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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
- 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 the `tr` man page.)

```
$ 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 pipe.

```
$ 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 (`>`) 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 the file `aaa` does not exist in the working directory. The second command uses `ls` to attempt to list a non-existent 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 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.

```
$ 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 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 keeps the shell from overwriting a file and 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
```