Preface

A book teaching how to program should help its readers to learn with minimal effort how to write properly working, efficient and interesting programs. Its potential readers may have very different interests, and the books that are currently available on the shelves generally do not take these needs into account. They mostly address a generic reader, whose interests the author is unaware of.

Books presenting a programming language in a specific context are much more effective and nicer to read, since the reader learns at the same time both the language and the basic concepts needed to formulate the problems one wants to solve. These books obviously address a more specialized audience. However, in many cases they are very precious and they are the right choice to teach professional and university courses.

The collection of programming manuals addressing a specialized audience is rather scarce and those dedicated to scientific programming even less numerous. Since computers play an increasingly important role in modern science this situation is very unfortunate. In many fields it is essential to both being able to express ideas into words or formulas and to translate them into a precise and rigorous programming language.

This book magnificently fills this gap in the current literature. The different parts of C language are presented together with scientifically interesting algorithms, each one of which is then put into practice. Often the algorithms are not at all basic, and their theoretical motivation is explained in detail. Various implementations of a single algorithm are discussed in depth, keeping the different, sometimes opposing needs into account: precision, execution efficiency, code compatibility and readability. In this way the reader learns how to tackle a new problem while keeping these various aspects in mind, and how to select an optimal choice fitting his needs.

The topics have been carefully selected and the problems are very accurately discussed, as are the codes included in the book. Indeed, this book is the result of years of experience in teaching academic courses in scientific programming. Moreover, the authors have many years of experience addressing scientific problems with the use of the computer, introducing new techniques and designing algorithms which have become commonly used. It is hard to think of authors more qualified than the present ones to write this kind of book.

The original setup and the authors' extraordinary talent make this book an excellent product, a reference point for all those interested in scientific programming.

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Giorgio Parisi is a full professor in Theoretical Physics at the *Sapienza* University of Rome. He is a member of the the French and of the American Academy of Sciences and of the Lincei Academy. For his work in theoretical physics he received the International Feltrinelli prize in 1986, the Boltzmann medal in 1992, the Dirac medal and prize in 1999, the Fermi medal in 2002, the Nonino prize and the Dannie Heineman prize in 2005. the Galileo Prize in 2006, the Microsoft European Science prize in 2007, the Lagrange in 2009 and the Max Planck medal in 2011. He wrote three books and over 500 scientific articles.