SWORD v1.0

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SWORD SMT-COMP 2008

- DPLL-solver
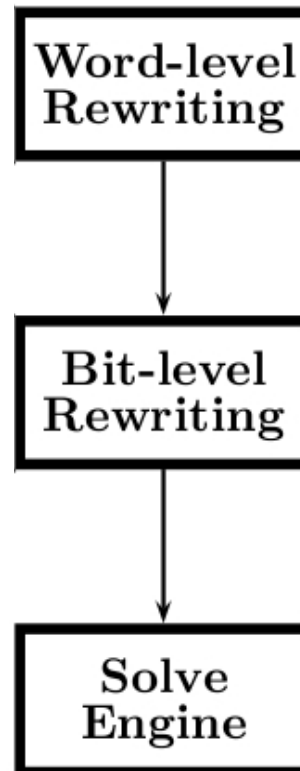- Extended by module concept
- Without any preprocessing

Modules:

- Sub-units with functionality for propagation and decision heuristics
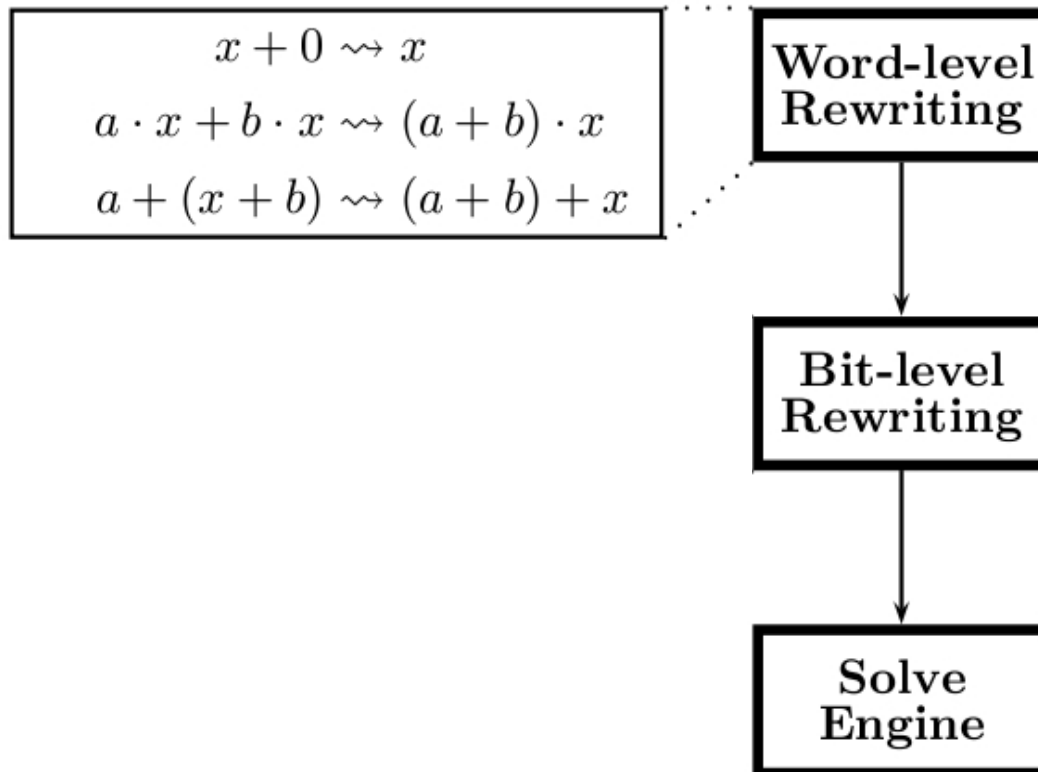- E.g. ADD, MUL, and DIV

