Python Novice to Pythonista

SKILLSOFT ASPIRE JOURNEY

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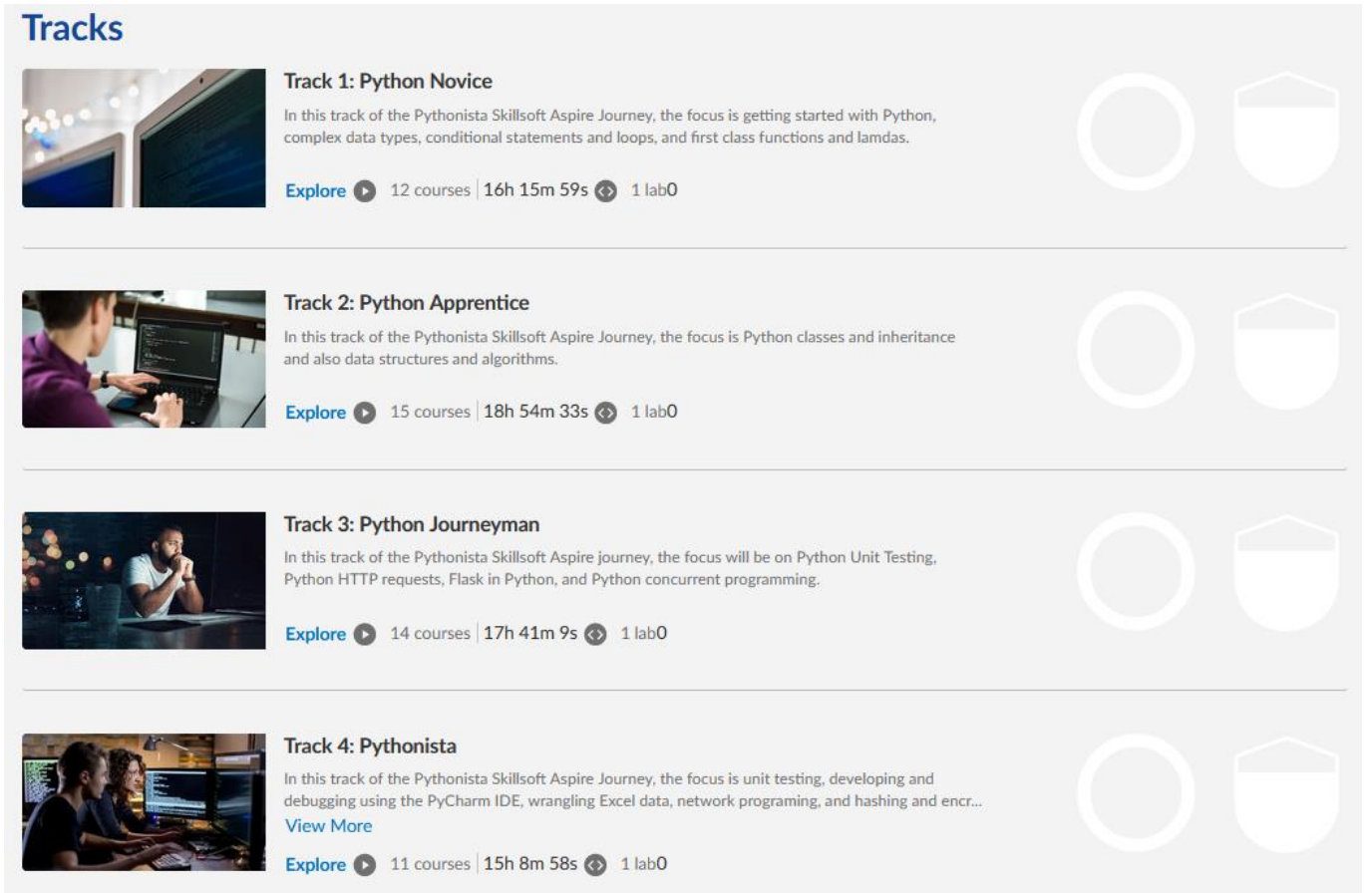
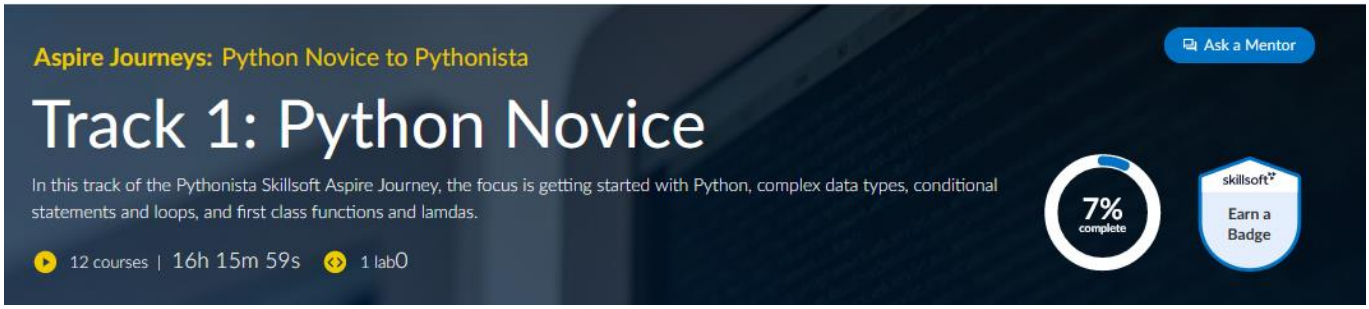
Python jest obecnie jednym z najdynamiczniej rozwijających się języków programowania. Łatwość programowania i dostępna duża liczba frameworków sprawiają, że z tego języka korzysta się powszechnie budując strony internetowe, pisząc skrypty, automatyzując zadania, analizując dane, a nawet tworząc zabezpieczenia przed cyberatakiem.



PREREQUISITES

In order to fully profit from the potential of this Aspire Journey, we recommend the following prerequisite skills:

- Experience with programming languages
- Foundational software development knowledge



Getting Started with Python: Introduction

Objectives

- install the Anaconda distribution of Python to run Python in a Windows environment
- run the Jupyter notebook server to execute Python code on a Windows machine
- install the Anaconda distribution of Python to run Python on a Mac machine
- run the Jupyter notebook server to execute Python code on a Mac machine
- execute Python code to perform simple calculations
- use built-in functions in Python to perform operations
- use variables in place of values directly
- create floating point, integer, Boolean, and string variables
- assign values to newly created variables
- perform operations to update variable values
- work with floats, integers, Booleans, and strings
- initialize and work with single-line and multi-line strings
- perform string formatting operations to display data
- recall features of Jupyter notebooks, built-in functions, and variables

Complex Data Types in Python: Working with Lists & Tuples in Python

Objectives

- create and initialize lists in Python
- access and update list elements
- add, remove, sort, and reverse elements from a list
- executing built-in functions with lists
- create new lists from existing lists using slicing operations
- extract specific elements from the original list using step size
- perform list functions on strings
- invoke functions on the string object
- access substrings using slicing operations
- specify the similarities between lists and tuples
- specify the differences between lists and tuples
- use dictionaries and sets in Python
- recall the ways in which lists and tuples are similar and different

