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Abstract

Exceptional Actors: Implementing Exception Handling for Encore

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Encore is an object-oriented programming language which uses the actor model as its concurrency model, and is specifically aimed at implementing concurrent and parallel systems. Communication between actors is done via asynchronous method calls, which store their results in futures, placeholder objects for later storing the result of an computation. Encore currently lacks an exception handling mechanism, which is an important part of programming languages, and helps programmers create more fault tolerant and robust software. This thesis presents an exception handling implementation for Encore, in which futures are used to propagate errors between actors. The implementation uses a modified version of the open-source library Exceptions4C as a basis, and enables basic exception handling through try-catch-finally expressions. It uses type-based matching that also considers subtyping, and allows the programmer to define and throw custom exception types. A pull-model is used to enable inter-process communication of exceptions, where receiving actors can choose to handle exceptions at any point by consuming associated futures. The implementation is a good first step, but there are Encore features such as streams which it does not yet support. Furthermore, it brings an overhead to programs, which can be reduced by redesigning parts of the exception handling model.

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