TECHCALIBRANTS **Topics : PYTHON**

Python Chapters Index

1. Introduction to Python

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- ✓ Where are all python is using?
- ✓ History of Python?
- ✓ Why the name was python?
- ✓ Python versions
- ✓ Python supports Functional and OOPs as well
- ✓ Solving few requirements by using C, Java and python ✓ Machine language
- ✓ Translator
- ✓ Interpreter
- ✓ Compiler
- ✓ Python keywords (33)
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- ✓ Flavours of Python
- ✓ Python versions
- ✓ Programs

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- ✓ Python program internal flow: Long answer ✓ Python Virtual Machine
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i. Definition 1
ii. Definition 2

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- ✓ Splitting of Strings
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✓ return vs None
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✓ Advantage
✓ A simple difference between normal and lambda functions ✓ Where lambda function fits exactly?
✓ filter() function
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✓ reduce() function
✓ Function Aliasing

- ✓ Function decorators
- ✓ Decorator explanation
- ✓ Steps to create decorator
- ✓ @ symbol
- ✓ Function generators
- ✓ next(generator) function
- ✓ Programs

11. Modules

- ✓ What is module?
- ✓ import module
- ✓ Renaming or aliasing a module ✓ from and import keywords
- ✓ import * (star symbol)
- ✓ member aliasing
- ✓ Reloading a Module:
- ✓ dir() function
- ✓ The Special variable __name__ ✓ Programs

12. Package

- ✓ What is package? ✓ Advantage
- ✓ Programs

13. List Data structure

- ✓ Why should we learn about data structures? ✓ Python Data structures
- ✓ Sequence of elements
- ✓ Introduction about list data structure

- ✓ Creating list
- ✓ creating empty list
- ✓ Creating list with elements
- ✓ Creating list by using list() function
- ✓ Difference between list() function and list class ✓ list having mutable nature
- ✓ Accessing elements from list
- ✓ Accessing list by using index
- ✓ What is Indexing
- ✓ Accessing list elements by Slicing
- ✓ Accessing list by using loops
- ✓ Important functions and methods in list
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- ✓ append method
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- ✓ Difference between append and insert
- ✓ 5. extend() method:
- ✓ 6. remove() method
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- ✓ Difference between remove() and pop() methods ✓ Ordering elements of List:
- ✓ reverse():
- ✓ sort() method:
- ✓ Aliasing and Cloning of list objects

- ✓ Aliasing list visualization
- ✓ Cloning or Copying
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- ✓ By using copy method
- ✓ Mathematical + and * operators
- ✓ Concatenation operator +
- ✓ Repetition operator *
- ✓ Comparison of lists
- ✓ Membership operators
- ✓ Nested Lists
- ✓ list comprehensions

- ✓ What is tuple data structure?
- ✓ When should we go for tuple data structure?
- ✓ Single value tuple
- ✓ Different ways to create a tuple.
- ✓ empty tuple
- ✓ Single value tuple
- ✓ Tuple with group of values
- ✓ By using tuple() function
- ✓ Accessing elements of tuple:
- ✓ Accessing tuple elements by using Index
- ✓ Accessing tuple elements by using slice operator: ✓ Tuple vs immutability:
- ✓ Mathematical operators on tuple:
- ✓ Concatenation operator (+):
- ✓ Multiplication operator (*)
- ✓ Important functions and methods of Tuple:
- ✓ len() function
- ✓ count() method
- ✓ index() method
- ✓ sorted() function
- ✓ min() and max() functions:
- ✓ Tuple packing
- ✓ Tuple unpacking:
- ✓ Tuple comprehension
- ✓ Differences between List and Tuple:
- ✓ Programs

15. Set Data structure

- ✓ What is set data structure?
- ✓ What symbol is required to create set?
- ✓ Set elements separated by what?
- ✓ Creating set by using same type of elements
- ✓ Creating set by using different type of elements
- ✓ Creating set by range() type of elements
- ✓ Difference between set() function and set class
- ✓ Empty set
- ✓ Important function and methods of set:
- ✓ add(x) method
- ✓ update(x, y) method
- ✓ Difference between add() and update() methods in set? ✓ Which of the following are valid for set s?
- ✓ copy() method

- ✓ pop() method
- ✓ remove(x) method

- ✓ discard(x) method
- ✓ clear() method
- ✓ Mathematical operations on the Set
- ✓ union() method
- ✓ intersection() method
- ✓ difference() method
- ✓ symmetric_difference():
- ✓ Membership operators: (in and not in) ✓ Set Comprehension
- ✓ Remove duplicates in list elements
- ✓ Frozen set
- ✓ Creating frozen set
- ✓ Programs

