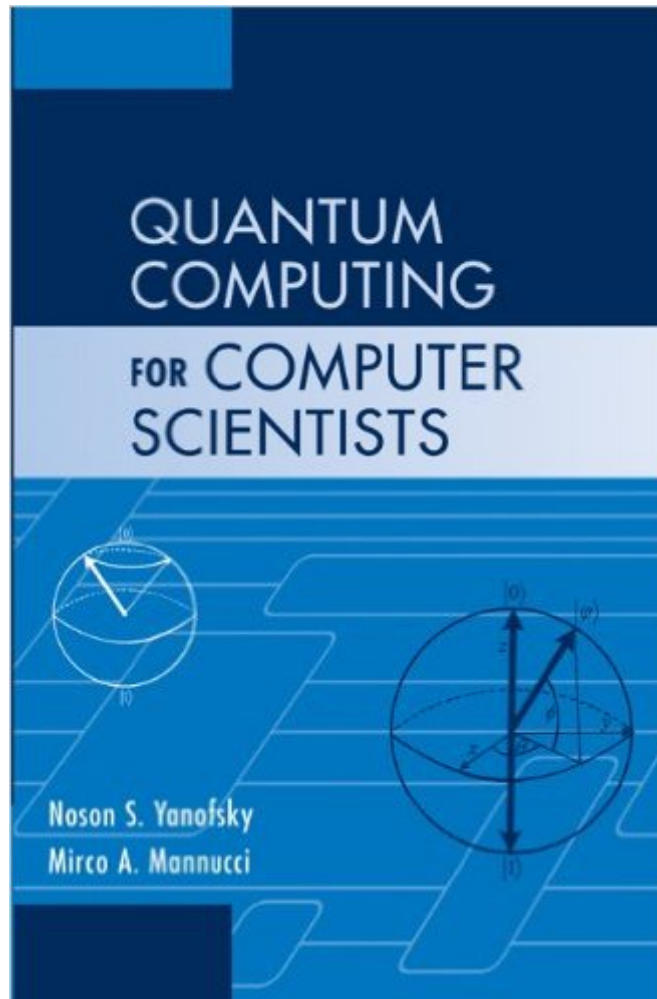


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# Quantum Computing For Computer Scientists



## Synopsis

The multidisciplinary field of quantum computing strives to exploit some of the uncanny aspects of quantum mechanics to expand our computational horizons. *Quantum Computing for Computer Scientists* takes readers on a tour of this fascinating area of cutting-edge research. Written in an accessible yet rigorous fashion, this book employs ideas and techniques familiar to every student of computer science. The reader is not expected to have any advanced mathematics or physics background. After presenting the necessary prerequisites, the material is organized to look at different aspects of quantum computing from the specific standpoint of computer science. There are chapters on computer architecture, algorithms, programming languages, theoretical computer science, cryptography, information theory, and hardware. The text has step-by-step examples, more than two hundred exercises with solutions, and programming drills that bring the ideas of quantum computing alive for today's computer science students and researchers.

## Book Information

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## Customer Reviews

Good points about the book: 1) The authors focus on the "what"s and "how"s rather than the "why"s. They do not waste time with nitty gritty details of quantum physics. The book is true to its title, and delves directly into the practical details of quantum computing. In this respect this book is a welcome exception among a plethora of similarly titled books that end up bombarding the readers with alpha particles and magical photons, and leave the quantum computing topics only vaguely explained. Just as classical computing is not about understanding semiconductors, quantum computing is not about chasing photons. This book makes this very clear. 2) The book moves at a very leisurely pace with LOTS of embedded examples and exercises. Though I skipped most of the exercises during my first reading, these helped me to consolidate my understanding during subsequent readings. This book is ideal for self-guided study. 3) The book goes beyond being a mere nice textbook. It also acts like a tour operator into the wonderful world of quantum computing with material suitable for an audience ranging from "casually curious" to potential researchers. A list of possible student projects, and a guide to quantum computing on the net are two very useful sections. I have never seen a single book providing such a broad yet practically useful view about a subject. Of course, one cannot expect to learn "everything" about a subject from a single book, but still this book goes a long way toward that goal.

Quantum Computing for Computer Scientists is a great introduction to this new field. (I have a computer degree and work in computers.) I like learning about new hot technologies and what they're all about. I picked this book up on a whim and really loved it. First, it is a relatively easy read. One does not need to know any physics or higher math. I never studied linear algebra in college (but I saw a lot of it working with graphics) this book does not assume it. I remember high school physics and I did not need more than that to read this book. Everything is clearly laid out and explained. (But remember, it is definitely NOT a popular book. It is a technical book with problems and lots of equations. It does however explain very carefully where the technical details come from.) Throughout the text there are lots of examples that explain things. This is not a theoretical book. There are also a lot of little programming assignments that one can do (if you have the time and are in the mood) to get a feel for how this is done. This book is definitely made for a computer person. I looked at a few other books on this subject before and could not make any headway. This book flows. Along the way you learn basic quantum mechanics and some of the fun and strange things about that subject that everyone is always talking about. The book shows that the concepts are not very hard. Almost every chapter has a title that refers to some part of computer science. Each chapter has a little review of some of the main aspects in classical computer science, and

then moves on to the quantum computing version. I think the most enjoyable chapter is chapter 3 "The Leap from Classical to Quantum".

I very much like the book, but I made the mistake of buying it for my large-sized Kindle. Kindle can't handle some of the fonts in the equations, so some of them have missing terms. In other cases, characters from the missing fonts were embedded inside the text as raster images. Sometimes a bra appears embedded in the text as a giant image, while the matching ket appears as a normal-sized character. The underlying problem is that the typesetting for the Kindle is often extremely sloppy. In this case, there is no evidence of proof reading. For example, in lists of subscripted variables embedded in the text, some subscripts are correctly typeset and some appear as conventional characters. That doesn't cause much confusion, but it is a clear sign that the typesetting was never checked. Elements of mathematical expressions that had been dropped in typesetting, either because of typos or incompatible fonts, had not been spotted, and I spent enough time guessing about missing terms that I am now looking for a hardcopy. These problems can't be explained by the technical limitations of the Kindle. It's just plain sloppy. Given that I paid \$44 for the Kindle version, I think we can expect better. I think the authors of the text can expect better, and I hope they complain about it. I've seen similar problems with other Kindle versions of books that have equations. When talking about the Kindle with friends, I cite typesetting of anything but plain text as a significant limitation. Comment Permalink Addendum 1/22/2012: I now have a hard cover copy and I have studied it thoroughly and enjoyed the book immensely. I have found it to be much more accessible to computer scientists than competing books I have looked at.

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