

Computational Physics Problem Solving With Python No Longer Used

Computational Physics Problem Solving With Python No Longer Used Computational Physics Problem Solving with Python No Longer Used Computational physics has historically been a cornerstone of modern scientific research, providing essential tools for modeling, simulation, and data analysis. Over the past decade, Python has emerged as the dominant programming language in this field, owing to its simplicity, extensive libraries, and community support. However, as the landscape of computational physics evolves, certain approaches and practices involving Python have become outdated or less favored. This article explores the concept of "computational physics problem solving with Python no longer used," examining the reasons behind this shift, the methods that have fallen out of favor, and the implications for current and future research.

The Rise and Dominance of Python in Computational Physics

Historical Context

In the early 2000s, computational physics relied heavily on languages like Fortran, C, and C++ due to their efficiency and performance. Python's emergence as a high-level, interpreted language was initially seen as a hobbyist or educational tool. However, with the development of scientific libraries such as NumPy, SciPy, Matplotlib, and later, Pandas and Jupyter notebooks, Python rapidly gained traction among researchers. Its ease of use, readability, and rapid prototyping capabilities made it an attractive choice for solving computational physics problems.

Advantages that Fueled Adoption

- Ease of learning and writing code
- Rich ecosystem of scientific libraries
- Strong community support
- Integration with visualization tools and data analysis pipelines
- Open-source nature, reducing barriers to entry

Reasons Why Python-Based Solutions Are No Longer Used in 2 Certain Contexts

Performance Limitations

While Python excels in ease of use, it is an interpreted language and inherently slower than compiled languages like C or Fortran. For computationally intensive tasks, such as large-scale simulations or real-time data processing, Python's performance bottlenecks have made it less suitable. Although techniques like Cython, Numba, and interfacing with C/C++ libraries can mitigate these issues, they add complexity and are not always practical for large or highly optimized simulations.

Obsolescence of Certain Libraries and Techniques

Some Python libraries or approaches used historically in computational physics have become outdated or deprecated due to better alternatives, lack of maintenance, or shifts in technology trends. For example:

- Using custom, handwritten numerical solvers instead of well-maintained, optimized libraries
- Relying on outdated visualization tools that are incompatible with modern workflows
- Adopting monolithic scripts instead of modular, scalable codebases

Shift Toward Specialized and High-Performance Languages

As computational demands grow, researchers increasingly turn to specialized languages and hardware, such as GPU programming with CUDA or OpenCL, or using Julia, which combines high-level syntax with performance close to C. These alternatives often outperform Python for large-scale or highly parallel computations, leading to a decline in Python-centric solutions for certain tasks.

Reproducibility and Standardization Challenges

In some scientific communities, reliance on Python scripts has posed reproducibility issues, especially when codebases become complex or depend on various environment configurations. As a result, there has been a move toward

containerized, standardized workflows or compiled code that ensures consistent results across systems, further reducing the use of traditional Python solutions.

Examples of Outdated Python Approaches in Computational Physics

3 Use of Legacy Scripts and Handwritten Numerical Methods

In earlier decades, physicists often wrote custom numerical algorithms in Python, such as finite difference schemes for solving differential equations, or used non-optimized libraries. These scripts, while functional, were inefficient and difficult to maintain.

Manual Data Analysis and Visualization

Using basic Python plotting libraries or even ASCII output, some researchers relied heavily on manual data inspection. Modern workflows now favor interactive notebooks, automated pipelines, and advanced visualization tools that streamline analysis and interpretation.

Monolithic Codebases Without Modular Design

Many early Python-based computational physics codes were monolithic, making debugging, scaling, or adapting difficult. The trend has shifted toward modular, object-oriented or functional programming approaches, often using frameworks like Jupyter or workflow managers such as Snakemake or Nextflow.

