



LogiKEy Plus: A Toolkit for Kids in 2030

Ali Farjami
SnT

Ali 2017

LogiKEY

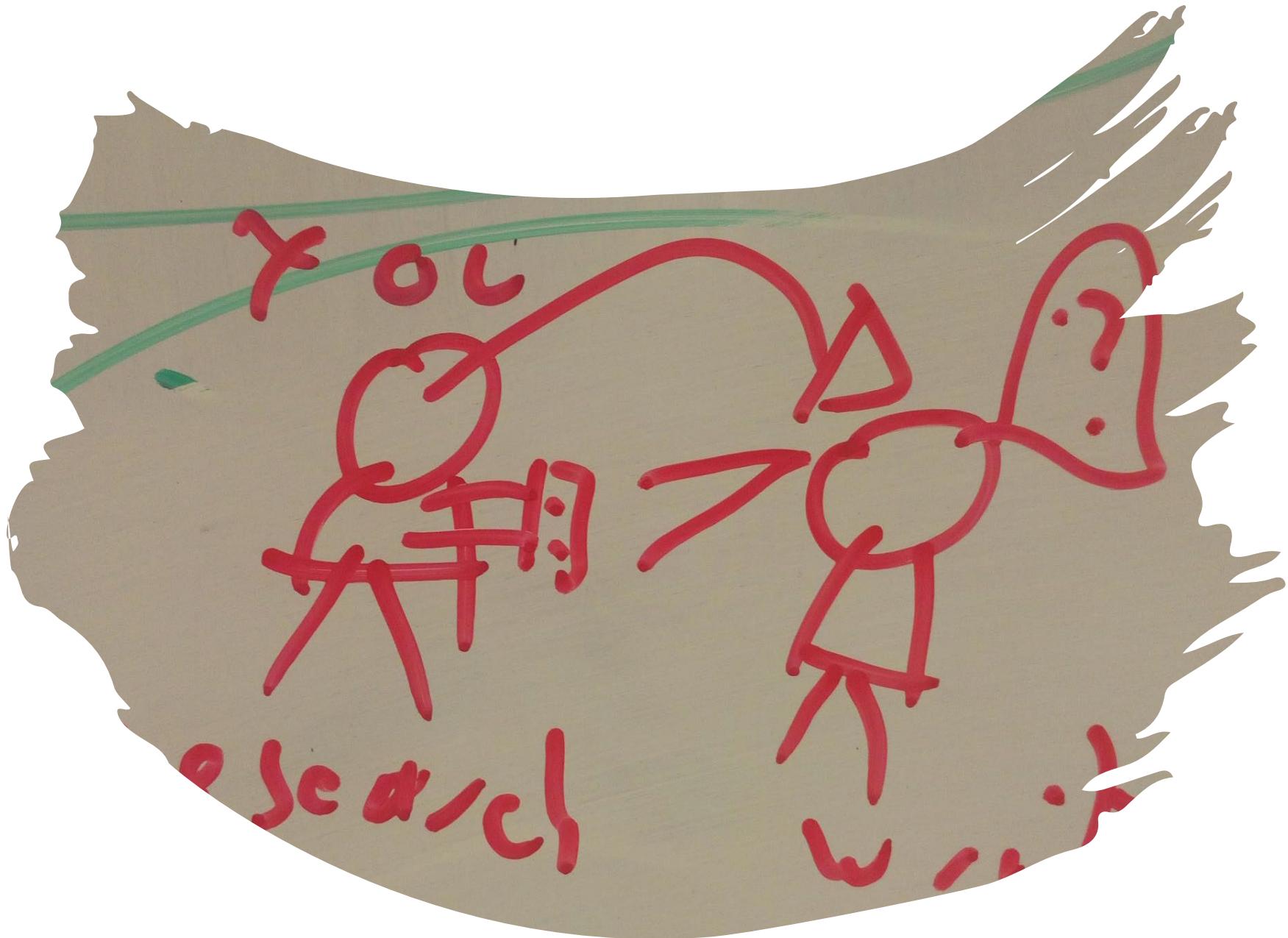
David 2017

Feb 2025

Logikids

Jan 2025

2030





Mashtoy

By Stacey Frost ☮

Innovative AI partner for toy design.

Can you suggest
a new toy design?

What are the
latest trends
in toy design?

Generate a
unique toy idea.

design a
random toy car.

MechaBrain Explorer

Obligations:

"You must light up when I press your buttons!"
"You must move when I push you!"

Permissions:

"You can make sounds when I play with you."
"You can go anywhere in my room."

Prohibitions:

"You must not break when I play with you."
"You cannot get dirty or lose your colours!"





Searched 4 sites ▾

The LogiKEy methodology is primarily a framework designed for ethical reasoning in complex systems, especially in AI, law, and governance. It focuses on using formal logic (particularly deontic logic) to model and solve ethical dilemmas by defining normative systems—rules or standards that govern behavior. This methodology is built on higher-order logic (HOL) and supports experimentation with various ethical theories, making it a flexible tool for reasoning about ethics in intelligent systems(FIS Uni Bamberg)(ar5iv).

While LogiKEy is mainly applied to areas like autonomous systems and legal reasoning, it could potentially be adapted for toy design if your goal is to ensure that your toy operates within clear ethical frameworks. For example, you might use LogiKEy to model the ethical implications of how a toy might influence behavior or decision-making in children. By applying LogiKEy, you could simulate scenarios where the toy encourages certain values (e.g., sharing, empathy) or analyze the fairness of its representations (inclusivity and diversity).

