

Synopsis

This book introduces programmers to 64 bit Intel assembly language using the Microsoft Windows operating system. The book also discusses how to use the free integrated development environment, ebe, designed by the author specifically to meet the needs of assembly language programmers. Ebe is a C++ program which uses the Qt library to implement a GUI environment consisting of a source window, a data window, a register window, a floating point register window, a backtrace window, a console window, a terminal window, a project window and a pair of teaching tools called the "Toy Box" and the "Bit Bucket". The source window includes a full-featured text editor with convenient controls for assembling, linking and debugging a program. The project facility allows a program to be built from C source code files and assembly source files. Assembly is performed automatically using the yasm assembler and linking is performed with ld or gcc. Debugging operates by transparently sending commands into the gdb debugger while automatically displaying registers and variables after each debugging step. The Toy Box allows the user to enter variable definitions and expressions in either C++ or Fortran and it builds a program to evaluate the expressions. Then the user can inspect the format of each expression. The Bit Bucket allows the user to explore how the computer stores and manipulates integers and floating point numbers. Additional information about ebe can be found at <http://www.rayseyfarth.com>. The book is intended as a first assembly language book for programmers experienced in high level programming in a language like C or C++. The assembly programming is performed using the yasm assembler automatically from the ebe IDE under the Linux operating system. The book primarily teaches how to write assembly code compatible with C programs. The reader will learn to call C functions from assembly language and to call assembly functions from C in addition to writing complete programs in assembly language. The gcc compiler is used internally to compile C programs. The book starts early emphasizing using ebe to debug programs. Being able to single-step assembly programs is critical in learning assembly programming. Ebe makes this far easier than using gdb directly. Highlights of the book include doing input/output programming using Windows API functions and the C library, implementing data structures in assembly language and high performance assembly language programming. Early chapters of the book rely on using the debugger to observe program behavior. After a chapter on functions, the user is prepared to use printf and scanf from the C library to perform I/O. The chapter on data structures covers singly linked lists, doubly linked circular lists, hash tables and binary trees. Test programs are presented for all these data structures. There is a chapter on optimization techniques and 3 chapters on specific optimizations. One chapter covers how to efficiently count the 1 bits in an array with the most efficient version using the

recently-introduced popcnt instruction. Another chapter covers using SSE instructions to create an efficient implementation of the Sobel filtering algorithm. The final high performance programming chapter discusses computing correlation between data in 2 arrays. There is an AVX implementation which achieves 20.5 GFLOPs on a single core of a Core i7 CPU. A companion web site, <http://www.rayseyfarth.com>, has a collection of PDF slides which instructors can use for in-class presentations and source code for sample programs.

Book Information

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Customer Reviews

I received a free copy of both versions (Windows, & (Linux, OS X)) in exchange for writing a review for them. This review applies to both. Both versions look like they have the same content in terms of what you learn about in 64-bit assembly. Some of the differences between the 2 versions: possibly assembly code in the programs process memory model function calls ; more info. at a link - (a 1 pg doc - there's info on "function call differences")Chapter 1.1 section (a reference) -has info. about why one should study assembly.Pros1. just teaches 64-bit assembly programmingThese books are the only ones I found that do this. They contain other helpful info. & also non-64 bit stuff. They contain examples of assembly programs & screen-shots with info. that pertain to them. 2. learn about the ebe program which can be used for writing assembly programs; ebe is used a lot in this book.Appendix A - Installing ebe for Linux, Mac, WindowsAppendix B - goes into ebe more ; major features of ebe3. suitable for beginners & up4. nicely organized5. can write different C programs in assembly6. can call C functions from the assembly program ; also system calls , stream i/o7. can do

high performance assemblyCons:1. Certain parts (some in the learning info), (more in code, exercises) were difficult) Sobel Filter code (more info. in this review) some exercises- a. use advanced math b. difficulty understanding what to do2.

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