Alternatives and Modern Directions in Computational Physics

Transition to High-Performance Languages and Frameworks

Using C, C++, or Fortran for core numerical routines, interfaced with Python for scripting and visualization

Adopting Julia for high-level syntax with performance comparable to low-level languages

Leveraging GPU programming with CUDA, OpenCL, or HIP for parallel computations

Adoption of Reproducible, Containerized Workflows

Using Docker or Singularity containers to encapsulate environments

Employing version control systems like Git for code management

Implementing continuous integration/testing pipelines to ensure reproducibility

Enhanced Visualization and Data Management Tools

Interactive notebooks (Jupyter, Pluto.jl) for dynamic data exploration

Visualization libraries such as Plotly, Bokeh, or ParaView

Databases and data pipelines for handling large datasets efficiently

4 Implications for Researchers and Educators

Shifting Skillsets and Educational Focus

As the field moves away from traditional Python scripting, educational programs increasingly emphasize knowledge of high-performance computing (HPC), parallel programming, and domain-specific languages. Students are encouraged to learn multiple tools and frameworks to stay adaptable.

Preservation of Legacy Code and Knowledge

Despite the decline of certain Python approaches, legacy codebases remain valuable for historical data, validation, or reproducibility. Maintaining and documenting these codes is essential, even as newer, more efficient methods are adopted.

Balancing Ease of Use with Performance

Future computational physics solutions strive to combine user-friendly interfaces with high performance. Hybrid approaches—using Python as a glue language, with critical routines implemented in faster languages—are now standard practice.

Conclusion

The landscape of computational physics problem solving with Python has undergone a significant change. While Python played a pivotal role in democratizing scientific computing, certain methods, libraries, and practices have become obsolete or less used due to performance limitations, technological advancements, and evolving research needs. Recognizing the historical context of Python's role helps in understanding the current trends and preparing for future innovations. Moving forward, a combination of high-performance languages, reproducible workflows, and advanced visualization tools will define the next generation of computational physics solutions, rendering some of the old Python-based approaches a thing of the past.

Question Answer

Why is Python no longer the preferred language for computational physics problem solving? While Python was once popular for its ease of use and extensive libraries, newer languages like Julia and optimized C++ frameworks now offer better performance and

scalability for intensive computational physics tasks. What are the main limitations of using Python for large-scale computational physics simulations? Python's interpreted nature can lead to slower execution speeds compared to compiled languages, making it less suitable for very large or time-sensitive simulations without significant optimization or external libraries. 5

How has the shift away from Python impacted the development of computational physics tools? The transition has led to increased adoption of high-performance languages like Julia and C++, resulting in faster, more efficient tools but also requiring more specialized programming knowledge. Are there still scenarios where Python is recommended for computational physics problems? Yes, Python remains useful for prototyping, data analysis, visualization, and interfacing with high-performance modules, but it is often supplemented with faster languages for computation-intensive tasks. What alternative programming languages are now favored over Python in computational physics? Julia is gaining popularity due to its high performance and ease of use, while C++ remains the standard for optimized, high-performance simulations; Fortran is also still used in legacy scientific code. What tools or libraries have replaced Python-based solutions in computational physics? Libraries like Julia's DifferentialEquations.jl, C++ frameworks such as deal.II, and GPU-accelerated tools like CUDA have become prominent alternatives to Python-based solutions. Is there a future where Python might regain its prominence in computational physics? While Python may continue to evolve with performance improvements and better integration with high-performance code, it is more likely to serve as a complementary language rather than the primary tool for intensive simulations in the future.

Computational Physics Problem Solving with Python No Longer Used

--- Introduction

Computational physics has historically been a cornerstone in understanding complex physical systems through numerical simulations, data analysis, and algorithmic problem-solving. For many decades, Python has been regarded as a dominant programming language in this domain due to its simplicity, extensive scientific libraries, and active community. However, in recent years, the landscape of computational physics has shifted away from Python, driven by emerging languages, specialized hardware, and evolving project requirements. This article explores the reasons behind the decline of Python in computational physics problem solving, the implications for practitioners, and the alternative approaches now prevailing in the field.

