Homework 1 PHY494

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1.1 Commands

(a)

The **cd** command stands for "change directory", its function is to let you navigate between directories. The **pwd** command stands for "print working directory" hence, it shows which directory you are currently working within.

(b)

To change to the home directory,from any directory, not necessarily the root, one can do any of the following: cd , cd /, or cd.

(c)

(i) This is an absolute path since it begin with /home and can be taken from any directory, whereas a relative path would only work within the context of the working directory.

(ii) Given you are in the directory (**/home/dvader**) you should be able to just **cd /data/bases**. This is because the part of the path **/home/dvader/Documents/..** will take you up one directory from **/Documents**, which implies that the directories **/data/bases** are subdirectories to **/home/dvader**.

(d)

It would show that you had changed into the home directory, since it's two directories up.

(e)

One way would be to write **man frbzz**, you could also write **help frbzz**, or **info frbzz**. Apparently my computer doesn't have this command.

(f)Bonus

Command line advantages:

1.2 Copy, rename, delete

```
Documents data

PHY494/01_shell/Documents:
work

PHY494/01_shell/Documents/work:
TODO.bak TODO.txt hints.txt homework lesson.txt
```

```
PHY494/01_shell/Documents/work/homework:
Makefile homework.log homework_1.tex
addtemperatures.py homework.pdf populate_inputs.py
homework.aux homework.tex temp.tex

PHY494/01_shell/data:
bases biggest_planets planets.dat planets_2.dat
```

1.3 BONUS: Pipes and Filters

(a)

120

(b)

Bespin Kamino Malastare

(c)

```
Ryloth              10600  mountains/valleys/deserts/tundra
Troiken          unknown   desert/tundra/rainforests/mountains
Mygeeto             10088  glaciers/mountains/icecanyons
Ojom             unknown   oceans/glaciers
```

1.4

(a)

Type **bag[1:3]**

(b)

Writing **bag[::-1]** will return the list in reverse. To slice **bag** to get **['towel','tea']**, type **bag[2:0:-1]**

(c)

Writing **ga[:4]** will give "Four" and **[15:20]** will give "seven".

(d)

(i) **bag[0] = 'book'** will replace the zeroth index value with 'book'.
(ii) writing **bag, mybag, yourbag** should give
(['book', 'towel', 'tea', 'mice'], ['book', 'towel', 'tea', 'mice'], ['book', 'towel', 'tea', 42, 'money'])
(iii) There doesn't seem to be much difference. Trying to assign x = a, will give an error, unless a is already defined as a list or something, in which case. I cannot tell the difference.

(e)

(i) TypeError: 'str' object does not support item assignment
(ii) Type **'Three' + ga[:4]**

(f)

Writing **ga.split()** provides a list, in which each word from the string is assigned to a component of the list. Writing **a,b,c = ga.split()[:3]** has assigned **a,b,c** to the string values **'Four','score'** and **'seven'** respectively, and has simultaneously split each word from **ga** into their own lists of letters. Writing **list([1,2,3])** lists the list **[1,2,3]**). The command **list(ga)** returns a list of the contents of **ga** but where each letter is it's own part of the list.

(g)

(i) Write **bags[0]**
(ii) Write **bags[0][1]**
(iii) Write **bags[1][2]**

1.5 Very Simple Temperature Calculator

(a)

To convert Farenheit to Kelvin, we do

$$T = \frac{5}{9}(\theta - 32) + 273.15 \tag{1}$$

So to find $\Delta T = T_2 - T_1$ in terms of $\Delta\theta = \theta_2 - \theta_1$ we just use the equation above and plug in our values for T in terms of θ as follows

$$T_2 = \frac{5}{9}(\theta_2 - 32) + 273.15 \qquad T_1 = \frac{5}{9}(\theta_1 - 32) + 273.15 \tag{2}$$

$$\Delta T = T_2 - T_1 = \frac{5}{9}(\theta_2 - 32) + 275.15 - (\frac{5}{9}(\theta_1 - 32) + 275.15) \tag{3}$$

$$\boxed{\Delta T = \tfrac{5}{9}(\theta_2 - \theta 1)} \tag{4}$$

(b)

```
import numpy as np

T = float(input("give me a T:"))
theta = float(input("give me a theta:"))
def convert_Farenheit(theta):
        return  5/9 * (theta - 32) - 273.15

print("T + theta = ",T + convert_Farenheit(theta))
```

(c)

```
In [1]: run addtemperatures.py
give me a T:265
give me a theta:63
T + theta =  9.072222222222251
```