **Output 2-4**.



Output 2-4 Results of the **ls** command (issued in my home directory).

Procedures—Part II.

1. Type the command ls -1.
2. Type the command ls -al.

   What do you notice between the two commands? Did you notice any new files or directories?

3. Type the commands ls -F.

   What do you notice about the command?

4. Copy the file from “your name”01 to the directory “your name”02.
5. Change directory to “your name”02.
6. Copy the file from your home directory to the present directory.

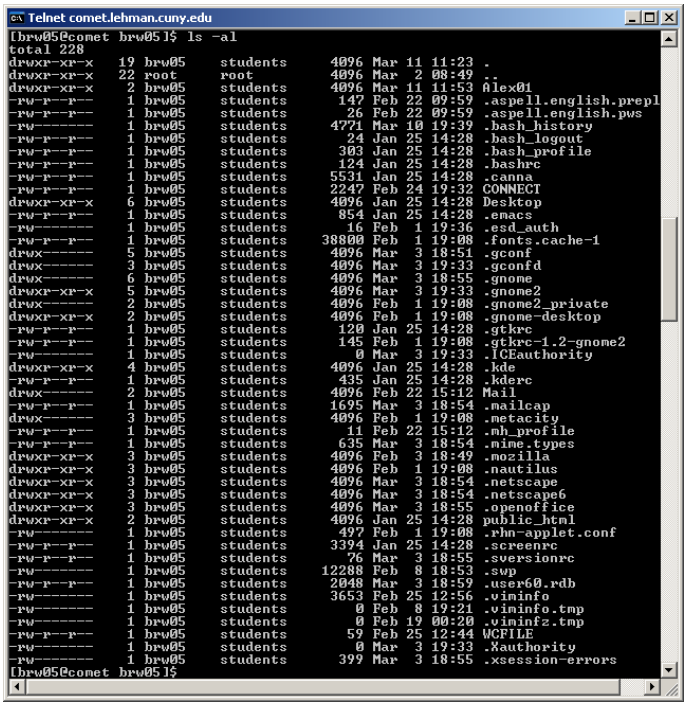
   How did you perform this task? How did you perform the task in step 4? Explain, in detail, as to whether you used relative or absolute path movement. Explain the difference between the two.

Sheet 2-2 Experiment procedures (Part II).

Part II

Below are results for Part II (**Sheet 2-2**) of the experiment.

1. The **ls -l** command displays results shown in **Output 2-3** on the previous page.
2. The **ls -al** command displays results shown in **Output 2-5**.



Output 2-5 Results of the **ls -al** command.

3. The **ls -F** command displays results shown in **Output 2-6**.

Output 2-6 Results of the **ls -F** command.

4. **cp** Alex01/CDFILE Alex02
5. **cd** *Alex02*
6. **cp** *~/CONNECT CONNECT*

Procedures—Part III.

1. Change directory to the root directory. i.e. cd /.
2. Type the command ls -al.
3. Explain and discuss the files and directories you find.

Sheet 2-3 Experiment procedures (Part III).

Procedures—Part IV.

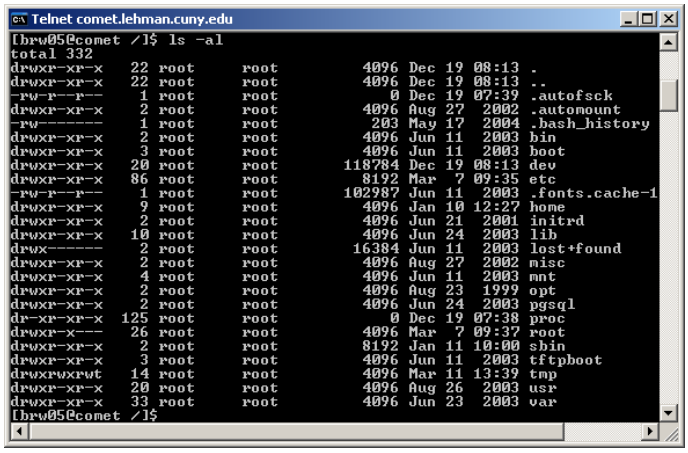
1. Return to your home directory
2. Type the command rm “your name”02. What happened?
3. Type the command rm -r “your name”02. What happened?
4. Explain, in detail, the difference between rm and rm -r commands.

