Lab 01: Scripting the Shell & Filtering Text

Readings

The readings for **Lab 01** are:

1. Shell Scripting Tutorial
    - Read from 1. Introduction through 13. Functions and then about exit codes and trap.

    You will need this information to complete this reading assignment.
2. The Linux Command Line:
    - Chapter 16 - Networking
    - Chapter 17 - Searching For Files
    - Chapter 18 - Archiving And Backup
3. The Linux Command Line:
    - Chapter 19 - Regular Expressions
    - Chapter 20 - Text Processing
4. RegexOne

Optional Resources:

- The Linux Command Line (Part 4: Writing Shell Scripts)
- Bash Guide
- Shell programming with bash: by example, by counter-example
- Introduction to Linux - Chapter 10. Networking
- Slackware Linux Essentials - Chapter 13 Basic Network Commands
- Regular Expressions - User Guide
- Using Grep & Regular Expressions to Search for Text Patterns in Linux
- The Basics of Using the Sed Stream Editor to Manipulate Text in Linux
- Advanced Bash Scripting - Text Processing Commands
- The Unix School - Awk & Sed
- Sed - An Introduction and Tutorial
- Grep - An introduction to grep and egrep
- USEFUL ONE-LINE SCRIPTS FOR SED

Part 01: Scripting the Shell

TL;DR

The focus of this Lab 01 - part 01 is to introduce shell scripting in bash and some basic networking.

Questions

Given the following output of `ls -l`:

```
total 8.0K

-rw-r--r-- 1 pbui pbui  23 Jan 18 15:39 README.md

-rw-r--r-- 1 pbui pbui 155 Jan 25 01:15 exists.sh
```

And the following script, `exists.sh`:

```
#!/bin/sh

if test -e "$1"; then

    echo "$1 exists!"

else

    echo "$1 does not exist!"

fi
```

In your `Lab01.docx` file, answer the following questions:

1. How would you run the script even though it is not executable?
2. How would you make this script executable?
3. Once this script is executable, how would you run it directly?
4. What is the purpose of the line `#!/bin/sh`?
5. What is the output of the script if you run it with the arguments `*`?
6. What is the `$1` that appears in the script?
7. What does `test -e "$1"` do?
8. What does this script do?

Write a new version of `exists.sh` with the following modifications:

1. Use `[` instead of test for the conditional.
2. Test every command line argument (one at a time).
3. Return an error code if one of the tests fails.

4. Display an error message and exit with an error if no arguments are given.

Testing

To verify the correctness of your `exists.sh` script, you should be able to reproduce the following:

```
$ ls -l                         # List files in reading02 directory
total 8.0K
-rw-r--r-- 1 pbui pbui  23 Jan 18 15:39 README.md
-rwxr-xr-x 1 pbui pbui 254 Jan 28 18:02 exists.sh

$ ./exists.sh * && echo Success       # Run script and check error code
exists.sh exists!
README.md exists!
Success

$ ./exists.sh * ASDF || echo Success  # Run script and check error code
exists.sh exists!
README.md exists!
ASDF does not exist!
Success
```

Part 02: Filtering Text

TL;DR

The focus of this Lab 01 – part 02 is to introduce regular expressions and revisit filters and pipelines.

Questions

In your `Lab01.docx` file, describe what command(s) you would use to accomplish the following:

1. Convert all the input text to upper case:

```
$ echo "All your base are belong to us" | ...

ALL YOUR BASE ARE BELONG TO US
```

2. Find and replace all instances of `monkeys` to `gorillaz`:

```
$ echo "monkeys love bananas" | ...

gorillaz love bananas
```

3. Remove any leading whitespace from a string of text:

```
$ echo "     monkeys love bananas" | ...

monkeys love bananas
```

4. Parse the `/etc/passwd` file for the shell of the root user:

```
$ cat /etc/passwd | ...

/bin/bash
```

Hint: You may need to read up on the format of `/etc/passwd`

5. Find and replace all instances of `/bin/bash`, `/bin/csh`, and `/bin/tcsh` to `/usr/bin/python` in `/etc/passwd`:

```
$ cat /etc/passwd | ... | grep python

root:x:0:0:root:/root:/usr/bin/python

mysql:x:27:27:MySQL Server:/var/lib/mysql:/usr/bin/python

xguest:x:500:501:Guest:/home/xguest:/usr/bin/python

condor:x:108172:40:Condor Batch System:/afs/nd.edu/user37/condor:/usr/bin/python

lukew:x:522:40:Luke Westby temp access:/var/tmp/lukew:/usr/bin/python
```

6. Find all the records in `/etc/passwd` that have a number that begins with a `4` and ends with a `7`:

```
$ cat /etc/passwd | ...

rtkit:x:499:497:RealtimeKit:/proc:/sbin/nologin
```

```
qpidd:x:497:495:Owner of Qpidd Daemons:/var/lib/qpidd:/sbin/nologin

uuidd:x:495:487:UUID generator helper daemon:/var/lib/libuuid:/sbin/nologin

mailnull:x:47:47::/var/spool/mqueue:/sbin/nologin
```

7. Given two text files, show all the lines that are present in both files.
8. Given two text files, show which lines are different.

Submission

To submit your assignment, please upload your work to the `Lab01` folder in your **assignments** Blackboard repository. Your `Lab01` folder should only contain the following files:

- `Lab01.pdf`
- `exist.sh`