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Fundamentals of Information Technology by Sunny Handa (Markham: LexisNexis Canada Inc., 2004)

Barbara Darby

Recommended Citation

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In the early 1990s, I purchased my first stereo with a CD player. I found myself trapped in a conversation with someone who tried to convince me that it was utter folly not to buy a turntable, because CD technology simply couldn't replicate the "warmth" of vinyl. Had I only Handa's book to hand, I could have provided a straightforward and understandable explanation for why my records were well enough left in my parents' basement; although "digitization . . . fails to record all characteristics of analog data, even at the highest finite sampling rate . . . Complete pinpoint accuracy is not necessary, [because] we 'hear' over the gaps".[1] This explanation was not likely to win the argument with that particular person, but nonetheless, it is completely apt.

Handa's 152-page book does exactly what it sets out to do, provide "a discussion of technology beginning with the most basic concepts".[2] It includes sections (and this summary is not comprehensive) on the fundamentals underlying modern technology (analog world, digital world), computers (hardware, software), communications networks (transmission modes, speed, technologies, the nature of content, its production and distribution), the Internet (ISPs, e-mail, WWW, file sharing, domains, e-commerce, and geographical screening), standards (development, benefits and pitfalls of) and cryptography and security.

The book is the first in a series that at the outset certainly seems very well conceived. Handa indicates he is originating a series of relatively short, inexpensive books devoted to discrete topics.[3] This will allow readers to fill in their own intellectual gaps as needed and tailor their library to their interests and needs. Prospective readers will especially appreciate that the series is conceived of as a set of books, each with its own accessible price, rather than as a single, large text or a loose leaf series (both of which might be sufficiently pricey to be affordable only to large firms, IT boutique firms, or libraries), because of this tailoring capacity to which the

format will lend itself. Especially because technology changes so quickly, an inexpensive book is also more easily replaced when it inevitably becomes necessary to do so, which is not to suggest this book is inadequate in its present presentation. Because it concentrates on the "fundamentals", it is not likely to be outdated in any extensive way any time soon.

To provide the context of my own background, I bought a Commodore PC10-II in 1987 to which I added WordPerfect 4.0 for DOS and nothing more. I can (more or less) troubleshoot my own computer problems on a self-taught basis (i.e., I close all the windows, and reboot). Even though I may be slightly more than just basically computer literate, I admit that despite Handa's stated attempt to write from a very basic position, some of the explanations still escape me, so this book might be hard going for some readers. On some occasions, Handa provides basic explanations for concepts, but assumes knowledge on a connecting issue. For example:

> To elaborate further, JavaScript is an interpreted language, meaning that the computer must evaluate the program every time it is run. Essentially, JavaScript is a scripting language for Web sites. JavaScript scripts can be embedded into HTML documents, allowing many possibilities for enhancing Web pages, such as interacting with HTML source code (source code is discussed below; HTML is discussed in Chapter 5), which enables Web authors to include dynamic content on their sites.[4]

I am not sure what a "scripting language" is, and when I reviewed the Table of Contents, I couldn't find the explanation. "Dynamic content" seems self-explanatory, but with this type of subject matter, I don't think an author can be completely assured that what he may perceive as very basic concepts will be familiar to his readers. I am not suggesting that each and every term should have been defined somewhere; however, with this type of subject matter (IT and its fundamental components) in this type of book (a book "written to accommodate both beginners and those advanced in under-

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standing modern and current information technology concepts"[5]), there will be inevitable moments of frustration for the beginner reader as well as the advanced reader, the latter who may wonder why so much time is being devoted to the obvious. By conceiving of such a broad audience initially, Handa left himself a real challenge with respect to style and content, and he succeeds for the most part.