Sheet 2-4 Experiment procedures (Part IV).

Part III

Below are results for Part III (**Sheet 2-3**) of the experiment.

1. **cd** /.
2. The **ls -al** command displays results shown in **Output 2-7**.



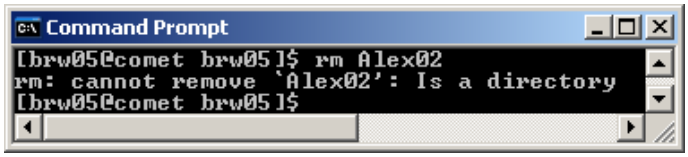
Output 2-7 Results of the **ls -al** command.

3. Most of the files and directories contained in the root directory (**Output 2-7**) are standard to the Linux operating system (See **Diagram 3-1** on page 4).

Part IV

Below are results for Part IV (**Sheet 2-4**) of the experiment.

1. **cd** ~.
2. The **rm** *Alex02* command displays results shown in **Output 2-8**.



Output 2-8 Results of the **rm** *Alex* command.

3. The **rm -r** *Alex02* command removes the *Alex02* directory.
4. See Analysis section.

3
DIAGRAMS

LABORATORY EXPERIMENT II

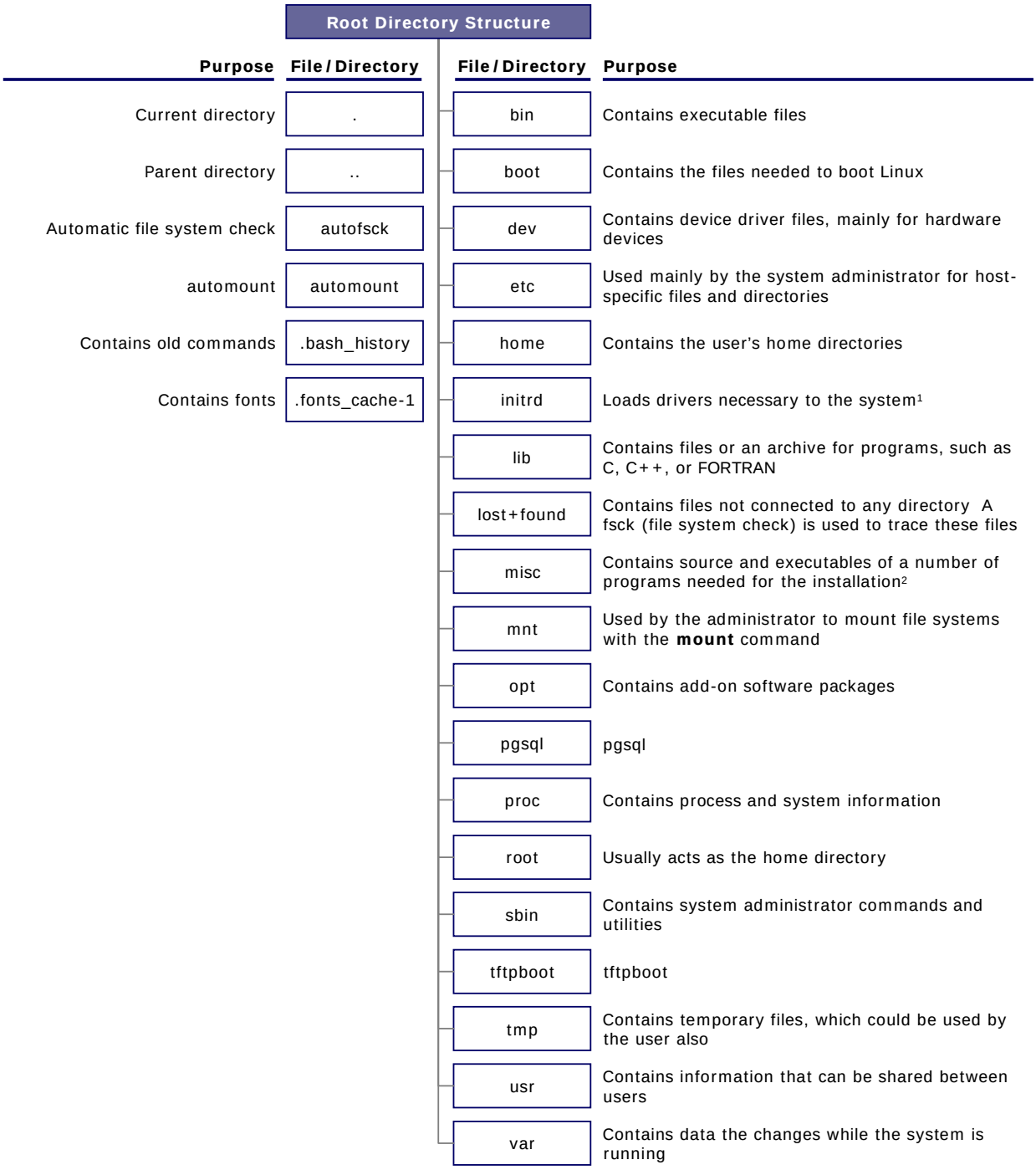


Diagram 3-1 Root directory structure.

Notes:
1. A Detailed Look at the Boot Process: http://www.redhat.com/docs/manuals/linux/RHL-9-Manual/ref-guide/s1-boot-init-shutdown-process.html
2. Linux.com—Anatomy of the Red Hat FTP site: http://www.linux.com/howtos/RedHat-CD-HOWTO/redhat-ftp-site.shtml

4
ANALYSIS

LABORATORY EXPERIMENT II

Procedures—Part I.

1. Login to your working directory.
2. Make a subdirectory under your working directory.
   - Use your name as the subdirectory name with a "01" at the end of your name. I.e. "your name"01.
   - Use the mkdir command to create the directory. i.e. mkdir john01
