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## ANSWERS TO EVEN-NUMBERED EXERCISES

2. Using sort as a filter, rewrite the following sequence of commands:

```
$ sort list > temp
$ lpr temp
$ rm temp
```

```
$ cat list | sort | lpr
```

4. Assume the following files are in the working directory:

```
$ ls
intro      notesb    ref2      section1  section3  section4b
notesa     ref1      ref3      section2  section4a  sentrev
```

Give commands for each of the following, using wildcards to express filenames with as few characters as possible.

- a. List all files that begin with **section**.

```
$ ls section*
```

- b. List the **section1**, **section2**, and **section3** files only.

```
$ ls section[1-3]
```

*or*

```
$ ls section[123]
```

- c. List the **intro** file only.

```
$ ls i*
```

- d. List the **section1**, **section3**, **ref1**, and **ref3** files.

```
$ ls *[13]
```

6. Give a command to
- Redirect standard output from a sort command to a file named **phone\_list**. Assume the input file is named **numbers**.  

```
$ sort numbers > phone_list
```
  - Translate all occurrences of the characters [ and { to the character (, and all occurrences of the characters ] and } to the character ), in the file **permdemos.c**. (*Hint: Refer to tr on page 987.*)  

```
$ cat permdemos.c | tr '[]{}' '()' or  
$ tr '[]{}' '()' < permdemos.c
```
  - Create a file named **book** that contains the contents of two other files: **part1** and **part2**.  

```
$ cat part[12] > book
```

8. Give an example of a command that uses grep
- With both input and output redirected.

```
$ grep \ $Id < *.c > id_list
```

- With only input redirected.

```
$ grep -i suzi < addresses
```

- With only output redirected.

```
$ grep -il memo *.txt > memoranda_files
```

- Within a pipeline.

```
$ file /usr/bin/* | grep "Again shell script" | sort -r
```

In which of the preceding cases is grep used as a filter?

Part **d** uses grep as a filter.

10. When you use the redirect output symbol (>) on a command line, the shell creates the output file immediately, before the command is executed. Demonstrate that this is true.

```
$ ls aaa  
ls: aaa: No such file or directory  
$ ls xxxxx > aaa  
ls: xxxxx: No such file or directory  
$ ls aaa  
aaa
```

The first command shows the file **aaa** does not exist in the working directory. The second command uses **ls** to attempt to list a nonexistent file (**xxxxx**) and sends standard output to **aaa**. The **ls** command fails and sends an error message to standard error (i.e., displays it on the screen). Even

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though the `ls` command failed, the empty file named **aaa** exists. Because the `ls` command failed, it did not create the file; the shell created it before calling `ls`.

12. Assume permissions on a file allow you to write to the file but not to delete it.

- a. Give a command to empty the file without invoking an editor.

```
$ cat /dev/null > filename
```

- b. Explain how you might have permission to modify a file that you cannot delete.

To delete a file, you must have write and execute permission for the directory holding the file. To write to a file, you must have write permission for the file and execute permission for the parent directory. When you have write permission only for a file and execute permission only for the directory holding the file, you can modify but not delete the file.

14. Why does the **noclobber** variable *not* protect you from overwriting an existing file with `cp` or `mv`?

The **noclobber** variable implements a shell feature that keeps the shell from overwriting a file; it does not work with utilities. Thus it keeps a redirect symbol (`>`) from allowing the shell to overwrite a file (the shell redirects output) but has no effect when you ask `cp` or `mv` to overwrite a file.

16. Create a file named **answer** and give the following command:

```
$ > answers.0102 < answer cat
```

Explain what the command does and why. What is a more conventional way of expressing this command?

Reading the command line from left to right, it instructs the shell to redirect standard output to **answers.0102**, redirect standard input to come from **answer**, and execute the `cat` utility. More conventionally, the same command is expressed as

```
$ cat answer > answers.0102
```

or simply

```
$ cp answer answers.0102
```