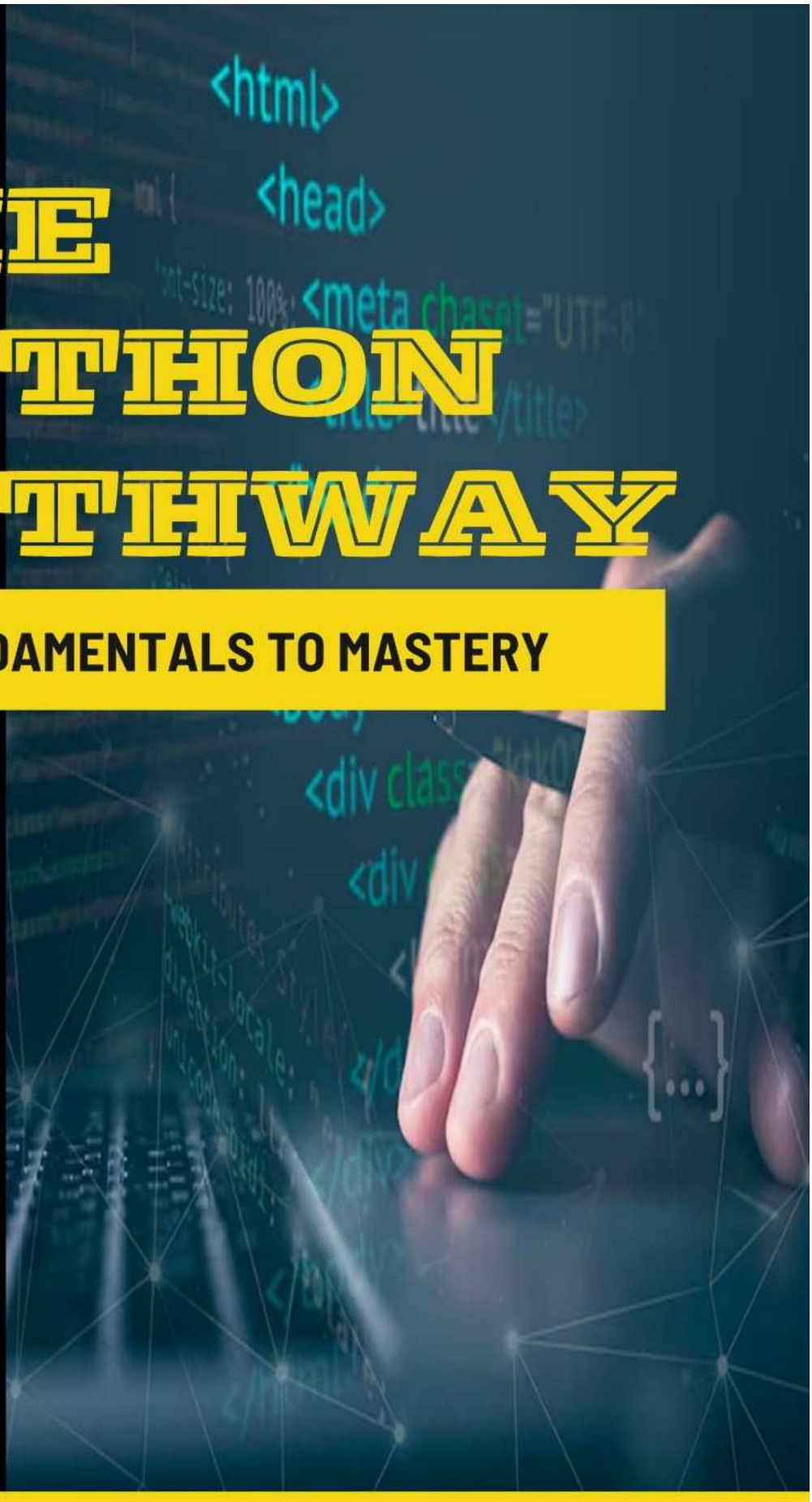
THE PYTHON PATHWAY

FROM FUNDAMENTALS TO MASTERY



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The Python Pathway: From Fundamentals to Mastery

First Edition

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Preface

In the fast-paced world of technology, programming languages play a crucial role in modern development. Among these, Python has distinguished itself as a highly versatile, powerful, and accessible language suitable for both beginners and experienced developers. With its straightforward syntax and vast array of libraries, Python stands out as an excellent choice for a diverse range of applications, including web development, data science, artificial intelligence, and much more.

