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Analisi e Visualizzazione delle Reti Complesse

NS07 - CNA in Python: Centrality - Robustness

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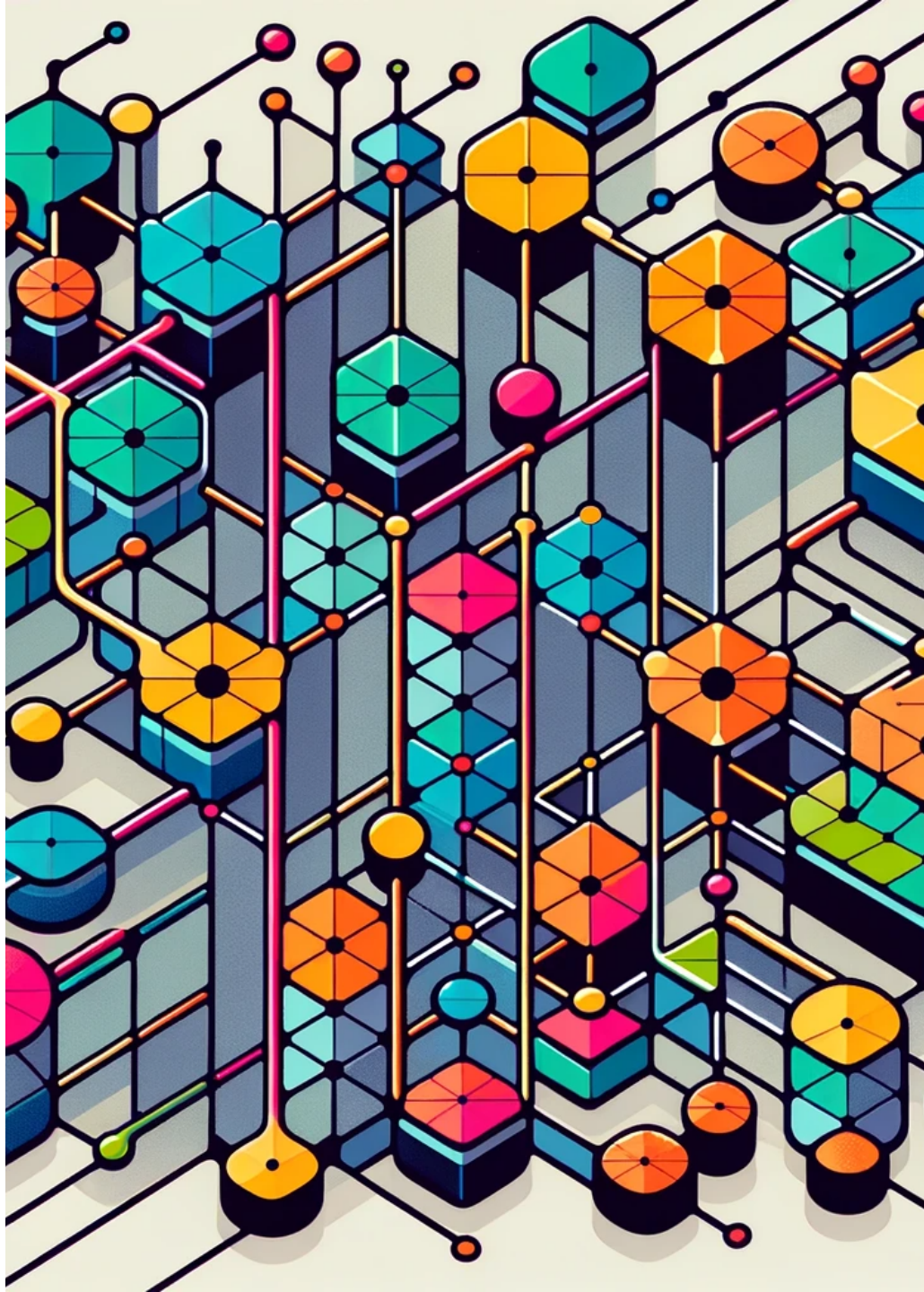

Goals:

Using Networkx to study centrality measures, their distributions, and network robustness

Reference:

Chapter 3 Tutorial.ipynb in the course book GitHub repo [ns1]

Exercise 1

Assume you have a NetworkX graph G of employees.

The node names are employee IDs, and the nodes have attributes for full name, department, position, and salary.

Which of the following will give you the salary for the employee with ID 5567?

```
G(5567)('salary')
G[5567]['salary']
G.node[5567]['salary']
G.node(5567)('salary')
```

Exercise 2

You have a NetworkX graph G and you are about to draw it with the following command: nx.draw(G, node size=node_size_list).

Which of the following is the correct way to obtain a node size list so that the nodes are sized according to their degree?

```
node_size_list = [G[n] for n in G.nodes]
node_size_list = [d for d in G.degree()]
node_size_list = G.degree()
node size list = [G.degree(n) for n in G.nodes]
node_size_list = [G.degree() for n in G.nodes]
```

Exercise 3

In a social network, which of the following would one expect to be true about the degrees of its nodes?

1. All nodes have very high degree
2. Most nodes connect to a single, large hub
3. A variety of degrees is to be found
4. All nodes have more or less the same degree

Exercise 4

Write a Python function that accepts a NetworkX graph and a node name and returns the average degree of that node's neighbors.

Use this function to compute this quantity for every node in the OpenFlights US network and take the average.

Does the friendship paradox hold here, i.e., is the average degree of nearest neighbors greater than the average node degree?

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Reading material

References

[ns1] **Chapter 3 (References to Python scripts and exercises)**

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Q&A