

Data Collection and DBMS

Reference Text Books:

Text Book:

1. Learn Python the Hard Way, Zed A. Shaw, Pearson

Reference Book:

1. Introduction to Computer Science using Python, Charles/ Wiley
2. Python Power!: The Comprehensive Guide
3. Python Crash Course: A Hands-on, Project-Based Introduction to Programming
4. Beginning Programming with Python For Dummies Learning Python by: Fabrizio Romano
5. Python Projects by Laura Cassell , Alan Gauld / Wiley
6. Python Cookbook by David B. Brain K. Jones / Shroff / O'reilly Publisher
7. Head First Python by Paul Barry / Shroff / O'reilly Publisher
8. Professional Iron Python by John Paul Muller / Wiley India Pvt Ltd
9. Beginning Programming with Python for Dummies by John Paul Muller / Wiley India Pvt Ltd

Day / Date	Theory (9:00 AM – 1:00 PM)	Lab (2:00 PM – 5:00 PM)	Faculty
Day1 14-10-2022	<ul style="list-style-type: none">• Installing Python• Introduction to Python• Basic Syntax,• Data Types, Variables, Operators, Input/output,• Declaring variable, data types in programs• Your First Python Program• Flow of Control (Modules, Branching)• If, If- else, Nested if-else• Looping, For, While,• Nested loops• Control Structure• Uses of Break & Continue	<p>Q.1. Using for loop, write and run a Python program for this algorithm. Here is an algorithm to print out n! (n factorial) from 0! to 10! :</p> <ol style="list-style-type: none">1. Set f = 12. Set n = 03. Repeat the following 10 times:<ol style="list-style-type: none">a. Output n, "!" = ", fb. Add 1 to nc. Multiply f by n <p>Q.2. Modify the program above using a while loop so it prints out all of the factorial values that are less than 2 billion. (You should be able to do this without looking at the output of the previous exercise.)</p>	Mr. Manjunath

<p>Day 2 15-10-2022</p>	<ul style="list-style-type: none"> • Pass, Strings and Tuples • Accessing Strings • Basic Operations • Assigning Multiple Values at Once • Formatting Strings • String slices, • Dictionaries • Introducing Dictionaries • Defining Dictionaries • Modifying Dictionaries • Deleting Items from Dictionaries 	<ol style="list-style-type: none"> 1. Write a program that asks the user how many days are in a particular month, and what day of the week the month begins on (0 for Monday, 1 for Tuesday, etc), and then prints a calendar for that month. For example, here is the output for a 30-day month that begins on day 4 (Thursday): <pre> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 </pre> 2. Define a procedure histogram() that takes a list of integers and prints a histogram to the screen. For example, histogram([4, 9, 7]) should print the following: <pre> **** ***** ***** </pre> 3. Write a version of a palindrome recognizer that also accepts phrase palindromes such as "Go hang a salami I'm a lasagna hog.", "Was it a rat I saw?", "Step on no pets", "Sit on a potato pan, Otis", "Lisa Bonet ate no basil", "Satan, oscillate my metallic sonatas", "I roamed under it as a tired nude Maori", "Rise to vote sir", or the exclamation "Dammit, I'm mad!". Note that punctuation, capitalization, and spacing are usually ignored. 4. A pangram is a sentence that contains all the letters of the English alphabet at least once, for example: The quick brown fox jumps over the lazy dog. Your task here is to write a function to check a sentence to see if it is a pangram or not. 5. In cryptography, a Caesar cipher is a very simple encryption techniques in which each letter in the plain text is replaced by a letter some fixed number of positions down the alphabet. For example, with a shift of 3, A would be replaced by D, B would become E, and so on. The method is named after Julius Caesar, who used it to communicate with his generals. ROT-13 ("rotate by 13 places") is a widely used example of a Caesar cipher where the shift is 13. In Python, the key for ROT-13 may be represented by means of the following dictionary: 	<p>Mr. Manjunath</p>
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Day3 17-10-2022	<ul style="list-style-type: none"> Working with Lists Introducing Lists Defining Lists Declare, assign and retrieve values from Lists Accessing list Operations in Lists Adding Elements to Lists Searching Lists Deleting List Elements Using List Operators Mapping Lists Joining Lists and Splitting Strings Historical Note on String Methods Working with Tuples Introducing Tuples Accessing tuples Operation 	<ol style="list-style-type: none"> Find the largest and smallest number in the list which taken as input from user using list operations. Write a Python program to create multiple lists Write a Python program to find the repeated items of a tuple. Write a Python program to sort a tuple by its float element. Sample data: [('item1', '12.20'), ('item2', '15.10'), ('item3', '24.5')] Expected Output: [('item3', '24.5'), ('item2', '15.10'), ('item1', '12.20')] Write a Python program to count the elements in a list until an element is a tuple. Sample input : list = [10, 20, 30, (40,50), 60] Sample output = 3 Write a Python program to compute element-wise sum of given tuples, using “zip()” function Original tuples: (1, 2, 3, 4) (3, 5, 2, 1) (2, 2, 3, 1) Element-wise sum of the said tuples: (6, 9, 8, 6) 	Mr. Manjunath
Day 4 18-10-2022	<ul style="list-style-type: none"> Function and Methods Defining a function Calling a function Types of functions Function Arguments Anonymous functions(Lambda, Map, List comprehension) Global and local 	<ol style="list-style-type: none"> Given a dictionary of students and their favourite colours: people={'Arham':'Blue','Lisa':'Yellow','Vinod':'Purple','Jenny':'Pink'} <ol style="list-style-type: none"> Find out how many students are in the list Change Lisa's favourite colour Remove 'Jenny' and her favourite colour Sort and print students and their favourite colours alphabetically by name 	

