

# Preface

It gives us immense pleasure to bring the book '*Programming and Problem Solving with Python*'. The book is intended for the students in initial years of engineering and mathematics who can use this high-level programming language as an effective tool in mathematical problem solving. Python is used to develop applications of any stream and it is not restricted only to computer science.

We believe that anyone who has basic knowledge of computer and ability of logical thinking can learn programming. With this motivation, we have written this book in a lucid manner. Once you go through the book, you will know how simple the programming language is and at the same time you will learn the basics of python programming. You will feel motivated enough to develop applications using python.

Since this book has been written with consideration that reader has no prior knowledge of python programming, before going through all the chapters, reader should know what are the benefits of learning python programming. Following are some of the reasons why one should learn python language.

- Python language is simple and easy to learn. For example, it has simple syntax compared to other programming languages.
- Python is an object-oriented programming language. It is used to develop desktop, standalone and scripting applications.
- Python is also an example of free open source software. Due to its open nature one can write programs and can deploy on any of platform, i.e., (Windows, Linux, Ubuntu and Mac OS), without changing the original program.

Thus, due to the features enlisted above, python has become the most popular language and is widely used among programmers.

## Use of Python in Engineering Domains

### Computer Engineering

Python is used in computer engineering

- To develop web applications
- By data scientists to analyse large amount of data
- In automation testing

- To develop GUI-based applications, cryptography and network security and many more applications

### **Electronics and Telecommunication Engineering and Electrical Engineering**

- Image processing applications can be developed by using python's 'scikit-image' library
- Widely used in developing embedded applications
- Develop IOT applications using Arduino and Raspberry pi

Python can also be used in **other engineering streams** such as mechanical, chemical, and bioinformatics to perform complex calculations by making use of numpy, scipy, and pandas library.

Thus, the end user of this book can be anyone who wants to learn basics of python programming. To learn the basics, the student can be of any stream/any engineering/Diploma/BCA/MCA background and interested to develop applications using python.

### **Organization of the Book**

The book is organized into two parts. The first part covers fundamentals of computer programming while the second part covers topics related to object-oriented programming and some basic topics on data structures.

In the first part of the book, the readers will learn about basics of computer, basics of python programming, executing python programs on various operating systems (**Chapter 1**), data types used in python, assignments, formatting numbers and strings (**Chapter 2**) operators and expressions (**Chapter 3**), decision statements (**Chapter 4**), loop control statements (**Chapter 5**) and functions (**Chapter 6**).

In the second part, the readers will be introduced to creation of classes and objects. The concept of creating list and strings using classes are discussed in **Chapters 7 and 8**. Reader will also become aware of basic topics of data structures, i.e. searching and sorting (**Chapter 9**) since it is one of the most important concept and used in almost all real-world applications. Various concepts and features of object-oriented programming such as inheritance, accessibility, i.e. encapsulation have been covered in **Chapter 10**. **Chapter 11** comprises one of the major important data structures of python, i.e. tuples, sets and dictionaries in great detail whereas **Chapter 12** explains graphics creation using turtle. Finally, **Chapter 13** will help the readers to understand the need of file handling and develop real-time applications based on it. Thus, after going through the second part of the book, the readers will be in a position to create a software application by considering flexibility, and reusability.

### **Online Learning Centre**

The text is supported by additional content which can be accessed from the weblink <http://www.mhihe.com/kamthane/python>. The weblink comprises

- Problems for practice
- Solutions Manual (for Instructors and Students)
- PPTs
- Useful web links for further reading

In the end, we would like to express gratitude to all our well-wishers and readers, whose unstinted support and encouragement has kept us going as a teacher and author of this book. Any suggestion regarding the improvement of the book will be highly appreciated.

ASHOK NAMDEV KAMTHANE

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