PRG400 : Python Programming

Code :   PRG400   **Duration :**   3 days   **Category :**   Scripting

Audience :

Developers and system administrators who want to learn how to program in Python and other persons who want to understand Python code.

Prerequisites :

Knowledge and experience with programming is not strictly required to participate in this course. Experience in C, C#, Java, Perl or Visual Basic is beneficial for a proper understanding.

Realization :

The theory is treated on the basis of presentation slides. Illustrative demos are used to clarify the concepts further. The theory is interspersed with practical exercises. The course material is in English.

Python Programming

Contents :

In this course you learn how to program in the object oriented programming language Python. Python is a language often used for installation scripts and for prototypes in large applications. After an introduction on how to install Python and how to run Python scripts, the basic concepts of Python, such as statements, variables and control flow structures are discussed. Also attention is paid to common collection data structures in Python such as Lists, Tuples and Dictionaries. Then the focus is on the use of functions in Python with the different methods of parameter passing, by value and by reference. Also the scope of variables and lambda functions are part of the subject matter. Next attention is paid to the handling of errors in Python scripts using exception handling. Also the functionality of Python library functions, for example the ones that can be used for accessing files, is addressed. The division of Python software modules and the use of namespaces and packages is part of the subject matter as well. Finally object oriented programming with classes and objects in Python is discussed in detail. In this respect concepts like encapsulation, inheritance and polymorphism are treated.

Module 1 : Python Intro

What is Python?
Python Features
History of Python
Getting Started
Setting up PATH
Python Environment Variables
Running Python
Command Line Options
Python in Interactive Mode
Python in Script Mode
Identifiers
Reserved Words
Comments
Lines and Indentation
Multi Line Statements
Quotes in Python

Module 2 : Variables and Data Types

Variables
Multiple Assignment
Python Data Types
Python Numbers
Numerical Types
Number Type Conversions
Conversion Functions
Built-in Number Functions
Python Strings
String Operators and Operations
Escape Characters
String Formatting
Triple Quotes
Raw and Unicode Strings
Built-in String Functions
Python Operators
Python Booleans

Module 3 : Data Structures

Sequences and Lists
Accessing and Updating Lists
Multidimensional Lists
List Operations
List Functions and Methods
Tuples
Accessing Values in Tuples
Usage of Tuples
Tuple Functions
Bytes and Byte Arrays
Sets and Dictionaries
Dictionary Characteristics
Accessing Values in Dictionaries
Updating Dictionaries
Properties of Dictionary Keys
Non Mutable Keys
Dictionary Methods

Module 4 : Control Flow

Control Flow Constructs
if Statement
else Statement
elif Statement
Nested if
while Loop
Infinite while Loop
for Loop
Iterating by Sequence Index
break Statement
continue Statement
Loop with else Combination
pass Statement

Module 5 : Functions

Functions
Function Syntax
Calling Functions
Pass by Value
Pass by Reference
Overwriting References
Function Arguments
Keyword Arguments
Default Arguments
Variable Length Arguments
Anonymous Functions
Syntax Lambda Functions
return Statement
Scope of Variables

Module 6 : Modules

Modules
import Statement
from import Statement
Locating Modules
Creating and Using Modules
dir Function
Packages
Using Packages
Direct Use of Package Modules
Namespaces and Scoping
globals and locals Functions
reload Function
Namespaces and Scoping
Test Harnass

Module 7 : Classes and Objects

Classes and Objects
Object Orientation in Python
OO Terminology Overview
Creating Classes
Class Members
Creating and Using Objects
Accessing Attributes
Built-in Class Attributes
Constructors and Destructors
Destroying Objects
Encapsulation and Data Hiding
Inheritance
Constructor Chaining
Multiple Inheritance
Overriding Methods
Class Methods
Operator Overloading
Polymorphism

Module 8 : Excepting Handling

Unexpected Errors
Handling Exceptions
Exception Handling Syntax
Example Exception Handling
except Clause no Exceptions
except Clause Multiple Exceptions
Standard Exceptions
try-finally Clause
Exception Arguments
Raising Exceptions
User Defined Exceptions

Module 9 : Python Libraries

Input and Output
IO Module
Opening Files
File Open Modes
Result of Calling open
File Object Attributes
Reading Binary Files
Writing Binary Files
Reading Text Files
Writing Text Files
File Positions
Renaming and Deleting Files
Directory Methods
Creating Directories
Regular Expressions
Matching versus Searching
Search and Replace
Regular Expression Modifiers