

A Primer On Scientific Programming With Python

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 The Book of R
 A Primer on Scientific Programming with Python
 Elegant SciPy
 Programming for Computations - Python

*A Primer On Scientific
 Programming With
 Python*

*OMB No.
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 by*

BRIDGET ANNA

Cloud and Serverless Computing for Scientists Addison-Wesley
 The book serves as a first introduction to computer programming of scientific applications, using the high-level Python language. The exposition is example- and problem-oriented, where the applications are taken from mathematics, numerical calculus, statistics, physics, biology, and finance. The book teaches "Matlab-style" and procedural programming as well as object-oriented programming. High school mathematics is a required background, and it is advantageous to study classical and numerical one-variable calculus in parallel with reading this book. Besides learning how to program computers, the reader will also learn how to solve mathematical problems, arising in various branches of science and engineering, with the aid of numerical methods and programming. By blending programming, mathematics and scientific applications, the book lays a solid foundation for practicing computational science.

INTRODUCTION TO SCIENTIFIC PROGRAMMING AND SIMULATION USING R

Springer
 Bestselling Programming Tutorial and

Reference Completely Rewritten for the New C++11 Standard Fully updated and recast for the newly released C++11 standard, this authoritative and comprehensive introduction to C++ will help you to learn the language fast, and to use it in modern, highly effective ways. Highlighting today's best practices, the authors show how to use both the core language and its standard library to write efficient, readable, and powerful code. C++ Primer, Fifth Edition, introduces the C++ standard library from the outset, drawing on its common functions and facilities to help you write useful programs without first having to master every language detail. The book's many examples have been revised to use the new language features and demonstrate how to make the best use of them. This book is a proven tutorial for those new to C++, an authoritative discussion of core C++ concepts and techniques, and a valuable resource for experienced programmers, especially those eager to see C++11 enhancements illuminated. Start Fast and Achieve More Learn how to use the new C++11 language features and the standard library to build robust programs quickly, and get comfortable with high-level programming Learn through examples that illuminate today's best coding styles and program design techniques Understand the "rationale behind the rules": why C++11 works as it

does Use the extensive crossreferences to help you connect related concepts and insights Benefit from up-to-date learning aids and exercises that emphasize key points, help you to avoid pitfalls, promote good practices, and reinforce what you've learned Access the source code for the extended examples from informit.com/title/0321714113 C++ Primer, Fifth Edition, features an enhanced, layflat binding, which allows the book to stay open more easily when placed on a flat surface. This special binding method—notable by a small space inside the spine—also increases durability.

A MATLAB® PRIMER FOR TECHNICAL PROGRAMMING FOR MATERIALS SCIENCE AND ENGINEERING

CRC Press
 Computational approaches offer exciting opportunities for us to do social science differently. This beginner's guide discusses a range of computational methods and how to use them to study the problems and questions you want to research. It assumes no knowledge of programming, offering step-by-step guidance for coding in Python and drawing on examples of real data analysis to demonstrate how you can apply each approach in any discipline. The book also: Considers important principles of social scientific computing, including transparency, accountability and

reproducibility. Understands the realities of completing research projects and offers advice for dealing with issues such as messy or incomplete data and systematic biases. Empowers you to learn at your own pace, with online resources including screencast tutorials and datasets that enable you to practice your skills and get up to speed. For anyone who wants to use computational methods to conduct a social science research project, this book equips you with the skills, good habits and best working practices to do rigorous, high quality work.

A Primer on Scientific Programming with Python

This book offers an introduction to cloud computing and serverless computing for students, researchers and R&D organizations through several practical examples. Rather than focusing exclusively on the computational issues related to cloud computing, the authors focus on addressing the multidisciplinary applications of cloud computing for daily research work in public institutions and private companies in fields such as archaeology, geosciences, computer sciences, medicine and physics. The book also discusses the emergence of serverless computing over the last three years as a means to make computational infrastructures more apparent to users, avoiding the need to concern one's self with the type of server or computing machine needed to perform a computing task. These topics are presented from the perspective of users, researchers and decision-makers, and are approached based on the authors' collective experience on the use and adoption of cloud computing.

