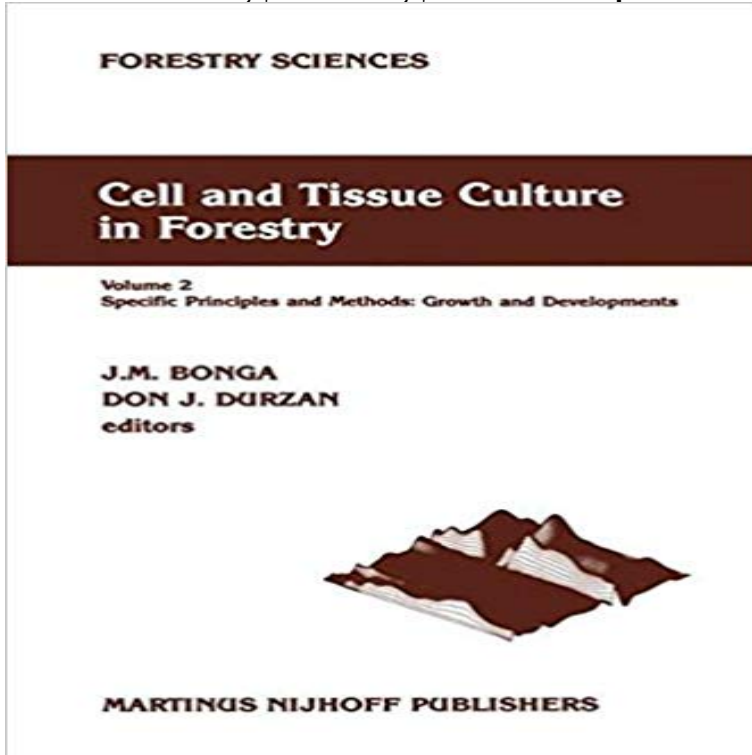


A High Performance Architecture for Prolog (The Springer International Series in Engineering and Computer Science)



Artificial Intelligence is entering the mainstream of computer applications and as techniques are developed and integrated into a wide variety of areas they are beginning to tax the processing power of conventional architectures. To meet this demand, specialized architectures providing support for the unique features of symbolic processing languages are emerging. The goal of the research presented here is to show that an architecture specialized for Prolog can achieve a ten-fold improvement in performance over conventional, general-purpose architectures. This book presents such an architecture for high performance execution of Prolog programs. The architecture is based on the abstract machine description introduced by David H.D. Warren known as the Warren Abstract Machine (WAM). The execution model of the WAM is described and extended to provide a complete Instruction Set Architecture (ISA) for Prolog known as the PLM. This ISA is then realized in a microarchitecture and finally in a hardware design. The work described here represents one of the first efforts to implement the WAM model in hardware. The approach taken is that of direct implementation of the high level WAM instruction set in hardware resulting in an *else* style architecture.

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