3. Make another subdirectory under your home directory and use 02 at the end of your name
4. Change directory to the "your name"01 directory.
5. Create a file in the "your name"01 directory.
6. Return to your home directory.

   How did you return to your home directory?

   NOTE: You were just given instruction to perform functions. You find the commands needed to perform the functions.

7. Enter the command ls -l.

   How do you tell a directory from an ordinary file?

8. Enter the command ls.

   How do you tell a directory from an ordinary file?

Sheet 4-1 Experiment procedures (Part I).

Procedures—Part II.

1. Type the command ls -1.
2. Type the command ls -al.

   What do you notice between the two commands? Did you notice any new files or directories?

3. Type the commands ls -F.

   What do you notice about the command?

4. Copy the file from "your name"01 to the directory "your name"02.
5. Change directory to "your name"02.
6. Copy the file from your home directory to the present directory.

   How did you perform this task? How did you perform the task in step 4? Explain, in detail, as to whether you used relative or absolute path movement. Explain the difference between the two.

Sheet 4-2 Experiment procedures (Part II).

Procedures—Part III.

1. Change directory to the root directory. i.e. cd /.
2. Type the command ls -al.
3. Explain and discuss the files and directories you find.

Sheet 4-3 Experiment procedures (Part III).

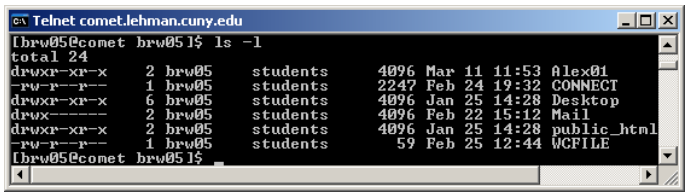
Procedures—Part IV.