--- The Historical Significance of Python in Computational Physics

Early Adoption and Advantages

Python gained popularity in computational physics because of:

- **Ease of Use:** Its readable syntax made it accessible for physicists without extensive programming backgrounds.
- **Rich Ecosystem:** Libraries such as NumPy, SciPy, Matplotlib, and SymPy provided powerful tools for numerical computation, symbolic mathematics, and visualization.
- **Community and Documentation:** An active user base facilitated knowledge sharing, tutorials, and collaborative projects.
- **Rapid Prototyping:** Python allowed quick development and testing of algorithms, fostering experimental approaches.

Typical Use Cases

Python was used extensively for:

- Solving differential equations (via SciPy's ODE solvers).
- Data analysis and visualization.
- Monte Carlo simulations.
- Quantum mechanics simulations.
- Classical mechanics and Computational Physics Problem Solving With Python No Longer Used

6 electromagnetism problems.

Educational Impact

Because of its simplicity, Python became a staple in physics education, helping students grasp complex concepts through computation, visualization and interactive notebooks.

--- Factors Leading to Python's Decline in Computational Physics

Despite its advantages, Python's dominance has waned in the field of computational physics due to several technical and practical reasons:

1. Performance

Bottlenecks – Interpreted Language Limitations: Python's interpreted nature results in slower execution times compared to compiled languages like C, C++, or Fortran. – GIL (Global Interpreter Lock): Limits the efficiency of multi-threaded CPU-bound tasks, restricting performance scaling on multi-core architectures. – Complexity of Large-Scale Simulations: High-fidelity simulations, such as molecular dynamics or astrophysical modeling, demand performance that Python alone cannot deliver efficiently.

2. The Rise of Compiled and Hybrid Languages – C/C++ and Fortran: These languages have long been the backbone of high-performance scientific computing due to their speed and mature numerical libraries. – Hybrid Approaches: Increasingly, computational physicists have adopted language interoperability, writing core performance-critical routines in C/C++ or Fortran and interfacing with Python for higher-level control—although this complicates codebases.

3. Specialized Hardware and Parallel Computing – GPU Acceleration: Frameworks like CUDA and OpenCL provide significant speed-ups for parallelizable tasks, mostly accessible via C/C++ or CUDA-specific languages, with limited Python support. – Distributed Computing Frameworks: High-performance computing clusters use MPI (Message Passing Interface), which is traditionally implemented in C/C++, with Python bindings (e.g., mpi4py) but often with performance overhead.

4. Emerging Languages and Paradigms – Julia: A modern language designed explicitly for scientific computing, offering near-C performance with a high-level syntax. – Rust: Known for safety and performance, increasingly adopted for computational tasks requiring efficiency. – Domain-Specific Languages (DSLs): Such as Halide or TensorFlow (for machine learning), which optimize performance for specific applications.

5. Software Ecosystem and Maintenance Concerns – Dependency Management: Large Python projects can suffer from dependency conflicts, versioning issues, and compatibility problems. – Memory Management: Python's garbage collection and dynamic typing sometimes hinder fine-grained control necessary for memory-intensive simulations. – Long-Term Stability: Some projects prefer the stability and predictability of compiled languages for long-term scientific codebases. --- The Transition Away from Python: What Has Replaced It? As Python's limitations became apparent, the community shifted toward alternative solutions tailored for high-performance and scalable scientific computing.

High-Performance Languages and Frameworks – C/C++: Still the standard for core simulation engines, especially in computational fluid dynamics, molecular dynamics, and astrophysics. – Fortran: Remains prevalent in legacy scientific codebases and high-performance numerical routines. – Julia: Gains traction due to its balance of performance and ease of use, with syntax similar to Python and C.

Domain-Specific and Specialized Tools – CUDA and OpenCL: For GPU acceleration of large-scale simulations. – MPI and OpenMP: For parallel processing on supercomputers. – Kokkos, RAJA: For performance portability across architectures.

