

EMPOWERING AGENT COORDINATION WITH SOCIAL ENGAGEMENT

Coordination by Social Engagements (CoSE), a commitment-drive methodology for programming agents

M. Baldoni¹, C. Baroglio¹, F. Capuzzimati¹, and R. Micalizio¹

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¹Università degli Studi di Torino, Dipartimento di Informatica
<http://di.unito.it/2COMM>

CoSE: COORDINATION BY SOCIAL ENGAGEMENTS

CoSE allows implementing agents incrementally, one goal at a time, and by focusing on subproblems (i.e., behaviors), that either directly or via interaction will be programmed to obtain the goal at hand

CoSE enjoys the following properties:

- **Agent-to-Agent Decoupling**
- **Agent-Logic-to-Coordination-Logic Decoupling**

Advantages: *code verification, code maintainability*

- **Programming of interacting agents:** systematically approached based on the *explicit representation of social engagements*
- **Basic idea:** when agents can directly handle social engagements as *resources*, the coding phase can be organized in a *precise sequence of steps*
- **Social engagements** are captured as *social commitments*
- **Advantages:**
 - *software engineering* perspective: *decoupling, modularity* of code
 - *modeling* perspective: based on truly social dependencies, agents can take into account other agents, in their deliberative cycle

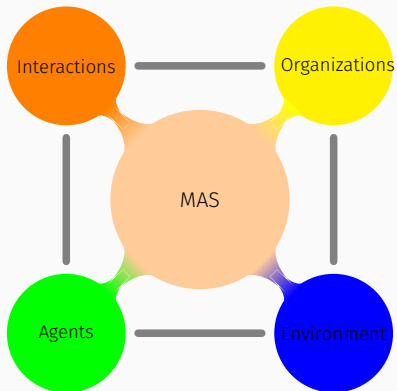
- CoSE extends environments by realizing Engeström's **activity systems**
- Engeström's **objectified meanings** are supplied by reified commitments
- All interactions are **driven by such meanings** instead than by the events (signs or signals), that are “physically” executed by the agents

SOCIAL ENGAGEMENTS

- Structures that **explicitly** represent the **dependencies** existing between any two agents that interact
- They can be used by agents in their **practical reasoning** together with *beliefs*, *intentions*, and *goals* for taking into account other agents and the conditions the latter committed to have achieved
- They are implemented as **observable properties** of artifacts

AGENTS, ENVIRONMENT, ORGANIZATIONS, INTERACTIONS

- CoSE is rooted on **JaCaMo+**, an extension of JaCaMo.
- Widly recognized that MAS design and development involves: **Agents, Environment, Interactions, and Organizations**
- JaCaMo integrates three parts: *Agents* (Jason), *Environment* (CArtAgO), and *Organizations* (Moise)
- JaCaMo+ integrates also *Interactions*

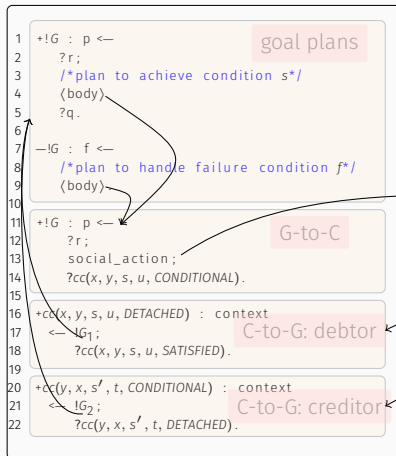


- In **JaCaMo** observational properties are **signals** and the agent is programmed to react to signals. The plans that implement the reaction are *causally* tied to such signals but such a relation is only implicit
- In **JaCaMo+** observational properties are **social engagements** and agents are programmed to react to social engagements in order to achieve their conditions. The goal of the plan is the commitment condition

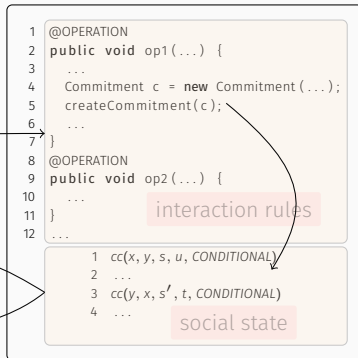
Social engagements (instead of signals) enable the specification of CoSE because they make **causal relationships explicit**, they introduce a separation of concerns (Agent-Logic-to-Coordination-Logic Decoupling), so they enable the specification of **standardized programming building blocks**

COSE USES PROGRAMMING BUILDING BLOCKS

Jason agent program



Commitment artifact



QUESTIONS?

PLEASE, COME TO OUR TABLE!

SESSION 1A, COUNCIL ROOM (G-1F)