Digitalized Energy Systems

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Exercise sheet 3

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Exercise 1: Create two agents a_1, a_2 and two different containers c_1, c_2: a_1 lives in c_1, and a_2 in c_2. The a_1 sends a sequence of messages to a_2. The second agent a_2 prints every message it gets. Implement this with the following message types:

1. String
2. Dict
3. A self-defined message class containing a String and a Dict

Note: You will need to configure serialization `https://mango-agents.readthedocs.io/en/latest/codecs.html`. ⇒**Code**

Exercise 2: In the last exercise sheet, you started the agents and a topology agent. So far, you have run these agents in a single container in mango, so that common local data structures were available to you. Today you are to modify the MAS so that the agents can run on different systems. You can simulate this by starting the agents from different processes (e.g. by calling separate scripts):

1. In the first script you start the topology agent and 5 other agents. In the second script you start 5 additional agents. These agents should now function as one MAS. The precondition for this is that the topology agent knows the agents from both containers.
   Hint: Start the scripts from two different shells.
2. Create different neighborhoods for this system, such that the neighborhoods between containers are designed differently. Neighborhoods also exist between agents in different containers. Specify the neighborhoods for each agent in a list. Reminder: The neighborhoods are specific to one agent, i.e. the neighborhood must be specified here for each agent.

Describe what you did.
⇒**Code**
⇒**Answer**

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Exercise 3: Create an agent system with three agents and model the constraint satisfaction problem discussed in the lecture (choosing from three colors without overlap, corresponding to the sensor network example).

1. Implement a possible example for the distributed solution of this problem! Trivial solutions are allowed! The agents must be initialized with a **random invalid** combination of colors. ⇒**Code**
2. Does the MAS provide an acceptable solution? If yes, which one? If no, why not? ⇒**Answer**
3. Does your MAS provide an acceptable solution for every possible initial color distribution? Why/Why not? ⇒**Answer**
4. Does your MAS terminate? Does it also converge? Explain (using this example if necessary) the difference. ⇒**Answer**