Verifying the Absence Property Pattern

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Abstract: Temporal properties are very common in various classes of systems, including information systems and security policies. This paper investigates two verification methods, proof and model checking, for one of the most frequent patterns of temporal property, the absence pattern. We explore two model-based specification techniques, B and Alloy, because of their adequacy for easily specifying systems with complex data structures, like information systems. We propose a first-order, assertion-based, sound and complete strategy to verify the absence pattern. This enables the proof of the absence pattern using conventional first-order provers. It also significantly increases the size of the models that can be checked, when compared to traditional LTL model checking techniques. The approach is illustrated throughout a case study.