OOP via Python
Session 06

Stephen Leach, Nov 2021

This Session

- Short live demo to get us back in the swing (10 mins)
- Practical exercise!

Live Demo
Ulam's Spiral

Practical Session

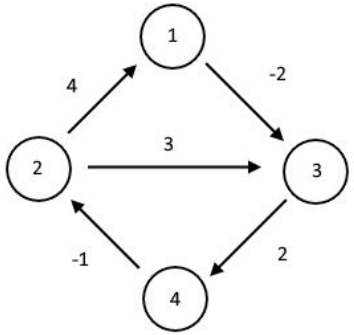
- Very short live demo to get us in the swing
- Then we have an exercise taken from RosettaCode.Org again
- Floyd-Warshall algorithm for finding the shortest paths between all pairs of locations in a weighted graph
- https://en.wikipedia.org/wiki/Floyd%E2%80%93Warshall_algorithm

Floyd-Warshall algorithm

The Floyd–Warshall algorithm is an algorithm for finding shortest paths in a weighted graph with positive or negative edge weights.

Task

Find the lengths of the shortest paths between all pairs of vertices of the given directed graph. Your code may assume that the input has already been checked for loops, parallel edges and negative cycles.



Print the pair, the distance and (optionally) the path.

Example

```
pair     dist    path
1 -> 2    -1     1 -> 3 -> 4 -> 2
1 -> 3    -2     1 -> 3
1 -> 4     0     1 -> 3 -> 4
2 -> 1     4     2 -> 1
2 -> 3     2     2 -> 1 -> 3
2 -> 4     4     2 -> 1 -> 3 -> 4
```

Exercise

- Clone https://github.com/sfkleach/oop-in-python
- Refactor `session06/floyd_warshall.py`
- Use `pytest test_floyd_warshall.py` to keep on the straight and narrow
- Some suggestions are provided at the top of the file