

higher calling as set forth in the *Westminster Shorter Catechism*: “Man’s chief end is to glorify God, and enjoy Him forever.”

If the issue is as urgent as Leonhard believes, I think that publishing this book (or any book) is totally insufficient to draw attention to the threat. A massive marketing campaign is required. The church might undertake such a task, if so inclined. But the church is sleepwalking in this arena. Some are struggling with trusting science, let alone steering it.

Even with these limitations, however, I strongly recommend *Technology Vs. Humanity*. Why? First, because Leonhard alerts us to the dimensions and urgency of the problem. Second, he proposes semi-tangible approaches, which he says are only conversation starters. Third, he sets forth fifteen *shall-nots*, five *core human rights* that should be incorporated into digital ethics, five *elements* of what it means to be human, and eight *must-do* actions in order for us to become stewards of our collective future. Finally, he appeals for action, not just another forum!

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ALGORITHMS TO LIVE BY: The Computer Science of Human Decisions by Brian Christian and Tom Griffiths. New York: Henry Holt and Company, 2016. 368 pages, bibliography, index. Hardcover; \$30.00. ISBN: 9781627790369.

In *Algorithms to Live By: The Computer Science of Human Decisions*, authors Brian Christian and Tom Griffiths offer an answer to “the oldest question of all: how to live” (p. 4). Their bold recommendation is to live “by the wisdom of computer science” (p. 6).

In the introduction, Christian and Griffiths announce that they will demonstrate that “applying the lens of computer science to everyday life” reveals “the algorithmic underpinnings of our daily lives” (p. 4). They define an algorithm as “a finite sequence of steps used to solve a problem” (p. 3), and they contend that computer science algorithms offer us “practical, concrete suggestions for how to solve specific problems” (p. 4) in life. The authors contend that many of life’s dilemmas actually correspond to “solved problems” in the field of computer science, which, “unlike most advice,” is “backed up by proofs” (p. 6). Indeed, the authors go so far as to suggest that many people “don’t need a therapist; they need an algorithm” (p. 3). Moreover, they claim that “as computers become better tuned to real-world problems,” they also provide “a better standard against which to compare human cognition itself” and, therefore,

can reveal the “meaning of rationality” and the very “nature of the human mind” (p. 4).

Algorithms to Live By is subtitled “The Computer Science of Human Decisions.” Indeed, a number of the algorithms considered in the book for application to human decision making are associated with the discipline of computer science. For example, chapter 3 considers how sorting algorithms might lead to recommendations for organizing a library of books or designing an athletic tournament. Chapter 4 looks at caching algorithms and how they might assist us not only in organizing the clothes in our closets but also in understanding our own human capacity for memory. Chapter 10 explores what the design principles underlying the technologies driving the Internet might imply for how we think about and conduct our communications with other humans. However, in the remainder of *Algorithms to Live By*, the authors employ algorithms from other disciplines so often that a reader might question how well the subtitle describes the contents of this book. In these other eight chapters, most of the algorithms under consideration are not so much computer science algorithms as they are formulae from other fields, particularly mathematics, that a computer scientist might draw upon in attempting to construct a computer model, simulation, or analysis of a given real-world human phenomenon or data set.

The authors acknowledge in the introduction that the design of algorithms for computers requires theories not only from computer science but also from mathematics, engineering, statistics, and operations research. Moreover, they suggest that the application of computer algorithms to human minds requires looking “to cognitive science, psychology, economics and beyond.” Christian and Griffiths also share how their own multidisciplinary academic backgrounds have assisted them in the fundamentally interdisciplinary task of writing this book.

Regardless of the disciplinary origins of the algorithms, the authors do cover an impressive range of topics in their text as they work to develop their central argument in favor of a computer-science-like, algorithm-oriented approach to human life. In the process, their recommendations for the employment of a particular algorithm are variously descriptive, predictive, and prescriptive.

The authors’ argument is perhaps most compelling when they recommend the *descriptive* use of algorithms. They demonstrate how algorithmic models can provide insight into complex real-world phenomena that might be difficult to describe otherwise. For example, in chapter 3, they provide a superb explanation of “Big-O notation” and its usefulness

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in describing why certain human tasks are more algorithmically complex than others. The descriptive limitations of certain algorithms are also acknowledged. For example, chapter 7 describes how what they term an “idolatry of data” can lead to “overfitting” data, resulting in overly detailed models that actually become less useful for describing real-world phenomena.