Lessons Learned

- Module concept yields speed-up compared to pure bit blasting

- Preprocessing is very important

- Some instances can be "solved" using term rewriting and unit propagation only
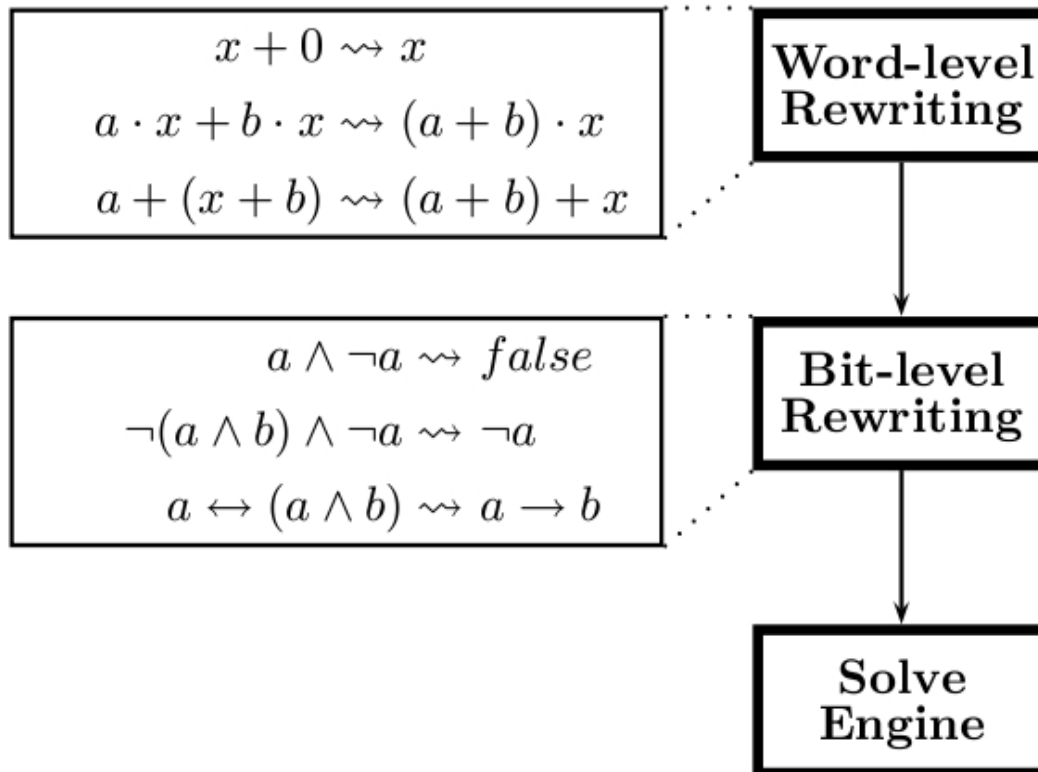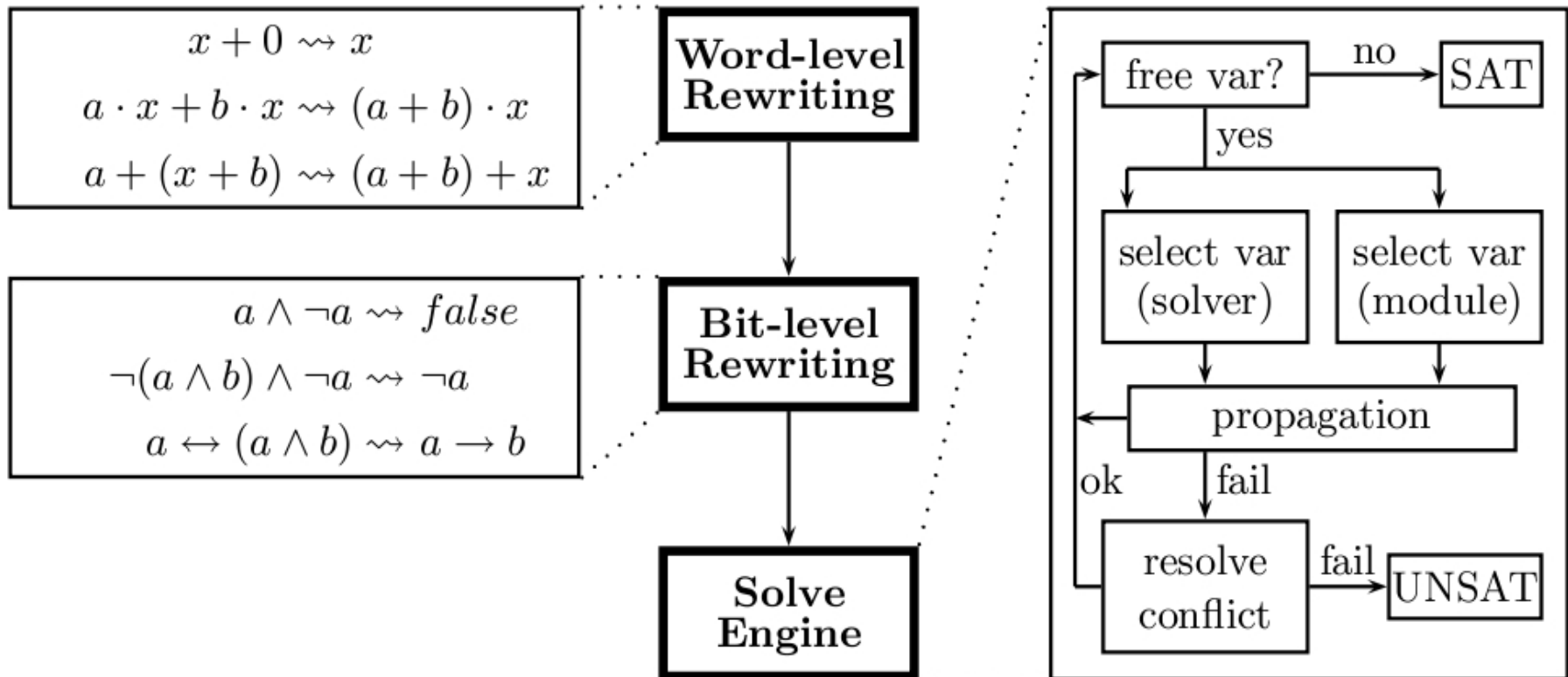
SWORD Architecture

SWORD Architecture

$$x + 0 \rightsquigarrow x$$
$$a \cdot x + b \cdot x \rightsquigarrow (a + b) \cdot x$$
$$a + (x + b) \rightsquigarrow (a + b) + x$$

Word-level Rewriting

Bit-level Rewriting

Solve Engine

SWORD Architecture

$$x + 0 \rightsquigarrow x$$
$$a \cdot x + b \cdot x \rightsquigarrow (a + b) \cdot x$$
$$a + (x + b) \rightsquigarrow (a + b) + x$$

Word-level Rewriting

$$a \wedge \neg a \rightsquigarrow false$$
$$\neg(a \wedge b) \wedge \neg a \rightsquigarrow \neg a$$
$$a \leftrightarrow (a \wedge b) \rightsquigarrow a \rightarrow b$$

Bit-level Rewriting

Solve Engine

SWORD Architecture

Current + Future Work

- Study new possibilities given by modules
- API + library

- Support of QF_AUFBV?