Laboratory Experiment IV

Printing and Metacharacters

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INTRODUCTION

This experiment involves printing and metacharacters. The first part focuses on printing files using various techniques. Redirections, basic metacharacters, and appending to files are the focal point in the second part of the experiment.

The main commands used in this experiment are **cat**, **lpr**, and **pr**. Other commands, like **cd** and **ls**, which facilitate file and directory navigation, assist in the performance of tasks.

1
LABORATORY SHEETS

LABORATORY EXPERIMENT IV

Procedures

The procedures (**Sheet 1-1** and **Sheet 1-2**) below provide the steps performed during this experiment.

Lehman College
Of the City University of New York

Experiment #4: Printing, Metacharacters

Part I

1. Log in to your home directory.
2. Create a file in your home directory several lines long.
3. Issue the command:
   pr "filename"
4. Issue the command:
   pr "filename" > "filename2"
5. Issue the command:
   pr "filename" | more
6. Analyze the results of all three types of commands.
7. Issue the command:
   cat "filename" |lpr -Ppr "printer"

   NOTE: If you are in Room 217, use 217 for "printer". If you are in Room 219, use 219 for "printer".
8. Issue the command:
   lpr – Ppr "printer" "filename"
9. Issue the command:
   pr "filename" | lpr
10. Issue the command:
    pr "filename" > lpr
11. What happened with these commands.
    Analyze the results. Investigate the print function and see if you can come up with other methods for printing output.

Sheet 1-1 Part I of the laboratory procedures—focuses on printing and utilizing redirection and piping to provide output to a printer or file.

Part II

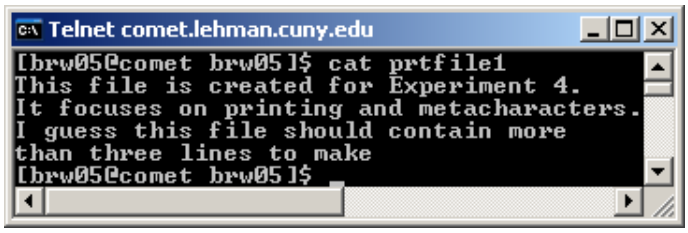
1. Change directory to your home directory.
2. Issue the command:
   ls > list. files
3. Issue the command:
   cat list. files
4. What happened in step 2?

   What did the "greater than" angle bracket do (>)?
5. Issue the command:
   cd /bin
6. Issue the command:
   *ls c**
7. What happened? What did the *asterik(*)* cause to happen?
   NOTE: If you lost count or could not see the output, then print it out.
8. Return to your home directory
9. Issue the command:
   ls /bin/c>>list. files*
10. Issue the command:
    cat list.files
11. What happened? Is there any difference in the list. files file?
12. Issue the command:
    ls /bin/c > list.files*
13. What happened this time?
14. There are two metacharacters not studied were the "[ ]" braces. What is their use? Give examples and show the examples in your analysis and conclusions.

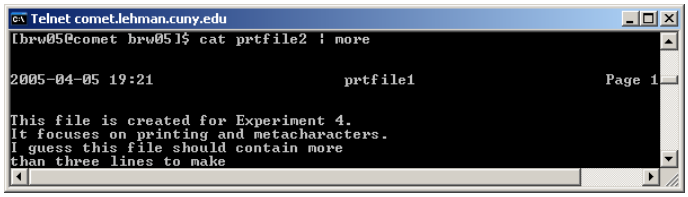
Sheet 1-2 Part II of the laboratory procedures—focuses on basic metacharacters, listing and viewing files, and appending to files.

2
DATA SHEETS

LABORATORY EXPERIMENT IV



Output 2-1 Contents of *prtfile1*.



Output 2-2 Contents of *prtfile2*. This file is actually takes up an entire screen because the **pr** command generated it, which is discussed in the Analysis section.

```
This file is created for Experiment 4.
It focuses on printing and metacharacters.
I guess this file should contain more
than three lines to make
```

Output 2-3 This is a printout of *prtfile1* from Task 7.

```
This file is created for Experiment 4.
It focuses on printing and metacharacters.
I guess this file should contain more
than three lines to make
```

Output 2-4 This is a printout of *prtfile1* from Task 8.

```
2005-04-05 19:21                prtfile1                Page 1


This file is created for Experiment 4.
It focuses on printing and metacharacters.
I guess this file should contain more
than three lines to make
```

Output 2-5 This is a printout of *prtfile1* from Task 9.

Results

This section provides the results for each task. Some tasks require in-depth explanations, while others present simple results.

Part I

Task 1
Logged into home directory.

Task 2
Created *prtfile1* (**Output 2-1**) in home directory.

Task 3
The **pr *prtfile1*** command seems to display the contents of the *prtfile1* to the standard output (screen), which actually scrolls off the screen.