Hybrid Programming Models – Cython and Numba: Used to speed up Python code by compiling parts of it to machine code, although not a complete solution for large-scale simulations. – Wrapper Libraries: Many physics codes are written in C++ or Fortran, with Python bindings for scripting and analysis, but the core computations are performed in the faster languages.

Scientific Computing Frameworks in Other Languages – Julia's DifferentialEquations.jl: Provides highly optimized solvers for differential equations. – TensorFlow and PyTorch: While popular in machine learning, they are increasingly used for physics-informed neural networks and other AI-driven physics modeling. --- Impacts on Education and Research Methodologies The shift away from Python in computational physics has several implications: Educational Changes –

Curriculum Evolution: Courses now incorporate C++, Julia, or Fortran for high-performance tasks, while Python is often relegated to data analysis and visualization. – Learning Curve: Students face steeper learning curves when mastering multiple languages and tools. Research and Development Practices – Code Development: Teams develop modular codebases with performance-critical parts in low-level languages, complicating collaboration. – Reproducibility: Managing multi-language environments and dependencies can affect reproducibility of computational results. – Workflow Complexity: Integrating different tools and languages increases the complexity of simulation workflows. --- Practical Considerations for Modern Computational Physicists Best Practices in the Current Landscape – Choosing the Right Tool for the Job: Use high-performance languages for core computations; rely on Python or Julia for scripting, visualization, and data analysis. – Leveraging Interoperability: Employ bindings (e.g., Cython, SWIG, F2py) to connect high-level languages with performant code. – Optimizing Code: Profile and optimize code at critical points, possibly rewriting bottlenecks in C/C++ or Fortran. – Parallelization and Hardware Acceleration: Exploit multi-threading, GPU acceleration, and distributed computing where appropriate. Future Directions – Adoption of Julia: Its growing ecosystem and performance advantages make Julia a pro Python in many areas. – Development of Unified Frameworks: Efforts are underway to create integrated environments that combine ease of use with high performance. – Machine Learning Integration: AI/ML approaches are increasingly used to approximate complex physics models, often with frameworks optimized for performance. --- Conclusion While Python revolutionized computational physics by making high-level programming development, its limitations—particularly in performance and scalability—have led the community to explore and adopt alternative solutions. The current trend favors hybrid approaches, specialized languages like Julia, and hardware-accelerated frameworks that better meet the demands of modern large-scale, high-precision simulations. For practitioners and Computational Physics Problem Solving With Python No Longer Used 8 educators, understanding this evolving landscape is critical to leveraging the best tools for research and learning. Moving beyond Python does not diminish its historical importance but highlights the ongoing quest for efficiency, scalability, and innovation in computational physics problem solving. --- References and Further Reading – Numerical Recipes in C by William H. Press et al. – High Performance Scientific Computing by Victor Eijkhout – Julia Language Documentation: <https://julialang.org/> – MPI for Python (mpi4py): <https://mpi4py.readthedocs.io/> – CUDA Programming Guide: <https://developer.nvidia.com/cuda-zone> – Computational Physics by Nicholas J. Giordano and Hisao Nakanishi --- In summary, the decline of Python as the primary language for computational underscores the importance of performance, scalability, and hardware compatibility in modern scientific computation. While Python remains invaluable for data analysis and visualization, the core heavy-lifting increasingly relies on languages and frameworks optimized for high-performance computing. computational physics, Python programming, problem solving, legacy code, outdated scripts, physics simulations, numerical methods, code deprecation, scientific computing, programming languages