Despite the occasional gaps such as that noted above, Handa's writing style is admirably accessible for topics that do not at first glance promise accessibility. Not only does the book ambitiously cover basic to very complex concepts, it also includes bits of information that are as interesting from a quirky trivia standpoint as from other more important perspectives, such as providing the derivations of such words as "bits", "byte", "macro" and "modem".[6] Handa makes good use of analogies for the technology he is explaining, such as the analogy between bandwidth and water pipes or postcards and Internet messages.[7] He also supplies a list of acronyms for reference purposes.

A wide audience will find this book useful, as either a descriptive resource to assist readers to negotiate the IT world by understanding its components, or to provide a handy reference source for descriptions or explanation to pass along to others in the course of contract negotiation or litigation. With respect to lawyers, I initially considered that Handa's book would primarily be useful to IT practitioners who themselves may understand the concepts they deal with, but who need to include definitions or explanations in legal briefs or correspondence in order to support a position about why, for instance, a commercial transaction was compromised by a lack of IT security or a licensing agreement was inadequate.

On further reflection, though, I think it is important that IT lawyers draw this book to the attention of their colleagues who practice other areas of law, as well. For instance, employment law practitioners will find the book helpful when it comes to assisting clients who are meting out or facing discipline for Internet use, or for employers or corporate clients who need to understand how to protect their systems and files, with respect to how they are backed up or what is taken from their premises when an employee leaves. Criminal lawyers, too, will find it useful with respect to technology-based crimes. Anyone who deals with the protection of information can find some help here, as virtually no information is either stored or transmitted without the use of computer technology anymore. It is also a great reference for the small or large business owner/ operator who is setting up networks, considering security issues, or considering whether to replace a hard drive or an entire network. Overall, it is a useful book that will help experts build on their established bases or allow them to sort out minutiae, and help the non-expert speak and *listen* to the expert, rather than simply nodding as if knowing, or staring blankly.

It may not be fair to register my main complaint about this book, that it doesn't go far enough in exploring some of the implications of the technology that it discusses. Handa doesn't set out to do this, so can't really be held responsible for its absence. That being said, I did find myself commenting in the margins at numerous sections that I would have liked more discussion on such topics as corporate monopolies in IT industries, the ramifications for consumers when "backward compatibility"[8] is not in place, or the legal and ethical problems that arise because "with the Internet, it is unknown who and how many organizations and/or persons will deal with the message while en route".[9] Handa gestures towards what I would call more philosophical issues on occasion, such as when he discusses technological myopia, the potential monopolies arising from standardization, the use of Application Programming Interfaces, or references a citation to an article like "Narrowing Broadband Choices: AT&T's Monopoly Over The Future of The Internet".[10] More often than not, though, I wanted him to go further, wanted more discussion of the politics related to the development of technology. As soon as some of these very provocative topics developed momentum, the topic was changed to a different aspect of technological fundamentals. For my intellectual bent, the book is undoubtedly useful, but at times its ability to hold my interest waned because of this.

However, this just isn't that type of book, and seems to be meant more for a reader to dip into as needed, than to read, fully engaged, from cover to cover. It is relentlessly descriptive rather than inquisitive. In Handa's defence, I do anticipate that other books in the series will step into the spaces unexplored here, and look at IT issues from a more philosophical or curiosity-driven standpoint, and perhaps the "fundamentals" book is right not to go too far in this direction. The benefit to me of reading Handa's book shows itself in the fact that notwithstanding that I have always had an interest in and reservations about the omnipresence of certain software companies, for example, I can now (sort of) describe facets of IT such as Application Programming Interfaces when I explain why I have my reservations about certain corporations, if anyone cares to listen. I will likely just tell them what "modem" stands for.

