Olivia Brunacini
PHY494 HW1

1.1 Commands and paths.

(a) What is the function of the cd and pwd command?
The function of the cd command is to change your current directory, or take you to your home directory. The function of the pwd command is to print the directory you're currently working in.

(b) Show commands for two different ways to change to your home directory, assuming you are currently in the root directory.

- Use cd
- Use cd ~
- bonus: cd -

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

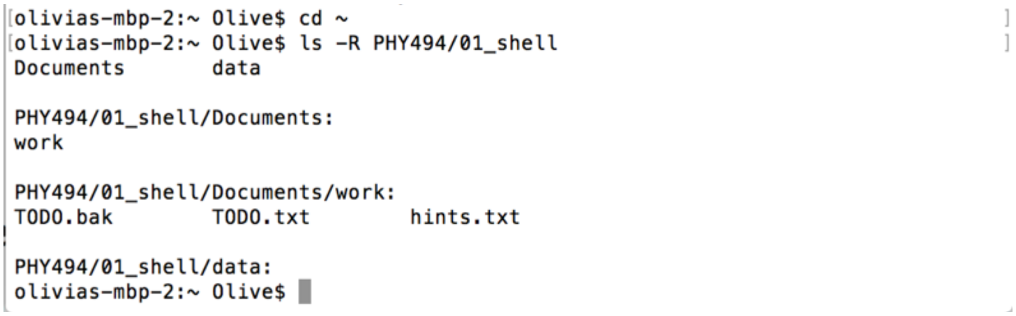
(i) Is this an absolute or relative path?
Since it starts with a ‘/ ‘, it’s an absolute path.
(ii) If you are located in the home directory of user dvader (/home/dvader) then what is the shortest path to bases?
Documents/../../bases/

(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?
bases

(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.
You could type ‘- -help frbzz’ or ‘man frbzz’ into terminal, assuming you’re on a mac. Another option would be going to the textbook or online resources.

1.2 Copy, rename, delete (4 points)

Given output:



```
[olivias-mbp-2:~ Olive$ cd ~
[olivias-mbp-2:~ Olive$ ls -R PHY494/01_shell
Documents       data

PHY494/01_shell/Documents:
work

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

PHY494/01_shell/data:
olivias-mbp-2:~ Olive$ 
```

1.3 BONUS: Pipes and Filters

(a) How many lines does the file planets 2.dat contain?
174

(b) What are the three biggest planets (by diameter) in the file planets.dat?
Bespin, Kamino, and Malastare.

(c) Which planets contain ice terrain?

(d) What is the most frequent and the least frequent first letter amongst all the planets?
Most frequent: C
Least frequent: J

1.4 Python Lists and Strings

a. How do you have to slice bag in order to get [’towel’, ’tea’]?
bag[1,-1]

(b) What does bag[::-1] do? How do you slice bag in order to get [’tea’, ’towel’]?
bag[::-1] gives 42, ‘tea’, ‘towel’, ‘guide’. In order to get [’tea’, ’towel’], you’d have to slice bag in this way: bag[1:-1:]

(c) Strings can also be sliced. How do you have to slice ga to get four and seven.

- Four: ga[:-26]
- Seven: ga[15:-10]

(d) You can access elements of a list in a variety of ways:

(i) Explain what bag[0] = ’book’ does? (Hint: print bag!)
It adds ‘book’ to the beginning of the list bag to give: ['book', 'towel', 'tea', 42]

(ii) Create two new variables:
mybag = bag
yourbag = bag[:]
and use them:
mybag[3] = ”mice”
yourbag . append (”money”)
What is the content of bag, mybag, yourbag?
bag: ['book', 'towel', 'tea', ‘mice']
mybag: ['book', 'towel', 'tea', ‘mice']
yourbag: ['book', 'towel', 'tea', 42, 'money']

(iii) From your observations, explain how the assignment x = a differs from y = a[:]?
In the example with ‘mybag’ and ‘yourbag’, x=a would contain only strings — y=a[:] would contain strings and integers

(e) Try ga[:4] = ”Three”

(i) Describe what happens?
You get an error message that the ‘str’ object does not support the line assignment — presumably because this is a string, and not an ordered list like ‘bag’ is.

(ii) How would you construct the string "Three score and seven years ago" from ga and the string “Three”?

(f) What do the commands
ga. split ()
a, b, c = ga.split()[:3]
list ([1 ,2 ,3])
list (ga)
do? You can show the output but you need to explain in your own words what is happening.

