# Learning Python



# **Student Workbook**

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# Introduction

This is the root page of the class workbook. The workbook contains all the material presented during the class, source code for examples and lab exercises, and links to related information on the web. Usage tips:

#### Navigation

- Always *start here*, and click on the titles below to go to lecture unit pages.
- To go to *lab exercises*, click either the links at the end of each lecture unit page, or the exercises link near the end of this page.
- To *return here*, use your browser's "back" button, or create a shortcut to this file on your desktop.

#### General

- As of October 2015, this workbook should render well in all browsers (*Internet Explorer* is no longer preferred).
- Copy the Workbook folder to a *hard drive* or USB stick if pages open too slowly from a CD or server copy.

#### Other tips

- For *reference material*, see Python's manuals, or the ebook copy of *Python Pocket Reference* in Extras.
- See also the distribution package's top-level "**README.txt**" file for more usage notes.
- This workbook is mostly a *conversation starter*—the class goes off-page often, and is driven by your input.

*The usual first question*: for pointers on which version of Python to install and use for the class (2.X or 3.X), see the Preface below, or wait for the first lab session.

# Contents

#### Preface

PYTHON 2.X OR 3.X? ABOUT THIS CLASS

# Part I: Python Language

## 1: General Python Introduction

SO WHAT'S PYTHON? WHY DO PEOPLE USE PYTHON? SOME QUOTABLE QUOTES A PYTHON HISTORY LESSON ADVOCACY NEWS WHAT'S PYTHON GOOD FOR? WHAT'S PYTHON NOT GOOD FOR? THE COMPULSORY FEATURES LIST PYTHON PORTABILITY ON APPLES AND ORANGES SUMMARY: WHY PYTHON?

#### 2. Using the Interpreter

HOW PYTHON RUNS PROGRAMS HOW YOU RUN PROGRAMS CONFIGURATION DETAILS MODULE FILES: A FIRST LOOK THE IDLE INTERFACE OTHER PYTHON IDES TIME TO START CODING *LAB SESSION 1* 

### 3. Types and Operators

A FIRST PASS THE 'BIG PICTURE' NUMBERS DYNAMIC TYPING INTERLUDE STRINGS LISTS DICTIONARIES TUPLES FILES GENERAL OBJECT PROPERTIES SUMMARY: PYTHON'S TYPE HIERARCHIES BUILT-IN TYPE GOTCHAS *LAB SESSION 2* 

#### 4. Basic Statements

GENERAL SYNTAX CONCEPTS

ASSIGNMENT **EXPRESSIONS** PRINT **IF SELECTIONS** PYTHON SYNTAX RULES DOCUMENTATION SOURCES INTERLUDE TRUTH TESTS WHILE LOOPS BREAK, CONTINUE, PASS, AND THE LOOP ELSE FOR LOOPS COMPREHENSIONS AND ITERATIONS LOOP CODING TECHNIQUES COMPREHENSIVE LOOP EXAMPLES **BASIC CODING GOTCHAS** PREVIEW: PROGRAM UNIT STATEMENTS LAB SESSION 3

#### 5. Functions

FUNCTION BASICS SCOPE RULES IN FUNCTIONS MORE ON "GLOBAL" (AND "NONLOCAL") MORE ON "RETURN" MORE ON ARGUMENT PASSING SPECIAL ARGUMENT MATCHING MODES ODDS AND ENDS GENERATOR EXPRESSIONS AND FUNCTIONS FUNCTION DESIGN CONCEPTS FUNCTION DESIGN CONCEPTS FUNCTIONS ARE OBJECTS: INDIRECT CALLS FUNCTION GOTCHAS OPTIONAL CASE STUDY: SET FUNCTIONS LAB SESSION 4

#### 6. Modules

MODULE BASICS MODULE FILES ARE A NAMESPACE NAME QUALIFICATION IMPORT VARIANTS RELOADING MODULES PACKAGE IMPORTS ODDS AND ENDS MODULE DESIGN CONCEPTS MODULES ARE OBJECTS: METAPROGRAMS MODULE GOTCHAS OPTIONAL CASE STUDY: A SHARED STACK MODULE LAB SESSION 5

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#### 10. System Interfaces

SYSTEM MODULES OVERVIEW RUNNING SHELL COMMANDS ARGUMENTS, STREAMS, SHELL VARIABLES FILE TOOLS DIRECTORY TOOLS FORKING PROCESSES THREAD MODULES AND QUEUES THE SUBPROCESS AND MULTIPROCESSING MODULES IPC TOOLS: PIPES, SOCKETS, SIGNALS FORK VERSIS SPAWNV

#### 11. GUI Programming

PYTHON GUI OPTIONS THE TKINTER 'HELLO WORLD' PROGRAM ADDING BUTTONS, FRAMES, AND CALLBACKS GETTING INPUT FROM A USER ASSORTED TKINTER DETAILS BUILDING GUIS BY SUBCLASSING FRAMES REUSING GUIS BY SUBCLASSING AND ATTACHING ADVANCED WIDGETS: IMAGES, GRIDS, AND MORE LARGER EXAMPLES TKINTER ODDS AND ENDS LAB SESSION 8

#### 12. Databases and Persistence

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#### Selected Exercise Solutions

LAB 1: USING THE INTERPRETER LAB 2: TYPES AND OPERATORS LAB 3: BASIC STATEMENTS LAB 4: FUNCTIONS LAB 5: MODULES LAB 6: CLASSES LAB 7: EXCEPTIONS AND BUILT-IN TOOLS

Exercise solution files directory

Lecture example files directory

Final exam (optional)