Food webs notebook

DSTA

1 Data Science and Complex Networks

1.1 Basic concepts

1.2 Outline

- notebooks are an advanced mechanism for software distribution and integration

- they execute inside the default container of web browsers

- we are isolated from the python implementation (away from the actual execution)

- The Jupyther `.ipynb` format is standard

- Markdown cells are used for comments and explanations

- to run the cells, J. requires a callable Python **kernel**

- a notbook is a JSON file, with JavaScript execution

```json
"cell_type" : "code",
"execution_count": 1, # integer or null
"metadata" : {
    "collapsed" : True, # whether the output of the cell is collapsed
    "autoscroll": False, # any of true, false or "auto"
},
"source" : ["your code goes here"],
"outputs": [{
    # list of output dicts (described below)
    "output_type": "stream",
    ...
}],
}
```

1.2.1 Jupiter Notebooks

Detailed installation instructions are at the Jupyter project website

Installation is similar to a Python module but it runs stand-alone and interacts via browser

It requires a Python 'core' to run in the background, similar to VS Code (but less coding support)

1.2.2 Online Jupyter Notebooks

All notebooks are also available online on Google Colab

A Google account is required

1.2.3 Jupyter to learn Network analysis

- start the Jupyter Notebook server, e.g.,

```
pip install jupyter

jupyter notebook
```

Python 3 notebooks are available from this module repo

Original Python 2 notebooks are available at the textbook repo

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1.2.4 Jupyter to learn Network analysis, II

Currently VS Code supports Jupyter with a dedicated extension

Also, a cell block in a plain Python files can be split up into cells that can be run separately, Jupyuter-style.

Use # %% at the beginning of a line to delimit cells; the cell buttons will appear.

Conventional top-to-bottom execution is preserved.

1.3 Plan for the lab

- study the "Food web" notebook associated to Chapter 1 of Caldarelli-Chessa's textbook.

- append your code in the cell below the `Q` questions.

- test *'what if'* questions by changing the code cells: double-click on the cell opens it up for editing.

- a solution is available, but please read it only after you have tried to solve the problem.

- We will repeat the experience next week with C-C's Trade Networks notebook.