

MODELING MICROPROCESSOR PERFORMANCE

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Modeling Microprocessor Performance

Trevor Conrad Meyerowitz



Modeling Microprocessor Performance:

Modeling Microprocessor Performance Bibiche Geuskens, Kenneth Rose, 2012-12-06 Modeling Microprocessor Performance focuses on the development of a design and evaluation tool named RIPE Rensselaer Interconnect Performance Estimator This tool analyzes the impact on wireability clock frequency power dissipation and the reliability of single chip CMOS microprocessors as a function of interconnect device circuit design and architectural parameters It can accurately predict the overall performance of existing microprocessor systems For the three major microprocessor architectures DEC PowerPC and Intel the results have shown agreement within 10% on key parameters The models cover a broad range of issues that relate to the implementation and performance of single chip CMOS microprocessors The book contains a detailed discussion of the various models and the underlying assumptions based on actual design practices As such RIPE and its models provide an insightful tool into single chip microprocessor design and its performance aspects At the same time it provides design and process engineers with the capability to model evaluate compare and optimize single chip microprocessor systems using advanced technology and design techniques at an early design stage without costly and time consuming implementation RIPE and its models demonstrate the factors which must be considered when estimating tradeoffs in device and interconnect technology and architecture design on microprocessor performance Single and Multi-CPU

Performance Modeling for Embedded Systems Trevor Conrad Meyerowitz, 2008 **Analytical Modeling of Modern Microprocessor Performance**, 2006 As the number of transistors integrated on a chip continues to increase a growing challenge is accurately modeling performance in the early stages of processor design Analytical modeling is an alternative to detailed simulation with the potential to shorten the development cycle and provide additional insight This thesis proposes hybrid analytical models to predict the impact of pending cache hits hardware prefetching and realistic miss status holding register MSHR resources on superscalar performance We propose techniques to model the non negligible influences of pending hits and the fine grained selection of instruction profile window blocks on the accuracy of hybrid analytical models We also present techniques to estimate the performance impact of data prefetching by modeling the timeliness of prefetches and to account for a limited number of MSHRs by restricting the size of profile window blocks As with earlier hybrid analytical models our approach is roughly two orders of magnitude faster than detailed simulations Overall our techniques reduce the error of our baseline from 39.7% to 10.3% when the number of MSHRs is unlimited When modeling a processor with data prefetching a limited number of MSHRs or both our techniques result in an average error of 13.8%, 9.5% and 17.8% respectively Moreover this thesis proposes analytical models for predicting the cache contention and throughput of heavily fine grained multithreaded architectures such as Sun Microsystems Niagara We first propose a novel probabilistic model using statistics characterizing individual threads run in isolation as inputs to accurately predict the number of extra cache misses due to cache contention among a large number of threads We then present a Markov chain model for analytically

estimating the throughput of multicore fine grained multithreaded architectures Combined the two models accurately predict system throughput obtained from a detailed simulator with an average

Processor Modeling and Evaluation Techniques for Early Design Stage Performance Comparison John-David Wellman,1996 *The Anatomy of a*

High-Performance Microprocessor Bruce Shriver,Bennett Smith,1998-06-18 This work describes in detail the microarchitecture of a high performance microprocessor giving an integrated treatment of platform and systems issues relating to the design and implementation of microprocessor based systems This book is a reference for individuals building systems using microprocessors and readers looking for significant insights into fundamental design guidelines that transcend the design implementation and use of a specific microprocessor Practitioners academics and technical and product managers alike will benefit from this detailed overview of microprocessors platforms and systems for years in the future *High*

Performance Computing ,1999 Performance and Fault Modeling with VHDL Joel Mark Schoen,1992 Describes how VHDL can be used across the system design process from specification to the development of maintenance strategies The contributors provide advanced techniques and detail how these can be adapted to improve the system development process reducing time and cost

Modelling Techniques and Tools for Performance Analysis D. Potier,1985 **Computer Systems Performance Modeling** Charles H. Sauer,K. Mani Chandy,1981 **Conference Proceedings of the ... IEEE International Performance, Computing, and Communications Conference** ,2002 *Modeling and Simulation* ,1990