1. Return to your home directory
2. Type the command rm "your name"02. What happened?
3. Type the command rm -r "your name"02. What happened?
4. Explain, in detail, the difference between rm and rm -r commands.

Sheet 4-4 Experiment procedures (Part IV).

This section contains a more detailed discussion of the results presented in the Data Sheets' section. It also notes any discoveries or errors encountered during the experiment.

Some questions presented straightforward results; therefore, I only note questions that need explanations. The procedures (**Sheets 1–4**) listed to the left revisit the tasks for each part. It may assist you in locating the task mentioned in the explanations.



Output 4-1 Results of the **ls l** command. It lists the directory contents in long format. The first column displays the file attributes.

Explanations

Part I

1. **Task 1**:
   Once I login, my system defaults to the home directory; therefore, my experiments start in the home directory.

2. **Task 5**:
   Although the cat command concatenates files or show contents of a file, it can also create files with the '>' symbol (243). To create the new file—CDFILE—I used the code below:

   cat > *CDFILE <Enter>*
   This file was created using the 'cat' command. <Enter>
   <ctrl-d>

   Discovery: The **touch** command (A-74), given by a hint from the professor, also creates a file. If a file does not exist, it can be created with the following syntax:

   touch *CDFILE <Enter>*

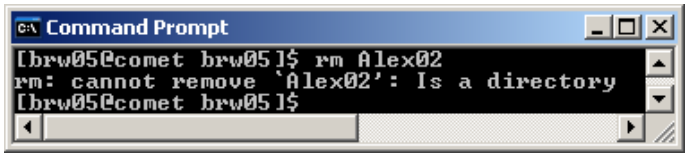
3. **Task 6:**
   I used **cd $HOME** to return to the home directory. **cd ~** also returns to the home directory.

4. **Task 7**:
   ls -l lists directory contents in long format. To distinguish between files and directories, look at the first item in the attribute list. A directory usually displays a '**d**' and a file displays a '**-**' (**Output 4-1**).

5. **Task 8**:
   The **ls** command lists the directory contents. In this list, directories are usually a different color, such as blue. However, not all systems display color-coded directories.

   Discovery: When I login from a Microsoft Windows system via Telnet, no color-coded distinction between files and directories appears with the **ls** command. Therefore, I would have to use **ls -l** or another option to distinguish between the two.

Output 4-2 Results of the **ls -F** command.



Output 4-3 Results of the **rm** *Alex* command.

Part II

1. **Task 2**:
   The **ls -al** command lists all contents in long format, including hidden files.

2. **Task 3**:
   Output 4-2 revisits the **ls -F** command (174). It displays '/' after directories, '*****' after binary executables, and '**@**' after symbolic links.

   Discovery: Text files contain no symbol.

3. **Task 6**:
   Absolute paths move directly from the root directory to the target directory without shortcuts or skipping any subdirectories. All absolute paths start with the '/' symbol.

   Absolute path example:
   cd /home/brw05/Alex02

   Relative paths do not start with the '/' symbol.

   Relative path example:
   cd ../../Alex02

Part III

1. **Task 3**:
   Please see **Diagram 3-1** on page 4.

Part IV

1. **Task 2**:
   Because the **rm** *Alex02* command attempted to remove a directory, an error (**Output 4-3**) occurs.

2. **Task 3**:
   The **rm -r** *Alex02* command removed the *Alex02* directory.

3. **Task 4**:
   The **rm** command removes files. It will not remove a directory without any arguments.

   The **rm -r** removes a directory and the files in it.

   Discovery: **rmdir** also removes a directory. However, the directory has to be empty first. The **rmdir** and **rm -r** commands will 'not' work if you are in the current directory.

References

1. Sarwar, Syed Mansoor, Robert Koretsky, Syed Aqeel Sarwar. Linux: The Textbook. Boston: Addison Wesley Longman Inc., 2002.