



# Introduction to Computation and Programming Using Python (MIT Press)

By John V. Guttag

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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 PyLab. 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. The book is based on an MIT course (which became the most popular course offered through MIT's OpenCourseWare) and was developed for use not only in a conventional classroom but in a massive open online course (or MOOC) offered by the pioneering MIT-Harvard collaboration edX.

Students are introduced to Python and the basics of programming in the context of such computational concepts and techniques as exhaustive enumeration, bisection search, and efficient approximation algorithms. The book does not require knowledge of mathematics beyond high school algebra, but does assume that readers are comfortable with rigorous thinking and not intimidated by mathematical concepts. Although it covers such traditional topics as computational complexity and simple algorithms, the book focuses on a wide range of topics not found in most introductory texts, including information visualization, simulations to model randomness, computational techniques to understand data, and statistical techniques that inform (and misinform) as well as two related but relatively advanced topics: optimization problems and dynamic programming. *Introduction to Computation and Programming Using Python* can serve as a stepping-stone to more advanced computer science courses, or as a basic grounding in computational problem solving for students in other disciplines.

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### Editorial Review

#### Review

This is the 'computational thinking' book we have all been waiting for! With humor and historical anecdotes, John Guttag conveys the breadth and joy of computer science without compromise to technical detail. This book is perfect for any student who wants to explore the essence of computer science.

**(Jeannette M. Wing**, President's Professor of Computer Science and Department Head, Carnegie Mellon University)

John Guttag is an extraordinary teacher and an extraordinary writer. (Perhaps having been an undergraduate English major -- an uncommon stepping stone to the leadership of the world's top EECS department -- has something to do with this.) This is not 'a Python book' -- although you will learn Python. Nor is it a 'programming book' -- although you will learn to program. It is a rigorous but eminently readable introduction to computational problem solving.

**(Ed Lazowska**, Bill & Melinda Gates Chair in Computer Science & Engineering, University of Washington)

There's no such thing as the only computer science book you'll ever need. But if you had to pick only one, this would be a great choice. You'll begin by getting a solid introduction to programming in Python. Armed with that, you'll go hands-on with important computing ideas like random methods, statistics, and optimization, using tools of great theoretical beauty and great practical importance.

**(Hal Abelson**, coauthor (with Gerald Jay Sussman) of *Structure and Interpretation of Computer Programs*)

#### About the Author

John V. Guttag is the Dugald C. Jackson Professor of Computer Science and Electrical Engineering at MIT.

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