I found the final chapters too abrupt (the sections on viruses and hacking). With respect to viruses, there could have been more said about how viruses "infect" computers (a basic description of the connectivity of a stand-alone to the Web, for instance, or a basic description of why software is vulnerable). Vulnerability is only discussed as arising because of the "connectedness of contemporary computers primarily via the Internet".[11] I would have appreciated a quick discussion of data mining as well, and spyware, as well as a basic description of how security software attempts to neutralize the threats. In the description of "hacking" I thought there

was room to discuss the basics of how a firewall works, and that it would be useful to know which countries have drafted legislation to address hacking. Again, these topics may be for other volumes in the series. I think the book would also benefit greatly from a concluding chapter that suggests how other areas of inquiry emerge from each of the "fundamentals", such as privacy concerns related to the Web, e-mail or viruses, or copyright issues related to software, etc., or a discussion of where Handa speculates technology is going. Given his expertise, I would be interested to hear him on this point.

Because the book is so descriptive in its conception and execution, one thing I did find puzzling was why Handa turns to judicial decisions so frequently for definitions of types of technology or parts of computers, for example. He credits the metaphor of microprocessors as computers' "brains" to *Delrina Corp. v. Triolet Systems Inc.*[12]; the description of a computer's internal memory as comprising two types to *Apple Computer Inc. v. Mackintosh Computers Ltd.*[13] and the functioning of magnetic media to a passage from *Northwest Corporation and Subsidiaries v. Commissioner of Internal Revenue.*[14] There are other examples, such as the definition of "Application Programs" which references to three different Canadian *Apple Computer* decisions.[15] Handa is clearly capable of providing easy-to-understand definitions of each IT "fundamental" in his own words, and the reason for the recourse to courts cases is not entirely clear, especially in the absence of a description of what the issues were in the cases cited or reference to why *these* cases were considered by Handa to be so particularly insightful so as to be the best sources for the definitions he uses. Perhaps this too is groundwork for other books in the series. Handa writes that the cases are provided as "jurisprudential hooks with which to cite elements of technology that [litigators] may be discussing in their legal submissions",[16] but if this were the case, a list of cases with a very general synopsis of what the case was about would assist litigators to focus their research.

I do appreciate that this is a Canadian book with references where appropriate to Canadian institutions and Canadian case law (with the proviso noted above), and that Handa has written in gender inclusive language. There is good, if limited, use of diagrams as well and more would have been helpful, to explain the building blocks of a network, for example, or to help the reader conceptualize where security software operates in a system. The index is sufficient (a few random attempts to find various topics I recalled being discussed didn't produce a reference), but a list of cases cited would be a very useful addition, along with a comment about why the cases are cited.

One interesting drawback of the book, interesting because of the book's subject matter, is that its approach to sources will without fail make Handa's research hard to replicate. Handa makes extensive use of Internet sources, and a random sampling of those sources found

several of the sites now unavailable. This is the nature of the Web, but is not a concern with reference to hardcopy published materials. On the other hand, the Web resources are accessible to anyone with a hookup and a good library may be less so. While Handa's Web resources have the exciting potential to draw the reader into some interesting places to launch further inquiry, some of the references draw a blank, which is frustrating.

Another facet of Handa's book which I found particularly intriguing was that it invited me to reconsider how we read and to reconsider the metaphorical layerings of review, readership, content and research that go into a book. If Handa's book is read in conjunction with using a computer hooked-up to the Web, the experience of reading becomes a real-time demonstration of much of the technology the book discusses. This creates its own unique (literally one-time only) experience, appropriately merging form and content. Because of its use of electronic citations, Handa's book and the way it invites the reader off the page and outward into the Web will be always evolving, as the links he relies on disappear or change on a minute-to-minute basis. Who knows how different the sites I looked at were from the day Handa selected them for his book? They will again be different when this review is read. Gone is the ability of readers to replicate the research of the writer when the research includes the Web.