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this book is designed for the learners who can use this high level programming language as
 an effective tool in solving of various mathematical scientific data analysis and prediction
 analysis problems python is used to develop various applications of any stream and is not
 restricted only to computer science

a functional start to computing with python enables students to quickly learn computing
 without having to use loops variables and object abstractions at the start requiring no prior

programming experience the book draws on python's flexible data types and operations as well as its capacity for defining new functions along with the specifics of

learn how to develop your own applications to monitor or control instrumentation hardware whether you need to acquire data from a device or automate its functions this practical book shows you how to use python's rapid development capabilities to build interfaces that include everything from software to wiring you get step by step instructions clear examples and hands on tips for interfacing a pc to a variety of devices use the book's hardware survey to identify the interface type for your particular device and then follow detailed examples to develop an interface with python and c organized by interface type data processing activities and user interface implementations this book is for anyone who works with instrumentation robotics data acquisition or process control understand how to define the scope of an application and determine the algorithms necessary and why it's important learn how to use industry standard interfaces such as rs 232 rs 485 and gpib create low level extension modules in c to interface python with a variety of hardware and test instruments explore the console curses tkinter and wxpython for graphical and text based user interfaces use open source software tools and libraries to reduce costs and avoid implementing functionality from scratch

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

already the industry standard for python users programmingpython from o'reilly just got even better this third edition has been updated to reflect current best practices and the abundance of changes introduced by the latest version of the language python 2.5 whether you're a novice or an advanced practitioner you'll find this refreshed book more than lives up to its reputation programmingpython 3rd edition teaches you the right way to code it explains python language syntax and programming techniques in a clear and concise manner with numerous examples that illustrate both correct usage and common idioms by reading this comprehensive guide you'll learn how to apply python in real world problem domains such as gui programming internet scripting parallel processing database management networked applications programming python third edition covers each of these target domains gradually beginning with in depth discussions of core concepts and then progressing toward complete programs large examples do appear but only after you've learned enough to understand their techniques and code along the way you'll also learn how to use the python language in realistically scaled programs concepts such as object oriented programming oop and code reuse are recurring side themes throughout this text if you're interested in python programming then this o'reilly classic needs to be within arm's reach the wealth of practical advice snippets of code and patterns of program design can all be put into use on a daily basis making your life easier and more productive reviews of the second edition about as comprehensive as any book can be dr dobb's journal if the language

had manuals they would undoubtedly be the texts from o reilly learning python and programming python are definitive treatments sd times

explore various verticals in software engineering through high end systems using python key features master the tools and techniques used in software engineering evaluates available database options and selects one for the final central office system component experience the iterations software go through and craft enterprise grade systems book description software engineering is about more than just writing code it includes a host of soft skills that apply to almost any development effort no matter what the language development methodology or scope of the project being a senior developer all but requires awareness of how those skills along with their expected technical counterparts mesh together through a project s life cycle this book walks you through that discovery by going over the entire life cycle of a multi tier system and its related software projects you ll see what happens before any development takes place and what impact the decisions and designs made at each step have on the development process the development of the entire project over the course of several iterations based on real world agile iterations will be executed sometimes starting from nothing in one of the fastest growing languages in the world python application of practices in python will be laid out along with a number of python specific capabilities that are often overlooked finally the book will implement a high performance computing solution from first principles through complete foundation what you will learn understand what happens over the course of a system s life cycle establish what to expect from the pre development life cycle steps find out how the development specific phases of the sdhc affect development uncover what a real world development process might be like in an agile way find out how to do more than just write the code identify the existence of project independent best practices and how to use them find out how to design and implement a high performance computing process who this book is for hands on software engineering with python is for you if you are a developer having basic understanding of programming and its paradigms and want to skill up as a senior programmer it is assumed that you have basic python knowledge

derive useful insights from your data using python you will learn both basic and advanced concepts including text and language syntax structure and semantics you will focus on algorithms and techniques such as text classification clustering topic modeling and text summarization text analytics with python teaches you the techniques related to natural language processing and text analytics and you will gain the skills to know which technique is best suited to solve a particular problem you will look at each technique and algorithm with both a bird s eye view to understand how it can be used as well as with a microscopic view to understand the mathematical concepts and to implement them to solve your own problems what you will learn understand the major concepts and techniques of natural language processing nlp and text analytics including syntax and structure build a text classification system to categorize news articles analyze app or game reviews using topic modeling and text summarization and cluster popular movie synopses and analyze the sentiment of movie reviews implement python and popular open source libraries in nlp and text analytics such as the natural language toolkit nltk gensim scikit learn spacy and pattern who this book is for it professionals analysts developers linguistic experts data scientists and anyone with a keen interest in linguistics analytics and generating insights from textual data

