CONTROL OF ACTIVITIES IN THE OR-PARALLEL TOKEN MACHINE

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ABSTRACT

A machine model consisting of a limited number of processors, a token pool and a storage has been defined, [HaCi]. A token represents the state of a process, which in turn executes a branch in the search tree of a logic program. Tokens in the token pool correspond to processes which are ready for execution but not allocated a processor. Processors execute processes as presecribed by the tokens and create new tokens. During an Or-parallel execution the number of processes usually exceedes the number of available processors. The problem of controlling the number of activities can be divided into two subproblems: (1) controlling the traversal of the search tree and (2) prunning some branches of the search tree. The solution to (1) can been seen as a scheduling problem and will be discussed in a forthcoming paper. To solve (2) we device a mechanism for prunning the search tree, removing from the system tokens representing no longer needed computations, when only one solution to a problem or a subproblem is required. We show how the mechanism is incorporated into the Or-parallel token machine without imposing any process hierarchy or message passing. We define a translation of the extended source language programs, [Ha,HHT], into sequences of abstract machine instructions and define the interpretation cycle of a processor for the extended instruction set. Finally we discuss how the mechanism can be generalised to prun ing of the trees when at most n solutions is reguired, and for guarded clauses [ClGr,Sh].

References

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