HSG-WAS-SS23 / exercise-8

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Task 1 & 2

Please visit https://github.com/johnphilipp/HSG-WAS-SS23-exercise-8

Task 3

> Consider that agents might be required to solve (complex) planning problems to reach their goals (remember our session on automated planning). What advantages do you see for having a top-down explicit specification of agent coordination patterns in this case?

In the case where agents are required to solve complex planning problems to reach their goals, having a top-down explicit specification of agent coordination patterns can provide several advantages:

By using an organization specification, agents can define cooperative patterns using concepts like roles, groups, workflows, and norms. This helps create a well-defined organizational structure that allows for efficient division of labor and coordination of tasks. A shared understanding of the expected behavior and interactions among agents can minimize the potential for misunderstandings and conflicts during the planning process, break down the (complex) problem and distribute it among agents, thereby improving performance.

In a normative MAS, norms are used to coordinate agents towards organizational goals. A top-down specification of coordination patterns ensures that agents are aware of and adhere to the established norms, reducing the likelihood of norm violations and ensuring the system operates within the desired guidelines. This can help agents not make decisions that lead to a dead-end and might be detrimental to the overall system performance.

Overall, I believe that while a top-down explicit specification of agent coordination patterns can offer advantages for complex planning problems by providing structure, norm adherence, and improved performance, it may not be suitable in highly dynamic environments, and could limit scalability, creativity, and adaptability of autonomous agents making alternative approaches like self-organization.

The overarching objective when utilizing top-down explicit specification is to achieve an equilibrium between imposing constraints on agents and permitting bottom-up autonomy. Determining the optimal Moise organization specification (OS) (i.e., $P \cap E \cap O$ not too big and $P \cap E \cap O$ not too small) across its three independent dimensions is a critical decision, as it facilitates agents' flexibility and adaptability in addressing intricate planning problems and accomplishing their goals.