2001 International Workshop on System-Level Interconnect Prediction ,2001 The SLIP workshop is a forum for the exchange of ideas at the interface between interconnect technology and physical design This year in recognition of the highly diverse backgrounds and motivations of the attendees SLIP 2001 has been organized around three mini tutorials a review of wire distribution models a look under the hood of a variety of system level interconnect modeling programs and back end of line yield modeling These tutorials set the scene for the paper sessions that follow Forward The Fourth International Conference/Exhibition on High-Performance Computing in the Asia-Pacific Region, Beijing, China, May 14-17, 2000 ,2000

High Performance Systems ,1990 Building an Advanced Climate Model ,1990 **Cockpit Displays** ,1995

Electrical Performance of Electronic Packaging ,2004 **Index to IEEE Publications** Institute of Electrical and Electronics Engineers,1989 Issues for 1973 cover the entire IEEE technical literature **2000 IEEE International**

Symposium on Performance Analysis of Systems and Software IEEE Computer Society,2000 These conference proceedings cover such topics as performance analysis real time workload characterization and Web enabled software and systems **Technology Projection Modeling of Future Computer Systems** Al Cutaia,1990 In response to the computer industry s urgent need for long range planning this book s primary purpose is to provide a method for envisioning future computer systems entry and mid range through the year 2000 The development of a systems model provides a method for envisioning future systems based on day to day decisions about technology development processes and system designs The

book focuses on system hardware rather than operating systems

Modeling Microprocessor Performance: Bestsellers in 2023 The year 2023 has witnessed a noteworthy surge in literary brilliance, with numerous compelling novels captivating the hearts of readers worldwide. Lets delve into the realm of top-selling books, exploring the fascinating narratives that have charmed audiences this year. The Must-Read : Colleen Hoover's "It Ends with Us" This poignant tale of love, loss, and resilience has captivated readers with its raw and emotional exploration of domestic abuse. Hoover expertly weaves a story of hope and healing, reminding us that even in the darkest of times, the human spirit can prevail. Uncover the Best : Taylor Jenkins Reid's "The Seven Husbands of Evelyn Hugo" This intriguing historical fiction novel unravels the life of Evelyn Hugo, a Hollywood icon who defies expectations and societal norms to pursue her dreams. Reid's absorbing storytelling and compelling characters transport readers to a bygone era, immersing them in a world of glamour, ambition, and self-discovery. Discover the Magic : Delia Owens' "Where the Crawdads Sing" This mesmerizing coming-of-age story follows Kya Clark, a young woman who grows up alone in the marshes of North Carolina. Owens spins a tale of resilience, survival, and the transformative power of nature, entrancing readers with its evocative prose and mesmerizing setting. These popular novels represent just a fraction of the literary treasures that have emerged in 2023. Whether you seek tales of romance, adventure, or personal growth, the world of literature offers an abundance of engaging stories waiting to be discovered. The novel begins with Richard Papen, a bright but troubled young man, arriving at Hampden College. Richard is immediately drawn to the group of students who call themselves the Classics Club. The club is led by Henry Winter, a brilliant and charismatic young man. Henry is obsessed with Greek mythology and philosophy, and he quickly draws Richard into his world. The other members of the Classics Club are equally as fascinating. Bunny Corcoran is a wealthy and spoiled young man who is always looking for a good time. Charles Tavis is a quiet and reserved young man who is deeply in love with Henry. Camilla Macaulay is a beautiful and intelligent young woman who is drawn to the power and danger of the Classics Club. The students are all deeply in love with Morrow, and they are willing to do anything to please him. Morrow is a complex and mysterious figure, and he seems to be manipulating the students for his own purposes. As the students become more involved with Morrow, they begin to commit increasingly dangerous acts. The Secret History is a masterful and gripping novel that will keep you wondering until the very end. The novel is a cautionary tale about the dangers of obsession and the power of evil.

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