



LOGIC AND COMPUTATION

## Building and Combining Unification and Matching Procedures.

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### **Abstract.**

The concept of unification is ubiquitous in logic programming and in automated reasoning, for instance to perform deduction in theorem proving. Equational unification consists in finding instances of terms so that these instances are equivalent with respect to an equational theory given by some set of axioms. Equational unification being undecidable in general, it is important to identify equational theories and simple cases where it is possible to obtain sound, complete and terminating unification procedures. Matching is a particular (simple) case of unification of greatest interest to execute rule-based programs and to perform simplification in theorem proving. We show a systematic approach to build and to combine unification and matching algorithms for a large class of equational theories. We illustrate the approach on equational theories of practical interest in the analysis of security protocols.