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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 that 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]
```

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

```
$ ls i*
```

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

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

6. Give a command to

- a. Redirect the standard output from a sort command into a file named **phone_list**. Assume that the input file is named **numbers**.

```
$ sort numbers > phone_list
```

- b. 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 the tr man page.*)

```
$ cat permdemos.c | tr '[{}]' '()' or  
$ tr '[{}]' '()' < permdemos.c
```

- 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

- a. With both input and output redirected.

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

- b. With only input redirected.

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

- c. With only output redirected.

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

- d. Within a pipe.

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

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

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

10. When you use the redirect output symbol (>) with a command, 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 that 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 the standard output to **aaa**. The `ls` command fails and sends an error message to standard error (you see it on the screen). Even 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 that your permissions allow you to write to a file but not to delete it.
- a. Give a command to empty the file without invoking an editor.

```
$ filename < /dev/null or  
$ 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 housing 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 the file is in, 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 keeps the shell from overwriting a file and does not work on 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 answers > answers.0102
```