ComS 252 Homework 8: Shell programming

Group assignment (with 5% penalty per group member)

Due October 26, 2021

1 Objectives

For this assignment, you will write some `bash` scripts. It is up to you to test your sripts thoroughly, and write them according to the specifications. The examples are provided as illustrations only, to help clarify how the scripts are expected to run.

2 Download

Download the virtual machine `Hw08.ova`. Accounts are `root` and `user` with passwords `rootpw` and `userpw`, as usual. All scripts should be placed in the `scripts/` subdirectory, in `user`'s home directory. Note that this directory is included in `user`'s `PATH`.

3 Pace conversion

Write a `bash` script named `pace_conv.sh`, that takes as arguments zero or more times. Each time will be formatted as either

- *minutes*:*seconds*, where both *minutes* and *seconds* are integers; or
- *minutes*: or
- *minutes*

where the last two cases correspond to the first case with zero seconds.

The input times represent a runner's average pace, measured in minutes per kilometer. The script should convert each into the equivalent average pace, measured in minutes per mile. For each input time, the script should output a line of the form

`x:xx min/km = y:yy min/mile`

for the appropriate times. For this script, you may assume that $25,146$ kilometers exactly equals $15,625$ miles.

The following examples illustrate how the script should behave, assuming it is in your path.

```
user# pace_conv.sh
user# pace_conv.sh 4:00
4:00 min/km = 6:25 min/mile
user# pace_conv.sh 4 4:30 5: 5:36 6:00 6:66
4:00 min/km = 6:26 min/mile
4:30 min/km = 7:14 min/mile
5:00 min/km = 8:02 min/mile
5:36 min/km = 9:00 min/mile
6:00 min/km = 9:39 min/mile
7:06 min/km = 11:25 min/mile
user#
```

Note: it is ok if your times are one second different from the ones shown here; this can happen due to rounding differences.

3.1 Grading rubric

- 1.0 points: proper `bash` script
- 1.5 points: loops over arguments
- 1.5 points: extracts minutes, seconds around ":"
- 2.0 points: conversion is correct
- 1.0 points: output format "x:xx min/km = x:xx min/mile"
- 1.0 points: correct handling of leading 0's in seconds

4 Listing files

Write a `bash` script named `myls.sh`, that takes an optional argument. The script should display the items in the directory specified on the command line, defaulting to the current working directory if none is specified. If the specified directory does not exist, the script should print an appropriate error message and terminate. The script should display a header with the folder name or "Current folder", as appropriate, followed by a dashed line. After the header, the script should list all items in the directory. For items that are files, the script should display the file size, in bytes, with commas as the thousand separator, to the left of the file name. For items that are not files (e.g., other directories or symbolic links), the script should only display the name. Directory names should be followed by a "/" character. The output should be lined up neatly, so that all item names are left justified, and file sizes are right justified. Then, the script should display a footer, with a dashed line, followed by the total of all file sizes, in bytes, also with commas as the thousand separator.

Your script may utilize the `ls` utility in any way you see fit.

The following examples illustrate how the script should behave, assuming it is in your path.

```
user# list.sh .
Current folder
------------------
                    ./
                    ../
                 18 .bash_logout
                193 .bash_profile
                291 .bashrc
                  0 out.txt
                    scripts/
                    .ssh/
------------------
                502
user# list.sh /boo
Folder /boo does not exist
user# list.sh /boot
Folder /boot
------------------
                    ./
                    ../
            196,376 config-4.16.3-301.fc28.x86_64
                    efi/
                    grub2/
         44,602,551 initramfs-0-rescue-4bab42d78bb845e2a0090043e629eaea.img
         16,878,959 initramfs-4.16.3-301.fc28.x86_64.img
```

```
                    loader/
                    lost+found/
          3,888,620  System.map-4.16.3-301.fc28.x86_64
          8,286,392  vmlinuz-0-rescue-4bab42d78bb845e2a0090043e629eaea
          8,286,392  vmlinuz-4.16.3-301.fc28.x86_64
                167  .vmlinuz-4.16.3-301.fc28.x86_64.hmac
------------------
         82,139,457
user#
```

4.1 Grading rubric

- 1.0 points: proper `bash` script
- 1.0 points: if no arguments, list for current directory; otherwise, list for directory passed as argument
- 1.0 points: header based on which directory:
  - Non-existant directory: "Folder does not exist", and exit
  - Current directory (including .): "Current folder"
  - Otherwise: "Folder (name)"
- 2.0 points: loops over all items in the folder
- 1.0 points: correctly handles file and subdirectory names with spaces
- 1.0 points: displays subdirectories without size, names followed by "/"
- 1.0 points: displays files with size
- 1.0 points: displays total size
- 1.0 points: computed total is correct
- 1.0 points: columns are lined up nicely
- 1.0 points: commas for thousands separator

5 Submitting your work

Run the `Turnin` script to submit your work. The script will collect and submit your scripts; be sure they have the correct names. Your scripts will be hand-graded by a human, so you will not receive a score immediately, except for missing scripts.