

Lab 4: Bash Scripting

October 4, 2020

Introduction

This lab will give you some experience writing bash scripts. You will need to sign in to `https://git-classes.mst.edu` and `git clone` the repository for this lab. Your repository will be named something along the lines of `2018-SS-A-lab0n-nmjxv3`. Make sure to clone with the HTTPS URL (unless you've set up SSH keys). I strongly advise you to experiment and to test your code as you go along! Bash is a little weird, so checking to make sure it's doing what you think it is is important.

Note: Watch out for spacing!!!!

Problem 1: Menus and Files

Make a shell script named `menu.sh` that loops through all the files in the current directory and for each file, prints out a menu:

```
v) View <FILENAME>
e) Edit <FILENAME>
c) Compile <FILENAME>
x) Execute <FILENAME>
q) Quit
```

Then the script gets the user's choice and does it. Consult the following list to see what 'it' is:

- View file: Open the file with `less`
- Edit file: Open the file in a text editor (your choice which one)
- Compile file: Compile the file with `g++`
- Execute file: If it is not already, make the file executable, and run the file
- Quit: Bail out of the program with `break` or `exit`
- Anything else: Print an error message and go to the next file

Hint: You can assign a wildcard to a variable, e.g. `textfiles=*.txt`.

Recall: to make a bash script file executable, type: `chmod +x menu.sh`

For example, if the current directory contains `file.cpp`, `file.h`, `goog.sh`, and `menu.sh`, your output might look something like this:

```
$ bash menu.sh
v) View file.cpp
e) Edit file.cpp
c) Compile file.cpp
x) Execute file.cpp
q) Quit
e
```

```
v) View file.h
e) Edit file.h
c) Compile file.h
x) Execute file.h
q) Quit
v
```

```
v) View goog.sh
e) Edit goog.sh
c) Compile goog.sh
x) Execute goog.sh
q) Quit
f
INVALID RESPONSE
```

Skipping this file!

```
v) View menu.sh
e) Edit menu.sh
c) Compile menu.sh
x) Execute menu.sh
q) Quit
q
```

Hints and requirements:

- Your script needs at least one function
- You should probably use a case statement!
- `for file in *.txt` loops over all `.txt` files in the current directory.

Problem 2: Your Own (Terrible) Search Engine

Write a bash script named `goog.sh` that counts the occurrence of a string in the source of a web page.
Here are some examples:

```
# Look for "Jake" on the specified web page
$ bash goog.sh Jake http://dsl.mwisely.xyz/labs/3/assignment/
Jake: 11
```

```
# Look for "the" on the specified web page
$ bash goog.sh the http://dsl.mwisely.xyz/labs/3/assignment/
the: 43
```

```
# Look for "The" on the specified web page
$ bash goog.sh The http://dsl.mwisely.xyz/labs/3/assignment/
The: 2
```

```
# Look for "cake" on the specified web page
$ bash goog.sh cake http://dsl.mwisely.xyz/labs/3/assignment/
cake: 0
```

```
# Give it the wrong number of arguments to see the usage
$ bash goog.sh
Usage goog.sh WORD WEBSITE
```

Behavior:

- Your script always takes exactly 2 arguments:
 - The string to search for
 - The URL of the website we're looking at
- If the user misuses your script, it should show them the usage.
- The program must print the number of times the word appears in the web pages source (case sensitive!)

Hints:

- You will likely need to read `man` pages or use your favorite search engine
- You'll want an `if` statement to check the number of arguments
- Use `exit NUM` to exit the shell script and return `NUM` to the shell.
- You should use pipes to redirect output
- The following commands may be useful:
 - `wget` downloads webpages.
 - * The `-O` flag can be used to direct downloaded content to standard out.
 - * The `--quiet` flag suppresses the download progress.
 - `grep` searches for occurrences of a string pattern
 - * The `-o` flag prints each match on its own line.
 - `wc` counts lines, words, and characters
 - * The `-l` flag just prints the number of lines.

Problem 3: Big Trouble in Little Whitespace

For this problem, follow the directions and write your answers in a file named `answers.txt`.

1. Use `compiley.sh` to compile `program.cpp` into an executable named `hello`.
 - (a) What is the command you ran in order to compile `program.cpp` to `hello` using `compiley.sh`?
 - (b) Briefly describe how the script works in plain English. (You don't need to explain the echo's.)
2. Rename your program to `my program.cpp` by running `mv program.cpp "my program.cpp"`. You can run `ls -l` to make sure your file name has that space in it.
 - (a) Can you still compile your program with `compiley.sh`?

```
# Don't forget to escape the space when you run the script!
$ bash compiley.sh my\ program.cpp hello

# Or, you could use quotes
$ bash compiley.sh "my program.cpp" hello
```
 - (b) Based on the output and `g++` error messages, what is the problem?
3. Change the last line of `compiley.sh` to `compile_file '$@'` and try compiling your program again.
 - (a) Does `compiley.sh` work now?
 - (b) Whats the problem this time?
4. Change the last line of `compiley.sh` to `compile_file "$@"` and try compiling your program again.
 - (a) Does `compiley.sh` work now?
 - (b) Why did the double quotes (") fix the problem?

Optional Bonus (5 points): Doing some math

CSV files are files that contain comma separated values. You can imagine them like a spread sheet where each row of the file is a row of the spreadsheet and commas indicate where the columns are. (In fact, you can import CSV files into various spreadsheet programs! They are nice for outputting tables from programs you write.) For an example, consult the `data.csv` file in your repository. (You can just open it in any text editor.)

Make a shell script that takes one CSV file as an argument. The script prints out the sum of the values in each row of the file and then prints the average of all row sums. For example, your output may look something like this:

```
Line 1: 15
Line 2: 195
Line 3: 2048
Average: 752
```

Hints:

- You can use `$IFS` to tell bash what character it should split a line into words on. Hint: use your favorite search engine to see what this means.
- You can assign arithmetic results to variables like so: `((a = 4 + 3))`.

Note: `(())` does integer division only, so your answer won't be exactly right, but it'll be close enough.

Epilogue

As with lab 2 and 3, your git repo on git-classes.mst.edu is your submission. Don't forget to `git add` all the files you want to submit, `git commit` them, and `git push` your changes so the grader can download them!

Your repo should contain the following files:

- `README.md`
- `compiley.sh`
- `program.cpp`
- `menu.sh`
- `goog.sh`
- `math.sh` – if you chose to do this one
- `answers.txt`