Complex Data Types in Python: Working with Dictionaries & Sets in Python

Objectives

- create and initialize dictionaries
- create dictionaries with other complex data types as values
- modify and update dictionaries using dictionary methods
- create and initialize sets
- perform union, intersection, difference, and other set operations
- work with nested types within other complex data types
- convert lists to dictionaries and vice versa
- recall feature of dictionaries and sets

Complex Data Types in Python: Shallow & Deep Copies in Python

Objectives

- perform shallow and deep copies of Python strings
- create shallow copies of lists
- create deep copies of lists where changes to the copy do not affect the original
- perform shallow and deep copies of tuples
- specify how shallow copies of dictionaries work
- specify how deep copies of dictionaries work
- perform shallow and deep copies of sets
- recall how shallow and deep copies work for complex data types

Conditional Statements & Loops: If-else Control Structures in Python

Objectives

- identify how conditions in Python work
- evaluate conditions involving primitive data types using if statements
- evaluate conditions involving complex data types using if statements
- evaluate multiple conditions for the purpose of decision making
- evaluate multiple conditions for the purpose of decision making using the nested control structures
- identify how to use the if-else statement to make decisions involving complex data types such as lists, tuples, and dictionaries
- recall how to convert an integer to a float, and a float or an integer to a string and vice-versa
- recall how to convert a primitive datatype to a complex datatype and to convert between various complex datatypes
- recall how to convert between various complex datatypes and view base conversions using the Python built-in functions
- implement basic concepts into some real programming such as conversions between datatypes and some Python built-in methods
- solve various programming problems using some Python built-in methods
- solve various programming problems using if-elif-else statements and nested if-else statements
- solve coding problems using a combination of the different forms of if-else statements
- recall details related to the order of precedence in Python and apply if-else statements to solve basic programming problems

Conditional Statements & Loops: The Basics of for Loops in Python

Objectives

- use for loops to process the elements in a list and the characters in a string
- code for loops to iterate over values in a tuple and the keys and values in a dictionary
- recognize the function of associating an else block with a Python for loop
- include if-else statements and other for loops within a for loop
- generate a sequence of consecutive integers with the range function
- define the interval in a sequence of increasing and decreasing integers using the range function
- use the range function to iterate over a large range of values and apply it within nested for loops
- write for loops in order to iterate over 1-dimensional and 2-dimensional sequences

Conditional Statements & Loops: Advanced Operations Using for Loops in Python

Objectives

- terminate a for loop when a specific condition is met using the break statement
- recognize how the break statement affects the code in the else block of a for loop
- skip an iteration of a for loop when a specific condition is met using the continue statement
- use the continue statement along with the break statement within the same for loop
- convey the fact that no action is performed under specific conditions by using the pass statement
- create a list out of the contents of another list using a comprehension
- specify conditions in list comprehensions in order to filter elements used in the source list and to define the values in the newly created list
- write for loops that make use of the break and continue statements to control flow and use comprehensions to generate a list

Conditional Statements & Loops: While Loops in Python

Objectives

- implement a basic while loop and recognize what conditions can cause it to become an infinite loop
- use while loops to carry out actions while evaluating expressions based on numerical and string data
- define while loops whose iterations depend on user input data
- recall the syntax for defining while loops within a single line
- iterate over a list of elements using while loops
- iterate over multiple lists and tuples using while loops
- identify when it is appropriate to use the break keyword to stop a while loop
- use the break statement in multiple scenarios to break out of a while loop and recognize the use of the pass keyword within such loops
- skip steps in individual iterations of a while loop using the continue statement
- compare while loops and for loops and implement a while loop which terminates only when the user enters a specific input

Functions in Python: Introduction

Objectives

- recall and implement custom functions
- define, invoke, and name functions
- recall how functions work as objects
- define and invoke functions with input arguments
- reference global variables from within a function
- recall the characteristics of working with positional arguments
- return information from functions
- write functions with multiple return statements
- return complex data types from functions
- specify keyword arguments while invoking functions
- recall nuances in invoking functions using keyword arguments
- specify default values for function arguments
- implement functions with *args variable length positional arguments
- combine positional and variable length arguments
- implement functions with **kwargs variable length keyword arguments
- recall characteristics of functions, input arguments, and return values

Functions in Python: Gaining a Deeper Understanding of Python Functions

Objectives

- specify global and local variables in Python
- recall what it means to pass arguments by value
- recall what it means to pass arguments by reference
- work with the math and os modules in Python
- work with the random and datetime modules in Python
- pass functions as input arguments to other functions
- work with functions that accept any number of arguments
- return functions from other functions
- define and invoke lambda functions
- define, invoke, and discard lambdas
- use lamdas as an input to the built-in filter() function
- describe global and local variable characteristics, argument passing techniques, first-class functions, and lambdas

Functions in Python: Working with Advanced Features of Python Functions

Objectives

- invoke a function from within its body
- implement terminating conditions and return values for recursive functions
- write simple programs that involve recursive calls
- implement generator functions using the yield keyword
- apply generators to create infinite sequences
- define closures in Python
- create closures that have access to local state variables
- define decorators to modify pre-existing code
- customize decorators that work with functions with different numbers of input arguments
- chain multiple decorators that apply to the same function
- recall characteristics of recursion, generators, and closures

Final Exam: Python Novice

Objectives

- access and update list elements
- add, remove, sort, and reverse elements from a list
- code for loops to iterate over values in a tuple and the keys and values in a dictionary
- convey the fact that no action is performed under specific conditions by using the pass statement
- create and initialize dictionaries
- create and initialize lists in Python
- create and initialize sets
- create closures that have access to local state variables
- create deep copies of lists where changes to the copy do not affect the original
- create dictionaries with other complex data types as values
- create floating point, integer, Boolean, and string variables
- create new lists from existing lists using slicing operations
- create shallow copies of lists
- define and invoke functions with input arguments
- define closures in Python
- define functions
- define, invoke, and name functions
- evaluate conditions involving complex data types using if statements
- evaluate conditions involving primitive data types using if statements
- evaluate multiple conditions for decision making

- executing built-in functions with lists
- identify how conditions in Python work
- identify when it is appropriate to use the break keyword to stop a while loop
- implement a basic while loop and recognize what conditions can cause it to become an infinite loop
- implement basic concepts into some real programming such as conversions between datatypes and some Python built-in methods
- implement custom functions
- implement function recursion
- implement generator functions using the yield keyword
- include if-else statements and other for loops within a for loop
- install the Anaconda distribution of Python to run Python in a Windows environment
- invoke a function from within its body
- modify and update dictionaries using dictionary methods
- pass functions as input arguments
- pass functions as input arguments to other functions
- perform shallow and deep copies of Python strings
- perform shallow and deep copies of sets
- recall custom functions
- recall how functions work as objects
- recall how to convert an integer to a float, and a float or an integer to a string and vice-versa
- recall the syntax for defining while loops within a single line
- recall what it means to pass arguments by value
- recognize the function of associating an else block with a Python for loop
- reference global variables from within a function
- return information from functions
- run the Jupyter notebook server to execute Python code on a Mac machine
- run the Jupyter notebook server to execute Python code on a Windows machine
- skip an iteration of a for loop when a specific condition is met using the continue statement
- skip steps in individual iterations of a while loop using the continue statement
- solve various programming problems using some Python built-in methods
- specify global and local variables in Python
- specify the similarities between lists and tuples
- terminate a for loop when a specific condition is met using the break statement
- use built-in functions in Python to perform operations
- use for loops to process the elements in a list and the characters in a string
- use the else keyword
- use the Jupyter notebook server to execute Python code on a Mac machine
- use variables in place of values directly
- use while loops to carry out actions while evaluating expressions based on numerical and string data
- work with the math module in Python
- work with the os module in Python

Python Novice

Objectives

- In this practice lab, learners will be presented with a series of exercises to practice developing in Python. Exercises include tasks such formatting data types, implementing flow control and conditionals, copying containers, and performing loops with list comprehension methods. Learners will also practice converting data types, working with global and local variables within functions, invoking functions with varying parameters and implementing recursive functions and closures.

