

PYTHON PROGRAMMING

(Textbook for Universities and Colleges)

```
# Python Program
def greet(name):
    print(f"Hello, {name}!")

for i in range(5):
    if i % 2 == 0:
        print(i, "is even")
    else:
        print(i, "is odd")

nums = [1, 2, 3, 4, 5]
squared = [x**2 for x in nums]
print("Squares:", squared)
```



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Learn • Code • Create
The Power of Python

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The textbook “Python Programming” is a foundational instructional publication for bachelor’s students in higher education institutions. It serves students enrolled in Computer Engineering, Information Technology, Information Systems, Computer Science, and related majors. The textbook presents the theoretical foundations of programming in a systematic sequence. It covers the concepts of algorithm and program, general features of Python, and preparation of a programming environment. It also covers syntax rules, variables, data types, operators, conditional and loop constructs, functions, collections, file handling, exceptions, and error handling. The text then examines object-oriented programming fundamentals, classes and objects, inheritance, polymorphism, special methods, packages, virtual environments, project-folder organization, initial Git practices, testing, and final project development.

The textbook does not limit instruction to syntax rules. Its main directions are algorithmic thinking, formal problem description, staged code construction, error analysis, data processing, and simple applied projects. Each topic is supported by theoretical explanations, sample programs, step-by-step comments, tables, diagrams, self-check questions, and independent assignments.

The publication is intended for students, master’s students, doctoral students, instructors, specialists studying programming fundamentals, and readers who want to develop applied programs in Python.

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Preface

Programming has become one of the fundamental skills required in modern science, engineering, education, agriculture, business, and technology. The ability to design an algorithm, describe a problem formally, process data, and obtain a reliable result is no longer limited to computer specialists. It is now an essential competence for students and professionals in many fields. For this reason, the study of programming must begin with clear theoretical foundations and continue through practical examples, structured exercises, and independent problem solving.

This textbook, Python Programming, has been prepared for students of universities and colleges who study Computer Engineering, Information Technology, Information Systems, Computer Science, and related specialties. It may also be useful for master's students, doctoral students, instructors, specialists, and independent learners who wish to develop practical programming skills using Python.

The main purpose of the textbook is to introduce programming not only as the writing of source code, but also as a systematic method of thinking. A correctly written program begins with a correctly formulated problem. Therefore, special attention is given to problem formulation, input data, constraints, expected results, algorithmic thinking, and verification of correctness. This approach helps students understand why a program is written in a particular way and how each instruction contributes to the final result.

Python has been selected as the main programming language because of its readable syntax, wide practical application, and strong educational value. Its simple structure allows beginners to focus on the logic of programming before dealing with more complex technical details. At the same time, Python is powerful enough for data processing, automation, object-oriented programming, testing, and project development.

The textbook presents the topics in a gradual and logical sequence. It begins with the stages of solving problems on a computer and the concept of an algorithm. It then explains the Python programming environment, syntax rules, variables, data types, operators, conditional statements, loops,

functions, collections, file handling, exceptions, and error analysis. Later chapters introduce object-oriented programming, classes and objects, inheritance, polymorphism, packages, virtual environments, project-folder organization, initial Git practices, testing, and final project development.

A distinctive feature of this textbook is its emphasis on the connection between theory and practice. Each topic is supported by explanations, sample programs, step-by-step comments, tables, diagrams, self-check questions, and independent assignments. These elements are intended to help students move from passive reading to active problem solving. The examples are written in a form suitable for classroom teaching, laboratory work, and independent study.

The textbook also encourages students to develop programming culture. A program should not merely run; it should solve the given problem correctly, handle data properly, follow a clear algorithm, and produce a verifiable result. For this reason, testing, debugging, error analysis, and correctness checking are treated as important parts of the learning process.

The authors hope that this textbook will help students acquire a solid foundation in programming, develop algorithmic thinking, and gain confidence in writing applied programs in Python. The material has been prepared with the aim of supporting both theoretical understanding and practical competence. It is expected that readers will use the knowledge gained from this book in academic work, professional activity, and future software development projects.

The authors express their gratitude to the reviewers, colleagues, and students whose observations and academic support contributed to the preparation of this textbook. Constructive comments and suggestions from readers will be appreciated and may be considered in future editions.

Acknowledgement

The authors express their sincere gratitude to all individuals and institutions who contributed to the preparation and publication of this textbook.

First, the authors would like to thank the reviewers for their valuable comments, scientific observations, and methodological recommendations. Their constructive feedback helped improve the structure, clarity, and academic quality of the textbook.

The authors are also grateful to the administration of Azerbaijan State Agricultural University and to the academic staff of the Department of Information Technologies for their support, cooperation, and professional discussions during the preparation of this work. Their teaching experience and practical observations in the field of programming education contributed to the development of the textbook content.

Special thanks are extended to Nex Gen Publications and its publishing staff for their professional assistance, editorial support, and careful attention during the publication process. The authors highly appreciate their contribution to the preparation, formatting, and publication of this textbook.

The authors also thank their colleagues, students, and all contributors whose questions, suggestions, and observations helped make the material clearer, more systematic, and more suitable for teaching and independent learning.

This textbook was prepared with the aim of supporting students in developing algorithmic thinking, programming culture, and practical skills in Python programming. The authors hope that it will serve as a useful academic resource for students, instructors, and independent learners.

The authors will gratefully receive constructive comments and suggestions from readers, which may be considered in future editions of the textbook.

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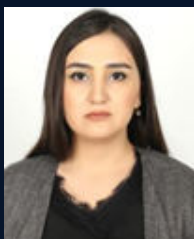
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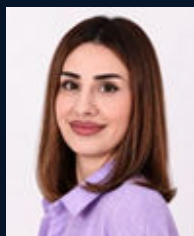
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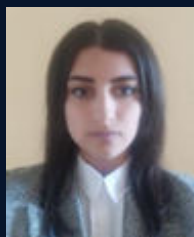
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