More often, the authors recommend not only the descriptive use of algorithms but also the *predictive* use of them. Indeed, the subtitle of chapter 6 is “Predicting the Future,” and it is an indication of the degree to which the authors evaluate algorithms in terms of their ability to predict future events. In chapter 7, the authors’ concern in regard to the overfitting of data is not merely that it may lead to a less descriptive model but, more importantly, that it “may make our predictions dramatically worse” (p. 155). The authors do acknowledge a degree of uncertainty that persists in the predictive use of algorithms. For example, in chapter 10, the authors underscore the futility of algorithmically predicting the actions of other humans by trying to guess their thoughts. However, at other times, the goal of using algorithms predictively is sometimes stated in terms that might make many Christians uneasy. During the consideration of caching algorithms in chapter 4, one computer scientist quoted by the authors suggests that the key question is: “if you don’t know the future, how *close* can you come” to clairvoyance, to “God’s algorithm, if you will,” to the “algorithm in the sky?” (p. 98). The authors go so far as to assert that “every decision is a kind of prediction,” and that, while “computer science can’t offer you a life with no regret,” it can offer “a life with minimal regret” (p. 43). In contrast, many Christians would profess a belief that certain decisions should not be based upon human or computerized algorithmic predictions of the future but, rather, should be made prayerfully, entrusting the unknown future to God, not so much in the hope of minimizing regret as a way of acting based upon faith.

The authors of *Algorithms to Live By* also recommend the *prescriptive* use of certain algorithms. Computer algorithms, they suggest, can tell us “how to think and decide, what to believe and how to behave” (p. 4). For example, chapter 5 examines scheduling algorithms that usefully prescribe the order in which to complete a set of tasks in accordance with a particular overall goal, such as minimizing the lateness of the most overdue task. However, in the Introduction and chapter 1, the authors insist that “the 37% rule” prescribes precisely how long to look for a parking space, an apartment, a new employee, or a spouse before making a choice, that is, after considering 37%

of the available options or after 37% of the available time has passed. “Mathematically,” the authors claim, “these are solved problems.” The 37% rule “is not merely an intuitively satisfying compromise between looking and leaping” but, rather, “the *provably optimal* solution” (p. 2). The authors’ prescription to put one’s trust in a mathematical algorithm when making such important life decisions as where to reside, whom to employ, and whom to marry is difficult to reconcile with faith in a God who knows the future, has a plan for our lives, and hears our prayers for guidance and patience.

In a similarly prescriptive manner, the authors advocate redesigning library systems in accordance with sorting algorithms. However, such insensitivity to the local knowledge is one of the factors that can make computer software so frustrating, when users are expected to reshape their mental models of their tasks in accordance with computer science algorithms that have been used to design the software modeling these tasks. In contrast, Egbert Schuurman suggests in his *Faith and Hope in Technology* that “human beings ought not to have to adapt themselves to computer systems but vice versa,” and that “respect and love for one’s neighbors means not allowing computer systems to rule their lives.”

Interestingly, toward the end of the text, the authors use the famous quote from Sartre that “hell is other people” to describe the complex recursive algorithms in games that require players to guess their opponent’s thoughts. However, this utterance by Sartre is often interpreted instead as a comment upon the tendency of humans to objectify each other. Indeed, the hazard inherent in the authors’ recommendation of looking at the world algorithmically, through the “lens of computing science,” is a tendency to regard the world—including other people—as problems to be solved. However, humans tend to resist such an objectifying gaze, and rightly so. A contemporary and French compatriot of Sartre, the Catholic existentialist Gabriel Marcel, contended in his *Being and Having* that we are called to regard one another not as problems to be solved, but as mysteries which exceed technical understanding and require a more conversational engagement by our whole self. Accordingly, if we do undertake to look at the world through the lens of computer science, we need to remember the reductive nature of algorithms and avoid the inappropriate application of them, particularly in situations involving other persons.

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