In practical terms, however, you might find that LogiKEy's approach is more useful for designing toys that include AI elements, such as interactive robots or smart educational toys. It would help ensure that these systems make ethically sound decisions when interacting with children or gathering data (ar5iv).

If you're not working with AI or autonomous systems in your toy design, other ethical design frameworks, like sustainable material usage or child development psychology, might be more directly applicable.



✉️ | Message Mashtoy



LogiKEY

*Obligation	✓
*Permission	✗
*Prohibition	✗
*Design Platform	✗
*Online Update	✗

LogiKEY Plus

*Obligation	✓
*Permission	✓
*Prohibition	✓
*Design Platform	✓
*Online Update	✗

LogiKEY Team

*Obligation	✓
*Permission	✓
*Prohibition	✓
*Design Platform	✓
*Online Update	✓

LogiKEy

*Obligation	✓
*Permission	✗
*Prohibition	✗
*Design Platform	✗
*Online Update	✗



Data in Brief

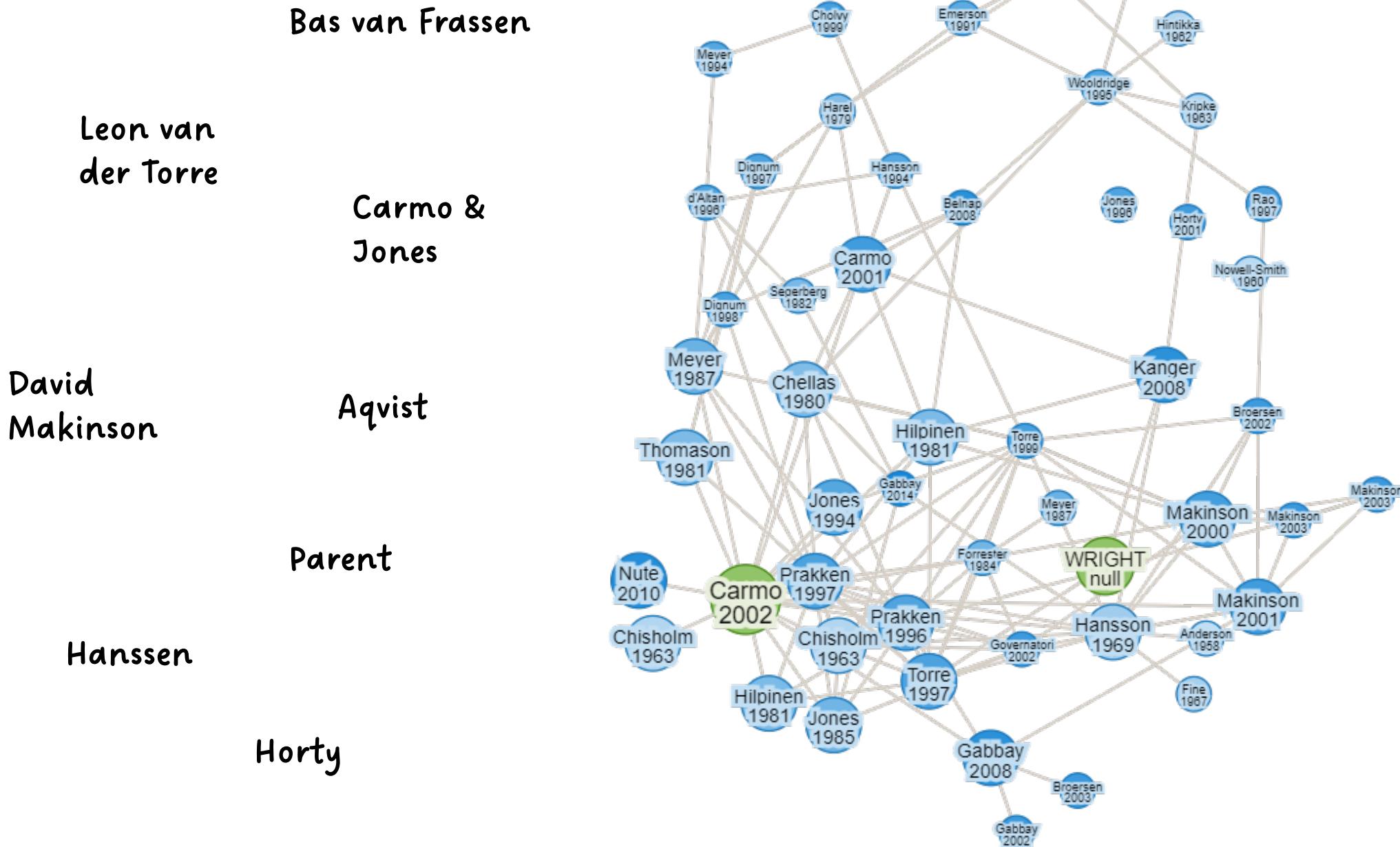
Volume 33, December 2020, 106409



Data Article

LogiKEy workbench: Deontic logics, logic combinations and expressive ethical and legal reasoning (Isabelle/HOL dataset)

