You will find a private GitHub repo called <github-username>-hw where you will submit all your homework assignments. Clone this repo and create a hw2 directory inside. Add this directory to the repo using $ git add hw2. All your code should appear in a file called hw2.py that lives inside the hw2 directory. Make sure to add hw2.py to the repo and commit your changes with $ git commit -a -m "good log message".

**Question 1** (10 points). A run-length encoding of a string compresses runs of consecutive identical characters into a pair $(x, y)$ where $x$ is the character and $y$ is the count. For example, a run-length encoding of the string

'‘aaabccccddddddabbb’‘

is the list

$[('a', 3), ('b', 2), ('c', 4), ('d', 6), ('a', 1), ('b', 3)]$

(a) Define a function `run_length_encode(s)` that takes a string and produces a run-length encoded representation (i.e., a list of 2-tuples that appropriately encodes $s$). Remember, your function should return the run-length encoded representation and not print it.

(b) Define a function `run_length_decode(l)` that takes a run-length encoded list and returns the appropriately decoded string. You may find the following example for loop syntax useful. Let $lst = [(‘a’, 3), (‘b’, 2), (‘c’, 6)]$. Consider the following loop.

```python
>>> for (x,y) in lst:
...    print("{} {}\n".format(x,y))

 a 3
 b 2
 c 6
```

Your code should contain an informative doc string and should be edited for clarity.

**Question 2** (5 points). Write a class called `PieChart` that represents a traditional pie chart. Each slice in the pie chart is a pair $(label, amount)$. You should store the items in an instance variable called `slices`, which will be a list of pairs. You may also elect to have an instance variable called `total` that stores the total amount of things labelled in the chart. You will find that reading https://mkaz.com/2012/10/10/python-string-format/ is helpful when writing the `__str__` method.

```python
class PieChart:
    def __init__(self):
    def add_slice(self, label, amount):
    def percentage(self, label):
    def __str__(self):
```

```python
>>> p = PieChart()
>>> p.add_slice("Entertainment", 10000)
>>> p.add_slice("Travel", 5000)
>>> p.add_slice("Food", 20000)
>>> print(p)
Entertainment: 10000 (1.00)
Travel: 5000 (0.29)
Food: 20000 (0.57)
```