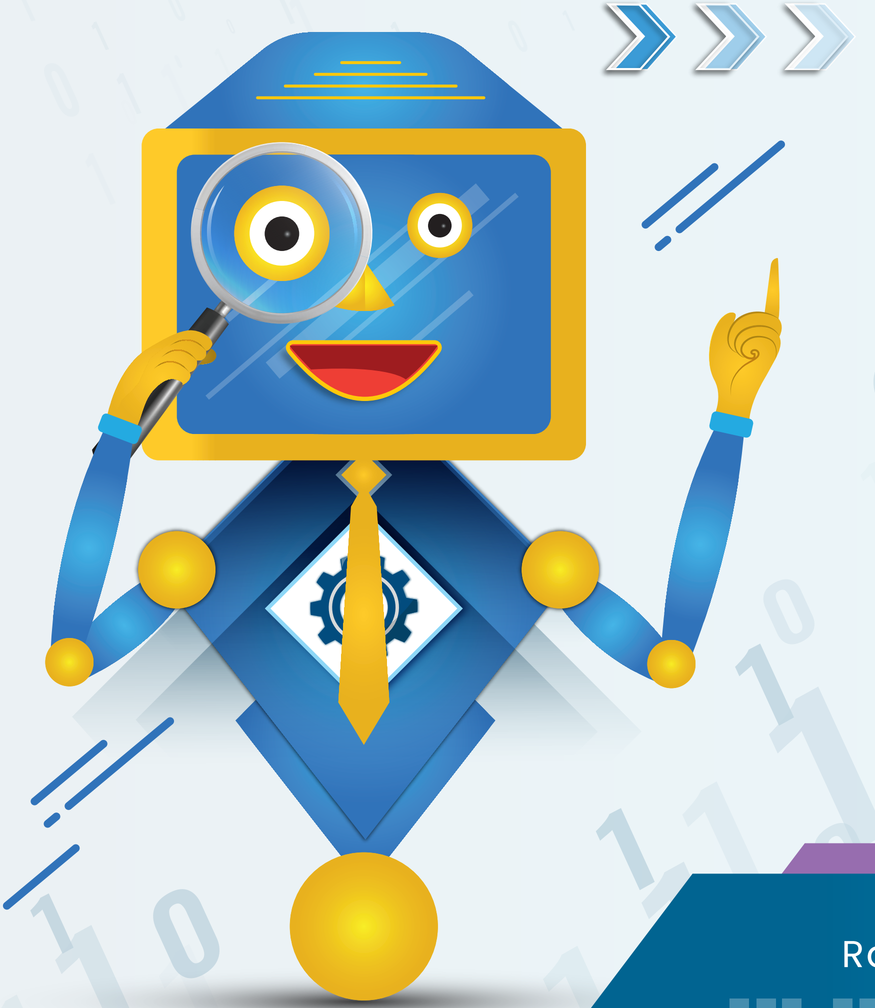
Learning Python

Intermediate Level

Python Run

Teacher's Book

Level 2



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PythonRun- Intermediate Level