Advanced Python Topics: File Operations in Python

Objectives

- use the open function in Python to open a file for reading
- recognize the differences between the read(), readline(), and readlines() functions when working with files in Python
- recall the differences between opening a file in write mode and append mode
- distinguish between the r+ and a+ modes to read from and write to a file
- use the load and loads functions of the json module to parse JSON data
- convert Python dictionaries and lists into JSON strings and files
- identify some of the file formats that can be handled by the CSV module in Python
- convert Python dictionaries and lists into CSV files
- define a customized file format creating a CSV dialect and use that to parse and write data

Advanced Python Topics: Exceptions & Command Line Arguments

Objectives

- use a try and except block to handle a Python exception
- control how you handle exceptions that your code may raise
- recognize how exceptions are defined in a hierarchy and how related exceptions can be caught and handled
- define multiple except blocks to handle various exceptions that can be raised by your code
- convert code prototyped in a Jupyter notebook into a Python script that can be executed from a shell
- run your code from the Python shell and recognize how to execute single-line and multi-line commands
- use the sys and argparse module to access command line arguments to a Python script
- parse and use the arguments passed to a Python script from the command line
- define the names and other customizable features of command line arguments to a Python script using the argparse module

Advanced Python Topics: Modules & Virtual Environments

Objectives

- use pre-built Python modules to perform common operations by importing them into your source code
- recognize the features available in popular Python libraries such as NumPy, random, and datetime
- package Python code into a tar archive for distribution to end users
- use pip to install a module in your environment and import it into your Python applications
- install the virtualenv tool and use it to create a virtual environment for Python applications
- activate and run Python scripts from within virtual environments
- install different packages in different virtual environments and recognize how they are isolated from each other

Advanced Python Topics: Migrating from Python 2 to Python 3

Objectives

- set up the Jupyter Notebook IDE to run and develop Python 2 code by installing a kernel for it
- recall the variations in syntax and output for various operations such as print, division, and round for Python 2 versus Python 3
- recognize the differences in the round function behavior and the different ways to accept user input in Python versions 2 and 3
- use the 2to3 conversion tool to identify the lines in your Python 2 scripts that need to be altered for Python 3 compatibility
- convert a Python 2 script to be Python 3 compatible using the 2to3 conversion tool

Python Classes & Inheritance: Introduction

Objectives

- recall how state and behavior can be encapsulated in a single unit
- describe how classes can be used as blueprints to create objects
- compare objects and instances to classes
- model is-a relationships using inheritance
- describe the advantages of using object-oriented programming
- describe classes, define how state and behavior of a class are represented, list the characteristics of class objects or instances, describe class inheritance, and list the advantages of object-oriented programming with classes

Python Classes & Inheritance: Getting Started with Classes in Python

Objectives

- create a classes using Python
- assign attributes to objects of classes
- initialize class variables using the init special method
- pass arguments to initialize the state of a class object
- define additional methods in a class
- recall how class variables work
- recall how class variables are different from instance variables
- recall how class variables share memory across objects of a class
- work with variables that have their own memory in each object
- define getters and setters for each instance variable
- prevent inadvertent modification of instance variables
- create a class to represent a real-world entity
- parse information to create classes using a dictionary
- describe the use of the init method in a class, specify why the self argument is passed to methods in a class, differentiate between class and instance variables, and specify how member variables can be made private

Python Classes & Inheritance: Working with Inheritance in Python

Objectives

- recall the default base class for all Python classes
- model an is-a relationship using inheritance
- invoke base class methods from subclasses
- provide implementations for base class methods
- work with class hierarchies
- define methods in a subclass
- define multiple inheritance levels in classes
- define multiple base classes for a single subclass
- recall what polymorphism is
- implement polymorphism in Python
- implement base and derived classes, specify an init method to initialize member variables, define getters and setters for member variables, and override a method

Python Classes & Inheritance: Advanced Functionality Using Python Classes

Objectives

- represent objects using customized strings
- perform addition operations on custom objects
- perform subtraction operations on custom objects
- perform multiplication operations on custom objects
- perform floor division, modulo, and power-of operations
- allow built-in functions to work with custom data types
- execute for-loops on custom data types
- define properties on classes for intuitive use
- define properties using a simpler syntax
- work with class methods to access and update class state
- work with utility methods on classes
- define classes as abstract
- list special methods and what they represent, define a class and create a property within it, and differentiate between class methods and static methods

Data Structures & Algorithms in Python: Fundamental Data Structures

Objectives

- identify what makes a data structure and some of the purposes they serve
- recall the metrics on which algorithms and operations on data are evaluated
- recognize how the performance of operations and algorithms is expressed in terms of the size of the input
- describe a linked list, and its contents and structure
- summarize the different ways in which nodes can be added to a linked list and how search operations work on this data structure
- recall different methods to remove nodes from a linked list and describe the process of reversing the order of nodes in this data structure
- describe techniques used to keep track of the number of elements in a linked list
- summarize the workings of a stack data structure, including the addition and removal of elements
- identify some of the operations on stacks, such as ISEMPTY and ISFULL, and recall the complexities of the different stack operations
- describe the queue data structure and compare it to stacks
- summarize the time complexities of the common operations on linked lists and compare the stack and queue data structures

Data Structures & Algorithms in Python: Implementing Data Structures

Objectives

- identify operations that run in constant time regardless of input
- recognize code whose time complexity varies directly with the value of the input
- identify tasks whose time complexity varies linearly with the size of the input
- recognize operations whose time complexity varies as the square of the input size
- use the native Queue class of Python and perform the standard queue operations on it
- code a bespoke Queue class that includes definitions for many of the standard queue operations, such as enqueue and dequeue
- recognize how a Python list can be used as a stack by loading and unloading elements from the same end
- implement a custom Stack class that includes functions for the common stack operations
- define a Linked List class and implement functions to insert a node at the head or the tail of the linked list
- code functions to perform search and delete operations in a linked list and to reverse the ordering of its nodes
- instantiate a Linked List and test out the various operations that have been defined

Data Structures & Algorithms in Python: Sorting Algorithms

Objectives

- identify the various properties of sorting algorithms that must be considered when selecting the right one for your data
- describe the operations involved when sorting a list of values using the Selection Sort algorithm
- summarize the process of a Bubble Sort when applied to a list of values
- recall the performance of the Bubble Sort on various measures such as time, space, and number of swaps
- describe the steps involved in performing an Insertion Sort and compare it to the Bubble Sort
- outline the workings of the Shell Sort and recall the performance metrics of this divide and conquer algorithm
- describe the process of sorting a list of elements using Merge Sort and list the complexity of this algorithm on various measures
- describe how the Quicksort algorithm partitions and sorts a list of elements
- recall the performance metrics of the Quicksort algorithm
- describe considerations for picking a sorting algorithm, list the properties of the Insertion Sort algorithm, and summarize the Shell Sort algorithm

