Python Basics (Python 101)

COURSE OVERVIEW

Python is an interpreted, object-oriented, high-level language that empowers you to automate your work so it can be completed predictably and accurately. This freely available language is installed on all major platforms without a charge. Given Python's vast libraries, you'll have a head start programming most tasks.

Be it system admins, network, cloud, or storage engineers, all lessons in our courseware are highly relevant for scripting within the workplace, including; data retrieval and storage from the local system, working with RESTful APIs, and decoding JSON.

Class is a combination of live instructor demo and hands-on labs.

WHO WILL BENEFIT FROM THIS COURSE?

- This course is an appropriate introduction to students of any background looking to get started with Python
- System Administrators
- Network Administrators and Engineers
- DevOps Engineers
- Management, Directors, VPs

PREREQUISITES

Keyboard proficiency

COURSE OBJECTIVES

- Current Python3 Standard Library
- Popular 3rd party libraries
- Version control with git
- Git integration with popular SCM (GitHub)
- Parsing and building files
- Pull JSON from API queries
- Manipulate Excel and other popular formats with pandas data frames
- Building feature-rich charts and graphs
- Searching with Regular Expressions (regex)
- Best practice techniques

COURSE OUTLINE

Introduction to Python

- Installing Python 3.x
- Preparing to write Python
- Preparing to write a Python file (*.py) - Text Editors
- Executing a Python file
- Python Enhancement Proposals (PEPs)
- Python Statements and Control Flow
- Python Interpreter
- Overview of the Standard Library

Version Controlling Code with Git

- Overview of Git
- Git commands
- Set up a GitHub account
- GitHub essentials
- README course requirements
- How to Set up a repo
- Issue a Pull request
- How to use “Issues” for peer review

Basics of Programming

- Functions and purpose of main()
- Objects
- Methods
- Built-in Functions
- Arguments
- Controlling standard out
- White spacing basic rules
- String Literal Escape Sequences
- Python Variables
- Naming Conventions & Rules
- Types as Objects
- Sequence Types
- List Iteration
- List Enumeration
- Sequence Assignments
- Mutable vs Immutable Objects
- Assignment Shorthand

Python Basic Variables and Data Types

- Numeric Types
- Operators and Precedence / Arithmetic Expressions
- Integers
- Floating points

String Types

- Generating Strings in Python
- Common String Methods
- Formatting String Output
- Booleans
- Printing and formatting strings
- Scripting with input()
- About raw_input()

Lists & Dictionaries & Tuples

- Lists
- Mixed Lists
- Common List Methods
- Other List Operations
- An overview on and construction of dictionaries
- Keys and Values
- Dictionary Methods
- Tuples
- Python Time Tuples
- Dictionaries vs Lists vs Tuples
- Translating JSON to Pythonic data

If, elif, else

- Relational Operators
- Logical operators
- Comparison Operations
- “simple” if Statement
- If else statements
- If elif
- Nested if statement

Looping with “while”

- While usage
- Count controlled loop
- Event-controlled loop
- Continue
- Break

Looping with “for”

- The for Loop
- For iteration examples
- Looping across data sets
- Looping across lists of lists
- Looping across lists of dictionaries

Understanding Iterators

- The range() Function
- Taking the range() of len()
- Iterable Objects
- The iter() Function
- Looping with dictionaries
- Looping with lists

Getting Data In and Out of Python

- Opening Files
- Working with Files
- Read data from files
- Controlling Output Location
- Intro to working with APIs
- What is a “REST”ful API?
- APIs and JSON

Creating Python Functions

- Function Basics
- Defining Functions
- Function Polymorphism
- Argument Defaults
- Lambdas
- What is if name == “main”
- Local Variables
- Variable Masking
- Preventing Variable Modifications
- Argument Matching Methods
- Basic List Comprehensions

Modules & Packages

- Pip and pip3
- Module Basics
- Packages
- Virtual environments
- Defined modules
- Import modules
- From import statements
- Some useful modules to know
- RESTful APIs and requests
- Dataframes with pandas
- Graphing with matplotlib

Python Scope

- Naming conventions
- Local scope

- Global scope
- Nested scope

Object Oriented Python

- About OOP
- The Class Statements
- Defining a class
- Class Inheritance
- Classes as Objects
- Using Dictionaries
- Understanding self
- Class fields and constructors
- Data structures
- Subclasses (Inheritance)
- Multiple Inheritance
- Static methods

(Optional) Regular Expression

- import re-library
- Writing regular expression
- Searching for data in files
- Using Regular Expression to search data sets
- Searching for data in Wireshark Traces (Python and *.pcaps)

Hands-On Labs

- Welcome to Alta3 Research Labs
- Using vim
- Introduction to VScode
- Python IDEs
- Revision Control with GitHub
- Python 101 - Certification Project (OPTIONAL)
- Installing Python
- Lecture - Python Basics
- Shebang
- Print
- Collecting user input()
- Lecture - Lists
- Working with Lists
- List Objects and Methods
- Lists of Lists
- Lecture - Dictionaries
- Python Dictionaries
- Getting dir(obj) help() and pydoc
- Lecture - Python Strings
- String Methods

- Copying Files and Folders
- Moving and Renaming Files and Folders
- Lecture - Conditionals
- Testing with if
- IPv4 Testing with if
- Writing your own if-logic script
- Using while, if, elif, else
- Troubleshooting while, if, elif, else
- Starting to Learn Loops
- Looping with for
- for loops and range()
- Lecture - Reading and Writing to Files
- Parsing Log Files
- Write to Files
- Read from Files
- Archive with zipfile
- Creating Functions
- pip and import
- Exploring Network Interfaces
- Defining Functions
- Scripting Commands with Python
- Error Handling - try except else finally
- Producing Graphs and Charts
- Walking the Directory Tree
- Excel and Intro to Pandas
- Lecture - Converting JSON to Python Data Types
- RESTful APIs and JSON
- requests library - Open APIs
- Searching with Regular Expressions
- Use RegEx to Search Text
- Best Practice and pylint
- Testing with pytest
- Packaging Python Projects
- Running Python Scripts with Crontab
- Creating objects in Python from “Scratch”
- Class Inheritance
- Using Classes
- Argument Parsing
- Unpacking Arguments
- Automating SMTP and Extended SMTP
- XML Parsing with ElementTree
- Timestamping - import time datetime

- Glossary
- Challenge - list, and dictionaries
- Challenge - for loop

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