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Mastering Parallel Programming with R

Master the robust features of R parallel programming to accelerate your data science computations



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Mastering Parallel Programming With R

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Mastering Parallel Programming with R Simon R. Chapple, Eilidh Troup, Thorsten Forster, Terence Sloan, 2016-05-31

Master the robust features of R parallel programming to accelerate your data science computations About This Book Create R programs that exploit the computational capability of your cloud platforms and computers to the fullest Become an expert in writing the most efficient and highest performance parallel algorithms in R Get to grips with the concept of parallelism to accelerate your existing R programs Who This Book Is For This book is for R programmers who want to step beyond its inherent single threaded and restricted memory limitations and learn how to implement highly accelerated and scalable algorithms that are a necessity for the performant processing of Big Data No previous knowledge of parallelism is required This book also provides for the more advanced technical programmer seeking to go beyond high level parallel frameworks What You Will Learn Create and structure efficient load balanced parallel computation in R using R's built in parallel package Deploy and utilize cloud based parallel infrastructure from R including launching a distributed computation on Hadoop running on Amazon Web Services AWS Get accustomed to parallel efficiency and apply simple techniques to benchmark measure speed and target improvement in your own code Develop complex parallel processing algorithms with the standard Message Passing Interface MPI using RMPI pbdMPI and SPRINT packages Build and extend a parallel R package SPRINT with your own MPI based routines Implement accelerated numerical functions in R utilizing the vector processing capability of your Graphics Processing Unit GPU with OpenCL Understand parallel programming pitfalls such as deadlock and numerical instability and the approaches to handle and avoid them Build a task farm master worker spatial grid and hybrid parallel R programs In Detail R is one of the most popular programming languages used in data science Applying R to big data and complex analytic tasks requires the harnessing of scalable compute resources Mastering Parallel Programming with R presents a comprehensive and practical treatise on how to build highly scalable and efficient algorithms in R It will teach you a variety of parallelization techniques from simple use of R's built in parallel package versions of lapply to high level AWS cloud based Hadoop and Apache Spark frameworks It will also teach you low level scalable parallel programming using RMPI and pbdMPI for message passing applicable to clusters and supercomputers and how to exploit thousand fold simple processor GPUs through ROpenCL By the end of the book you will understand the factors that influence parallel efficiency including assessing code performance and implementing load balancing pitfalls to avoid including deadlock and numerical instability issues how to structure your code and data for the most appropriate type of parallelism for your problem domain and how to extract the maximum performance from your R code running on a variety of computer systems Style and approach This book leads you chapter by chapter from the easy to more complex forms of parallelism The author's insights are presented through clear practical examples applied to a range of different problems with comprehensive reference information for each of the R packages employed The book can be read from start to finish or by

dipping in chapter by chapter as each chapter describes a specific parallel approach and technology so can be read as a standalone

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Enjoying the Song of Appearance: An Emotional Symphony within **Mastering Parallel Programming With R**

In a global consumed by displays and the ceaseless chatter of instantaneous connection, the melodic elegance and mental symphony developed by the written term usually disappear into the background, eclipsed by the persistent sound and disruptions that permeate our lives. But, located within the pages of **Mastering Parallel Programming With R** a charming fictional value filled with natural thoughts, lies an immersive symphony waiting to be embraced. Constructed by an elegant musician of language, that fascinating masterpiece conducts readers on a mental journey, skillfully unraveling the hidden tunes and profound affect resonating within each carefully crafted phrase. Within the depths of this emotional examination, we will investigate the book is key harmonies, analyze its enthralling publishing model, and surrender ourselves to the profound resonance that echoes in the depths of readers souls.

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Table of Contents Mastering Parallel Programming With R

1. Understanding the eBook Mastering Parallel Programming With R
 - The Rise of Digital Reading Mastering Parallel Programming With R
 - Advantages of eBooks Over Traditional Books
2. Identifying Mastering Parallel Programming With R
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Mastering Parallel Programming With R
 - User-Friendly Interface
4. Exploring eBook Recommendations from Mastering Parallel Programming With R
 - Personalized Recommendations

- Mastering Parallel Programming With R User Reviews and Ratings
- Mastering Parallel Programming With R and Bestseller Lists
- 5. Accessing Mastering Parallel Programming With R Free and Paid eBooks
 - Mastering Parallel Programming With R Public Domain eBooks
 - Mastering Parallel Programming With R eBook Subscription Services
 - Mastering Parallel Programming With R Budget-Friendly Options
- 6. Navigating Mastering Parallel Programming With R eBook Formats
 - ePub, PDF, MOBI, and More
 - Mastering Parallel Programming With R Compatibility with Devices
 - Mastering Parallel Programming With R Enhanced eBook Features
- 7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Mastering Parallel Programming With R
 - Highlighting and Note-Taking Mastering Parallel Programming With R
 - Interactive Elements Mastering Parallel Programming With R
- 8. Staying Engaged with Mastering Parallel Programming With R
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Mastering Parallel Programming With R
- 9. Balancing eBooks and Physical Books Mastering Parallel Programming With R
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Mastering Parallel Programming With R
- 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
- 11. Cultivating a Reading Routine Mastering Parallel Programming With R
 - Setting Reading Goals Mastering Parallel Programming With R
 - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Mastering Parallel Programming With R
 - Fact-Checking eBook Content of Mastering Parallel Programming With R

- Distinguishing Credible Sources
13. Promoting Lifelong Learning
- Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
14. Embracing eBook Trends
- Integration of Multimedia Elements
 - Interactive and Gamified eBooks

Mastering Parallel Programming With R Introduction

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