Data Structures & Algorithms in Python: Implementing Sorting Algorithms

Objectives

- write the code to implement a Selection Sort
- implement the Bubble Sort algorithm in Python
- code a function to implement the Insertion Sort algorithm
- write the code to implement the divide-and-conquer Shell Sort algorithm
- invoke the Shell Sort algorithm on an array of integers and examine the output at each iteration to understand how it works
- code a function to implement the Merge Sort algorithm and test it on an array of integers
- write the partition and Quicksort functions in order to implement a Quicksort
- apply Quicksort on an array of integers and analyze the results at each iteration to understand how the algorithm works
- describe the Bubble Sort algorithm and summarize the two functions needed to implement the Quicksort algorithm

Data Structures & Algorithms in Python: Trees & Graphs

Objectives

- describe how a sorted list of elements can be searched efficiently using a binary search
- recognize what trees and binary trees are and recall the properties of a binary search tree
- summarize how insert and lookup operations occur in a BST
- identify the minimum and maximum values in a BST, identify the greatest depth of the data structure, and calculate the sum of values from the root to a leaf node
- recall the different ways in which to traverse a BST and describe the method to perform a breadth first traversal
- summarize the pre-order and in-order depth first traversal techniques for a BST
- describe the post-order traversal technique for a BST
- identify the components that make up a graph and recognize the different terms associated with these data structures
- recognize the different ways to represent graphs and describe the structure of an adjacency matrix
- summarize the representation of a graph in the form of an adjacency list and adjacency set
- traverse over the nodes in a graph using the topological sort algorithm
- summarize the properties of a binary search tree and list three different ways in which a graph can be represented

Data Structures & Algorithms in Python: Implementing Trees & Graphs

Objectives

- code a function to perform a binary search on a sorted array of elements
- define the classes and functions required to implement a binary search tree
- create functions to perform common BST operations such as lookup and finding the minimum and maximum values
- write a function to perform a breadth first traversal of a BST
- code functions to perform pre-order, in-order, and post-order traversals of a BST
- define an abstract base class for a graph implementation and a vertex class with an adjacency set
- implement an adjacency set representation for a graph
- build a graph represented as an adjacency set and test out the functions defined to work with it
- define a class to represent a graph in the form of an adjacency matrix
- code a function to perform a breadth first traversal of a graph
- write a function to traverse a graph in a depth first manner
- implement a topological sort of a directed acyclic graph
- list the three different forms of depth first traversal of a binary tree and describe the Topological Sort algorithm for a graph

Python Apprentice

Objectives

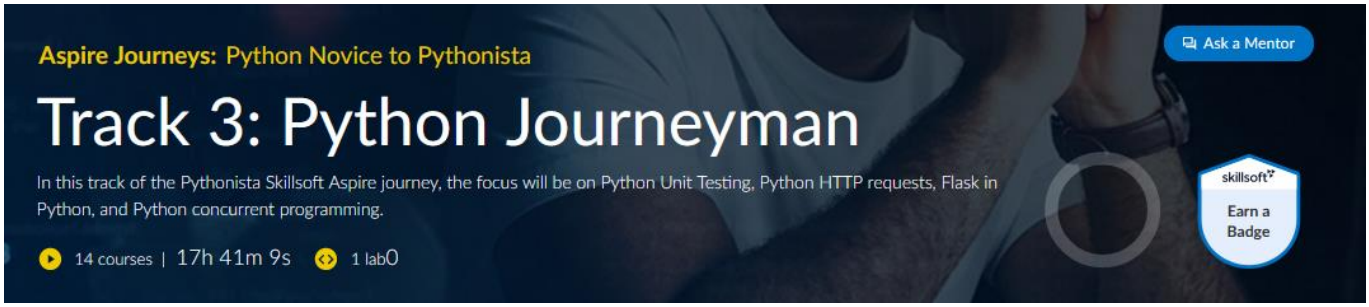
- In this practice lab, learners will be presented with a series of exercises to practice developing in Python. Exercises include tasks such as file handling, implementing polymorphism, implementing special method names, as well as implementing an abstract class and using static methods. Learners will also practice using a Python list as a stack, performing queue operations, implementing a graph as an adjacency matrix, and traversing a Binary Search Tree (BST).

Final Exam: Python Apprentice

Objectives

- assign attributes to objects of classes
- code a function to implement the Insertion Sort algorithm
- code a function to perform a breadth-first traversal of a graph
- control how you handle exceptions that your code may raise
- create a classes using Python
- create functions to perform common BST operations such as lookup and finding the minimum and maximum values
- define a class to represent a graph in the form of an adjacency matrix
- define a Linked List class and implement functions to insert a node at the head or the tail of the linked list
- define classes as abstract
- define multiple base classes for a single subclass
- define multiple inheritance levels in classes
- define the classes and functions required to implement a binary search tree
- describe a linked list, and its contents and structure
- describe how a sorted list of elements can be searched efficiently using a binary search
- describe how classes can be used as blueprints to create objects
- describe how the performance of operations and algorithms is expressed in terms of the size of the input
- describe the differences between the read(), readline(), and readlines() functions when working with files in Python
- describe the operations involved when sorting a list of values using the Selection Sort algorithm

- describe the steps involved in performing an Insertion Sort and compare it to the Bubble Sort
- distinguish between the r+ and a+ modes to read from and write to a file
- identify operations that run in constant time regardless of input
- identify the various properties of sorting algorithms that must be considered when selecting the right one for your data
- identify what makes a data structure and some of the purposes they serve
- implement a custom Stack class that includes functions for the common stack operations
- implement an adjacency set representation for a graph
- implement the Bubble Sort algorithm in Python
- implement the native Queue class of Python and perform the standard queue operations on it
- initialize class variables using the init special method
- invoke base class methods from subclasses
- outline the workings of the Shell Sort and recall the performance metrics of this divide and conquer algorithm
- pass arguments to initialize the state of a class object
- perform addition operations on custom objects
- perform floor division, modulo, and power-of operations
- perform subtraction operations on custom objects
- recall how class variables are different from instance variables
- recall how state and behavior can be encapsulated in a single unit
- recall the default base class for all Python classes
- recall the different ways in which to traverse a BST and describe the method to perform a breadth-first traversal
- recall the metrics on which algorithms and operations on data are evaluated
- recognize how exceptions are defined in a hierarchy and how related exceptions can be caught and handled
- recognize how the performance of operations and algorithms is expressed in terms of the size of the input
- recognize the differences between the read(), readline(), and readlines() functions when working with files in Python
- recognize the features available in popular Python libraries such as NumPy, random, and datetime
- recognize what trees and binary trees are and recall the properties of a binary search tree
- run your code from the Python shell and recognize how to execute single-line and multi-line commands
- set up the Jupyter Notebook IDE to run and develop Python 2 code by installing a kernel for it
- summarize how insert and lookup operations occur in a BST
- summarize the pre-order and in-order depth-first traversal techniques for a BST
- use a try and except block to handle a Python exception
- use pip to install a module in your environment and import it into your Python applications
- use pre-built Python modules to perform common operations by importing them into your source code
- use the 2to3 conversion tool to identify the lines in your Python 2 scripts that need to be altered for Python 3 compatibility
- use the native Queue class of Python and perform the standard queue operations on it
- work with class hierarchies
- work with utility methods on classes
- write the code to implement a Selection Sort
- write the partition and Quicksort functions to implement a Quicksort



