Codio: Equivalence Testing in Python

Run equivalence.py in the Codio workspace - Testing with Python - which implements equivalence partitioning. This test partitions integers [-3,5] into equivalence classes based on *lambda x, y: (x-y)%4 == 0.*

In the output, you should see how a set of objects to be partitioned is considered, and a function evaluates if the two objects are equivalent before printing the result.

test_equivalence_partition() produces the following output:

set([1, -3]) set([2, -2]) set([3, -1]) set([0, 4]) 0 : set([0, 4]) 1 : set([1, -3]) 2 : set([2, -2]) 3 : set([3, -1]) 4 : set([0, 4]) -2 : set([2, -2]) -3 : set([1, -3]) -1 : set([3, -1])

You should carry out further investigations on the code and experiment with it.

Output for range(-3, 5):

```
codio@elitewonder-memphisswitch:~/workspace$ python3 equivalence.py
{1, -3}
{2, -2}
{3, -1}
{0, 4}
-3 : {1, -3}
-2 : {2, -2}
-1 : {3, -1}
0 : {0, 4}
1 : {1, -3}
2 : {2, -2}
3 : {3, -1}
4 : {0, 4}
```

Output for range(0, 5):

```
codio@elitewonder-memphisswitch:~/workspace$ python3 equivalence.py
{0, 4}
{1}
{2}
{3}
0 : {0, 4}
1 : {1}
2 : {2}
3 : {3}
4 : {0, 4}
```

Output for range(-1, 10):

```
codio@elitewonder-memphisswitch:~/workspace$ python3 equivalence.py
{3, -1, 7}
{0, 8, 4}
{1, 5, 9}
{2, 6}
-1 : {3, -1, 7}
0 : {0, 8, 4}
1 : {1, 5, 9}
2 : {2, 6}
3 : {3, -1, 7}
4 : {0, 8, 4}
5 : {1, 5, 9}
6 : {2, 6}
7 : {3, -1, 7}
8 : {0, 8, 4}
9 : {1, 5, 9}
```

As Reid (2007) states, given a set of objects and an equivalence relation, this function classifies them into groups based on their equivalence.

Testing for equivalence aims to establish that two treatments are indistinguishable. Merely performing a statistical test to ascertain the significance or insignificance of the difference is insufficient. Instead, it is necessary to determine the scientifically or clinically significant extent of the difference and establish a spectrum of treatment effects that are considered trivial. Following an experiment, it is essential to articulate the treatment effect and compute the 95% confidence interval, which is vital in interpreting the findings (Web Archive, 2012).

References:

Reid, J. (2007). *Equivalence partition «Python recipes «ActiveState Code*. [online] Available at: https://code.activestate.com/recipes/499354-equivalence-partition/

Web Archive (2012). *Statistical tests for equivalence*. [online] Available at: http://web.archive.org/web/20120119090119/http://www.graphpad.com/library/BiostatsSpecial/article_182.htm