- ga.split(): ['Four', 'score', 'and', 'seven', 'years', ‘ago’] splits the string up into separate strings based on words
- list(ga) splits the string up into separate letters

(g) Nested lists: Given the list
bags=[['salt', 'pepper'], ['pen', 'eraser', 'ruler']]
how do you have to index bags to get

(i) ['salt', 'pepper']
bags[1]

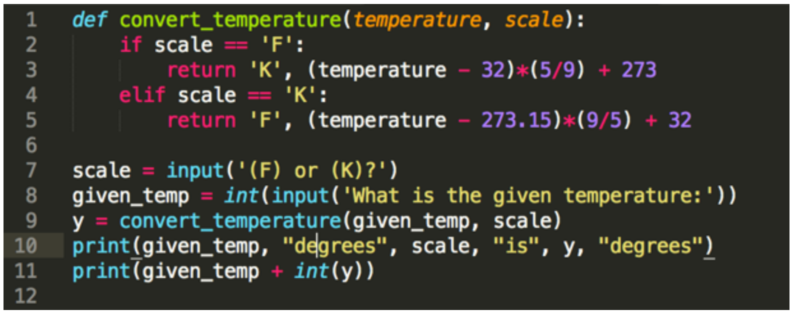
(ii) 'pepper'
bags[0][1]

(iii) 'ruler'
bags[1][2]

1.5 Very Simple Temperature Calculator

(a) F = (K - 273.15)*(9/5) + 32

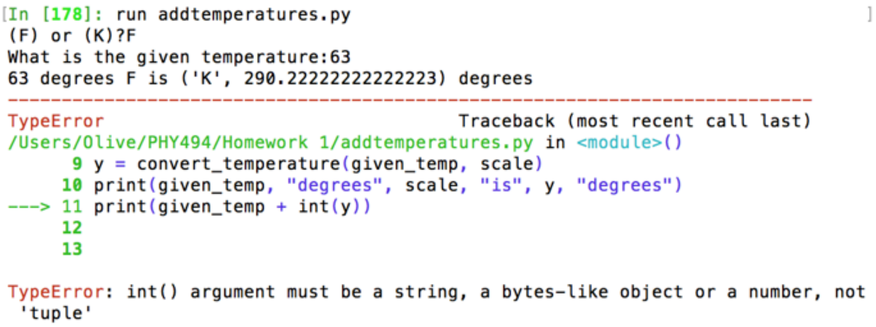
(b)



```
def convert_temperature(temperature, scale):
    if scale == 'F':
        return 'K', (temperature - 32)*(5/9) + 273
    elif scale == 'K':
        return 'F', (temperature - 273.15)*(9/5) + 32

scale = input('(F) or (K)?')
given_temp = int(input('What is the given temperature:'))
y = convert_temperature(given_temp, scale)
print(given_temp, "degrees", scale, "is", y, "degrees")
print(given_temp + int(y))
```

©
For theta = 63˚F



```
[In [178]: run addtemperatures.py                                              ]
(F) or (K)?F
What is the given temperature:63
63 degrees F is ('K', 290.22222222222223) degrees
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
/Users/Olive/PHY494/Homework 1/addtemperatures.py in <module>()
      9 y = convert_temperature(given_temp, scale)
     10 print(given_temp, "degrees", scale, "is", y, "degrees")
---> 11 print(given_temp + int(y))
     12 
     13 

TypeError: int() argument must be a string, a bytes-like object or a number, not
 'tuple'
```

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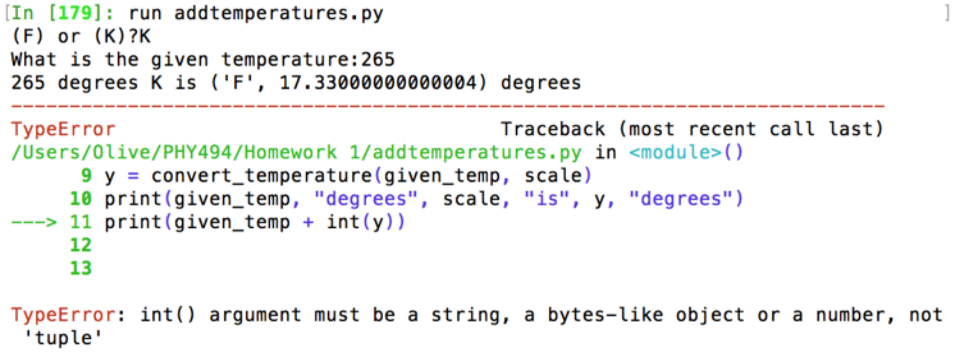
For T = 265K



```
In [179]: run addtemperatures.py
(F) or (K)?K
What is the given temperature:265
265 degrees K is ('F', 17.33000000000004) degrees
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
/Users/Olive/PHY494/Homework 1/addtemperatures.py in <module>()
      9 y = convert_temperature(given_temp, scale)
     10 print(given_temp, "degrees", scale, "is", y, "degrees")
---> 11 print(given_temp + int(y))
     12
     13

TypeError: int() argument must be a string, a bytes-like object or a number, not
 'tuple'
```