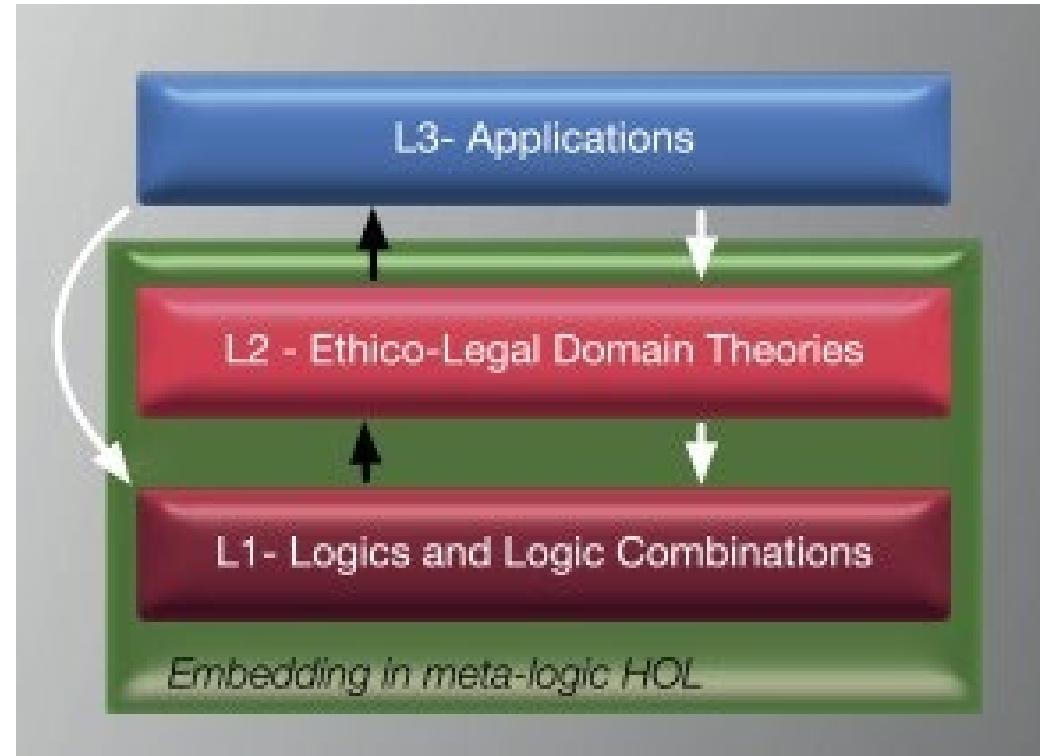
Christoph Benzmüller ^{a b}  , Ali Farjami ^a, David Fuenmayor ^b, Paul Meder ^a,
Xavier Parent ^a  , Alexander Steen ^a, Leendert van der Torre ^{a c}, Valeria Zahoransky ^{a d}



We are focusing on

Layer L1

Making L1
Customizable



LogiKEy Plus

*Obligation	✓
*Permission	✓
*Prohibition	✓
*Design Platform	✓
*Online Update	✗

Thanks to:
Andrea De Domenico,
Krishna Manoorkar,
Alessandra Palmigiano,
Mattia Panettiere,
Xiaolong Wang

Two upgrades:

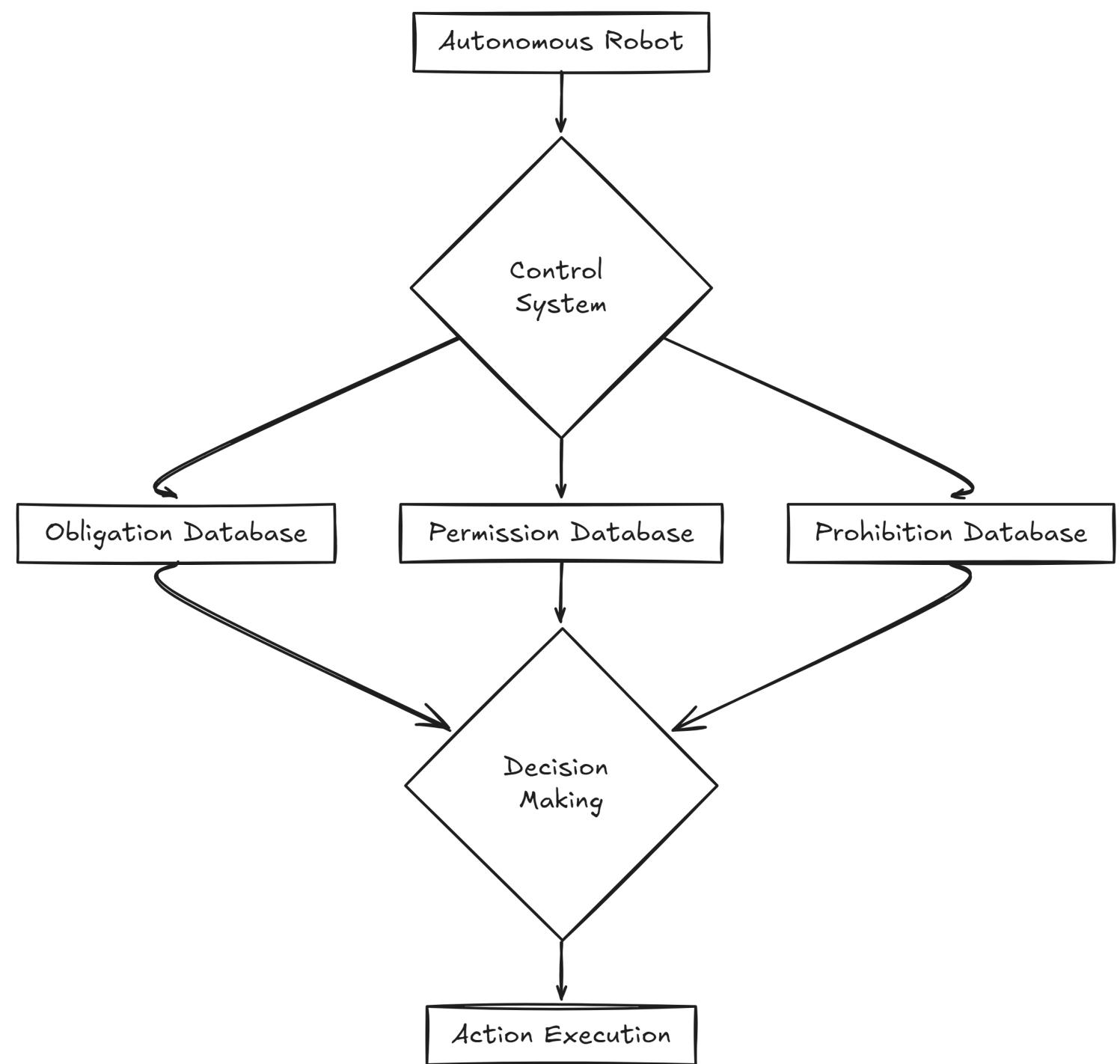
Accessing Memory

Deontic Control Systems:

Conflict management
Sorting and giving priority

Partial Database

No need for
coordination between
obligation, permission
and prohibition



Flexible Control System

Input/Output Logic:

Free

(Normative)

Software

Movement





Four Freedoms Speech

Freedom of speech and expression
Freedom of worship
Freedom from want
Freedom from fear



Open Source:

The freedom to run
the program as you
wish

The freedom to study
how the program
works, and change it

Easy to distribute:

The freedom to
redistribute copies

The freedom to distribute
copies of your modified
versions to others

No Dark Pattern

Axiom schemata for propositional logic (PL)

S5-schemata for \Box and \Diamond (S5)

$\Diamond(\psi_1 \rightarrow \psi_2/\varphi) \rightarrow (\Diamond(\psi_1/\varphi) \rightarrow \Diamond(\psi_2/\varphi))$ (COK)

$\Diamond(\psi/\varphi) \rightarrow \Box\Diamond(\psi/\varphi)$ (Abs)

$\Box\psi \rightarrow \Diamond(\psi/\varphi)$ (Nec)

$\Box(\varphi_1 \leftrightarrow \varphi_2) \rightarrow (\Diamond(\psi/\varphi_1) \leftrightarrow \Diamond(\psi/\varphi_2))$ (Ext)

$\Diamond(\varphi/\varphi)$ (Id)

$\Diamond(\psi/\varphi_1 \wedge \varphi_2) \rightarrow \Diamond(\varphi_2 \rightarrow \psi/\varphi_1)$ (Sh)

If $\vdash \varphi$ and $\vdash \varphi \rightarrow \psi$ then $\vdash \psi$ (MP)

If $\vdash \varphi$ then $\vdash \Box\varphi$ (N)

Four Freedoms for Deontic Logic

You are **free** to choose your base logic:

Propositional,
Intuitionistic,
Modal,...

Obligations and permissions on selfextensional logics

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Abstract

We further develop the abstract algebraic logic approach to input/output logic initiated in [13], where the family of selfextensional logics was proposed as a general background environment for input/output logics. In this paper, we introduce and discuss the generalizations of several types of permission (negative, dual negative, static, dynamic), as well as their interactions with normative systems, to various families of selfextensional logics, thereby proposing a systematic approach to the definition of normative and permission systems on nonclassical propositional bases.

Keywords: input/output logic, selfextensional logics, abstract algebraic logic.