A Primer on Scientific Programming with Python SAGE

The Book of R is a comprehensive, beginner-friendly guide to R, the world's most popular programming language for statistical analysis. Even if you have no programming experience and little more than a grounding in the basics of mathematics, you'll find everything you need to begin using R effectively for statistical analysis. You'll start with the basics, like how to handle data and write simple programs, before moving on to more advanced topics, like producing statistical summaries of your data and performing statistical tests and modeling. You'll even learn how to create impressive data visualizations with R's basic graphics tools and contributed packages, like ggplot2 and ggvis, as well as interactive 3D visualizations using the rgl package. Dozens of hands-on exercises (with

downloadable solutions) take you from theory to practice, as you learn: -The fundamentals of programming in R, including how to write data frames, create functions, and use variables, statements, and loops -Statistical concepts like exploratory data analysis, probabilities, hypothesis tests, and regression modeling, and how to execute them in R -How to access R's thousands of functions, libraries, and data sets -How to draw valid and useful conclusions from your data -How to create publication-quality graphics of your results Combining detailed explanations with real-world examples and exercises, this book will provide you with a solid understanding of both statistics and the depth of R's functionality. Make The Book of R your doorway into the growing world of data analysis.

Introduction to Computation and Programming Using Python, third edition Academic Press

The book serves both as a reference for various scaled models with corresponding dimensionless numbers, and as a resource for learning the art of scaling. A special feature of the book is the emphasis on how to create software for scaled models, based on existing software for unscaled models. Scaling (or non-dimensionalization) is a mathematical technique that greatly simplifies the setting of input parameters in numerical simulations. Moreover, scaling enhances the understanding of how different physical processes interact in a differential equation model. Compared to the existing literature, where the topic of scaling is frequently encountered, but very often in only a brief and shallow setting, the present book gives much more thorough explanations of how to reason about finding the right scales. This process is highly problem dependent, and therefore the book features a lot of worked examples, from very simple ODEs to systems of PDEs, especially from fluid mechanics. The text is easily accessible and example-driven. The first part on ODEs fits even a lower undergraduate level, while the most advanced multiphysics fluid mechanics examples target the graduate level. The scientific literature is full of scaled models, but in most of the cases, the scales are just stated without thorough mathematical reasoning. This book explains how the scales are found mathematically. This book will be a valuable read for anyone doing numerical simulations based on ordinary or partial differential equations. *A Primer on Mathematical Modelling* Princeton University Press

C++ Primer Plus, Sixth Edition New C++11 Coverage C++ Primer Plus is a carefully crafted, complete tutorial on one of the most significant and widely used programming languages today. An accessible and easy-to-use self-study guide, this book is appropriate for both serious students of programming as well as developers already proficient in other languages. The sixth edition of C++ Primer Plus has been updated and expanded to cover the latest developments in C++, including a detailed look at the new C++11 standard. Author and educator Stephen Prata has created an introduction to C++ that is instructive, clear, and insightful. Fundamental programming concepts are explained along with details of the C++ language. Many short, practical examples illustrate just one or two concepts at a time, encouraging readers to master new topics by immediately putting them to use. Review questions and programming exercises at the end of each chapter help readers zero in on the most critical information and digest the most difficult concepts. In C++ Primer Plus, you'll find depth, breadth, and a variety of teaching techniques and tools to enhance your learning: A new detailed chapter on the changes and additional capabilities introduced in the C++11 standard Complete, integrated discussion of both basic C language and additional C++ features Clear guidance about when and why to use a feature Hands-on learning with concise and simple examples that develop your understanding a concept or two at a time Hundreds of practical sample programs Review questions and programming exercises at the end of each chapter to test your understanding Coverage of generic C++ gives you the greatest possible flexibility Teaches the ISO standard, including discussions of templates, the Standard Template Library, the string class, exceptions, RTTI, and namespaces Table of Contents 1: Getting Started with C++ 2: Setting Out to C++ 3: Dealing with Data 4: Compound Types 5: Loops and Relational Expressions 6: Branching Statements and Logical Operators 7: Functions: C++'s Programming Modules 8: Adventures in Functions 9: Memory Models and Namespaces 10: Objects and Classes 11: Working with Classes 12: Classes and Dynamic Memory Allocation 13: Class Inheritance 14: Reusing Code in C++ 15: Friends, Exceptions, and More 16: The string Class and the Standard Template Library 17: Input, Output, and Files 18: The New C++11 Standard A Number Bases B C++ Reserved Words C The ASCII

Character Set D Operator Precedence E
Other Operators F The stringTemplate
Class G The Standard Template Library
Methods and Functions H Selected
Readings and Internet Resources I
Converting to ISO Standard C++ J Answers
to Chapter Reviews

Julia Programming for Operations Research
Cambridge University Press

"Havill's problem-driven approach introduces algorithmic concepts in context and motivates students with a wide range of interests and backgrounds." -- Janet Davis, Associate Professor and Microsoft Chair of Computer Science, Whitman College "This book looks really great and takes exactly the approach I think should be used for a CS 1 course. I think it really fills a need in the textbook landscape." -- Marie desJardins, Dean of the College of Organizational, Computational, and Information Sciences, Simmons University "Discovering Computer Science is a refreshing departure from introductory programming texts, offering students a much more sincere introduction to the breadth and complexity of this ever-growing field." -- James Deverick, Senior Lecturer, The College of William and Mary "This unique introduction to the science of computing guides students through broad and universal approaches to problem solving in a variety of contexts and their ultimate implementation as computer programs." -- Daniel Kaplan, DeWitt Wallace Professor, Macalester College