this book is a printed edition of the special issue state of the art sensors technology in spain 2017 that was published in sensors

solve design planning and control problems using modern ai techniques optimization problems are everywhere in daily life what s the fastest route from one place to another how do you calculate the optimal price for a product how should you plant crops allocate resources and schedule surgeries optimization algorithms introduces the ai algorithms that can solve these complex and poorly structured problems in optimization algorithms ai techniques for design planning and control problems you will learn the core concepts of search and optimization deterministic and stochastic optimization techniques graph search algorithms trajectory based optimization algorithms evolutionary computing algorithms swarm intelligence algorithms machine learning methods for search and optimization problems efficient trade offs between search space exploration and exploitation state of the art python libraries for search and optimization inside this comprehensive guide you ll find a wide range of optimization methods from deterministic search algorithms to stochastic derivative free metaheuristic algorithms and machine learning methods don t worry there s no complex mathematical notation you ll learn through in depth case studies that cut through academic complexity to demonstrate how each algorithm works in the real world plus get hands on experience with practical exercises to optimize and scale the performance of each algorithm about the technology every time you call for a rideshare order food delivery book a flight or schedule a hospital appointment an algorithm works behind the scenes to find the optimal result blending modern ai methods with classical search and optimization techniques can deliver incredible results especially for the messy problems you encounter in the real world this book shows you how about the book optimization algorithms explains in clear language how optimization algorithms work and what you can do with them this engaging book goes beyond toy examples presenting detailed scenarios that use actual industry data and cutting edge ai techniques you will learn how to apply modern optimization algorithms to real world problems like pricing products matching supply with demand balancing assembly lines tuning parameters coordinating mobile networks and cracking smart mobility challenges what s inside graph search algorithms metaheuristic algorithms machine learning methods state of the art python libraries for optimization efficient trade offs between search space exploration and exploitation about the reader requires intermediate python and machine learning skills about the author dr alaa khamis is an ai and smart mobility technical leader at general motors and a lecturer at the university of toronto the technical editor on this book was frances buontempo table of contents part 1 1 introduction to search and optimization 2 a deeper look at search and optimization 3 blind search algorithms 4 informed search algorithms part 2 5 simulated annealing 6 tabu search part 3 7 genetic algorithms 8 genetic algorithm variants part 4 9 particle swarm optimization 10 other swarm intelligence algorithms to explore part 5 11 supervised and unsupervised learning 12 reinforcement learning appendix a appendix b appendix c

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addressing key issues in modern cybernetics and informatics this book presents vital research within networks and systems it offers an extensive overview of the latest methods algorithms and design innovations this book compiles the meticulously reviewed proceedings of the networks and systems in cybernetics session of the 13th computer science online conference 2024 csoc 2024 held virtually in april 2024

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praise for core python programming the complete developer s guide to python new to python the definitive guide to python development for experienced programmers covers core language features thoroughly including those found in the latest python releases learn more than just the syntax learn advanced topics such as regular expressions networking multithreading gui cgi and python extensions includes brand new material on databases internet clients java jython

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if you re a developer getting into networking for the first time or an it pro looking to build practical automation skills this second edition gives you a clear and structured path to master essential networking concepts and become a confident hands on python network administrator if you re looking to automate repetitive networking tasks build tools for infrastructure or become a network administrator you ll find this book teaching all the skills structure and mindset to make it happen you ll start off by getting the basics of python down and then quickly move on to tcp udp and socket programming you ll work with protocols like http ftp dns and email and you ll use python to automate everyday network tasks as you read on you ll dive into modern network automation using netmiko paramiko and napalm manage asynchronous tasks with asyncio and set up monitoring and analysis workflows through snmp ping3 iperf3 and locust you ll also use simpy to simulate networks program firewalls scanning encryption and vpns you ll also get to work on configuration management and orchestration using ansible this will teach you how to automate server and network setups manage software lifecycles enforce standards and integrate python for advanced logic this book is all about clarity and practicality using simple easy to follow examples that work in the real world it s not meant to deal with complicated business scenarios but it does cover the most important routine and common jobs of network programming key features learn the basics of python syntax and data structures for network automation get the hang of tcp udp and socket programming for real communication tasks practice your skills with http ftp dns and email

