

Preface

The problem of cache coherence (consistency) has been studied for almost two decades now, and so far most of the solutions introduced have been on the hardware level. A representative set of papers dealing with hardware issues of the cache coherence problem has been selected and presented in a companion IEEE Computer Society Press book *The Cache Coherence Problem in Shared Memory Multiprocessors: Hardware Solutions*, edited by M. Tomašević and V. Milutinović.

Intensive work on the development of software mechanisms for coherence maintenance began in the second half of the 1980s. Almost all software solutions (except some trivial ones) are developed through academic research and implemented only in prototype machines. Thus we have found that the field of software techniques for maintaining the cache coherence is wide open for future research and development. This book is viewed as a selection of papers dealing with state-of-the-art software solutions for cache coherence maintenance in shared-memory multiprocessors. As such, this selection is a near complement with the selection given in the previously mentioned Tomašević-Milutinović book.

This book is intended for readers who are experienced in computer engineering but uninitiated in the topic of cache coherence. In our opinion, the selection of papers in this book will satisfy readers who wish to gain an in-depth understanding of the problem, as well as those interested in a comprehensive, relatively broad overview. We think that this book will be of special interest for both categories of multicomputer investigators and designers: computer architects and compiler writers. Because it includes most of the representative approaches to the software coherence maintenance, as well as a number of efforts in the related performance evaluation field, this book may also be used as a software coherence reference handbook for advanced undergraduate and typical graduate students in multiprocessing and multiprogramming areas.

Most of the preparational work for this IEEE Computer Society Press book was completed prior to November 1993; that is why some recent references are not reprinted. Instead, we have only listed them as suggestions for further reading.

This book summarizes our half-decade long research and education efforts in the field of software coherency. Our research views are built into this book (the initial research efforts were supported by NCR Corporation.) Our educational views have been expressed through numerous conference tutorials (at some of the leading conferences in the field) and in house presentations (for some of the leading industry in the field), both in the USA and Europe.

In addition to this book, we have prepared a set of transparencies for a 6-hour tutorial presentation. These transparencies include carefully prepared step-by-

step examples for a number of approaches covered in the book. For more information, interested readers are welcome to contact the authors by e-mail (etartalj@ubbg.etf.bg.ac.yu) or (emilutiv@ubbg.etf.bg.ac.yu).

The selected papers (27) for this tutorial are organized into five chapters. Each chapter is devoted to a separate topic, although we are aware that some of the papers could have been classified into two, or maybe even more, chapters. Short editors' introductions are given for the entire book, and then for each chapter separately.

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