Task 4
The **pr *prtfile1* > *prtfile2*** displays no visible results, but produces *prtfile2* (**Output 2-2**).

Task 5
The **pr *prtfile1* | more** command pipes the results of **pr *prtfile1*** to the **more** command, which in turn displays the results one screenful at a time.

Task 6
Results of **pr *prtfile1***, **pr *prtfile1* > *prtfile2***, and **pr *prtfile1* | more** are analyzed in the Analysis section.

Task 7
The **cat *prtfile1* | lpr -Ppr219**[1] pipes the results of **cat *prtfile1*** to **lpr -Ppr219**, which prints the contents of *prtfile1* to printer 219 (**Output 2-3**).

Task 8
The **lpr -Ppr219 *prtfile1*** prints *prtfile1* to printer 219 (**Output 2-4**).

Task 9
The **pr *prtfile1* | lpr** command pipes the results of **pr *prtfile1*** to **lpr**, which prints those results to the default printer (**Output 2-5**).

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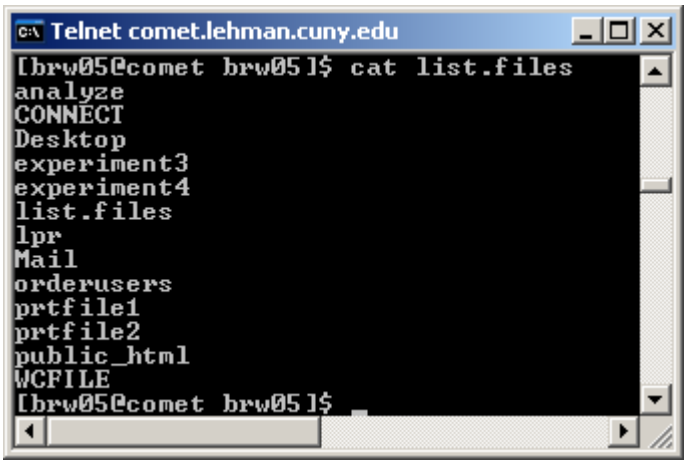
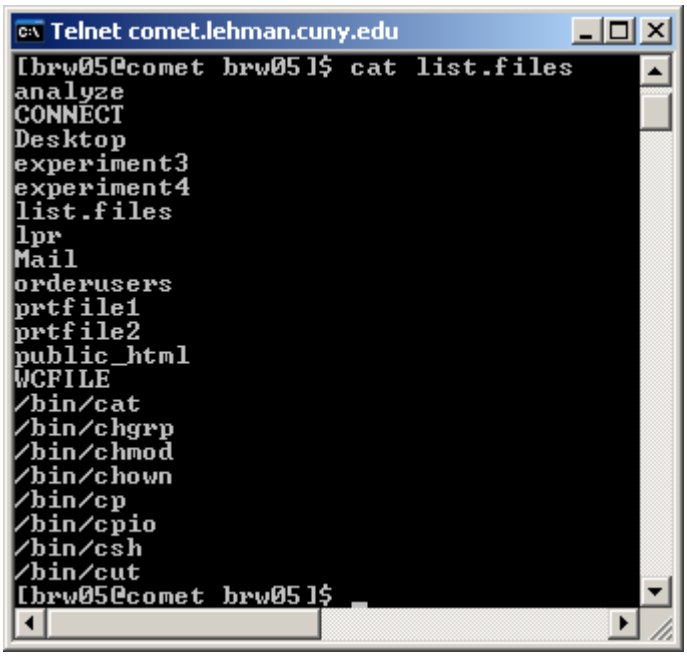
[1] Printer 219 is located in Lehman College. Your printer may have a different name or location.



Output 2-6 Contents of *list.files*. This file was generated from the **ls > *list.files*** command.

Output 2-7 Results of the **ls *c**** command, performed in the */bin* directory.



Output 2-8 Contents of the *list.files* after issuing the **ls */bin/c* >> *list.files*** command.

Task 10
The **pr *prtfile1* > *lpr*** command redirects the output of **pr *prtfile1*** to the *lpr* file.

Task 11
The difference between **pr *prtfile1* | lpr** and **pr *prtfile1* > *lpr*** are discussed in the Analysis section.

Part II

Task 1
The **cd ~** changes to the home directory.

Task 2
The **ls > *list.files*** command displays no results to the screen.

Task 3
The **cat *list.files*** command displays the contents of *list.files* (**Output 2-6**) to the screen or standard output.

Task 4
Issuing **ls > list.files** redirects the output of **ls** to the *list.files* file.

The "greater than" (>) sign is presented in Task 2 is discussed in the Analysis section.

Task 5
The **cd */bin*** command changed the current director to */bin*.

Task 6
Issuing **ls *c**** displays a listing of all the files in the current directory (*/bin*) starting with 'c' (**Output 2-7**).