You are **free** to fully characterize your logic: Adding and Removing Axioms

Obligations and permissions, algebraically

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Abstract

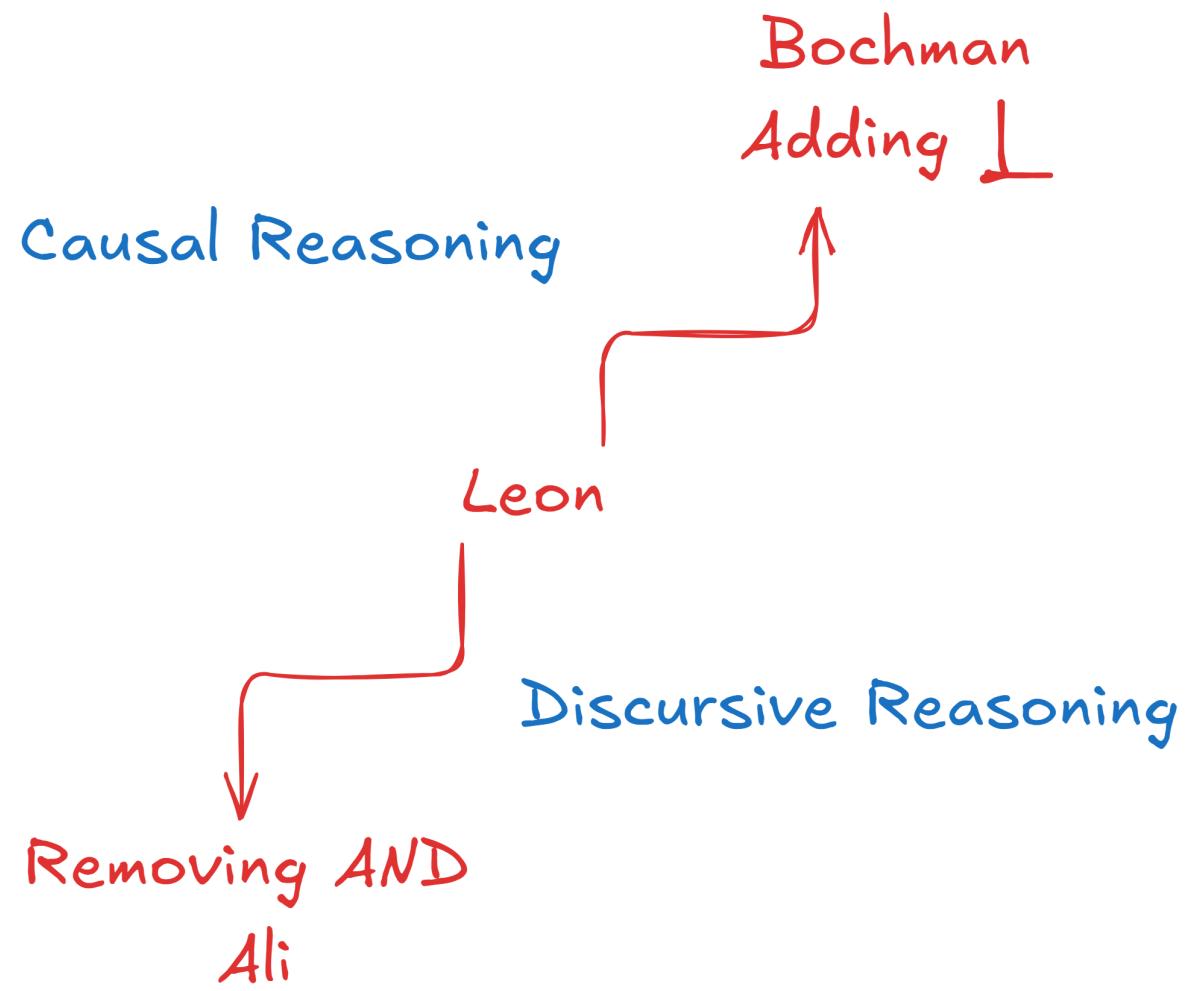
We further develop the algebraic approach to input/output logic initiated in [1], where subordination algebras and a family of their generalizations were proposed as a semantic environment of various input/output logics. In particular, we consider precontact algebras as a suitable algebraic environment for negative permission, and we characterize properties of several types of permission (negative, static, dynamic), as well as their interactions with normative systems, by means of suitable modal languages encoding outputs.

Keywords: input/output logic, subordination algebras, precontact algebras, selfextensional logics, slanted algebras, algorithmic correspondence theory.

2000 MSC: 03G25, 03G10

(\perp)	$\perp \prec \perp$	(\top)	$\top \prec \top$
(SB)	$\exists b(b \prec a)$	(SF)	$\exists b(a \prec b)$
(SI)	$a \leq b \prec x \Rightarrow a \prec x$	(WO)	$b \prec x \leq y \Rightarrow b \prec y$
(AND)	$a \prec x \& a \prec y \Rightarrow a \prec x \wedge y$	(OR)	$a \prec x \& b \prec x \Rightarrow a \vee b \prec x$
(DD)	$a \prec x_1 \& a \prec x_2 \Rightarrow \exists x(a \prec x \& x \leq x_1 \& x \leq x_2)$		
(UD)	$a_1 \prec x \& a_2 \prec x \Rightarrow \exists a(a \prec x \& a_1 \leq a \& a_2 \leq a)$		

Name	Properties
\diamond -defined	(DD) (SF)
\blacksquare -defined	(UD) (SB)
defined	\diamond -defined + \blacksquare -defined
\diamond -premonotone	\diamond -defined + (SI)
\blacksquare -premonotone	\blacksquare -defined + (WO)
\diamond -monotone	\diamond -premonotone + (WO)
\blacksquare -monotone	\blacksquare -premonotone + (SI)
monotone	\diamond -monotone + \blacksquare -monotone
\diamond -regular	\diamond -monotone + (OR)
\blacksquare -regular	\blacksquare -monotone + (AND)
regular	\diamond -regular + \blacksquare -regular
\diamond -normal	\diamond -regular + (\perp)
\blacksquare -normal	\blacksquare -regular + (\top)
subordination algebra	\diamond -normal + \blacksquare -normal



You are **free**
to combine
and design
new logics

Kracht formulas:
ob + Per + Pro

Correspondence and Inverse Correspondence for Input/Output Logic and Region-Based Theories of Space