Discovering Computer Science: Interdisciplinary Problems, Principles, and Python Programming is a problem-oriented introduction to computational problem solving and programming in Python, appropriate for a first course for computer science majors, a more targeted disciplinary computing course or, at a slower pace, any introductory computer science course for a general audience. Realizing that an organization around language features only resonates with a narrow audience, this textbook instead connects programming to students' prior interests using a range of authentic problems from the natural and social sciences and the digital humanities. The presentation begins with an introduction to the problem-solving process, contextualizing programming as an essential component. Then, as the book progresses, each chapter guides students through solutions to increasingly complex problems, using a spiral approach to introduce Python language features. The text also places programming in the context of fundamental computer science principles, such as abstraction, efficiency, testing, and algorithmic techniques,

offering glimpses of topics that are traditionally put off until later courses. This book contains 30 well-developed independent projects that encourage students to explore questions across disciplinary boundaries, over 750 homework exercises, and 300 integrated reflection questions engage students in problem solving and active reading. The accompanying website —

<https://www.discoveringcs.net> — includes more advanced content, solutions to selected exercises, sample code and data files, and pointers for further exploration.

Introduction to Numerical Methods for Variational Problems Springer Nature

A fully updated tutorial on the basics of the Python programming language for science students Python is a computer programming language that has gained popularity throughout the sciences. This fully updated second edition of *A Student's Guide to Python for Physical Modeling* aims to help you, the student, teach yourself enough of the Python programming language to get started with physical modeling. You will learn how to install an open-source Python programming environment and use it to accomplish many common scientific computing tasks: importing, exporting, and visualizing data; numerical analysis; and simulation. No prior programming experience is assumed. This guide introduces a wide range of useful tools, including: Basic Python programming and scripting Numerical arrays Two- and three-dimensional graphics Animation Monte Carlo simulations Numerical methods, including solving ordinary differential equations Image processing Numerous code samples and exercises—with solutions—illustrate new ideas as they are introduced. This guide also includes supplemental online resources: code samples, data sets, tutorials, and more. This edition includes new material on symbolic calculations with SymPy, an introduction to Python libraries for data science and machine learning (pandas and sklearn), and a primer on Python classes and object-oriented programming. A new appendix also introduces command line tools and version control with Git.

3D Math Primer for Graphics and Game Development, 2nd Edition Woodhead Publishing

In this book we describe the magic world of mathematical models: starting from real-life problems, we formulate them in terms of equations, transform equations into algorithms and algorithms into programs to be executed on computers. A broad variety of examples and exercises

illustrate that properly designed models can, e.g.: predict the way the number of dolphins in the Aeolian Sea will change as food availability and fishing activity vary; describe the blood flow in a capillary network; calculate the PageRank of websites. This book also includes a chapter with an elementary introduction to Octave, an open-source programming language widely used in the scientific community. Octave functions and scripts for dealing with the problems presented in the text can be downloaded from <https://paola-gervasio.unibs.it/quarteroni-gervasio> This book is addressed to any student interested in learning how to construct and apply mathematical models.

A Primer for Computational Biology Wiley-Interscience

This book presents computer programming as a key method for solving mathematical problems. There are two versions of the book, one for MATLAB and one for Python. The book was inspired by the Springer book *TCSE 6: A Primer on Scientific Programming with Python* (by Langtangen), but the style is more accessible and concise, in keeping with the needs of engineering students. The book outlines the shortest possible path from no previous experience with programming to a set of skills that allows the students to write simple programs for solving common mathematical problems with numerical methods in engineering and science courses. The emphasis is on generic algorithms, clean design of programs, use of functions, and automatic tests for verification.

A Primer on Scientific Programming with Python "O'Reilly Media, Inc."

This book offers a concise and gentle introduction to finite element programming in Python based on the popular FEniCS software library. Using a series of examples, including the Poisson equation, the equations of linear elasticity, the incompressible Navier–Stokes equations, and systems of nonlinear advection–diffusion–reaction equations, it guides readers through the essential steps to quickly solving a PDE in FEniCS, such as how to define a finite variational problem, how to set boundary conditions, how to solve linear and nonlinear systems, and how to visualize solutions and structure finite element Python programs. This book is open access under a CC BY license.