This points to another facet of technology which for myself as a former academic is interesting: is the old but deeply entrenched ideal of providing references in one's work as a source of quality assurance something to be reconsidered, as sources and information seem decreasingly fixed in ink and increasingly spread in ether? Just ask how vulnerable any student felt whose RAM ate his homework, or a lawyer whose Web resources, unprinted the day they were found, were unavailable the day they were needed. Perhaps reliance on Web resources makes a book's research basis actually, oddly, more current, if less predictable, than reliance on conventionally published materials, because after the date of publication, the book's references can continue to change and accommodate new perspectives on various issues. While the unpredictability of this type of citation seems unsettling, it also poses new possibilities: why couldn't an author cite his own always-updated Web page, for instance, to keep his book completely current? This comment is not in any way intended to question the sources Handa relies on or why he did so (his reputation and work are irreproachable), but an observation that a fundamental element of IT that I think continues to challenge those of us trained academically before IT was so pervasive is that our very concepts surrounding information (content, transmission, currency, authenticity, etc.) have to be re-evaluated. Handa's book is a terrific example of a melding of old technology (the book), timeworn citation methods (the footnote), and new technology (the cite to the Web).

Another curious component of Handa's book and specifically his use of Internet resources is how the book connects itself and the reader with the wider commercial world, and again, I distinguish the experience of reading Handa's book from that of reading books by writers less ready to use Internet resources. For example, when I tried to check a citation to a Web site (http://www.serverwatch.com/tutorials/article.php/1363291[17]), my laptop and I were brought into contact with advertisements for HP ProLiant ML110 Servers (with an animated advertisement on the right side of the screen) and an advertisement for a Microsoft Server on the left (not animated). These were not pop-ups, but ads on the sites themselves. I was also offered the chance for a free newsletter, a free presentation from McAfee, and a second phone line for $14.99 from Vonage, The Broadband Phone Company. I admit it, I clicked on the offer, and found myself in the default U.S. screen to sign up. I went back to the site minutes later, and all the ads had changed. Such is the nature of research on the Web. Who knows what cookies were left behind? At another of Handa's references, http://computing-dictionary.thefreedictionary.com/object-

oriented%20programming, the site indicates that "object-oriented programming is not available in the general English dictionary".[18] This site presented me with over 50 other terms to search, but I could not immediately put my hands on definitions of the languages referenced at Handa's use of the citation. I was, however, provided with links for dating Catholic people, affordable hosting, and earning a degree online, but when I tried to access the "testers wanted" link, it was sadly unavailable. I wonder what opportunity I missed? The site did guarantee it was spyware free, though, which is reassuring.

My musings on what it means to read a book these days aside, overall, readers, lay and otherwise, lawyer and non-lawyer, will find this book very useful, and based on this volume alone, the series should be an excellent contribution to IT and associated fields generally, not only as a source of information and discussion, but for what appears at the outset to be a series that is well-conceived with audience, cost, and content in mind. With Handa at the helm of this series, we have a very promising project to look forward to. Now, if I can just get this file converted to Word. . . .

Notes:

[1] S. Handa, *Fundamentals of Information Technology* (LexisNexis Canada Inc. 2004) at 18.

[2] *Ibid.* at ix.

[3] *Ibid.* at ix.

[4] *Ibid.* at 34.

[5] *Ibid.* at xi.

[6] *Ibid.* at 11, 14, 34 and 59.

[7] *Ibid.* at 58 and 136.

[8] *Ibid.* at 31.

[9] *Ibid.* at 136.

[10] *Ibid.* at 34, n. 26.

[11] *Ibid.* at 152.

[12] (1993), 47 C.P.R. (3d) 1 (Ont. Ct. (Gen. Ct.)), *infra* note 4 at 21.

[13] (1986), 10 C.P.R. (3d) 1 (F.C.T.D.), *infra* note 4 at 23.

[14] 108 T.C. 358 at 4 (U.S. Tax. Ct. 1997), *infra* note 4 at 30.

[15] *Supra* note 1 at 30.

[16] *Ibid.* at xii.

[17] *Ibid.* at 38.

[18] Object-oriented programming, online: TheFreeDictionary.com http://www.thefreedictionary.com/object-oriented%20programming (date accessed: March 3, 2005).