This book is specifically designed for students enrolled in MCA, BCA, B.Tech., and B.Sc. IT/CS programs, offering an in-depth guide to Python programming. It is ideal for newcomers to coding as well as those with some programming experience who wish to refine their skills. The content is carefully organized to ensure smooth progression from foundational concepts to more advanced topics, empowering readers to tackle real-world challenges using Python.

The book consists of ten chapters, each addressing a key aspect of Python programming. It begins with an introduction to the language, covering its history, installation, and basic syntax. As the reader advances, the book delves into topics such as control structures, functions, data structures, object-oriented programming, regular expressions, exception handling, multithreading, file manipulation, and working with databases.

To reinforce the concepts presented, special attention is given to practical examples, code samples, and exercises that encourage hands-on learning. Moreover, the book incorporates popular built-in modules like NumPy, Pandas, and re, enabling readers to fully leverage Python for tasks like data analysis, scientific computing, and pattern matching.

The primary goal of this book is to bridge the gap between theoretical learning and practical application, helping readers gain a profound understanding of Python's potential. By the end of the book, readers will be equipped to create robust applications and take their first steps toward becoming skilled Python developers.

We would like to extend our sincere thanks to everyone who contributed to the development of this book. We hope this resource serves as a valuable tool for students, educators, and developers, igniting a lasting passion for programming and innovation.

Happy coding!

Acknowledgement

We extend our heartfelt gratitude to everyone who has supported us throughout the journey of writing this book. First and foremost, we are deeply thankful to our mentors, colleagues, and academic institutions for their invaluable guidance, encouragement, and insightful discussions that have enriched our understanding of the subject.

We express our sincere appreciation to our faculty members for their constant support and encouragement in our academic pursuits. Their expertise and constructive feedback have played a significant role in shaping our research and writing.

A special note of gratitude goes to our students, whose curiosity and enthusiasm inspire us to explore new dimensions of learning and innovation. Their inquisitive minds have motivated us to refine our knowledge and present complex concepts in an accessible manner.

We also wish to acknowledge our families and friends for their unwavering support, patience, and belief in our abilities. Their encouragement has been our greatest source of strength throughout this journey.

Finally, we extend our sincere thanks to the publishers and editorial team for their guidance in bringing this book to life. This work is a culmination of collective efforts, and we hope it serves as a valuable resource for students, researchers, and professionals in the field of Computer Science and Technology.

With deep gratitude,

Ms. Apoorva Verma
Dr. Leena Bhatia

Contents

ABOUT AUTHORS

Ms. Apoorva Verma is an accomplished academician and researcher in the field of Computer Science. She is currently an Assistant Professor in the Department of Information Technology at the Asian School of Business, part of the esteemed Asian Education Group, Noida. With a Master's degree (MCA) and a Ph.D. in progress from Rajasthan Technical University, Kota, she brings over five years of experience in higher education, fostering innovation and excellence in her students. Her expertise spans a wide array of domains, including Python Programming, Artificial Intelligence, Machine Learning, C, C++, DBMS, Data Analytics, and Business Analytics. A two-time UGC-NET qualifier in Computer Science, Ms. Verma has a strong research portfolio with publications in prestigious Scopus-indexed and Elsevier journals. She has actively presented her work at various national and international conferences and seminars, further solidifying her presence in the research community. Beyond academics, Ms. Verma is a published author of a book on Cloud Computing and a contributed chapter on Artificial Intelligence and its Applications. Her innovative mindset is reflected in her patented work on AI-Based Micro GPS Tracking, showcasing her commitment to technological advancements. Passionate about inspiring young minds, she strives to instill critical thinking and innovation in her students, preparing them for the dynamic world of technology and research.

Dr. Leena Bhatia is an accomplished academic and a highly regarded Associate Professor at S. S. Jain Subodh PG College, Jaipur. With over 25 years of experience in the field of education, she has made significant contributions to the development of young minds in the areas of computer science and information technology. Dr. Bhatia is also a Research Guide at RTU, Kota, where she supervises and mentors PhD. D. Scholars in their research endeavors. A prolific author, Dr. Bhatia has published numerous articles in reputed journals, contributing to the advancement of knowledge in her areas of expertise. She has also authored 12 books and book chapters, further enriching the academic community with her insights and research findings. Her research interests span a wide range of topics, including E-Commerce, M-Commerce, algorithms, Big Data, and Python programming. Dr. Bhatia's passion for these subjects is evident in her extensive work, which continues to inspire both students and professionals in the field.

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