The Book of R MIT Press

Scientific Python is taught from scratch in this book via copious, downloadable, useful and adaptable code snippets. Everything the working scientist needs to know is covered, quickly providing researchers and research students with

the skills to start using Python effectively.

A Primer on Scientific Programming with Python Academic Press

The new edition of an introduction to the art of computational problem solving using Python. This book introduces students with little or no prior programming experience to the art of computational problem solving using Python and various Python libraries, including numpy, matplotlib, random, pandas, and sklearn. It provides students with skills that will enable them to make productive use of computational techniques, including some of the tools and techniques of data science for using computation to model and interpret data as well as substantial material on machine learning. All of the code in the book and an errata sheet are available on the book's web page on the MIT Press website.

Elegant SciPy Springer Nature

Designed for undergraduates, An Introduction to High-Performance Scientific Computing assumes a basic knowledge of numerical computation and proficiency in Fortran or C programming and can be used in any science, computer science, applied mathematics, or engineering department or by practicing scientists and engineers, especially those associated with one of the national laboratories or supercomputer centers. This text evolved from a new curriculum in scientific computing that was developed to teach undergraduate science and engineering majors how to use high-performance computing systems (supercomputers) in scientific and engineering applications. Designed for undergraduates, An Introduction to High-Performance Scientific Computing assumes a basic knowledge of numerical computation and proficiency in Fortran or C programming and can be used in any science, computer science, applied mathematics, or engineering department or by practicing scientists and engineers, especially those associated with one of the national laboratories or supercomputer centers. The authors begin with a survey of scientific computing and then provide a review of background (numerical analysis, IEEE arithmetic, Unix, Fortran) and tools (elements of MATLAB, IDL, AVS). Next, full coverage is given to scientific visualization and to the architectures (scientific workstations and

vector and parallel supercomputers) and performance evaluation needed to solve large-scale problems. The concluding section on applications includes three problems (molecular dynamics, advection, and computerized tomography) that illustrate the challenge of solving problems on a variety of computer architectures as well as the suitability of a particular architecture to solving a particular problem. Finally, since this can only be a hands-on course with extensive programming and experimentation with a variety of architectures and programming paradigms, the authors have provided a laboratory manual and supporting software via anonymous ftp. Scientific and Engineering Computation series
Programming for Computations - Python Lulu.com

This book presents computer programming as a key method for solving mathematical problems. There are two versions of the book, one for MATLAB and one for Python. The book was inspired by the Springer book TCSE 6: A Primer on Scientific Programming with Python (by Langtangen), but the style is more accessible and concise, in keeping with the needs of engineering students. The book outlines the shortest possible path from no previous experience with programming to a set of skills that allows the students to write simple programs for solving common mathematical problems with numerical methods in engineering and science courses. The emphasis is on generic algorithms, clean design of programs, use of functions, and automatic tests for verification.

Discovering Computer Science No Starch Press

A Research Primer for the Social and Behavioral Sciences provides an introductory but comprehensive overview of the research process that primarily concerns human subjects. This book discusses the methods of acquiring knowledge, importance of a well-chosen problem, review of the literature, and relationship between theory-building and hypothesis-testing. The common sources of invalidity in practice, non-experimental research types, Stevens' classification of scales, and estimation based on probabilistic sampling are also elaborated.

This text likewise covers the role of computer in research, techniques for analysis of data, univariate and bivariate statistics, and assumptions underlying analysis of variance. Other topics include the canonical correlation analysis, non-parametric analysis of variance, deterministic problem analysis techniques, and common errors in presentation of findings. This publication is intended for novice investigators in the broad category of social and behavioral sciences.

Introduction to Python for Science and Engineering World Scientific

The book teaches students to model a scientific problem and write a computer program in C language to solve that problem. It introduces the basics of C language, and then describes and discusses algorithms commonly used in scientific applications (e.g. searching, graphs, statistics, equation solving, Monte Carlo methods etc.).

Python Programming and Numerical Methods Springer

This text provides a very simple, initial introduction to the complete scientific computing pipeline: models, discretization, algorithms, programming, verification, and visualization. The pedagogical strategy is to use one case study – an ordinary differential equation describing exponential decay processes – to illustrate fundamental concepts in mathematics and computer science. The book is easy to read and only requires a command of one-variable calculus and some very basic knowledge about computer programming. Contrary to similar texts on numerical methods and programming, this text has a much stronger focus on implementation and teaches testing and software engineering in particular.

The Science of Functional Programming (draft version) Springer Nature

Learn How to Program Stochastic Models Highly recommended, the best-selling first edition of Introduction to Scientific Programming and Simulation Using R was lauded as an excellent, easy-to-read introduction with extensive examples and exercises. This second edition continues to introduce scientific programming and stochastic modelling in a clear,

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