Task 7
See the Analysis section for a discussion on the asterisk (*****).

Task 8
The **cd $HOME** command returns to the home directory.

Task 9
The **ls */bin/c** >> *list.files*** command displays no results to the screen.

Task 10
The **cat *list.files*** command displays the contents of *list.files* (**Output 2-8**) to the screen.

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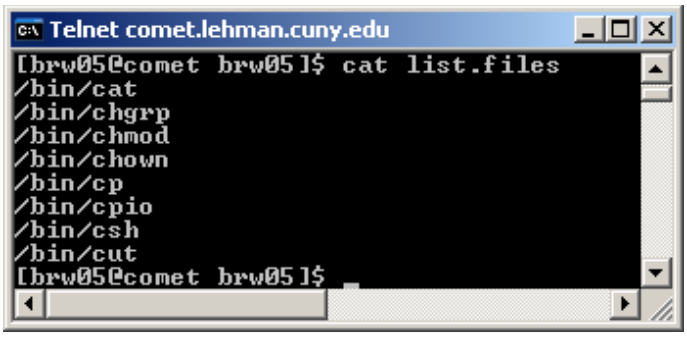


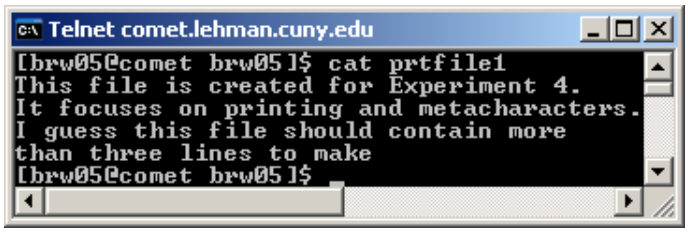
Output 2-9 Contents of the *list.files* after issuing the **ls */bin/c* > list.files*** command.

Task 11
A discussion of what happened with *list.files* after task 2 and task 9 is in the Analysis section.

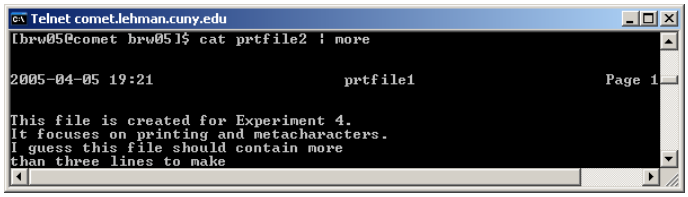
Task 12
The **ls */bin/c* > list.files*** command displays no results on the screen.

Task 13
Issuing **ls */bin/c* > list.files*** redirects output from **ls */bin/c*** the *list.files* (**Output 2-9**) file. More discussion on this task is in the Analysis section.

Task 14
Along with the metacharacters presented in this experiment, the brackets "[ ]" metacharacter is also discussed in the Analysis section.

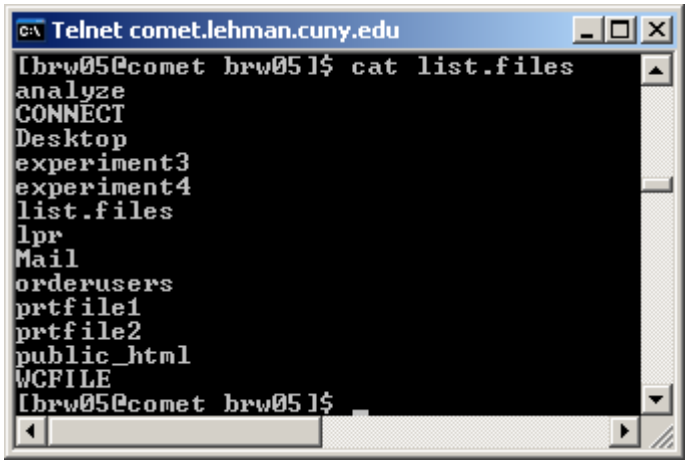


Output 3-1 Contents of *prtfile1*.



Output 3-2 Contents of *prtfile2*.

Output 3-3 Results of the **ls** command in the home directory.



Output 3-4 Contents of *list.files*.

Explanations

Part I

Task 6

The **pr *prtfile1*** command displays the contents of *prtfile1* to the screen one page at a time. Even if there is only one line of text, an entire page is still display; therefore, the screen may scroll beyond the contents of the file.

The **pr *prtfile1* > *prtfile2*** redirects the output of **pr *prtfile1*** to the *prtfile2* file. That does not mean *prtfile1* and *prtfile2* will be identical; the **pr *prtfile1*** command adds a header to the *prtfile1* file. You can see the difference in **Output 3-1** and **Output 3-2**.