16. Dictionary data structure

- ✓ What is dictionary data structure?
- ✓ What symbol is required to create set?
- ✓ Create dictionary
- ✓ Empty dictionary
- ✓ Access values by using keys from dictionary
- ✓ How to handle this KeyError?
- ✓ Update dictionary
- ✓ Removing or deleting elements from dictionary ✓ By using del keyword
- ✓ We can delete total dictionary object
- ✓ clear() method
- ✓ Important functions and methods of dictionary ✓ dict() function
- ✓ dict({key1:value1, key2:value2}) function
- ✓ dict([tuple1, tuple2])
- ✓ len() function
- ✓ clear() method
- ✓ get() method
- ✓ pop() method
- ✓ popitem() method
- ✓ keys() method
- ✓ values() method
- ✓ items() method
- ✓ copy() method
- ✓ Dictionary Comprehension
- ✓ Programs

17. OOPS Part 1 – class, object, variables, methods etc

✓ Before OOPS ✓ Limitations ✓ After OOPS ✓ Advantages✓ Is Python follows Functional approach or Object-oriented approach ✓ OOPs (Object Oriented Programming Principles)

- ✓ Features of Object-Oriented Programming System
- ✓ class

i. Definition 1
ii. Definition 2

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- ✓ How to define a class
- ✓ Brief discussion about class
- ✓ self variable
- ✓ object
- ✓ Why should we create an object? ✓ What is an object?

i. Definition 1 ii. Definition 2 iii. Definition 3 iv. Definition 4

- ✓ Syntax to create an object
- ✓ Calling instance data
- ✓ Can we create more than one object?
- ✓ Constructor
- ✓ What is the main purpose of constructor?
- ✓ When constructor will be executed?
- ✓ How many times constructor will be executed?
- ✓ Is constructor mandatory to define?
- ✓ Can I call constructor explicitly like a method?
- ✓ How many times constructor will be executed?
- ✓ Constructor can contain how many parameters?
- ✓ If constructor having no parameters, then how to define?
- ✓ If trying to print self variable
- ✓ If constructor having more parameters, then how to define? ✓ Difference between methods and constructor
- ✓ Types of Variables:
- ✓ 1. Instance variables:
- ✓ What is instance variable?
- ✓ Separate copy for every object
- ✓ Where should we declare instance variable?
- ✓ By using constructor
- ✓ The __dict__ attribute
- ✓ By using instance method
- ✓ By using object name
- ✓ Accessing instance variable
- ✓ By using self variable
- ✓ By using object name
- ✓ Every object has a separate copy of variable exists
- ✓ static variable (class level variable)
- ✓ What is static variable
- ✓ Where can we declare static variable?

- ✓ Only one copy of static variable to all objects ✓ How can we access static variable?
- ✓ Instance Variable vs Static Variable
- ✓ Declaring static variable

- ✓ Inside class and outside of the method ✓ Inside constructor
- ✓ Inside instance method
- ✓ Inside classmethod

- ✓ class name
- ✓ cls variable
- ✓ Inside static method
- ✓ @staticmethod declarator
- ✓ Accessing static variable
- ✓ Inside constructor

- ✓ Inside instance method
- ✓ Inside classmethod
- ✓ Inside staticmethod
- ✓ Local variable
- ✓ What is local variable
- ✓ Why we need to use local variable
- ✓ Where can we access local variable
- ✓ Types of methods
- ✓ Instance methods
- ✓ What is the use of Setter and Getter Methods
- ✓ Setter method
- ✓ Getter Method
- ✓ Class Methods
- ✓ What is class method
- ✓ When we can go to class methods
- ✓ @classmethod decorator
- ✓ How to access class methods
- ✓ static Methods
- ✓ How to declare static method
- ✓ How to access static methods
- ✓ Passing members of one class to another class
- ✓ Inner classes
- ✓ Garbage Collection
- ✓ What is the main objective of Garbage Collector
- ✓ How to enable and disable Garbage Collector in our program: ✓ Importance functions in gc module
- ✓ gc.isenabled()
- ✓ gc.disable()
- ✓ gc.enable()
- ✓ Programs

18. OOPS Part 2 – Inheritance

- ✓ What is inheritance
- ✓ Conclusion of the story

- ✓ Advantage

- ✓ How to implement inheritance

- ✓ Types of Inheritance:

  - ✓ Single Inheritance
  - ✓ Multi-level Inheritance
  - ✓ Multiple inheritance
  - ✓ Parent classes can contain a method with same name
  - ✓ If parent classes contain a method with same name, then which method

    will access by child class

  - ✓ Scenarios
  - ✓ Constructors in Inheritance

- ✓ If child class and super class both having constructors, then?
- ✓ Calling super class constructor from child class constructors
- ✓ Method Resolution Order (MRO)
- ✓ There are three principles followed by MRO
- ✓ Why should we understand MRO?
- ✓ Is there any predefined method to check sequence of execution of classes?
- ✓ Demo program 1 for method resolution order
- ✓ Demo Program-2 for Method Resolution Order
- ✓ super() function
- ✓ Which scenario we can use super() function in child class to call super

  class members?

