

PYTHON FOR DATA ANALYSIS

Week 1: (Basics)

- **Day 1:** Learn the basics of Python, What is Python?, why Python? Program installation.
- **Day 2:** , Python syntax basic programs, Python variables and data types, Get familiar with Jupyter Notebook, an interactive environment for running Python code.
- **Day 3:** Input operation, comments, Reserve words, Indention
- **Day 4:** Arithmetic Operators, Comparison Operators, Python Assignment Operators, Logical Operators.
- **Day 5:** Bitwise Operators, Membership Operators, Identity Operators, Operator precedence. Expression in python, strings operations on strings Examples and usages.

Week 2: (Decision Control Statement)

- **Day 1:** Introduction to Decision control statement Selection/ Control Branching Statements if statement if-else statement
- **Day 2:** if-elif-else statement and nested if statements
- **Day 3:** Basic Loop structure/Iterative statements
- **Day 4:** For Loop
- **Day 5:** while Loop, Nested Loops

Week 3: (Decision Control Statement)

- **Day 1:** The break statement, the continue statement.
- **Day 2:** pass statement else statement used with loops
- **Day 3:** Case Study I develop calculator
- **Day 4:** Case study II Generating a Calendar
- **Day 5:** Problem Solving Strategies, Examples

Week 4: (Data structure)

- **Day 1:** List, Introducing list, Accessing elements in a list, using individual values from list
- **Day 2:** Using Individual Values from a List, Changing, Adding, and Removing Elements Modifying Elements in a list, Adding Elements to a List, Removing Elements from a List Organizing a list Sorting a List Permanently with the sort() Method Sorting a List Temporarily with the sorted() Function
- **Day 3:** Printing a List in Reverse Order , Finding the Length of a List, Avoiding Index Errors When Working with Lists, Looping Through an Entire List, A Closer Look at Looping, Working with Part of a List Slicing a List , Looping Through a Slice , Copying a List
- **Day 4:** Tuples , Defining a Tuple , Creating, Tuple, Accessing elements in tuples, Tuple slices, Tuple Immutable/Mutable, Looping Through All Values in a Tuple Writing over a Tuple.
- **Day 5:** Basic Tuple Methods Tuple Operations, Concatenation, Repetition, Membership operators Deleting a Tuple Len(), Max(), Sum(), Min(), Sort().

PYTHON FOR DATA ANALYSIS

Week 5: (Data structure)

- **Day 1:** SET Set Creation, Using the range Function ,Accessing elements in sets ,Sets Operation, Membership operators ,Union ,Intersection ,Set Difference ,Symmetric difference Set Methods, Update(),isdisjoint() ,issubset() ,issuperset () ,discard(),copy() ,Len(),Max()Sum(),Min(),Sorted(),copy()
- **Day 2:** FROZENSET,Advantages of Frozen set over Set ,Frozenset Methods ,union() intersection(),difference(),symmetric difference(),isdisjoint(),issubset(),issuperset()
- **Day 3:** Dictionary, Defining Dictionary, Accessing Values in Dictionary,Displaying Dictionary Contents, Items(),Keys(),Values().
- **Day 4:** Dictionaries are Mutable, Dictionary Methods, Copy(),pop(key, d), get(key, d),from keys(seq, v),Setdefault (key, v),Iteration through Key/Values, Dictionary To List/Set/Tuple
- **Day 5:** Dictionary Methods, Copy(),pop(key, d),get(key, d),from keys(seq, v),Setdefault (key, v),Iteration through Key/Values, Dictionary To List/Set/Tuple.

Week 6: (Functions,OOPs & Exception Handling)

- **Day 1:** Defining a Function, Passing Information to a Function, Arguments Parameters, Passing Arguments Positional Arguments, Keyword Arguments, Default Values, Equivalent Function Calls Avoiding Argument Errors, Return Values, Returning a Simple Value, Making an Argument Optional.
- **Day 2:** Making an Argument Optional Returning a Dictionary, Using a Function with a while Loop, Passing a List, Modifying a List in a Function, Preventing a Function from Modifying a List.
- **Day 3:** OOPS, Classes and Objects, The Self variable, Constructor, Type of variables, Namespaces, Types of Methods. Instance Methods, Class Methods, Static Methods, Passing members of One Class to another class.
- **Day 4:** Inner classes, Inheritance and Polymorphism,Constructors,Super() method, Types of inheritance, Single inheritance, Multiple inheritance, Method overloading, Method over riding,Polymorphism.Abstract Classes and interfaces, Abstract methods and abstract classes, Interfaces in python. Abstract classes vs interfaces.
- **Day 5:** Exception Handling, Errors in Python program, Compile time errors, Runtime errors, Logical errors Exceptions, Exception handling, Types of exception, The except block, The assert statement User-defined exceptions.

Week 7: (Iterators & Generators)

- **Day 1:** Command line Arguments, Parsing command line argument, getopt method, Exception getoptGetopt error, Iterators, Iterating through an iterator, Building your own iterator, Python infinite iterators.
- **Day 2:** Generators, Create generators, Difference between generator function and normal function,Python generator with a loop, Python generator expression, Why generators used in python?, Represent infinite stream, Pipelining generators, Standard modules,OS module, Process environment, Process working directory Pipes, File descriptors, File system permission,Directories,Symbolic link, Running external commands.

