Ratselfax

Solves combinatorial problems.

Ratselfax is a toolset to solve combinatorial problems over the finite integer domain (to say it simple: a SAT solver just not limitied to boolean).

Design properties include:

- Native integer, no convert to boolean
- Native suport for clauses, selects, orclaws, ties, ...
- Strengthend conflict analysis
- Conflict driven choosing
- Allows to solve combinatorial optimization problems (MaxSAT,...)
- The alphabet per var must be small (design focus is in the order of tens of symbols, but that's no hardcoded limit for the core).

Supported input formats depend on frontend:

- **ratselfax_cnf** solves boolean satisfiability and optimization problems encoded in dimacs .cnf and .wcnf formats
- **ratselfax_xcsp** solves xcsp-encoded csp/wcsp problems
- **ratselfax** has it's own problem description language

The implementation is relativly generic, missing some optimization more specialized and/or more mature software typically would include. It's just the result of some few tens of weeks of one-person development.

The solver doesn't directly inherit any algorithms from other software, but the outcome of it's developement in many aspects matches what most successfull solvers are known to do: For example, the technique of using 2-watched literals to speed up clause-based constraint propagation is a relatively natural consequence of clause based constraint propagation. The first-UIP sheme also is (besides indentify decision roots) a naturally attractive basis for designing a conflict tracker. Basing assumption choices on conflict analysis feedback also is a totally natural aproach, but on the other hand, the way interactions of learning- and choosing shemes perform is extremely counter-intuitive to analyse, if not totally unpredictable.

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Jan Bruns is a poor german person, so in the unlikely scenario that you intend to use the software or derivates commercially, this would require additional licensing. I also don't like weapons, and other things designed to harm, and I have my very own oppinion about what might harm. For example, I'm not a fan of genome research, and not every single scientific advance is always worth some collateral damage. Please don't use this piece of software for overly ugly things.

Gruss

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