- ✓ Calling method of a specific super class
- ✓ Different cases for super() function
- ✓ Programs

19. OOPS Part 3 – Polymorphism

- ✓ What is Polymorphism
- ✓ Duck Typing Philosophy of Python
- ✓ Overloading
- ✓ What is overloading
- ✓ Operator Overloading:
- ✓ Is python supports operator overloading?
- ✓ How operator overloading works in python?
- ✓ Magic methods
- ✓ List of operators and corresponding magic methods.
- ✓ Method Overloading
- ✓ How we can handle overloaded method requirements in Python ✓ Constructor Overloading
- ✓ Constructor with Default Arguments
- ✓ Constructor with Variable Number of Arguments:
- ✓ Method overriding:
- ✓ Demo Program for Method overriding
- ✓ Constructor overriding
- ✓ Calling parent class constructor from child class constructor
- ✓ Programs

20. OOPS Part 4 – abstract class, interface etc

✓ In python which things we can make as an abstract?
✓ There are two types of methods in-terms of implementation
✓ Implemented method
✓ Un-implemented method
✓ So, how to declare abstract method
✓ abstract method
✓ abstract class
✓ If child class missed to provide abstract methods implementation, then
✓ abstract class can contain concrete methods also
✓ Can abstract class contains more sub classes?
✓ On which scenario an abstract class contains more than one child classes? ✓ Abstract class object creation
✓ Different cases and scenarios for abstract class object creation
✓ Interface

- ✓ What is an interface?
- ✓ When should we go for ...?

i. Interface
ii. Abstract class
iii. Normal class or concrete class

- ✓ Double underscore (Name mangling) ✓ __str__(self) method
- ✓ Programs

21.Exceptional handling

- ✓ Syntax Errors
- ✓ Programmer responsible
- ✓ Runtime Errors
- ✓ Scenarios where runtime errors will occur?
- ✓ Normal flow of the execution
- ✓ Abnormal flow of the execution
- ✓ What we need to do if program terminates abnormally ✓ What is an Exception?
- ✓ Is it really required to handle the exceptions?
- ✓ What is the meaning of exception handling?
- ✓ Default Exception Handing in Python:
- ✓ Exception hierarchy diagram
- ✓ Programmer focus
- ✓ Handling exceptions by using try except

i. try block
ii. except block

- ✓ try-except flow
- ✓ Control flow in try and except

i. 7 cases and scenarios with examples

- ✓ Printing exception information
- ✓ try with multiple except blocks
- ✓ Single except block can handle multiple exceptions
- ✓ Default except block
- ✓ finally block
- ✓ Why separate block for clean-up activities, can“t we write inside try and except blocks

- ✓ Coming to the try block
- ✓ Coming to the except block
- ✓ What is the speciality of final block?
- ✓ Control flow about finally block

i. few cases and scenarios with examples

- ✓ Any situation like, finally will not execute?
- ✓ Control flow in try-except-finally

i. 6 cases and scenarios with examples

✓ Nested try-except-finally blocks
i. 4 cases and scenarios with examples

- ✓ else block with try-except-finally
- ✓ At what time which block
- ✓ Various possible combinations of try-except-else-finally
- ✓ Types of Exceptions
- ✓ Predefined Exceptions
- ✓ User Defined Exceptions
- ✓ User defined exceptions or Custom Exceptions
- ✓ Steps to follow to Define and Raise Customized Exceptions
- ✓ Programs

22. File IO

- ✓ What is a file
- ✓ Types of Files
- ✓ Text files
- ✓ Binary Files
- ✓ file modes and their meanings
- ✓ Opening a File
- ✓ Various properties of File Object
- ✓ Writing data to text files
- ✓ Instead of overriding the content, how to append the content to the file
- ✓ writelines(argument)
- ✓ Reading Character Data from text files
- ✓ readline() method
- ✓ readlines() method
- ✓ with keyword
- ✓ Advantage
- ✓ The seek() and tell() methods
- ✓ How to check a specific file exists or not?

- ✓ sys.exit(0)
- ✓ Program to print the number of lines, words and characters present in the given file?

