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Porting and refactoring Prolog programs: the PROSYN® case study

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The PROSYN System:

- A huge expert system for chemical process design
- Remarkable aspects:
  - Very large: ~1M source code lines (a lot of copy pasted code)
  - Written over a long period of time (since 1987)
  - Most authors where not professional programmers
- Components:
  - Expert modules supporting a task in chemical process design
  - User Interface subsystem: input widgets and feedback
  - Data sources: text files, databases, external programs
  - General Infrastructure:
    - load/saving of inferred facts
    - meta-interpretation of knowledge rules
    - load on demand subsystem
  - Portability framework: Unix/X11 to Windows/MFC (incomplete)

Challenges of the porting process

- **Porting**
  - IF/Prolog emulation in SWI-Prolog
  - Dialect support to allow interoperability between different flavors of Prolog. Wielemaker and Costa 2011
- **Debugging**
  - Ciao Assertion Language. Hermenegildo et al. 2005
  - Run-time checking of assertions. Mera et al. 2009
  - Porting of this Ciao tools to SWI-Prolog (emulation)
- **Refactoring**
  - New tool that allows term rewriting at source level
  - Based on source location and reflexive capabilities

Real demo!

- **Debugging session:**
  - First we run the program.
  - Now we run it enabling checking (run/compile time)
  - An error is shown, telling us that a type is incorrect
  - Therefore, a fix is required
  - Now the error is fixed
- **Refactoring example:**
  - `ignore(A) :- (A → true ; true).`

Conclusions

- The combination of the existing tools in Ciao and SWI-Prolog plus the refactoring tool provides a good basis for porting and refactoring of a poorly structured program
- Interesting case study where the application of such tools has been instrumental
- Developed tools available at:

https://github.com/edisonm/