Homework #2

Physics 129 Spring 2022

Problems due **Saturday, April 9, at 11:55 P.M.**

Please read the homework guidelines handout on the course web page.

Before attempting this assignment, ensure your RPi is connected to the Internet, then run the `update_physrpi` script.

Better answers and code will get better grades.

Reading

→ Complete by **Monday, April 11**

- Read chapters 5–7, 15, the material on `tar` and `rsync` in chapter 18, and chapter 24 in Shotts. *You may skip the sections about CD-ROMs in chapter 15, but do read about* `dd`.
- Read chapter 2 in K&N.

Problems

1. **`cat` and `echo`.** Explain the difference between the `cat` and `echo` commands.
2. **Variables and Aliases.** Explain the difference in `bash` between variable assignment and aliases.
3. **Mounting and Using a Disk.** For each step in this procedure, either run the given command or decide what you have to do. If a command you run produces output, copy the output into the answer file.

    a. Run `cat /proc/partitions | grep sd`

    b. Insert your flash drive into the Raspberry Pi, and run `cat /proc/partitions | grep sd` again. Your flash drive should now be available, probably as device `/dev/sda`. If it is assigned a different device name, substitute that for `sda` below.

    c. Run `df | grep sd` to see if your drive has been automatically mounted. If so, unmount it and verify that it is no longer mounted.

d. Create a directory under `/home/pi` to use as a mount point, and mount partition `/dev/sda1` there.

e. Run `sudo mount | grep sd` with no arguments.

f. Run `df | grep sd` to confirm your disk is mounted.

g. Create a small text file on the mounted drive.

h. Unmount the flash drive.

i. Run `sudo mount | grep sd` with no arguments.

j. Run `df | grep sd` to confirm your disk is unmounted.

k. Mount `/dev/sda1` on `/mnt`.

l. Run `cat /mnt/filename`, where `filename` is the name of the file you created, to show you can read it off the disk.

4. **Piped Commands.** Run the following command lines, place the output in your answer file, and explain what the commands did:

(a) `cat /etc/passwd | sort -t: -k3 -rn`

(b)
```
cat /etc/passwd | grep :1000: | sed -e 's/pi/cake/g' | \
tr [:lower:] [:upper:]
```

Hint: `sort`, `sed`, and `tr` are described in chapter 20 of Shotts.

5. **Shell Script.** Provide a complete explanation of the function of this script:

```
#!/bin/sh

#
# proctemp - Return processor temperature
#
# 03Jul17  Updated to use $() in addition to ``
# 22Apr16  Everett Lipman
#

TDIR=/sys/class/thermal
TBASE=thermal_zone

for i in $TDIR/$TBASE*
do
   echo -n "`basename $i`: "
   echo "scale=1; $(cat $i/temp)/1000.0" | bc
done
```

Hints: Review command substitution in chapter 7 of Shotts.
You can read about `for` loops in chapter 33 of Shotts.
Don't try to copy and paste code from a PDF file. A copy of the script shown above can be found on your RPi in the `physrpi/scripts` directory.