Outputting Actema Proofs

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Context
Coq is a well-known proof system, based on type theory whose development is organized by Inria. Actema is a prototype of a novel user interface for building formal proofs, developed at LIX; it builds on theoretical tools coming from Deep Inference, and is based on the idea that the user can easily point to subterms of either the goal or hypotheses. A description can be found in [1].

A first version of Actema, restricted to first-order logic can be tested online (http://actema.xyz/). A new version, not yet publicly available, acts as a front-end for Coq.

Goal
This Coq-Actema implementations includes Actema as a front-end, which has been adapted by Pablo Donato to present Coq proof states, and export the Actema actions back to Coq. Specialized tactics, written by Benjamin Werner, translate these actions into the type theory of Coq.

The resulting Coq proof term, however, is hard to read. There are several open paths for rendering Actema proofs in a readable manner; among others:
- Finding a readable textual output which could be re-run by Coq in textual mode.
- Some kind of video output, “replaying” the proof.
Although this can be discussed, the first idea would probably be the primary goal of the internship.

This involves a good understanding of the deep inference tactics, and probably some rewriting of them. A nice side-effect could be providing a usable version of these tactics for users of textual Coq.

Assessment
There should be a fair balance between theory and implementation in the work to be done. Knowledge of Coq, logic, and a taste for functional programming are mandatory. There also may be some more algorithmic questions to tackle.

Bibliography