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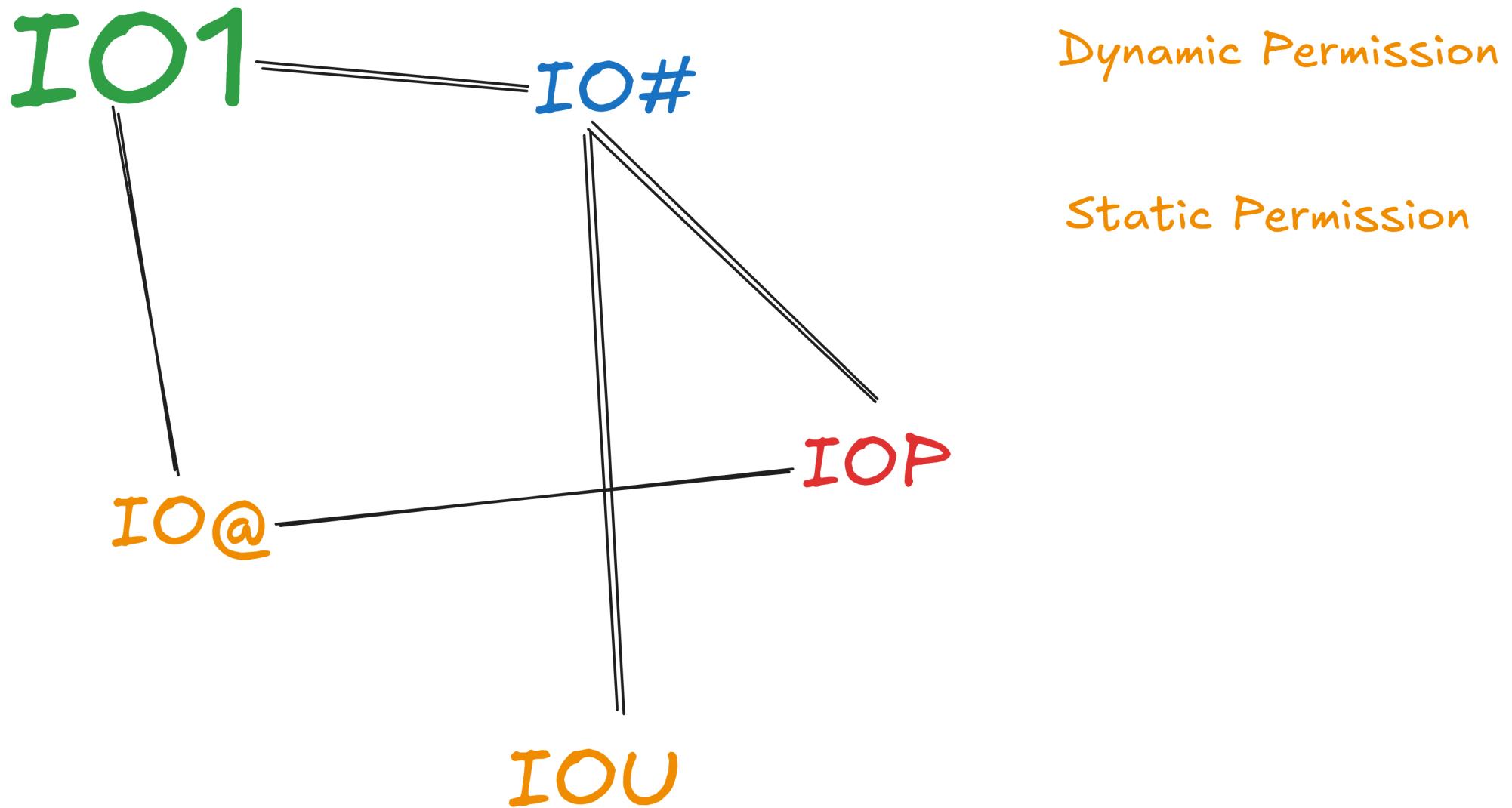
^dSchool of Philosophy and Social Development, Shandong University, Jinan, China

Abstract

We further develop the algebraic approach to input/output logic initiated in [27], where subordination algebras and a family of their generalizations were proposed as a semantic environment of various input/output logics. In particular: we extend the modal characterizations of a finite number of well known conditions on normative and permission systems, as well as on subordination, precontact, and dual precontact algebras developed in [29], to those corresponding to the infinite class of *analytic inequalities* in a modal language consisting both of positive and of negative unary modal operators; we characterize the syntactic shape of first-order conditions on algebras endowed with subordination, precontact, and dual precontact relations which guarantees these conditions to be the first-order correspondents of axioms in the modal language above; we introduce algorithms for computing the first-order correspondents of modal axioms on algebras endowed with subordination, precontact, and dual precontact relations, and conversely, for computing the modal axioms of which the conditions satisfying the suitable syntactic shape are the first-order correspondents; finally, we extend Celani's dual characterization results between subordination lattices and subordination spaces to a wider environment which also encompasses precontact and dual precontact relations, and relative to an infinite class of first order conditions relating subordination, precontact and dual precontact relations on distributive lattices.

Keywords: input/output logic, subordination algebras, subordination lattices, precontact algebras, Sahlqvist theory, inverse correspondence, Kracht's theorem.