The **pr *prtfile1* | more** command pipes the results of **pr *prtfile1*** to the **more** command, which allows the user to view the file one screenful at a time. It fixes the result encountered with the **pr *prtfile1*** command.

Task 11

The **pr *prtfile1* | lpr** command pipes the results of **pr *prtfile1*** to the **lpr** command, which prints those results; and **pr *prtfile1*** > *lpr* redirects the output of **pr *prtfile1*** to the *lpr* file.

Part II

Task 4

Issuing **ls > *list.files*** redirects the output of the **ls** command to the *list.files* file. In previous experiments, output redirection created a file identical to the command's result.

However, *list.files* displays the directory structure in a manner similar to the way **ls -l** would. **ls** alone display the directory structure horizontally.

See **Output 3-3** and **Output 3-4** for the difference between **ls** and *list.files*.

The '>' symbol is discussed on page 5.

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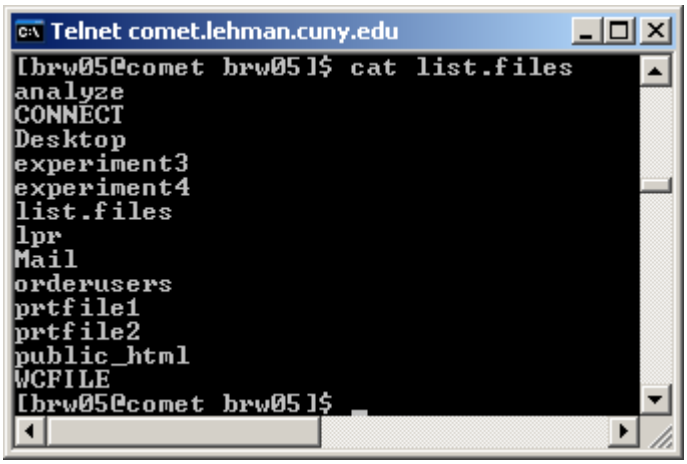
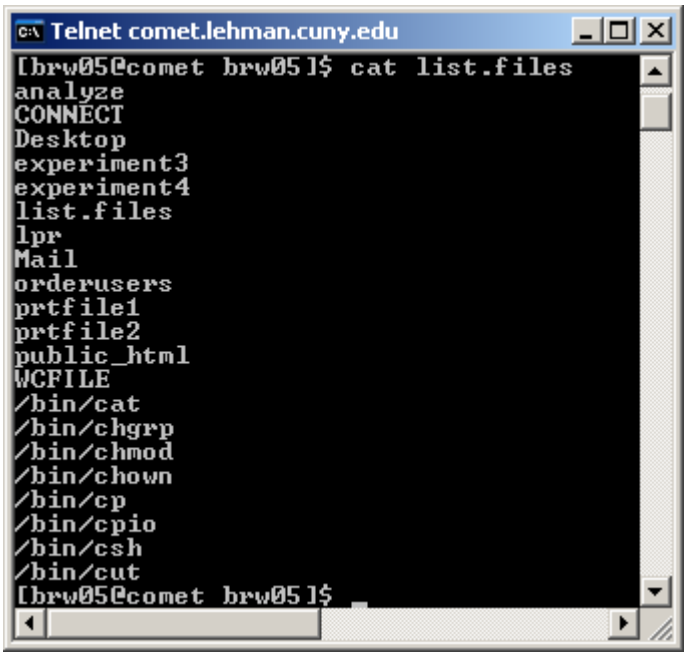


Output 3-5 Contents of *list.files* before issuing the **ls */bin/c* >> list.files** command.



Output 3-6 Contents of the *list.files* after issuing the **ls */bin/c* >> list.files** command.

Task 7
The '*****' symbol is discussed in Metacharacters.

Task 11
After issuing the **ls */bin/c* >> *list.files*** command, *list.files* is concatenated with the old *list.files*, as shown in **Output 3-6**.

The '>>' symbol is discussed on page 5.

Task 13
Issuing a command with output redirection to an existing file causing the file to be replaced with the results of the command. Therefore, **ls */bin/c* > *list.files*** replaces *list.files* with the results of **ls */bin/c***.

Metacharacters

The *****, >, and >>, and | are metacharacters used in this experiment. Their purpose is in the table below:

Metacharacter	Purpose
*	Matches zero or more characters
>	Output redirection
>>	Redirect by appendage
|	Pipe between commands
[]¹	Insert wildcards

[1] Not used in this experiment.

Discoveries

Part II

Task 2
Issuing the **ls** command lists the directory contents horizontally; however, when redirected to a file, it places the contents of a directory line-by-line (vertically).

New Commands

Below is a list of new commands used in this experiment:

Command	Purpose
pr[1]	Format files page-by-page and display to standard output or printer.

[1] For a complete syntax of the **pr** command type **pr --help** or **man pr** at the LINUX shell prompt.

References

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