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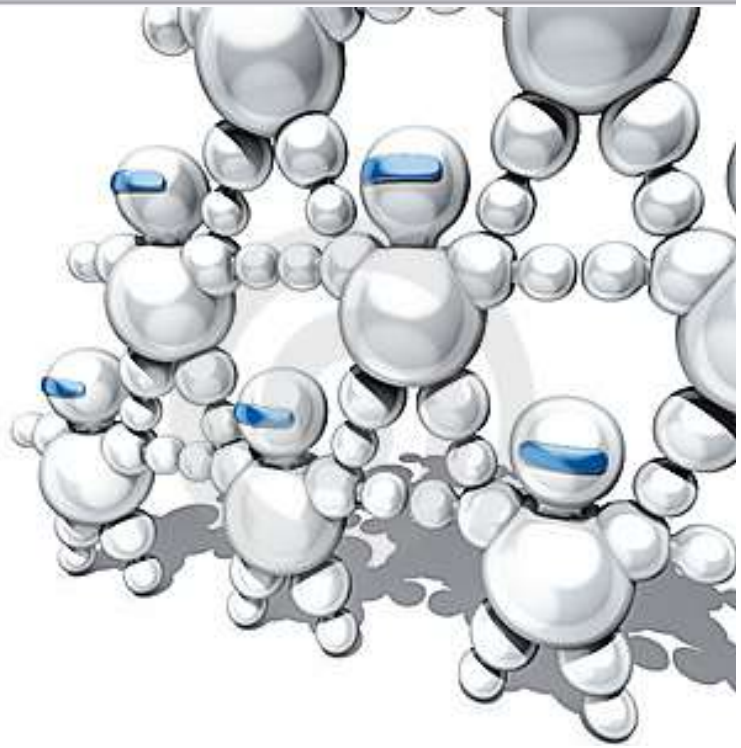
Self-Organizing Agent Systems



Final work

Maite López-Sánchez
Volume Visualization and Artificial Intelligence Research Group (WAI)
Facultat/dept de Matemàtiques i Informàtica
Universitat de Barcelona (UB)

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ABS frameworks

- StarLogo TNG (visual programming)

  http://web.mit.edu/mitstep/starlogo-tng/download/index.html
- NetLogo (specific scripting language)

  https://ccl.northwestern.edu/netlogo/download.shtml

  Resources: http://ccl.northwestern.edu/netlogo/resources.shtml
- Mesa (python)

  https://mesa.readthedocs.io/en/master/

  https://github.com/projectmesa/mesa/

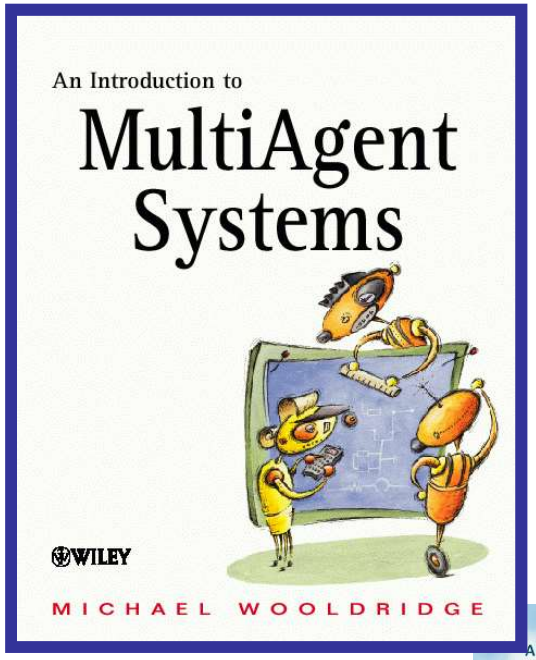
Presentation video:
https://www.youtube.com/watch?v=IcySLoprPMc

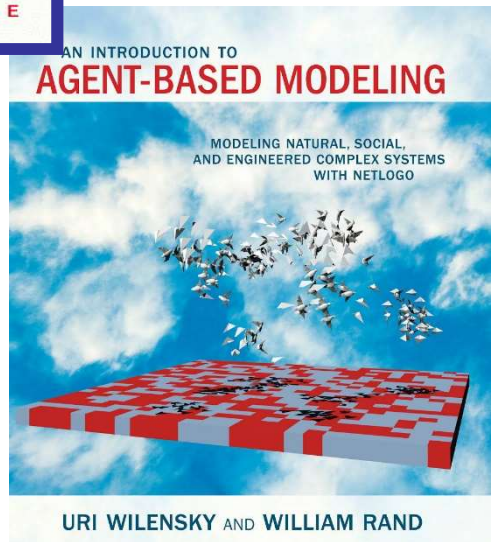
Presentation

Bibliography

- Michael Wooldridge,
  "An Introduction to Multiagent Systems"
  John Wiley & Sons 2002.
  ISBN 0 7149691X.

- Uri Wilensky and William Rand,
  “An introduction to Agent-Based Modeling"
  MIT Press, 2015.
  ISBN 978-0-262-73189-8.





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Final work assignment

Course Assessment

- Practical (programming) deliverable on:
  - (part) Research described in the paper you presented, or
  - An smart city simulator
- Technical requirements:
  - Usage of an ABS framework is highly recommended (but not compulsory)
  - Mechanisms for self-organization of the multi-agent system are expected to be explicit:
    - Agent communication
    - Coordination norms, …

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Smart city simulator

Course Assessment

- Choose a city service you want to model:
  - Mobility services
    - Public transportation,
    - Traffic lights,
  - Waste services:
    - Garbage collection service
  - Environment:
    - CO_2 emissions…
  - Security
  - Water
  - Health …

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Smart city simulator

Course Assessment

- Characterise agents' behaviours in terms of
  - Agent needs and preferences
  - Agent capabilities
  - Multiple features
  - Optionally: agents can learn/adapt
- Consider an fixed topology of agent relationships:
  - Grid, Network,…
  - Topology will be fixed during a simulation but it should be relatively independent of agents' code.

Smart city simulator

Course Assessment

- Simulations:
  - Must include overall indicators of the system performance.
    - **Must include at least one ethical indicator**
  - Individual agent displays will only make sense in specific cases.

Final work assignment

Course Assessment

Deliverables:

- Simulation code
- Report including:
  - Technical details: design decisions
  - Conducted tests: evaluation and conclussions
- Presentation and demo
  - May the 7th: "prototype“/preliminary presentation
  - **May the 28th**: final work presentation.
  - 10 minutes long if individual work.

Class