FOREWORD

Computing is transforming our society in ways that are as profound as the changes wrought by physics and chemistry in the previous two centuries. Indeed, there is hardly an aspect of our lives that hasn't already been influenced, or even revolutionized, by digital technology. Given the importance of computing to modern society, it is therefore somewhat paradoxical that there is so little awareness of the fundamental concepts that make it all possible. The study of these concepts lies at the heart of computer science, and this new book by MacCormick is one of the relatively few to present them to a general audience.

One reason for the relative lack of appreciation of computer science as a discipline is that it is rarely taught in high school. While an introduction to subjects such as physics and chemistry is generally considered mandatory, it is often only at the college or university level that computer science can be studied in its own right. Furthermore, what is often taught in schools as "computing" or "ICT" (information and communication technology) is generally little more than skills training in the use of software packages. Unsurprisingly, pupils find this tedious, and their natural enthusiasm for the use of computer technology in entertainment and communication is tempered by the impression that the creation of such technology is lacking in intellectual depth. These issues are thought to be at the heart of the 50 percent decline in the number of students studying computer science at university over the last decade. In light of the crucial importance of digital technology to modern society, there has never been a more important time to re-engage our population with the fascination of computer science.

In 2008 I was fortunate in being selected to present the 180th series of Royal Institution Christmas Lectures, which were initiated by Michael Faraday in 1826. The 2008 lectures were the first time they had been given on the theme of computer science. When preparing these lectures I spent much time thinking about how to explain

computer science to a general audience, and realized that there are very few resources, and almost no popular books, that address this need. This new book by MacCormick is therefore particularly welcome.

MacCormick has done a superb job of bringing complex ideas from computer science to a general audience. Many of these ideas have an extraordinary beauty and elegance which alone makes them worthy of attention. To give just one example: the explosive growth of web-based commerce is only possible because of the ability to send confidential information (such as credit card numbers, for example) secretly and securely across the Internet. The fact that secure communication can be established over "open" channels was for decades thought to be an intractable problem. When a solution was found, it turned out to be remarkably elegant, and is explained by MacCormick using precise analogies that require no prior knowledge of computer science. Such gems make this book an invaluable contribution to the popular science bookshelf, and I highly commend it.

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