PYTHON FOR DATA ANALYSIS

- **Day 3:** Standard modules, OS module, Process environment, Process working directory, Pipes, File descriptors, File system permission, Directories, Symbolic link, Running external commands
- **Day 4:** File I/O, Reading a file, Writing a file, Working with binary files, Pickle in python, The seek() and tell() method, Zipping and unzipping files, Working with directories
- **Day 5:** Problem Solving Strategies, Examples

Week 8: (Python for Data Analysis Pandas)

- **Day 1:** Getting Started with pandas - Introduction to pandas Data Structures, Series DataFrame, Index Objects, Essential Functionality, Reindexing, Dropping Entries from an Axis, Indexing, Selection, and Filtering, Integer Indexes, Arithmetic and Data Alignment.
- **Day 2:** Function Application and Mapping, Sorting and Ranking, Axis Indexes with Duplicate Labels, Summarizing and Computing Descriptive Statistics, Correlation and Covariance, Unique Values, Value Counts, and Membership.
- **Day 3:** Data Loading, Storage, and File Formats, Reading and Writing Data in Text Format, Reading Text Files in Pieces, Writing Data to Text Format
- **Day 4:** Working with Delimited Formats, JSON Data
- **Day 5:** Working with XML and HTML: Web Scraping.

Week 9: (Python for data analysis)

- **Day 1:** Using HDF5 Format
- **Day 2:** Reading Microsoft Excel Files
- **Day 3:** Interacting with Web APIs
- **Day 4:** Interacting with Databases
- **Day 5:** Case study for usage of pandas

Week 10: (Python for data analysis: NumPy)

- **Day 1:** NumPy Basics: Arrays and Vectorized Computation, The NumPy ndarray: A Multidimensional Array Object, Creating ndarrays, Data Types for ndarrays, Arithmetic with NumPy Arrays, Basic Indexing and Slicing, Boolean Indexing, Fancy Indexing.
- **Day 2:** Transposing Arrays and Swapping Axes, Universal Functions: Fast Element-Wise Array Functions, Array-Oriented Programming with Arrays.
- **Day 3:** Expressing Conditional Logic as Array Operations, Mathematical and Statistical Methods, Methods for Boolean Arrays.
- **Day 4:** Sorting, Unique and Other Set Logic, File Input and Output with Arrays,
- **Day 5:** Linear Algebra, Pseudorandom Number Generation, Example: Random Walks Simulating Many Random Walks at Once

PYTHON FOR DATA ANALYSIS

Week 11: (Data Loading, Storage, and File Formats)

- **Day 1:** Reading and Writing Data in Text Format ,Reading Text Files in Pieces ,Writing Data to Text Format ,Working with Delimited Formats ,JSON Data ,XML and HTML: Web Scraping ,Binary Data Formats ,Using HDF5 Format ,Reading Microsoft Excel Files, Interacting with Web APIs ,Interacting with Databases.

Data Cleaning and Preparation: Handling Missing Data, Filtering Out Missing Data, Filling In Missing Data Data Transformation, Removing Duplicates, Transforming Data Using a Function or Mapping, Replacing Values, Renaming Axis Indexes, Discretization and Binning Detecting and Filtering Outliers, Permutation and Random Sampling, Computing Indicator/Dummy Variables.

Day 2: Data Wrangling: Join, Combine, and Reshape Hierarchical Indexing, Reordering and Sorting Levels, Summary Statistics by Level, Indexing with a Data Frame's columns, Combining and Merging Datasets, Database-Style Data Frame Joins, Merging on Index, Concatenating Along an Axis, Combining Data with Overlap, Reshaping and Pivoting, Table of Contents, Reshaping with Hierarchical Indexing, Pivoting "Long" to "Wide" Format, Pivoting "Wide" to "Long" Format.

Day 3: Data Aggregation and Group Operations: GroupBy Mechanics, Iterating Over Groups, Selecting a Column or Subset of Columns, Grouping with Dicts and Series, Grouping with Functions, Grouping by Index Levels, Data Aggregation, Column-Wise and Multiple Function Application, Returning Aggregated Data Without Row Indexes, Apply: General split-apply-combine, Suppressing the Group Keys, Quantile and Bucket Analysis.

Day 4: Example: Filling Missing Values with Group-Specific Values

Example: Random Sampling and Permutation

Example: Group Weighted Average and Correlation

Example: Group-Wise Linear Regression, Pivot Tables and Cross-Tabulation.

Day 5: Time Series Analysis: Date and Time Data Types and Tools, Converting Between String and Datetime, Time Series Basics, Indexing, Selection, Subsetting, Time Series with Duplicate Indices, Date Ranges, Frequencies, and Shifting, Generating Date Ranges, Frequencies and Date Offsets, Shifting (Leading and Lagging) Data, Time Zone Handling, Time Zone Localization and Conversion, Operations with Time Zone-Aware Timestamp Objects, Operations Between Different Time Zones, Periods and Period Arithmetic, Period Frequency Conversion, Quarterly Period Frequencies, Converting Timestamps to Periods (and Back), Creating a Period Index from Arrays, Resampling and Frequency Conversion, Downsampling, Upsampling and Interpolation, Resampling with Periods, Moving Window Functions ,Exponentially Weighted Functions, Binary Moving Window Functions, User-Defined Moving Window Functions

PYTHON FOR DATA ANALYSIS

Week 12: (Workshop)

Interview Questions and Answers

Resume Preparation

Note: 1) Exercises For Each Topic

2) Assignments

3) Case studies

4) Real Time Scenarios