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To Anne Barras Penzias,
David, Mindy, Laurie, Bonnie, and Rachel,
with love

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Preface

I HAVE SPOKEN to a great many groups over the past few years—graduating high school seniors, human resource managers, boards of directors of major institutions—groups of all kinds, all over the United States and in other parts of the world as well. Despite their different backgrounds and points of view, two common threads of interest unite them:

First, they share a curiosity about the computer technology that surrounds us, how it works, and its potential for "intelligence."

Second, they not only want to become more comfortable with technology—they want to be better able to profit from it. Specifically, they want to know how technology can help them use information more successfully.

Have you ever stopped to think how much your life depends on information? Almost everything does! While some people might succeed with more luck than brains, we all improve our chances by basing our decisions on well-considered information. For quality information, today's consistently successful decision-makers rely on a combination of mind and machinery. Getting the best combination requires understanding how the two fit together and the roles that each might play. It also requires having a personal information strategy that matches your individual information interests, problem-solving skills, and technology preferences. This book will give you both a better understanding of the mind and technology and the ability to tailor an information strategy that suits you best.

I have tried to write for those who don't bring technical knowledge to their reading, so I give less attention to engineering and mathematical applications of computing, for example, than to capabilities that a nontechnical user might encounter someday.

There's more to information technology than the computer itself. In addition to using modern tools—such as telephones, microfilm, and computers—to help us transmit, store, and process information, we humans employ a great deal of older technology as well. Thanks to the inventions of writing, drawing, and arithmetic, for example, a "simple" piece of paper can be used to send a message, preserve an image, or aid a calculation. Together, all these technologies supplement the human mind's ability to communicate, remember, and think.

I want to demystify information processing by giving you a look at what goes on beneath the slick surface layer that computers often present to their potential users. Beneath that layer, computers have much in common with their more easily understandable ancestors—notched sticks, clay tablets, clocks, and adding machines.

We can best understand information processing as the manipulation of symbols—particles of thought, like numbers, words, and pictures—that are subject to the rules of logic, grammar, and arithmetic which both humans and computers employ. These rules enable computers to deal with problems that humans solve by using intelligence, such as recognizing handwriting, winning a chess game, or diagnosing problems in malfunctioning machinery. Still, even the best of present-day computing systems lack a key attribute of intelligence: the ability to move from one context to another.

Even though a computer's actions sometimes mimic human intelligence, such machines are fundamentally different from brains. While computers afford humans much valuable help in

processing massive amounts of information—as in refining the shape of a jetliner's wings, or keeping the books of the Social Security Administration—they offer little serious competition in the areas of creativity, integration of disparate information, and flexible adaptation to unforeseen circumstances. Here the human mind functions best.

Unlike machines, human minds can create ideas. We need ideas to guide us toward progress, as well as tools to implement them. As with any other set of tools, the real power of information technology comes from the human ideas that create and focus it.

The following notions may serve as helpful guideposts as you begin to develop your personal information strategy. Remember:

1. Computer ownership doesn't guarantee computer literacy.
2. Logic is cumbersome: that's why humans rarely use it.
3. Computers don't contain "brains" any more than stereos contain musical instruments.
4. Machines only manipulate numbers; people connect them to meaning.
5. An inexact number is almost always good enough.
6. Computers are just fast pocket calculators pushing their own buttons.
7. Digital information travels better, like mailing cookie recipes instead of cookies.
8. Computers are like cars—they're great for speed, but you have to steer them.
9. People run too many errands for their machines, especially if they expect to.
10. If you don't want to be replaced by a machine, don't act like one.

After all, I have no doubt that the world's most powerful information tool will continue to be the human mind.

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Finally, I owe special debts of gratitude to Ed Barber and Julia Heiney. With patience, dedication, unfailing good humor, and eloquent examples, Ed waged a year-long battle against prolixity, vague generality, and a whole list of bad writing habits I didn't know I had. As

each new draft came back doused in red ink, Julia would once again convert my penciled revisions into neat rows of word-processed characters, all the while orchestrating my work life and the demands of a busy office around my writing excursions.

Many thanks to all.

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