Python Unit Testing: An Introduction to Python's unittest Framework

Objectives

- install the latest version of Python and write a test using the unittest framework
- define and execute multiple tests within a single test case
- recognize the effect of the test names on the execution of test methods
- pick individual tests from a script which need to be executed
- identify the various assert functions available in unittest and their specific use cases
- use the different decorators available in unittest to conditionally and unconditionally skip specific tests

Python Unit Testing: Advanced Python Testing Using the unittest Framework

Objectives

- recognize when a test script will benefit from the use of fixture functions
- use the setUp and tearDown functions to define common operations for tests in a script
- apply the setUpClass and tearDownClass functions in a Python test script
- group test cases into a test suite and execute them using a test runner
- use the makeSuite function to initialize a test suite
- download, install and configure the PyCharm IDE
- create a script which uses the unittest framework by using the PyCharm IDE
- define a script testing out multiple functions in the source using the PyCharm IDE

Python Unit Testing: Testing Python Code Using pytest

Objectives

- write and execute a test using pytest
- execute tests defined in multiple scripts using pytest
- pick the tests to execute based on the test function names
- stop the execution of tests when there are a specific number of test failures
- apply markers to tests and run only those tests which contain specific marker, and skip the execution of specific tests unconditionally
- debug test scripts using the python debugger
- parametrize calls to a function an application using the pytest parametrize decorator
- use fixtures to define common operations for test functions
- apply module and function level scopes for fixtures functions
- bundle fixture functions which are shared across scripts within a single conftest.py file

Python Requests: HTTP Requests with Python

Objectives

- write and execute a test using the doctest module
- recognize where doctests can be placed within source code
- create a readme file for a Python module which bundles documentation and testing in a single file
- use the ELLIPSIS directive to account for unpredictable output in doctests
- use the ELLIPSIS directive to check if the code raises exceptions for incorrect input values
- recall how to set doctest to ignore whitespace in the output of tests tests

Flask in Python: An Introduction to Web Frameworks & Flask

Objectives

- install the Python Requests package and set up a workspace
- make a GET request and explore the response object returned, which includes a status code and headers
- parse a response body containing JSON-formatted data
- invoke a GET request that includes parameters
- use the Requests package to construct a POST request that includes a set of key-value pairs to be submitted to a server
- submit data to pastebin.com using their APIs and with a POST request
- retrieve metadata for a resource by means of a HEAD request
- invoke PUT, OPTIONS, and DELETE requests and recognize the specific use case for each of them
- set the headers in an HTTP Request and parse the headers in a Response object
- define the encoding format for the contents in an HTTP Response and download and handle binary content such as images
- identify the format of an HTTP Response and parse the data accordingly
- handle successful and unsuccessful HTTP requests according to the status code of the response
- recognize when an HTTP request has triggered a redirect, explore the redirect history, and configure the read and connect timeout values for a request
- catch errors that are thrown by HTTP requests by using the exceptions module in the Requests package
- compare the GET and HEAD requests, summarize the PUT and DELETE requests, and view the redirect history following a GET request

Flask in Python: Building a Simple Web Site Using Flask

Objectives

- describe the steps involved in a web request and the role of web applications in the process
- recognize the various pieces that can make up a web applications and the role of web frameworks in defining them
- recall the features of the Flask framework that are available either out of the box or via extensions
- describe the roles of routes in a Flask application and the options available when defining a route function
- recognize the need for templates when defining a web site and describe the use of Jinja for this purpose
- identify some of the commonly used extensions in Flask applications and recall the purpose they serve

Flask in Python: User Interactions in Flask Applications

Objectives

- install Flask in a virtual environment on your development machine
- write the code for a simple "Hello World" web site using Flask
- recognize how route definitions can be altered and the benefits of running your Flask app in debug mode
- define a route that renders an HTML page when a URL is accessed
- download and use some boilerplate HTML files so that your web site definition need not begin from scratch
- modify the boilerplate CSS and HTML definitions to customize the look of a web site
- generate URLs dynamically using the url_for function
- create a base template that can be inherited by other templates, along with placeholders that can be overridden
- inherit the elements from a base template in a child template HTML file
- define multiple routes to point to the same route function

Flask in Python: User Authentication in a Flask Application

Objectives

- serve a custom error page whenever a 404 error is invoked on your web site
- configure a route in your Flask app so that POST requests can be submitted to it
- use the Flask debugger to record information in your application's log
- convey the invocation of an operation to end users using message flashing
- highlight flashed messages by defining a style for them in a CSS file
- install and use WTForms in your Flask application to accept user input for registration
- define a login page using field definitions and built-in validators available in WTForms
- include the two pages defined using WTForms in the Flask application
- invoke the validators defined for WTForm elements to ensure that the user input is in the correct form
- ensure that all the built-in validators applied on the WTForm elements work as they are expected to

Python Concurrent Programming: Introduction to Concurrent Programming

Objectives

- install SQL Alchemy and use it to connect the Flask application to a SQLite database
- use SQL Alchemy to generate relational database tables for each model defined in your application
- execute queries against tables using a SQLAlchemy model
- separate the model definitions, routes, and app initialization into separate files that are easier to maintain
- modify the import statements to account for the restructuring of the Flask app and test that the functionality has not been affected
- use the Bcrypt package to generate hashes of passwords so that they can be stored securely
- create a bespoke validator for fields in your WTForms
- install and use a Flask extension to allow users to login to your Flask app and maintain a login session
- implement the logout feature so that users can sign out of a Flask app
- access and display the three most recent reviews posted on your Flask web site
- test that the feedback display functionality implemented works as expected
- configure your Flask web site to display images loaded from the app's static resources

Python Concurrent Programming: Multithreading in Python

Objectives

- recognize what sequential execution is and what its limitations are
- describe multithreading and compare its performance with a sequential execution of tasks
- identify the specific use cases for multithreading
- summarize multiprocessing and contrast it with multithreading
- describe the implementation of threads and processes in the Python language
- recognize what a race condition is and when it can occur with concurrent programming
- outline how locks can help concurrent tasks synchronize their actions on shared resources
- summarize how semaphores can restrict the number of concurrent tasks accessing a shared resource
- identify the use cases for event and condition objects in Python and distinguish between the two
- recognize when a deadlock can occur in an application and the actions you can take to avoid it
- enumerate the built-in data structures available in Python for concurrent programming
- outline how pools of threads and processes can optimize concurrency in your application
- recall the different synchronization mechanisms in Python and the conditions necessary for deadlocks

Python Concurrent Programming: Multiprocessing in Python

Objectives

- initialize and execute a thread in Python
- set a name for a thread and ensure a thread waits for a created thread to complete
- define your own type to run in a thread by deriving the multithreading.Thread class
- execute two threads concurrently to save time relative to a sequential execution
- identify what a race condition is and when this may occur with multithreading
- use a lock to synchronize threads that update a shared resource
- recognize the conditions under which a deadlock may occur
- define tasks in such a manner that deadlocks will not occur
- create semaphores in Python and recognize the effect of calling their acquire and release methods
- describe the use of BoundedSemaphores to restrict the number of times a semaphore can be released
- define threads that will wait for an event to occur before they can proceed
- create a condition instance that will have multiple threads waiting for data to be generated
- recall how to retrieve details about running threads and describe semaphores in Python