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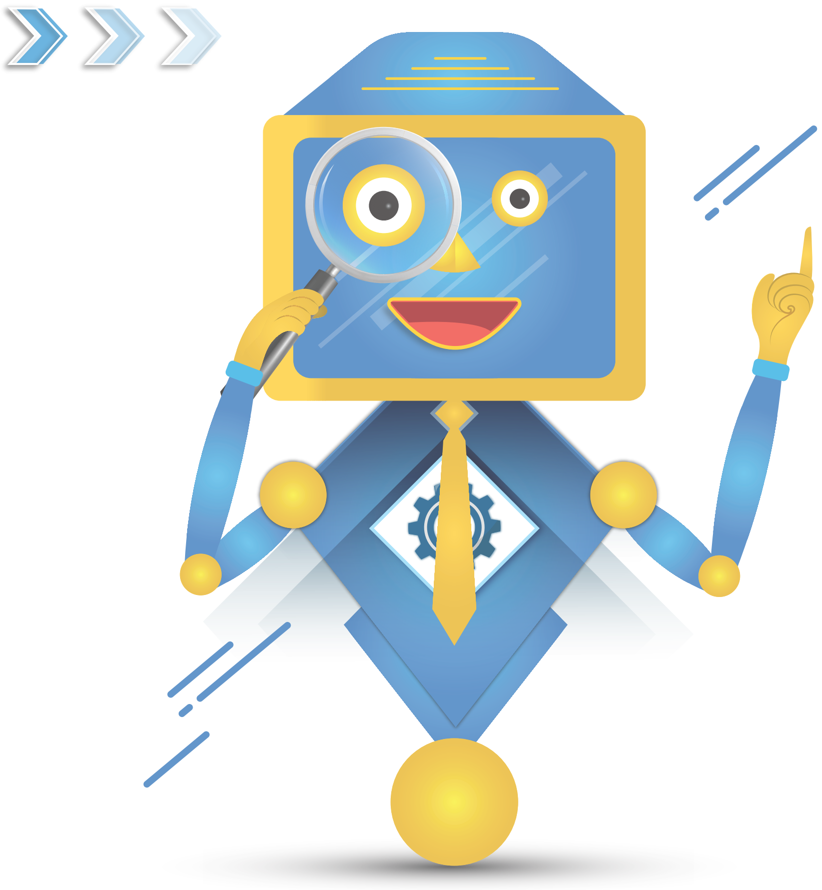

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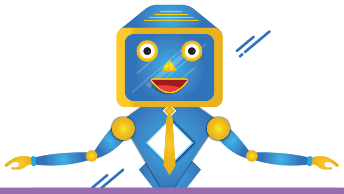
A guide to learning Python programming language



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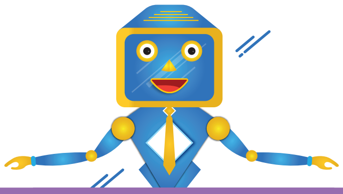

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Unit 5 - ›› Libraries in Python

›› Project - Based Assessments

Introduction

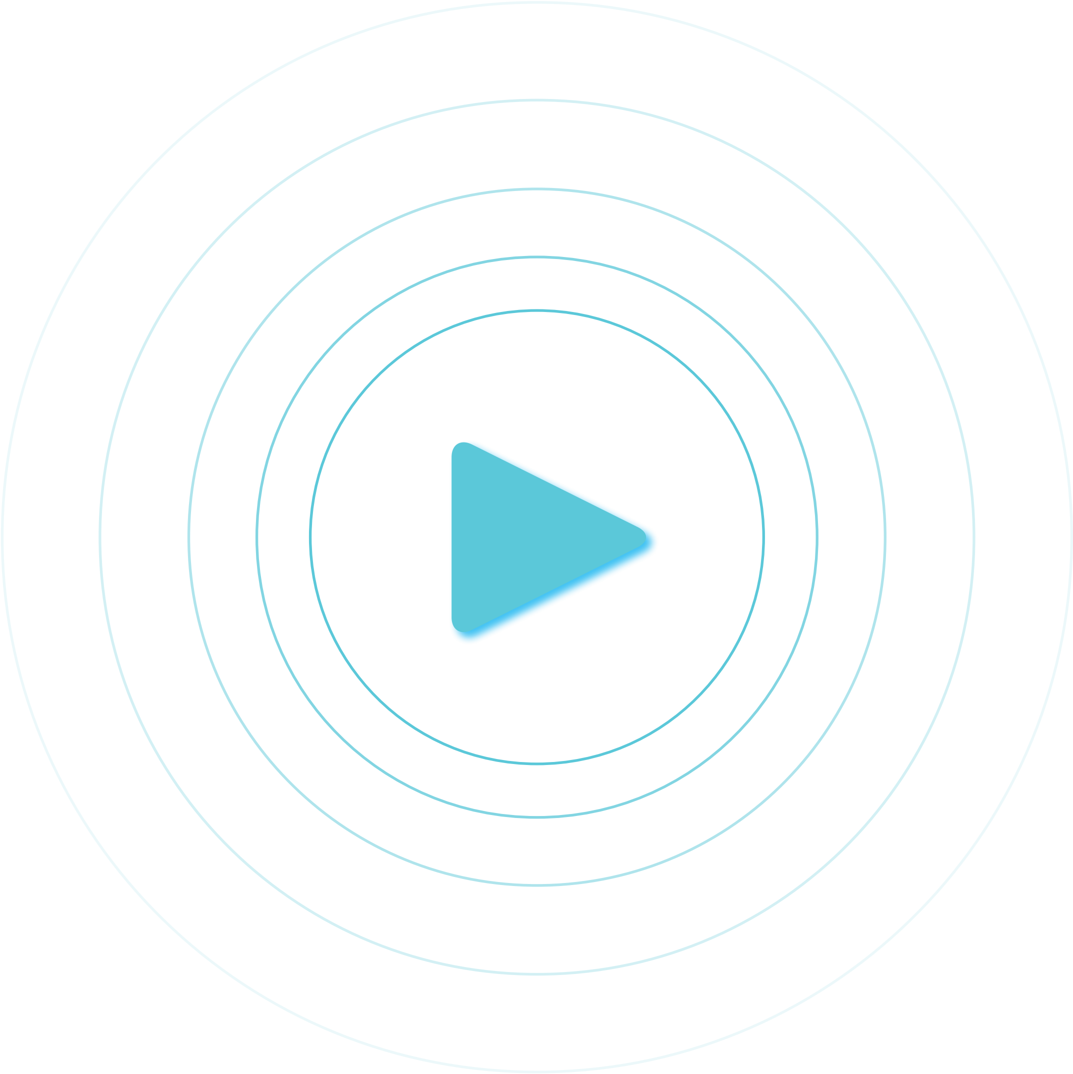
This book is the intermediate level core book in the *PythonRun* series, that will build on the knowledge you have gained from the beginner level book and allow you to delve deeper in **learning more Python syntax fundamentals, data types and functions.**

