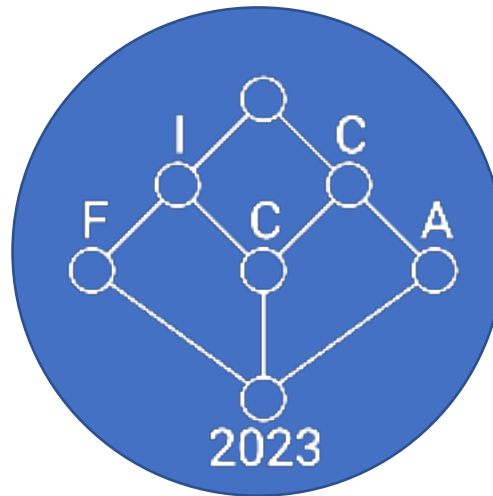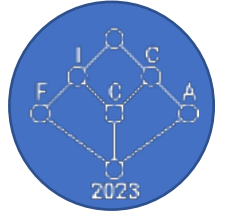# Computational Notebooks for FCA

(CoNo-Concepts)
Workshop @ ICFCA 2023

T. Georges, M. Huchard

Interest

- Easy to document with markdown in addition to comments
- Each cell prints its own execution trace
- Iterative Development: an algorithm can be developed step by step
- Visualizations: figures friendly, plenty of ploting libraries …
- Interactive Computing: executing code cells and seeing the results immediately
- The notebook can be exported into a script of a library
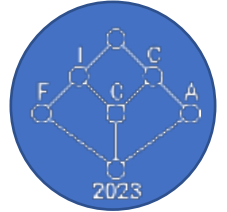- Data science : plenty of algorithms
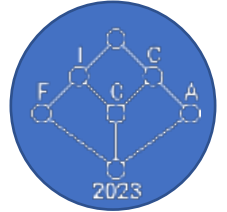
A software engineer view

Andreas Zeller

Effective Notebooks:
Making Notebooks Reusable, Extensible, and Well-Tested

https://www.youtube.com/watch?v=5FiRoIdq2MI

Advice for making good notebooks

From Andreas Zeller' talk

Best practices (more in his talk)

- Ensure automation

- Use version control (e.g. github) for backup and collaboration

- Maintain (evolve the libraries)

- Test (run / re-run / have a few usage examples / use assertions)

- Apply good programming practices
  - E.g. modularize into functions, use OO paradigm, move reusable functions into separate libraries that are imported

- Document (document each function, use figures)

Limits for good practices application in Notebooks

- Reduced Efficiency Compared to Regular **IDEs** (coding help with smart editor, access to language documentation, plugins integration)
- **Limited Modularity**: tends to promote a more linear and sequential style of coding, this is a 'monolith software'
- **Limited Testing Options**: executing comprehensive unit tests, integration tests, or end-to-end tests can be more complex
- **Version Control Challenges**: A notebook is a unique file in a specific file format (.ipynb), that complexity changes tracking.
- **Linear workflow**: compared to Orange workflow / Scikit Learn pipelines / Talend workflows
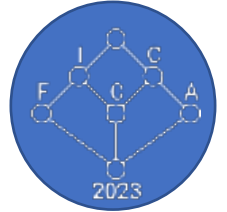
Notebooks for FCA

- Collect the FCA libraries
- Make the existing FCA tools / libraries usable in notebooks
- Share the existing notebooks
  - Apply some collective check
  - Publish them on public websites + github
- Share experiences / tutorials
- …