Ontology Course Notes

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1 SUMOjEdit

1.1 Problem Statement

- Write statements in logic
- An expressive logic (a HOL) so visual/graph editing not possible
- Big library of theories so remembering/checking types and signatures are important
- Need to make it easier for newcomers to write correct code
- Primarily use automated theorem proving, but using them like interactive theorem provers can be helpful

1.2 Theory Library

Suggested Upper Merged Ontology (SUMO)

- Started in year 2000, open source
- 20,000 terms, 80,000 statements
- Dozens of domain ontologies
- Mapped to GlobalWordNet for NLP applications

1.3 Sigma Knowledge Engineering Environment

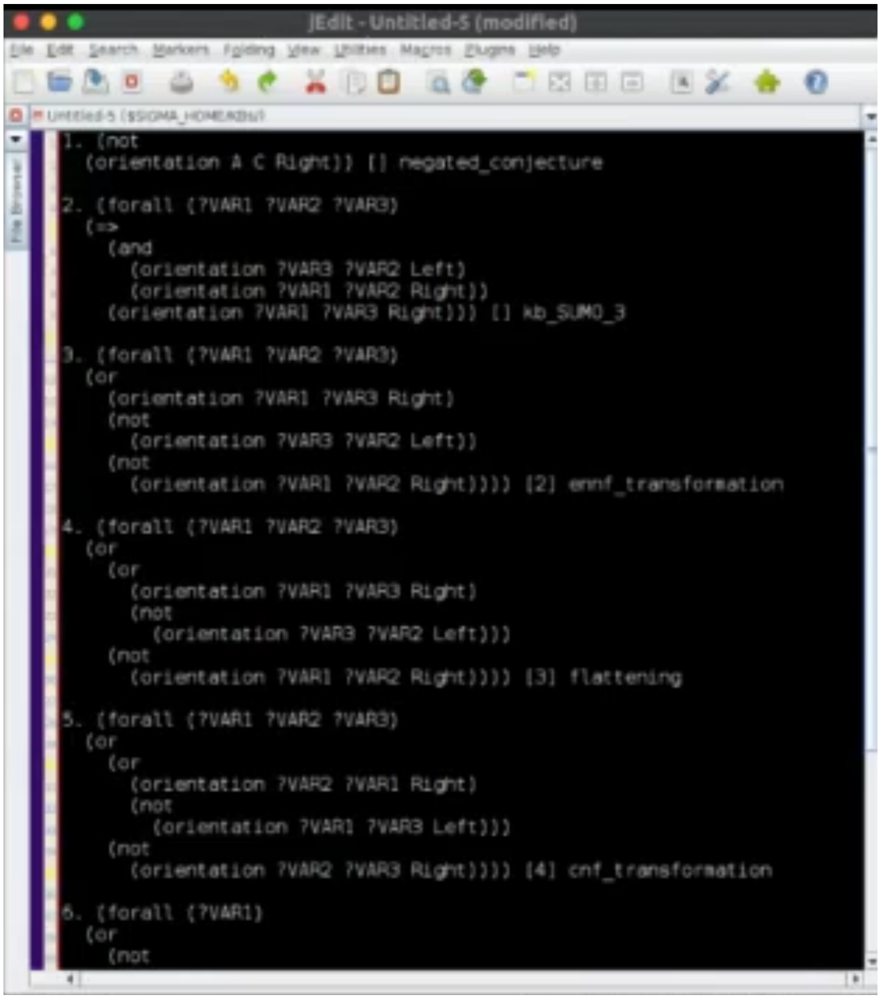
- Co-evolved with SUMO since inception
- Browsing, error checking
- Translation from SUMO into TPTP, TF0, THF
- Interface to E from Vampire and SystemOnTPTP
- Reused for SUMOjEdit

1.4 Editor Features

- Color coding — logical operators, fundamental relations, docs
- Errors and warnings
- Formatting
- Open browser
- Go to definition
- Theorem proving

1.5 Theorem Proving Interface

- Highlight any statement
- Converted to TPTP
- Sent to E or Vampire
- Proof converted back to SUO-KIF/SUMO


jEdit - Untitled-5 (modified)
File Edit Search Markers Folding View Utilities Macros Plugins Help
Untitled-5 ($SIGMA_HOME/KBs/)
File Browser

```
1. (not
  (orientation A C Right)) [] negated_conjecture

2. (forall (?VAR1 ?VAR2 ?VAR3)
  (=>
    (and
      (orientation ?VAR3 ?VAR2 Left)
      (orientation ?VAR1 ?VAR2 Right))
    (orientation ?VAR1 ?VAR3 Right))) [] kb_SUMO_3

3. (forall (?VAR1 ?VAR2 ?VAR3)
  (or
    (orientation ?VAR1 ?VAR3 Right)
    (not
      (orientation ?VAR3 ?VAR2 Left))
    (not
      (orientation ?VAR1 ?VAR2 Right)))) [2] ennf_transformation

4. (forall (?VAR1 ?VAR2 ?VAR3)
  (or
    (or
      (orientation ?VAR1 ?VAR3 Right)
      (not
        (orientation ?VAR3 ?VAR2 Left)))
    (not
      (orientation ?VAR1 ?VAR2 Right)))) [3] flattening

5. (forall (?VAR1 ?VAR2 ?VAR3)
  (or
    (or
      (orientation ?VAR2 ?VAR1 Right)
      (not
        (orientation ?VAR1 ?VAR3 Left)))
    (not
      (orientation ?VAR2 ?VAR3 Right)))) [4] cnf_transformation

6. (forall (?VAR1)
  (or
    (not
```

Figure 1: Theorem proving interface