Python Concurrent Programming: Asynchronous Executions in Python

Objectives

- describe the different types of Queue objects available in Python
- implement producer and consumer threads that add to and remove from a queue
- define, initialize, and execute a process in Python
- distinguish between multiprocessing and multithreading in the context of sharing data in memory
- share data between processes using shared memory
- share complex Python data between processes using the Manager class
- implement locks to allow only one process to update a shared resource
- use queues and pipes to enable communication between concurrent processes
- recall the ways in which processes can share data and distinguish between Queue and Pipe

Python Journeyman

Objectives

- create a pool of processes to which tasks can be submitted
- use the map function of a multithreading.Pool instance to submit multiple tasks to a process pool
- recognize the use of futures objects to execute tasks asynchronously
- compare the performance of process pools and thread pools for tasks that are network-bound
- compare the performance of process pools and thread pools for tasks which are CPU-bound
- create and execute a coroutine using the asyncio module
- use the run, create_task, and gather functions in the asyncio modules to execute tasks
- summarize process pools and contrast multithreading and multiprocessing in Python

Final Exam: Python Journeyman

Objectives

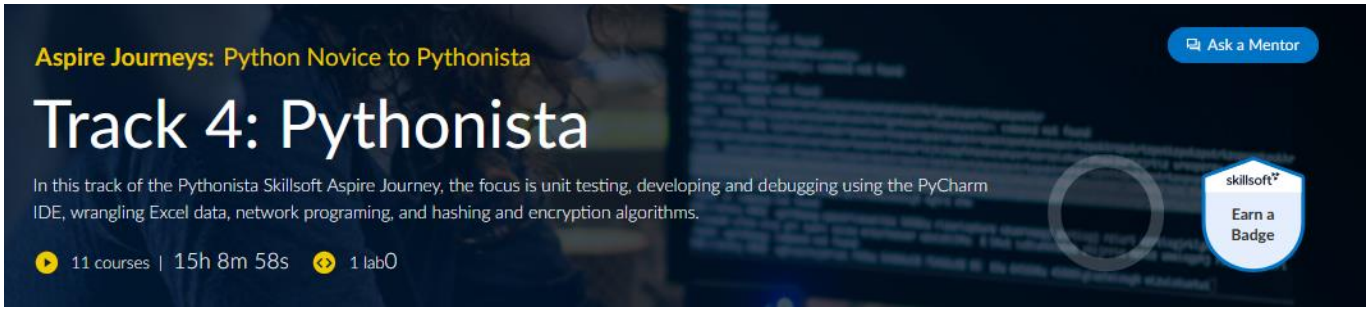
- configure a route in your Flask app so that POST requests can be submitted to it
- convey the invocation of an operation to end-users using message flashing
- create a condition instance that will have multiple threads waiting for data to be generated
- create and execute a coroutine using the asyncio module
- create a pool of processes to which tasks can be submitted
- create a readme file for a Python module which bundles documentation and testing in a single file
- define and execute multiple tests within a single test case
- define a route that renders an HTML page when a URL is accessed
- define a script testing out multiple functions in the source using the PyCharm IDE
- define, initialize, and execute a process in Python
- describe multithreading and compare its performance with sequential execution of tasks
- describe the different types of Queue objects available in Python
- describe the implementation of threads and processes in the Python language
- describe the steps involved in a web request and the role of web applications in the process
- distinguish between multiprocessing and multithreading in the context of sharing data in memory
- download, install and configure the PyCharm IDE
- execute queries against tables using an SQLAlchemy model
- execute tests defined in multiple scripts using pytest
- execute two threads concurrently to save time relative to a sequential execution
- generate hashes of passwords using the Bcrypt package
- generate URLs dynamically using the url_for function
- handle successful and unsuccessful HTTP requests according to the status code of the response
- identify the specific use cases for multithreading
- implement producer and consumer threads that add to and remove from a queue
- initialize and execute a thread in Python
- install Flask in a virtual environment on your development machine
- install SQL Alchemy and use it to connect the Flask application to an SQLite database
- install the latest version of Python and write a test using the unittest framework
- install the Python Requests package and set up a workspace
- invoke PUT, OPTIONS, and DELETE requests and recognize the specific use case for each of them
- make a GET request and explore the response object returned
- make a GET request and explore the response object returned, which includes a status code and headers
- recall the features of the Flask framework that are available either out of the box or via extensions
- recognize the conditions under which a deadlock may occur
- recognize the various pieces that can make up web applications and the role of web frameworks in defining them
- recognize what a race condition is and when it can occur with concurrent programming
- recognize what sequential execution is and what its limitations are
- recognize when a test script will benefit from the use of fixture functions
- recognize where doctests can be placed within source code
- retrieve metadata for a resource using a HEAD request
- return a custom error page whenever a 404 error is invoked on your web site
- select the tests to execute based on the test function names
- serve a custom error page whenever a 404 error is invoked on your web site

- set a name for a thread and ensure a thread waits for a created thread to complete
- stop the execution of tests when there are a specific number of test failures
- summarize how semaphores can restrict the number of concurrent tasks accessing a shared resource
- use SQL Alchemy to generate relational database tables for each model defined in your application
- use the Bcrypt package to generate hashes of passwords so that they can be stored securely
- use the different decorators available in unittest to conditionally and unconditionally skip specific tests
- use the Flask debugger to record information in your application's log
- use the map function of multithreading. Pool instance to submit multiple tasks to a process pool
- use the Requests package to construct a POST request that includes a set of key-value pairs to be submitted to a server
- use the run, create_task, and gather functions in the asyncio modules to execute tasks
- use the setUp and tearDown functions to define common operations for tests in a script
- using an SQLAlchemy model, execute queries against tables
- write and execute a test using the doctest module
- write the code for a simple "Hello World" web site using Flask

Python Journeyman

Objectives

- In this practice lab, learners will be presented with a series of exercises to practice developing in Python. Exercises include tasks such as testing with pytest, making HTTP requests, serving HTTP requests with a Flask endpoint, and rendering a jinja template. Learners will also practice using multithreading and multiprocessing with Python, processing data in a queue and creating and executing a coroutine with Asyncio.