Lion Project



You are
free to
efficiently
implement
your logic

```

consts I01 :: " $\tau \Rightarrow \tau$ " (" $\Diamond^1_0$ ")
consts I02 :: " $\tau \Rightarrow \tau$ " (" $\Diamond^2_0$ ")
consts I03 :: " $\tau \Rightarrow \tau$ " (" $\Diamond^3_0$ ")
consts I04 :: " $\tau \Rightarrow \tau$ " (" $\Diamond^4_0$ ")

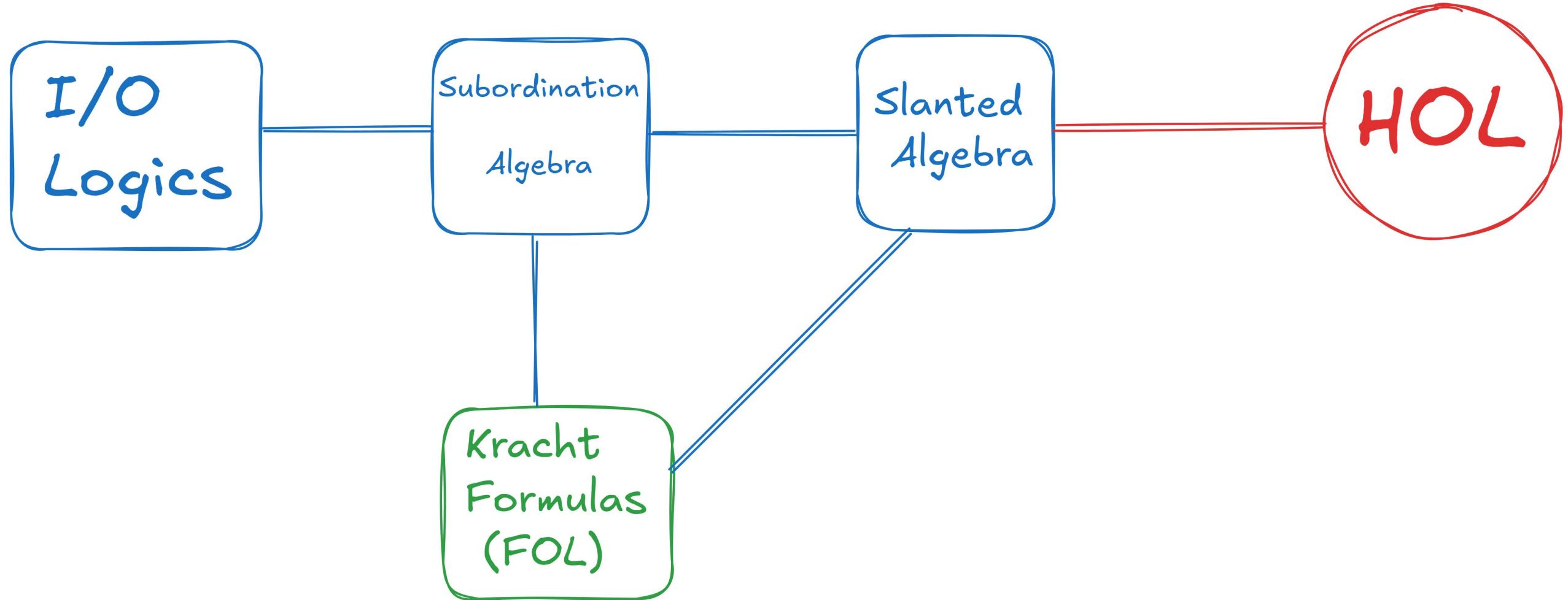
axiomatization where
ax_I01 : "monotone  $\Diamond^1_0$ " and
ax_I02 : "regular_dia  $\Diamond^2_0$ " and
ax_I03i : "monotone  $\Diamond^3_0$ " and
ax_I03ii : " $(\Diamond^3_0 \varphi) \leq \Diamond^3_0 (\varphi \wedge \Diamond^3_0 \varphi)$ " and
ax_I04i : "regular_dia  $\Diamond^4_0$ " and
ax_I04ii : " $(\Diamond^4_0 \varphi) \leq \Diamond^4_0 (\varphi \wedge \Diamond^4_0 \varphi)$ "

(*Soundness out1*)
lemma I01top: " $\Diamond^1_0 T \leq T$ " by (meson settrue_def)
lemma I01SI: " $((\Diamond^1_0 \alpha \leq \varphi) \wedge (\beta \leq \alpha)) \rightarrow (\Diamond^1_0 \beta \leq \varphi)$ " using monotone_def ax_I01 by force
lemma I01WO: " $((\Diamond^1_0 \alpha \leq \varphi) \wedge (\varphi \leq \psi)) \rightarrow (\Diamond^1_0 \alpha \leq \psi)$ " by simp
lemma I01AND: " $((\Diamond^1_0 \alpha \leq \varphi) \wedge (\Diamond^1_0 \alpha \leq \psi)) \rightarrow (\Diamond^1_0 \alpha \leq (\varphi \wedge \psi))$ " by (simp add: setand_def)

(*Soundness out2*)
lemma I02top: " $\Diamond^2_0 T \leq T$ " by (simp add: settrue_def)
lemma I02SI: " $((\Diamond^2_0 \alpha \leq \varphi) \wedge (\beta \leq \alpha)) \rightarrow (\Diamond^2_0 \beta \leq \varphi)$ " using regulartomonotone
  using monotone_def ax_I02 by fastforce
lemma I02WO: " $((\Diamond^2_0 \alpha \leq \varphi) \wedge (\varphi \leq \psi)) \rightarrow (\Diamond^2_0 \alpha \leq \psi)$ " by simp
lemma I02AND: " $((\Diamond^2_0 \alpha \leq \varphi) \wedge (\Diamond^2_0 \alpha \leq \psi)) \rightarrow (\Diamond^2_0 \alpha \leq (\varphi \wedge \psi))$ " by (simp add: setand_def)
lemma I02OR: " $((\Diamond^2_0 \alpha \leq \varphi) \wedge (\Diamond^2_0 \beta \leq \varphi)) \rightarrow (\Diamond^2_0 (\alpha \vee \beta) \leq \varphi)$ " using ax_I02 regular_dia_def regular_dia_def setor_def by auto

(*Soundness out3*)
lemma I03top: " $\Diamond^3_0 T \leq T$ " by (simp add: settrue_def)
lemma I03SI: " $((\Diamond^3_0 \alpha \leq \varphi) \wedge (\beta \leq \alpha)) \rightarrow (\Diamond^3_0 \beta \leq \varphi)$ " using monotone_def ax_I03i by fastforce
lemma I03WO: " $((\Diamond^3_0 \alpha \leq \varphi) \wedge (\varphi \leq \psi)) \rightarrow (\Diamond^3_0 \alpha \leq \psi)$ " by simp
lemma I03AND: " $((\Diamond^3_0 \alpha \leq \varphi) \wedge (\Diamond^3_0 \alpha \leq \psi)) \rightarrow (\Diamond^3_0 \alpha \leq (\varphi \wedge \psi))$ " by (simp add: setand_def)
lemma I03CT: " $((\Diamond^3_0 \alpha \leq \varphi) \wedge (\Diamond^3_0 (\alpha \wedge \varphi) \leq \psi)) \rightarrow (\Diamond^3_0 \alpha \leq \psi)$ " using monotone_def ax_I03i ax_I03ii setand_def by (smt (verit, ccfv_threshold))

