Definitive Parallel Programming

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A thesis submitted for the award of
a Master's degree by research in Computer Science

Abstract

In this thesis we introduce definitive (definition-based) programming, and examine its applicablity to both parallel synchronous programming and modelling and synchronisation of concurrent systems. We show that definitions can be used to program in a highly parallel but interference-free manner, by taking advantage of the synchronous nature of operation of our model of computation, the abstract definitive machine (adm). We introduce a cognitively-based definitive specification notation called LSD, which allows modelling of concurrent systems in a natural manner. An LSD specification can be transformed into a family of adm programs, to allow simulation of the behaviour described by the specification. This strategy combines the cognitive expressiveness of LSD and the computational power of the adm.

Keywords: parallel programming, state-transition system, definitive programming, modelling, simulation, specification, agent, synchronisation.

September 1989