Introduction to Data Science - Assignment #1

Due date: Wednesday, Sept 28 at 9pm

Note: Please follow the instructions in Question 9 and write the link to your GitHub in the assignment part in Sakai. The code for each question should be in a separate file and should be running without errors. You need to make sure that your GitHub folder is accessible for grading by the TA. For example, you may make your account/folder publicly accessible.

Note 2: Make sure that you use long enough, meaningful names for your variables. For example, the variable that takes the radius of circle 1 in Question 5 should be something like `radius0fCircle1` and not abbreviated as `r1` or `radi1`; unless they are used in a heavy math formula (which is not the case here).

Note 3: Comment your code.

Question 1 (1 point)

Using loop statements, write a python code that reaches a value equal to or greater than 10^8 by multiplying consecutive numbers starting from 1.

Question 2 (1 point)

Define a function in python that receives a list of strings as argument and returns a dict for which the key of each element is string and the value is the string length.

Question 3 (1 point)

Define a function that takes x and y as arguments and returns x^y. Then use a `for` loop and argument unpacking to call this function for the pairs of numbers in the list below.

```
l = [[5,6], [5,7], [4,2], [3,6], [9,8], [1,3], [9,3], [7,1], [5,4], [2,7],
     [9,1], [9,3], [2,5]]
```

Question 4 (1 point)

In the following code, `x` is a random value, and `l` is a list of random values between 0 and 1.

1. Sort the list.
2. Find the index of the first element in the list that is equal to or greater than x.

```
from random import random

l = [random() for i in range(20)]
x = random()
```

Question 5 (1 point)

Write a function that takes two `int` values as the radii of two circles, calculates the area of the circles, and then returns the percentage of the area of the larger circle that can be covered by the area of the smaller circle.

Question 6 (1 point)

Write a function that receives a list of numbers and returns a dictionary whose keys are the values of the list elements and the value of each key is a proportion of the list elements that are smaller than or equal to that key.

[bonus] Question 7 (1 point)

Write a function that takes the number of seconds past from a day and prints the time in hours, minutes, and seconds with AM or PM. It should print a message if the hour is greater than 24.
You can use the `print` function as below.

```
h = 5
m = 17
s = 47

print(h, m, s, 'AM')
```

Question 8 (1 point)

Install the `pandas` package. Then import it with alias `pd` and complete the code below to create a data frame with the column names and data in the table. You can refer to documentation here.

```
################## your code here ##################
## you need to
## 1. Import pandas with alias pd
## 2. Make a dict with columns names as a key and a list
## of column values as a value


#########################################################

df = pd.DataFrame(data)
print(df)
```

A	B	C
1	3.1	800
2	4.2	150
2	1.5	400
1	6.3	210

Question 9 (1 point)

Create a GitHub account, initialize a repository in GitHub, and `push` your codes there. Add your repository address to your assignment.