

CS 246 Fall 2019 — Tutorial 1

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1 Input, Output, and Error

There are three ways we interact with programs once they are running:

- Input: keyboard, typically not read until a newline occurs
- Output: terminal, buffered
- Error: terminal, not buffered

Since both output and error are printed to the terminal, data printed to output and error will appear in the terminal with no visual difference and mixed together.

2 Redirection

Redirection is overriding the default method which for input, output, and/or error.

2.1 Input Redirection

Giving a file as the standard input to a program.

Example: `wc < mywords.txt`

Exercise: Many utilities operate the same whether `some_command some_file` or `some_command < some_file` are executed. Find one utility for which these commands are the same, and two for which they behave differently.

2.2 Output/Error Redirection

Sending the output (or error) to somewhere other than the terminal. Suppose we have a program (`printer` — prints even numbers to stdout, odd to stderr) that prints to standard output and standard error.

- **Exercise:** How can we redirect stdout to `print.out` and stderr to `print.err`?
- **Exercise:** How can we redirect the output from standard output to standard error?
- **Exercise:** How can we redirect standard output and standard error to the same file?
- **Exercise:** What would be the purpose of redirecting output to `/dev/null`?

3 Pipelining

Pipelining is taking the output of a program and redirecting to be the input of a program.

Example: To print South Korean holidays, use

```
calendar -A 30 -f /usr/share/calendar/calendar.holiday | grep "South Korea"
```

Exercise: Suppose we want to determine the 10 most commonly occurring words in a collection of words (see `wordCollection` file) and output it to the file `top10`.

Exercise: What if we wanted the word counts of the first 10 words alphabetically?

Exercise: What if we wanted the top 10 words but wanted to break ties based upon reverse alphabetical order?

4 Embedded Commands

We can use a subshell to use the output of commands as command line arguments to scripts.

This is different from redirection. The output of the embedded command is run first and replaces the embedded command with the output.

`egrep $(cat file) myfile.txt` allows us to run `egrep` with the contents of a file being the regular expression.

Exercise: What is the difference between the following?

- `egrep $(cat file) myfile`
- `egrep "cat file" myfile`