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Research Topic

Logical Framework

Research Problem

What expressions should be included in the logical framework of a computer programming language?

Problem Statement

Given a programming language, certifications, and a relationship to prove, construct logical operators and arguments that allow efficient reasoning.

Problem Description

The logical framework specifies logics and programming languages and enables people to reason about them. The proposed research topic involved extending the expression power of language. The logical framework needs to be extensive enough to allow efficient reasoning about certifications and proofs, while constrained and defined enough to allow reasoning.

Computer Science Perspective

The logical framework is a necessary foundation for proving the logic of security in computing, among other applications. It is a tool to make sure that whatever you are working on actually makes sense.

Disciplines Actively Involved

Mathematics and Philosophy

Other Discipline Involved

The logical framework overlaps advanced calculus in mathematics and logic in philosophy. Principles in cryptography are certainly developed with the logical framework, however, cryptology was presented as a tool to verify certain logical statements from a security perspective and not the other way around in this talk.

Actively Involved Discipline is defined as a discipline associated with an investigator working on the research problem.

References

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- Uluç Saranlı and Frank Pfenning. Using constrained intuitionistic linear logic for hybrid robotic planning problems. In *Proceedings of the International Conference on Robotics and Automation (ICRA'07)*, Rome Italy, April 2007. IEEE Computer Society Press. To appear. [\[PDF\]](#)
- Kevin D. Bowers, Lujo Bauer, Deepak Garg, Frank Pfenning, and Michael K. Reiter. Consumable credentials in logic-based access-control systems. In *Proceedings of the 14th Annual Network and Distributed System Security Symposium (NDSS'07)*, San Diego, California, February 2007. Internet Society. To appear. Preliminary version available as Technical Report CMU-CYLAB-06-002, Carnegie Mellon University, February 2006. [\[PDF\]](#)

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