protocols using real world python scripts set up ssh connections and device configurations using netmiko paramiko and napalm take charge of asynchronous network operations with python s asyncio library keep an eye on look at and test networks using snmp ping3 iperf3 locust and simpy make your network security stronger by using firewalls scanning ssl tls and vpn configurations take advantage of the napalm and git integration to automate your configuration management and version control with ansible playbooks roles and automation workflows you can orchestrate server and network setups table of content introduction to python and networking tcp udp and socket programming working with application layer exploring network automation network monitoring and analysis network security and python working with apis and network services network programming with asyncio network testing and simulation network configuration management ansible and python

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portable powerful and a breeze to use python is the popular open source object oriented programming language used for both standalone programs and scripting applications python is considered easy to learn but there s no quicker way to mastery of the language than learning from an expert teacher this edition of learning python puts you in the hands of two expert teachers mark lutz and david ascher whose friendly well structured prose has guided many a programmer to proficiency with the language learning python second edition offers programmers a comprehensive learning tool for python and object oriented programming thoroughly updated for the numerous language and class presentation changes that have taken place since the release of the first edition in 1999 this guide introduces the basic elements of the latest release of python 2 3 and covers new features such as list comprehensions nested scopes and iterators generators beyond language features this edition of learning python also includes new context for less experienced programmers including fresh overviews of object

oriented programming and dynamic typing new discussions of program launch and configuration options new coverage of documentation sources and more there are also new use cases throughout to make the application of language features more concrete the first part of learning python gives programmers all the information they ll need to understand and construct programs in the python language including types operators statements classes functions modules and exceptions the authors then present more advanced material showing how python performs common tasks by offering real applications and the libraries available for those applications each chapter ends with a series of exercises that will test your python skills and measure your understanding learning python second edition is a self paced book that allows readers to focus on the core python language in depth as you work through the book you ll gain a deep and complete understanding of the python language that will help you to understand the larger application level examples that you ll encounter on your own if you re interested in learning python and want to do so quickly and efficiently then learning python second edition is your best choice

this open access book constitutes the proceedings of the 9th european moocs sta summit emoocs 2025 which took place in paris france during june 30 july 2 2025 the 20 full papers included in this book were carefully reviewed and selected from 79 submissions they deal with the ongoing transformation and critical challenges in online education particularly in the context of artificial intelligence ai and sustainable lifelong learning

this extensively revised and expanded new edition offers concepts principles and applied information that relates to the wellbeing of reptiles as a manual on health and welfare in a similar vein to volumes addressing the sciences of anatomy behaviour or psychology this book thoroughly examines the biology of reptile welfare and is about meeting biological needs the editors acknowledged experts in their own right have once again drawn together an extremely impressive international group of contributors positive and negative implications of general husbandry and research programs are discussed in addition to greatly revised original content are nine new chapters offering readers novel insight into sensory systems social behaviour brain and cognition controlled deprivation and enrichment effects of captivity imposed noise and light disturbance on welfare spatial and thermal factors evidential thresholds for species suitability in captivity record keeping as an aid to captive care arbitrary husbandry practices and misconceptions the authors have adopted a user friendly writing style to accommodate a broad readership although primarily aimed at academic professionals this comprehensive volume is fundamentally a biology book that will also inform all involved in captive reptile husbandry among others zoo personnel herpetologists veterinarians lab animal scientists and expert readers in animal welfare and behavioural studies will benefit from this updated work

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