Introduction to Using PyCharm IDE

Objectives

- install and configure the PyCharm IDE on your system
- customize syntax highlighting for various source files in your Python project
- minimize typing errors by using the auto-complete feature
- apply name changes to variables and functions to all their references
- analyze the state of an application in the middle of code execution with the use of breakpoints
- use the step into feature to get inside function calls and step over to run them in one go
- pause code execution at a line only under a specified condition
- use the resume button to ensure that code execution only pauses at breakpoints
- install a Python package using the PyCharm IDE

Excel with Python: Working with Excel Spreadsheets from Python

Objectives

- create a Microsoft Excel workbook by choosing from a list of templates
- create a Microsoft Excel workbook using the openpyxl library
- access individual cells programmatically using openpyxl
- access entire rows and columns and manipulate them programmatically
- save the contents of an in-memory representation to a Microsoft Excel file on disk
- use lists and other Python containers to read to and write from Excel files
- specify rows and columns that always ought to be on-screen as a user browses an Excel file
- filter data in a range based on various attributes
- sort data in a range using different columns and sort criteria
- customize the size of rows and columns to enhance readability
- merge and unmerge groups of cells

Excel with Python: Performing Advanced Operations

Objectives

- apply styling elements to control the display of data in cells
- apply sophisticated styles and alignments to format cell contents
- use number formats to represent currencies and add comma separators
- apply formatting that varies based on the value contained in a cell
- choose from different in-built icon sets and rules to control cell formatting at a granular level
- insert images into Microsoft Excel files and control their size and location
- insert formulae into Excel workbooks
- use openpyxl to programmatically construct formulae in workbooks
- use the $ operator to convert relative cell references into absolute ones
- use openpyxl to construct both absolute and relative cell references
- use VLOOKUP to lookup specific values from a range in Excel
- assign names to groups of cells and use those names in formulae to enhance readability
- use Excel pivot tables to dynamically analyze and group data
- use Pandas to read data from Microsoft Excel and perform pivoting operations
- use Pandas to perform multi-level indexing and access individual row values as well as index values

Excel with Python: Constructing Data Visualizations

Objectives

- use Microsoft Excel to visualize data
- use openpyxl to construct visualizations in Excel workbooks
- tweak the title, formatting, and legend of a graph
- alter the data displayed on the axes of a graph
- alter the weight and line style of data series to customize the appearance of a visualization
- construct and modify bar chart visualizations in Excel
- use openpyxl to build different types of bar charts programmatically
- plot financial data containing open, high, low, close, and volume information about stock prices
- use bubble charts to represent three dimensions of data in a two dimensional visualization

Socket Programming in Python: Introduction

Objectives

- use the socket module in a Python application and identify the functions that can be used to get information about the application's host
- write server and client applications that can communicate with each other using TCP sockets
- implement socket communication between applications by using Python's with context manager
- configure an application to wait for a set amount of time for communication from another process
- recognize how data needs to be transformed to bytes when transferring it over Python sockets
- use the pickle module to serialize data when sending it over a socket connection and de-serialize the data at the other end
- recover and use objects that were transmitted from another Python application over a socket connection

Socket Programming in Python: Advanced Topics

Objectives

- build a Python app to break up a large text file into chunks and send the chunks over a socket connection to a recipient app
- code a Python app to receive a large text file in chunks and reconstruct that file
- transmit an image file from one Python app to another by breaking it up into chunks
- configure the server of a client-server chat application
- write the code for the client end of a client-server chat application
- recognize the effects of setting sockets to run in blocking mode when large transfers are involved
- recall the considerations for setting a Python socket to use non-blocking mode
- write a Python app that subscribes to RSS data feeds
- set up applications to transfer data using UDP and distinguish between UDP and TCP sockets

Python Design Patterns: Principles of Good Design

Objectives

- recall the basic principles of good design in code
- describe the Single Responsibility and Open/Closed principles of good design
- describe the Liskov's Substitution, Interface Segregation, and Dependency Inversion principles of good design
- describe the principle of Least Knowledge and the Hollywood principle of good design
- recognize issues that may arise when classes do not implement the principle of Single Responsibility
- design and implement the principle of Single Responsibility
- design and implement the Open/Closed principle
- design and implement the Liskov's Substitution principle
- design and implement the Interface Segregation principle
- design and implement the Dependency Inversion principle
- recall the three broad categories of design patterns
- describe the three types of design patterns and when to use each

Python Design Patterns: Working with Creational Design Patterns

Objectives

- recall how the Singleton pattern works and when to use this pattern
- write code for a simple implementation of the Singleton pattern
- implement the Singleton pattern using a more Pythonic style
- implement the Singleton pattern using global objects in Python
- recall how the Factory and Abstract Factory patterns work and when they can be used
- implement a simple design for the Factory pattern
- iteratively improve the design of code using refactoring
- design and implement the serializer using the Factory pattern
- apply the Abstract Factory pattern to create a family of objects
- recall how the Builder pattern works and when it should be used
- implement a simple design for the Builder pattern
- recall how the Object Pool pattern works and when it should be used
- implement the Object Pool pattern to limit the number of instances
- improve the Object Pool pattern by making the object pool a singleton

Python Design Patterns: Working with Structural Design Patterns

Objectives

- recognize the design of the Adapter pattern and when it should be used
- recognize the need for the Adapter pattern when working with legacy components
- write code for the Adapter pattern to offer a consistent interface to clients
- describe the design of the Decorator pattern and its advantages
- recognize the importance of the Decorator pattern for adding responsibilities dynamically
- implement the Decorator pattern to allow adding responsibilities at runtime
- describe the design of the Façade pattern and where it is applied
- design and implement the Façade pattern to offer a simple interface to clients
- describe the design of the Proxy pattern and list its use cases
- design and implement the Proxy pattern to control access to an object
- describe the design of the Flyweight pattern and why it is used
- design and implement the Flyweight pattern to efficiently use lightweight resources

Python Design Patterns: Working with Behavioral Design Patterns

Objectives

- describe the Strategy pattern and its use cases
- design and implement the Strategy pattern and recognize how it is used in Python built-in functions
- describe the Chain of Responsibility pattern and how it is used
- write code to implement the Chain of Responsibility pattern
- describe the Observer pattern and when it should be used
- implement the Observer pattern for a simple use case
- implement the Observer pattern for a more complex use case
- describe the Command pattern and its use cases
- implement the Command pattern to perform undo operations
- describe the Iterator pattern and its applications
- design an Iterator using special methods in Python

Final Exam: Pythonista

Objectives

- access individual cells programmatically using openpyxl
- alter the weight and line style of data series to customize the appearance of a visualization
- analyze the state of an application in the middle of code execution with the use of breakpoints
- apply sophisticated styles and alignments to format cell contents
- apply styling elements to control the display of data in cells
- assign names to groups of cells and use those names in formulae to enhance readability
- build a Python app to break up a large text file into chunks and send the chunks over a socket connection to a recipient app
- code a Python app to receive a large text file in chunks and reconstruct that file
- configure an application to wait for a set amount of time for communication from another process
- create a Microsoft Excel workbook by choosing from a list of templates
- create a Microsoft Excel workbook using the openpyxl library
- customize syntax highlighting for various source files in your Python project
- describe the basic principles of good design in code
- describe the Chain of Responsibility pattern and how it is used
- describe the Command pattern and its use cases
- describe the design of the Decorator pattern and its advantages
- describe the design of the Flyweight pattern and why it is used
- describe the design of the Proxy pattern
- describe the design of the Proxy pattern and list its use cases
- describe the Liskov's Substitution, Interface Segregation, and Dependency Inversion principles of good design
- describe the Observer pattern and when it should be used
- describe the principle of Least Knowledge
- describe the principle of the Hollywood principle of good design
- describe the Single Responsibility and Open/Closed principles of good design
- describe the Strategy pattern and its use cases
- describe the use the socket module in a Python application
- implement a simple design for the Factory pattern
- implement the Singleton pattern using global objects in Python
- insert formulae into Excel workbooks
- insert images into Microsoft Excel files and control their size and location
- install and configure the PyCharm IDE on your system
- minimize typing errors by using the auto-complete feature

