1 — PHY 494: Homework assignment (25 points total)

Due Tuesday, Jan 19, 2016, 1:30pm.[1]
Submit a PDF through Blackboard (name it *lastname*_*firstname*_hw1.pdf). Homeworks must be legible or may otherwise be returned ungraded with 0 points.

This assignment contains **bonus problems**. A bonus problem is optional. If you do it you get additional points that count towards this homework's total, although you can't get more than the maximum number of points. If you don't do it you can still get full points. Bonus problems and bonus points are indicated with an asterisk "*".

Note: Work through http://asu-compmethodsphysics-phy494.github.io/ASU-PHY494/2016/01/14/01_Unix_Shell/ and answer the questions below as you go along. In general, for full credit you need to (1) show the commands that you used and (2) answer the question. Sometimes you should also copy and paste output.

1.1 Commands and paths (8 points)

(The following questions do not require you to show code unless explicitly stated.)

(a) What is the function of the `cd` and the `pwd` command? [**2 points**]

(b) Show commands for three ways to change to your home directory, assuming you are currently in the root directory. [**1.5 points**]

BONUS: Show a fourth possibility. [**bonus +0.5***]

(c) Given the path `/home/dvader/Documents/../data/bases`:

(i) Is this an absolute or relative path? [**0.5 points**]

(ii) If you are located in the home directory of user dvader (`/home/dvader`) then what is the shortest path to `bases`? [**1 points**]

(d) If you were in a directory `/home/dvader/data` and you executed the command `cd ./.././.././.`, what would be the output of running the `pwd` command afterwards? [**1 points**]

(e) Describe two ways by which you could learn more about the function of a Unix command `frbzz` that you don't know anything about. [**2 points**]

(f) BONUS: (Skim)read Neal Stephenson's *In the Beginning was the command line* from 1999 (PDF)[2]. What are the advantages and disadvantages of using the command line instead of a graphical user interface? [**bonus +4***]

[1] Update 2016-01-18: in problem 1.3.(d) analyze *all* planets not just the two from the previous problem.
[2] originally available from http://www.cryptonomicon.com/beginning.html

1.2 Copy, rename, delete (4 points)

After you completed the two activities in the section on *Copy, rename, delete* you should end up with a specific directory structure under `~/PHY494/01_shell`. Show the output of the commands

```
cd ~
ls -R PHY494/01_shell
```

which will be compared against the expected directory structure and content. **[4 points]**

1.3 Pipes and Filters (5 points)

Work through the activities in this section. Answer the following questions and show the commands that you used to arrive at the answer.

(a) How many lines does the file `planets_2.dat` contain? **[1 points]**

(b) What are the three biggest planets (by diameter) in the file `planets.dat`? **[1 points]**

(c) Which planets contain *ice* terrain? **[1 points]**

(d) What is the most frequent and the least frequent first letter amongst *all* the planets? **[2 points]**

1.4 Advanced Pipes and Filters (5 points)

Obtain additional data files from the course repository with the git command

```
cd ~
git clone https://github.com/ASU-CompMethodsPhysics-PHY494/PHY494-resources.gi
cd PHY494-resources/01_shell/data
```

and then work through the activities. Answer the following questions:

(a) How many lines are there in all files ending in *csv*? List each file separately. Show your command and its output. **[2 points]**

(b) Who are the 4 heaviest people in the people.csv file? Show all commands needed and the output. **[3 points]**

1.5 Shell scripts (3 points)

Work through the section *Shell scripts*.

(a) What are the values of the shell environment variables `HOME` and `SHELL`? **[1 points]**

(b) Show that running `bash ~/bin/update_resources.sh` updates your git repository. (Show the output; it should not contain errors.) **[2 points]**