```



2035

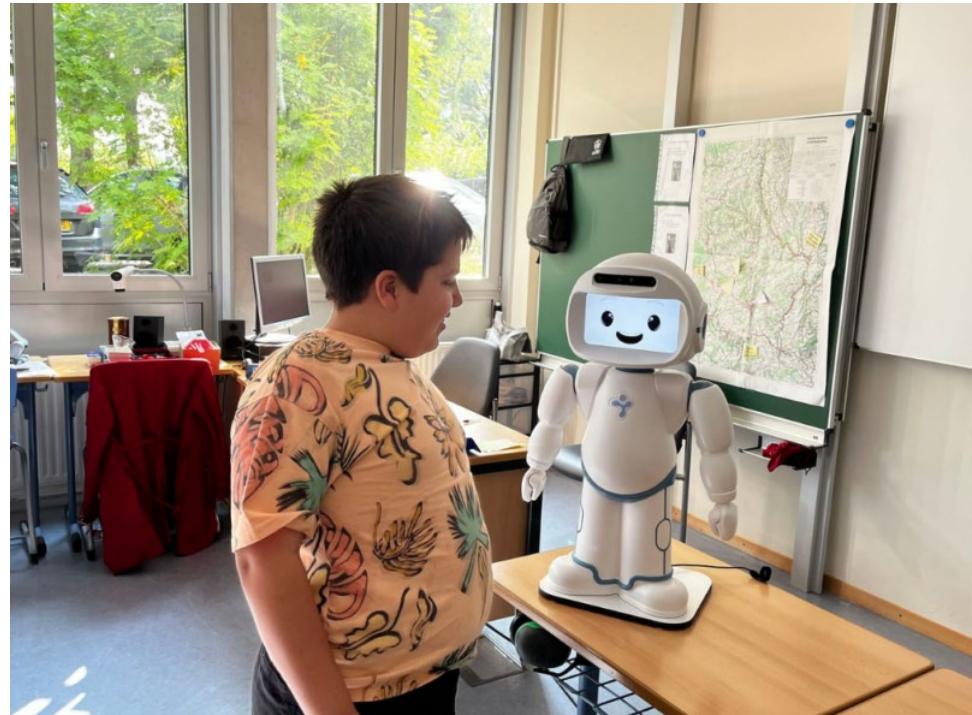


Photo from silicon Luxembourg

Student Robots Clash: Cooperation Crisis in Schools

In 2035, schools face new challenges as student-owned robots struggle to cooperate, leading to conflicts and disruptions. Educators are working to address the growing issue of robot rivalry in classrooms.



Generative Agents: Interactive Simulacra of Human Behavior

LogiKEy Team

*Obligation



*Permission



*Prohibition



*Design Platform



*Online Update



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NEURIPS 2024: THE CONCORDIA CONTEST



\$10,000 in Prizes!

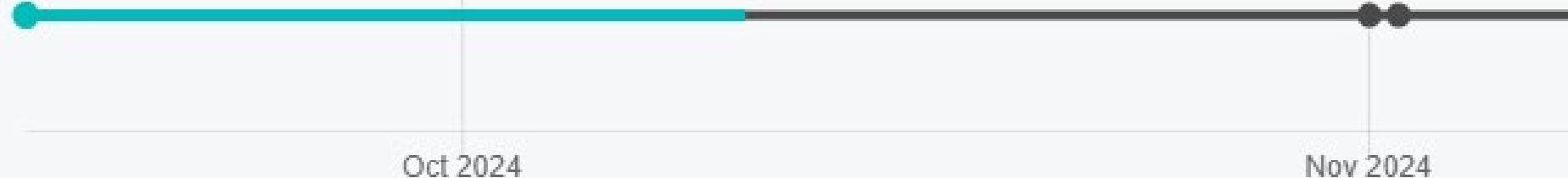
ORGANIZED BY: [Concordia Contest Team](#)

CURRENT PHASE ENDS: November 1, 2024 At 1:00 AM GMT

CURRENT SERVER TIME: October 10, 2024 At 11:28 AM GM

Docker image: [ihsaanullah/concordia:latest](#)

Competition Report: <https://www.cooperativeai.com/contests/concordia-2024>



RL 2020: Humans **punish** and **reward** AI agents.

By 2030: AI agents will be capable of **punishing** each other.

Deception: AI agents **deceive** other AI agents and humans to avoid **punishment** or receive more **rewards**.

LogiKEy for Organizations:

Please contact ali.farjami@uni.lu
for dealing prices and more
discussions!

Special Offer for Kindergartens