This teacher's guide serves as a comprehensive guide to equip teachers for project based learning. During the application process, teachers take the role of facilitators. They spark curiosity, cultivate the skills needed for inquiry and guide students along the way.

The text is divided into; tutorials, provided to give a detailed guide to programming concepts, alongside with practice exercises for hands on application. There are also quick test projects, at the end of most units which will help evaluate the students understanding and improve their programming and computational skills.

Students are encouraged to work in groups of two when working on the quick tests at the end of units as well as the end of book project based assessments. Working in a team, gives students opportunities to learn from others. It leads to resource building and team members become better equipped to deal with challenges. New skills and knowledge always benefit and positively influence the individual growth of students.

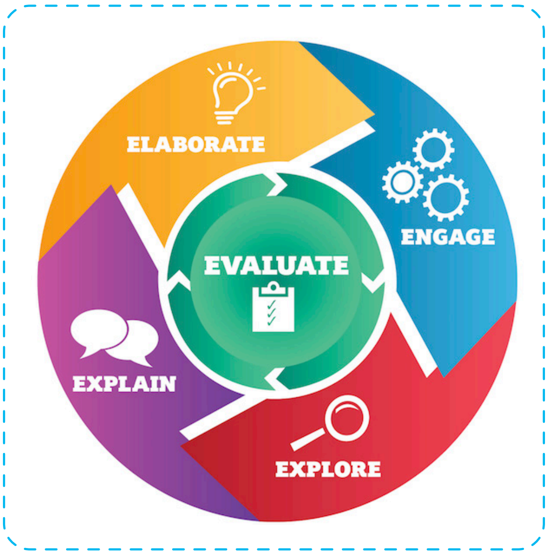
The material is divided into 12 lessons, each being 45 minutes long, along with project based assessments at the end of the book.



➜➜ Methodolgy

The 5Es methadology is an instructional model encompassing the phases Engage, Explore, Explain, Elaborate, and Evaluate steps which educators have traditionally taught students to move through in phases. However, the 5Es are not actually a linear progression. Engaging is not separate from exploring. Exploring is not necessarily separate from explaining. Part of exploring requires elaborating and all of these elements require evaluating.

The lessons of the *PythonRun* book are made up of tutorials, which will engage the students with new topics and within the tutorials are practice exercises to implement the new concepts, which allow the students to explore them.