- recall how the Builder pattern works and when it should be used
- recall how the Factory and Abstract Factory patterns work and when they can be used
- recall how the Object Pool pattern works and when it should be used
- recall how the Singleton pattern works and when to use this pattern
- recall the basic principles of good design in code
- recall the Single Responsibility and Open/Closed principles of good design
- recognize the Command pattern
- recognize the design of the Adapter pattern and when it should be used
- recognize the effects of setting sockets to run in blocking mode
- recognize the effects of setting sockets to run in blocking mode when large transfers are involved
- recognize the need for the Adapter pattern
- recognize the need for the Adapter pattern when working with legacy components
- recognize the Singleton pattern
- save the contents of an in-memory representation to a Microsoft Excel file
- save the contents of an in-memory representation to a Microsoft Excel file on disk
- specify rows and columns that always ought to be on-screen as a user browses an Excel file
- transmit an image file from one Python app to another by breaking it up into chunks
- use Microsoft Excel to visualize data
- use number formats to represent currencies and add comma separators
- use openpyxl to construct visualizations in Excel
- use openpyxl to construct visualizations in Excel workbooks
- use openpyxl to programmatically construct formulae
- use openpyxl to programmatically construct formulae in workbooks
- use the resume button to ensure that code execution only pauses at breakpoints
- use the socket module in a Python application
- use the socket module in a Python application to get information about the application's host
- visualize data using Microsoft Excel
- write code to implement the Chain of Responsibility pattern

Pythonista

Objectives

- In this practice lab, learners will be presented with a series of exercises to practice developing in Python. Exercises include tasks such implementing good design principles and writing applications that can communicate using TPC sockets. Learners will also practice working with Singleton, Observer and Factory design patterns and implementing iterators using special methods.

Bookshelf

Optional

BOOK

The Quick Python Book, Third Edition

37

BOOK

Beginning Python: From Novice to Professional, Thir...

67

BOOK

Python All-in-One for Dummies

34

BOOK

Python Basics

81

BOOK

Beginning Programming with Python for Dummies, 2nd...

26

BOOK

Python Programming: An Introduction To Computer...

11

BOOK

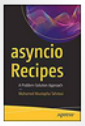
Python Crash Course: A Hands-on, Project-Based...

136

BOOK

Practical Python Design Patterns: Pythonic Solution...

3



BOOK

Asyncio Recipes: A Problem-Solution Approach

BOOK

Pro Python Best Practices: Debugging, Testing and...

5

BOOK

Cracking Codes with Python: An Introduction to Building...

2

BOOK

Python Unit Test Automation: Practical...

10

BOOK

Minimal Python: Be Efficient and Become An Effective...

4

BOOK

Python Command Line Tools: Design Powerful Apps with...

1

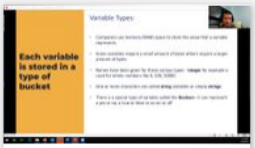
BOOK

Testing in Python: Robust Automation for Professionals

2

Bootcamp Replays

Optional



COURSE

Get Into Programming with Python Bootcamp: Session ...

55

COURSE

Get Into Programming with Python Bootcamp: Session ...

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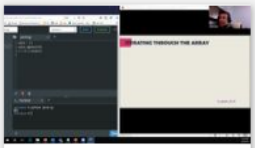

COURSE

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COURSE

Get Into Programming with Python Bootcamp: Session ...

19

COURSE

Python Fundamentals Bootcamp: Session 1 Replay

96

COURSE

Python Fundamentals Bootcamp: Session 2 Replay

50

COURSE

Python Fundamentals Bootcamp: Session 3 Replay

32

COURSE

Python Fundamentals Bootcamp: Session 4 Replay

35

COURSE

Python Best Practices Bootcamp: Session 1 Replay

8

COURSE

Python Best Practices Bootcamp: Session 2 Replay

4

COURSE

Python Best Practices Bootcamp: Session 3 Replay

7

COURSE

Python Best Practices Bootcamp: Session 4 Replay

4

COURSE

Python for DevOps Bootcamp: Session 1 Replay

16

COURSE

Python for DevOps Bootcamp: Session 2 Replay

8

Business & Leadership for Pythonista

Optional

COURSE

Developing and Supporting an Agile Mindset

1057

COURSE

Encouraging Team Communication and...

1526

COURSE

The Essential Role of the Agile Product Owner

274

COURSE

Using Strategic Thinking to Consider the Big Picture

591

COURSE

Getting to the Root of a Problem

924

COURSE

Unleashing Personal and Team Creativity

840

COURSE

Contributing as a Virtual Team Member

2623

COURSE

Developing a Growth Mindset

2364

COURSE

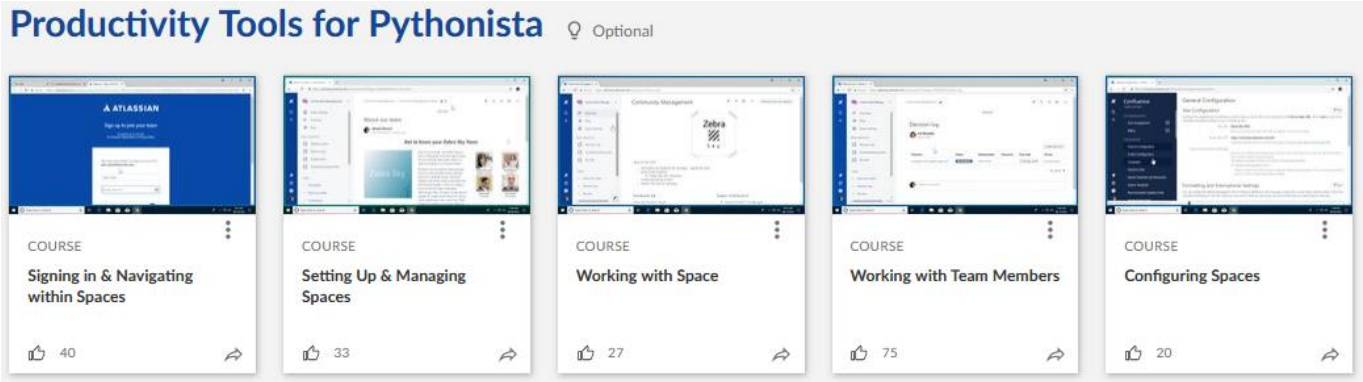
Developing a Successful Team

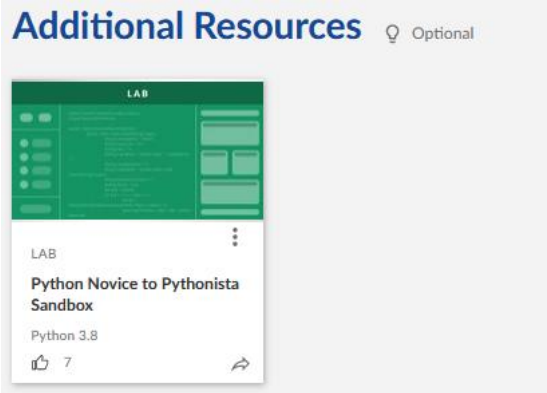
580

COURSE

Reaching Sound Conclusions

273





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