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# Concurrency and inheritance in actor-based object-oriented languages

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## Abstract

The combination of concurrent and object-oriented programming is a promising paradigm. However, the design of such an integrated language faces a serious problem: concurrent features of the language may interfere with object-oriented features such as inheritance and encapsulation. We present a new concurrency control mechanism for concurrent object-oriented languages based on the actor model, with the aim of avoiding such a problem. The concurrency constraints of an object are expressed with a pair of constructs—behavior abstraction sets and replacement clauses. They are completely separated from the code of methods; moreover, they are the units of inheritance. We introduce a new replacement scheme called lazy replacement for actor-based languages to reduce complexity in expressing the concurrency constraints of objects. We examine the relationship between the proposed concurrency control mechanism and a well-known inheritance mechanism using an experimental language.

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