- ✓ Working with Binary data
- ✓ Working with csv files
- ✓ Zipping and Unzipping Files
- ✓ To create Zip file
- ✓ To perform unzip operation
- ✓ Working with Directories
- ✓ To know contents of directory
- ✓ Pickling and Unpickling of Objects
- ✓ Programs

23. Database connectivity

- ✓ Data Storage Areas
- ✓ Temporary Storage Areas
- ✓ Permanent Storage Areas
- ✓ File Systems
- ✓ Databases
- ✓ Python Database Programming

- ✓ Standard Steps for Python database Programming ✓ import database specific module
- ✓ Establish Connection.
- ✓ Create Cursor object
- ✓ In-built methods to execute the sql queries
- ✓ commit or rollback
- ✓ Fetch the result from the Cursor
- ✓ close the resources
- ✓ Important methods while working with Database

i. connect() ii. cursor()

iii. execute()
iv. executescript()

v. executemany() vi. commit()

vii. rollback() viii. fetchone() ix. fetchall()

x. fetchmany(n) xi. close()

- ✓ Working with Oracle Database
- ✓ Installing cx_Oracle:
- ✓ How to Test Installation
- ✓ Expected common errors while executing programs ✓ Programs

24. Regular expressions

- ✓ What is Regular expression?
- ✓ When should we chose?
- ✓ The main important application areas of Regular Expressions are
- ✓ compile()
- ✓ finditer()
- ✓ On Match object we can call start(), end() and group() methods methods ✓ Character classes
- ✓ Pre-defined Character classes:
- ✓ Quantifiers
- ✓ Important functions of re module

i. match()
ii. fullmatch()

iii. search() iv. findall()

v. finditer() vi. sub()

vii. subn() viii. split()

ix. compile()

✓ ^ symbol ✓ $ symbol ✓ Programs

25. Multithreading

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- ✓ Multi-Tasking
- ✓ Process based Multi-Tasking
- ✓ Where multi-tasking fits?
- ✓ Thread based Multi-tasking
- ✓ Where multi-tasking fits
- ✓ Areas of multi-threading
- ✓ The ways of Creating Thread in Python
- ✓ Creating a Thread without using any class
- ✓ Creating a Thread by inheriting Thread class
- ✓ Creating a Thread without inheriting Thread class ✓ Without multi-threading
- ✓ With multithreading
- ✓ Setting and Getting Name of a Thread:
- ✓ How to get and set name of the thread
- ✓ Thread Identification Number (ident):
- ✓ active_count()
- ✓ enumerate() function
- ✓ isAlive()
- ✓ join() method
- ✓ join(seconds) method
- ✓ Daemon Threads
- ✓ Example: Garbage Collector

- ✓ setDaemon() method
- ✓ Default Nature
- ✓ Main Thread is always Non-Daemon
- ✓ Scenarios from previous program
- ✓ Synchronization
- ✓ How to overcome data inconsistency problems? ✓ How to implement synchronization

i. Lock
ii. 2. RLock
iii. 3. Semaphore

- ✓ Synchronization By using Lock concept: ✓ acquire() method
- ✓ release() method
- ✓ Lock()

- ✓ Problem with Simple Lock
- ✓ RLock()
- ✓ Demo Program for synchronization by using RLock:
- ✓ Difference between Lock and RLock
- ✓ Synchronization by using Semaphore
- ✓ How to create Semaphore object?
- ✓ BoundedSemaphore:
- ✓ Difference between Lock and Semaphore
- ✓ Inter Thread Communication
- ✓ Interthread communication by using Event Objects
- ✓ Methods of Event class
- ✓ set()
- ✓ clear()
- ✓ isSet()
- ✓ wait() | wait(seconds)
- ✓ Interthread communication by using Condition Object ✓ Methods of Condition
- ✓ Interthread communication by using Queue:

- ✓ Important Methods of Queue
- ✓ Types of Queues

i. FIFO Queue
ii. LIFO Queue
iii. Propriety Queue

- ✓ Programs

26. Logging module

- ✓ Why Logging is required?
- ✓ What is Logging
- ✓ The main advantages of logging
- ✓ Can we use print statement for debugging? ✓ logging module
- ✓ How to implement Logging

- ✓ How to configure log file in over writing mode: ✓ How to Format log messages:
- ✓ To display only level name:
- ✓ To display levelname and message

- ✓ Add timestamp in the log messages:
- ✓ change date and time format
- ✓ Writing Python program exceptions to the log file ✓ Problems with root logger
- ✓ Need of Our own customized logger:
- ✓ Advanced logging Module Features
- ✓ Logger
- ✓ Steps for Advanced Logging
- ✓ Demo Program for File Handler:
- ✓ Programs

27. Python + Spark (Advance to Hadoop) = PySpark

- ✓ What is spark? ✓ Why spark?

- ✓ Spark ✓ Spark ✓ Spark ✓ Spark ✓ Spark ✓ Spark

28. Data Science

set up
programs by using python core explanation
SQL explanation
core module with Programs SQL modules with Programs

- ✓ What is Data science?
- ✓ Where python is using in Data science? ✓ Data science programs by using python

29. IDEs explanation

- ✓ IntelliJ
- ✓ PyCharm