

An Introduction to Parallel Programming Solutions, Chapter 1

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1.

```
quotient = n / p;
remainder = n % p;
if (my_rank < remainder) {
    my_n_count = quotient + 1;
    my_first_i = my_rank * my_n_count;
} else {
    my_n_count = quotient;
    my_first_i = my_rank * my_n_count + remainder;
}
my_last_i = my_first_i + my_n_count;
```
2. We are assigning blocks of elements to cores in order (the first n/p elements to core 0, the next n/p elements to core 1, so on). So, for example, if $n = 12$ and $p = 4$, core 0 spends 12 milliseconds in the call to `Compute_next_value` ($i = 0, 1, 2$), core 1 spends 30 milliseconds ($i = 3, 4, 5$), core 2 spends 48 milliseconds ($i = 6, 7, 8$), and core 3 spends 66 milliseconds ($i = 9, 10, 11$). So clearly this assignment will do a very poor job of load balancing.
A better approach uses a cyclic assignment of the work to the cores:

```
/* assign[c][j] is the jth value of i assigned to core c */
/* work[c] is the total amount of work assigned to core c */
c = j = 0;
for (i = 0; i < n; i++) {
    work[c] += 2*(i+1);
    assign[c][j] = i;
    c = (c + 1) % p;
    if (c == 0) j++;
}
```

Introduction To Parallel Programming Solution Manual

Subodh Kumar

Introduction To Parallel Programming Solution Manual:

Introduction to Parallel Programming Subodh Kumar,2023-01-05 In modern computer science there exists no truly sequential computing system and most advanced programming is parallel programming This is particularly evident in modern application domains like scientific computation data science machine intelligence etc This lucid introductory textbook will be invaluable to students of computer science and technology acting as a self contained primer to parallel programming It takes the reader from introduction to expertise addressing a broad gamut of issues It covers different parallel programming styles describes parallel architecture includes parallel programming frameworks and techniques presents algorithmic and analysis techniques and discusses parallel design and performance issues With its broad coverage the book can be useful in a wide range of courses and can also prove useful as a ready reckoner for professionals in the field

Introduction to Parallel Computing Vipin Kumar,2001-07-01 *Parallel Programming* Thomas Rauber,Gudula Rünger,2013-06-13 Innovations in hardware architecture like hyper threading or multicore processors mean that parallel computing resources are available for inexpensive desktop computers In only a few years many standard software products will be based on concepts of parallel programming implemented on such hardware and the range of applications will be much broader than that of scientific computing up to now the main application area for parallel computing Rauber and Rünger take up these recent developments in processor architecture by giving detailed descriptions of parallel programming techniques that are necessary for developing efficient programs for multicore processors as well as for parallel cluster systems and supercomputers Their book is structured in three main parts covering all areas of parallel computing the architecture of parallel systems parallel programming models and environments and the implementation of efficient application algorithms The emphasis lies on parallel programming techniques needed for different architectures For this second edition all chapters have been carefully revised The chapter on architecture of parallel systems has been updated considerably with a greater emphasis on the architecture of multicore systems and adding new material on the latest developments in computer architecture Lastly a completely new chapter on general purpose GPUs and the corresponding programming techniques has been added The main goal of the book is to present parallel programming techniques that can be used in many situations for a broad range of application areas and which enable the reader to develop correct and efficient parallel programs Many examples and exercises are provided to show how to apply the techniques The book can be used as both a textbook for students and a reference book for professionals The material presented has been used for courses in parallel programming at different universities for many years **OpenMP Shared Memory Parallel Programming** Rudolf Eigenmann,Michael J. Voss,2003-05-15 This book contains the presentations given at the Workshop on OpenMP Applications and Tools WOMPAT 2001 The workshop was held on July 30 and 31 2001 at Purdue University West Lafayette Indiana USA It brought together designers users and researchers of the OpenMP application programming interface OpenMP

has emerged as the standard for shared memory parallel programming. For the first time it is possible to write parallel programs that are portable across the majority of shared memory parallel computers. WOMPAT 2001 served as a forum for all those interested in OpenMP and allowed them to meet, share ideas and experiences and discuss the latest developments of OpenMP and its applications. WOMPAT 2001 was co-sponsored by the OpenMP Architecture Review Board (ARB). It followed a series of workshops on OpenMP including WOMPAT 2000, EWOMP 2000 and WOMPEI 2000. For WOMPAT 2001 we solicited papers formally and published them in the form of this book. The authors submitted extended abstracts which were reviewed by the program committee. All submitted papers were accepted. The authors were asked to prepare a final paper in which they addressed the reviewers' comments. The proceedings in the form of this book were created in time to be available at the workshop. In this way we hope to have brought out a timely report of ongoing OpenMP related research and development efforts as well as ideas for future improvements.

Introduction to Parallel Computing Ananth Grama, 2003. A complete source of information on almost all aspects of parallel computing, from introduction to architectures to programming paradigms to algorithms to programming standards. It covers traditional Computer Science algorithms, scientific computing algorithms and data intensive algorithms.

Books in Print Supplement, 2002 Solutions Manual to Scientific Parallel Computing L. R. Scott, 2005-01-05 **The British National Bibliography** Arthur James Wells, 2000 First Annual OSU Workshop on Parallel Computing, 1990 **Second International Workshop on Software Engineering and Code**

Design in Parallel Meteorological and Oceanographic Applications, 1998 **Scientific and Technical Aerospace Reports**, 1986 Forthcoming Books Rose Arny, 2003 Applied Simulation and Modelling, ASM '85 International Association of Science and Technology for Development, 1985 Principles of Concurrent Programming M. Ben-Ari, 1982 Mathematics of Computing Parallelism A Comparative Study of Parallel Programming Languages: The Salishan Problems J.T. Feo, 1992-06-26. As execution speeds reach the physical limits of single CPU computers, the only hope of achieving greater computing power is with parallel systems. Researchers have proposed countless new programming languages, but their differences, similarities, strengths, weaknesses and problem domains are subtle and often not well understood. Informed comparison of parallel languages is difficult to four problems. Each chapter includes a description of the language's philosophy, semantics and syntax, and a solution to each problem. By considering solutions rather than language features or theoretical properties, the gap is bridged between the language specialists and users. Both professionals and students in the fields of computer and computational science will find the discussions helpful and understandable.

Revue roumaine des sciences techniques, 1995 Computers and Artificial Intelligence, 1985 Advances in Parallel and Distributed Computing IEEE Computer Society, 1997. Annotation: Papers from the March 1997 conference address topics related to the field such as architectural aspects of parallel computer hardware and basic software, new algorithms and performance issues, focusing on parallel distributed programming paradigms and novel applications for parallel and distributed computing.

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