The process of enhancing programs, and fixing errors will support students to explain their processes. Quick tests, at the end of the units, and project-based assessments will elaborate on the lessons of the unit which will help test and evaluate the students level of understanding the material.

	Traditionaly (I do)	STEM Learning (You do)
Engage	- I tell them... - I show them...	- Students reflect - Students question
Explore	- I give the... - I demonstrate... - They look at models....	- Student unpacks problem - Student develops model - Student gathers data
Explain	- Talk & Turn - Carousel “Discussion” - What did... - What was	- Have you answered the question? - Have you solved the problem? - Does the evidence support the claim?
Elaborate	- Read about - Watch - Introduce new idea	- Concept - self connections - Concept - concept connections - Concept - world connections - Anchor - Investigative - Phenomena
Evaluate	- Give vocab - assessments - Keep journals to grade	- Reflect on investigative process - Reflection hypothesis - New reflection on anchor phenomena

Unit 1 ››

›› Lists In Python

›› Lesson 1 1.1 1.2 1.31

›› Lesson 2 1.1 1.2 1.3 1.4 1.5

1.6 Quick Tests

➜ Unit 1: Lists in Python

Overview:

Lists are used to store multiple items in a single variable. Lists are one of the built-in data types in Python used to store collections of data. A list is created by placing all the items (elements) inside square brackets [] , separated by commas.

Vocabulary:

- List
- Index
- Methods
- Join method
- Len, del functions
- Max, min functions

Before the Lessons:

- Review information and knowledge of the previous ***PythonRun*** book.
- Go through the lessons material and apply all the practical assignments.

Lesson 1 Plan

Suggested Time: 45 minutes

Section 1.1: Lists Manipulations? (15 mins)

Lists are one of the simplest and most important data structures in Python. Lists are collections of items where each item in the list has an assigned index value. A list is mutable, meaning you can change its contents. Lists are very **fexible** and have many built-in control functions.

- List Index: “indexing” means referring to an element of an iterable by its position within the iterable.
- Replace Items: using the index number of a list item to modify the value associated with that item. The equals sign is used to change a value in a list.
- List Slicer: “slicing” means getting a subset of elements from an iterable based on their indices.

Section 1.2: List Methods (15 mins)

- All methods are functions in Python, not all functions are methods. There is a key difference between functions and methods in Python. Functions take objects as inputs. Methods in contrast act on objects.

- Methods are called upon using the “dot notation”.

- .pop**(index)** - removes the item at the given position in the list, and returns it.
- .remove(item) - removes the item from the list.
- .append(item) - adds an item to the end of the list.
- .insert(index, item) - inserts an item at a given position.

Section 1.3: Join Method (10 mins)

- **join()** method is a string method and returns a string in which the elements of the sequence have been joined by the string separator.

* Iterables are objects capable of returning their members one at a time. (such as, strings, lists, tuples and dictionaries).

Lesson 2 Plan

Suggested Time: 45 minutes

Section 1.4: Len(), del() Functions (10 mins)

- The **len()** function returns the number of items (length) in an object.
- The **del()** function is primarily used to delete objects in Python. It can be used to delete an item at a given index. Also, it can be used to remove slices from a list.

Section 1.5: List Arithmetic (10 mins)

- There are several ways to join, or concatenate, two or more lists in Python. One of the easiest ways are by using the **+ operator**.
- Lists can also be multiplied by a number to make copies of themselves.
- Division (/) and subtraction (-) give only errors.

Section 1.6 Min(), max() Functions (10 mins)

- The max() function is used to find the largest value in a list of values.
- The min() function is used to find the lowest value in a list.
- The list of values can contain either strings or numbers. You may encounter a situation where you want to find the minimum or maximum value in a list or a string.

Quick Tests (15 mins)

- **Encourage students to work in teams of two.**
- Encourage students to **use the computational thinking process** of problem solving. Decomposition invites students to break down complex problems into smaller, simpler problems. Pattern recognition guides students to make connections between similar problems and experiences. Abstraction invites students to identify important information while ignoring unrelated or irrelevant details. Lastly, students use algorithms when they design simple steps to solve problems.

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