	<p>variables</p> <ul style="list-style-type: none"> • Using Optional and Named Arguments • Using type, str, dir, and Other Built-In Functions • Concepts of Modules • Operations Exception • Exception Handling • Except clause • Try finally clause • User Defined Exceptions 	<p>Write a function translate() that will translate a text into "rövarspråket" (Swedish for "robber's language"). That is, double every consonant and place an occurrence of "o" in between. For example, translate("this is fun") should return the string "tothohisos isos fofunon".</p> <p>2. Write a program that contains a function that has one parameter, n, representing an integer greater than 0. The function should return n! (n factorial). Then write a main function that calls this function with the values 1 through 20, one at a time, printing the returned results. This is what your output should look like:</p> <pre> 1 1 2 2 3 6 4 24 5 120 6 720 7 5040 8 40320 9 362880 10 3628800 </pre> <p>3. We can define sum from 1 to x (i.e. $1 + 2 + \dots + x$) recursively as follows for integer $x \geq 1$:</p> <pre> 1, if x = 1 x + sum from 1 to x-1 if x > 1 </pre> <p>Complete the following Python program to compute the sum $1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10$ recursively:</p> <pre> def main(): # compute and print 1 + 2 + ... + 10 print sum(10) def sum(x): # you complete this function recursively main () </pre> <p>4. Define a function overlapping () that takes two lists and returns True if they have at least one member in common, False otherwise.</p> <p>5. Write a function find_longest_word() that takes a list of words and returns the length of the longest one.</p> <p>6. Write a function filter_long_words() that takes a list of words and an integer n and returns the list of words that are longer than n</p>	Mr. Manjunath
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Day 5 19-10-2022	<ul style="list-style-type: none"> • Advanced Python: • Object Oriented Python • OOPs concept • What's an Object? • Indenting Code • Native Data types 	<p>1. Create a class 'Student' with <code>rollno</code>, <code>studentName</code>, <code>course</code>, <code>dictionary of marks(subjectName -> marks [5])</code>. Provide following functionalities</p> <ol style="list-style-type: none"> A. initializer B. override <code>__str__</code> method C. accept student data 	Mr. Manjunath

	<ul style="list-style-type: none"> • Declaring variables • Referencing Variables • Object References • Class and object • Attributes, Inheritance • Overloading & Overriding • Data hiding • Regular Expressions Using python • Object Oriented Linux Environment 	<p>D. Print student data for given id.</p> <p>E. Print Student who has failed in any subject. Write menu driven program to test above functionalities.(accept records of 5 students and store those in list)</p> <p>2. Write a menu driven program to maintain student information. for every student store studetid, sname, and m1,m2,m3 marks for 3 subject. also store gpa in student class, add a function in student class to return GPA of a student</p> <p>calculategpa(): where $gpa = (1/3)*m1 + (1/2)*m2 + (1/4)*m3$</p> <p>Create an array to store Multiple students.</p> <ol style="list-style-type: none"> 1. Display All Student 2. Search by id 3. Search by name 4. calculate GPA of a student 5. Exit 	
Day 6 20-10-2022	<ul style="list-style-type: none"> • Working with Pandas • Data Wrangling with Pandas • Working with NumPy • Data cleaning with Python 	<ol style="list-style-type: none"> 1. Write a NumPy program to read a CSV data file and store records in an array. 2. Write a NumPy program to convert a PIL Image into a NumPy array. Also convert a NumPy array to an image. Display the image. Sample Output: [[[255 255 255 0] [255 255 255 0]]] 3. Write a NumPy program to convert Pandas dataframe to Numpy array with headers. 4. Write a Pandas program to read a dataset from diamonds <ul style="list-style-type: none"> <input type="checkbox"/> DataFrame and modify the default columns values and print the first 6 rows <input type="checkbox"/> calculate the mean of each numeric column of diamonds DataFrame. <input type="checkbox"/> calculate count, minimum, maximum price for each cut of diamonds DataFrame <input type="checkbox"/> print a concise summary of diamonds DataFrame. <input type="checkbox"/> count the duplicate rows of diamonds DataFrame. 	Mr. Manjunath
Day 7 21-10-2022	<ul style="list-style-type: none"> • Working with beautiful soup • Working with matplotlib, seaborn • Working with ggplot, plotly 	<ol style="list-style-type: none"> 1. Extract any website data using Beautiful Soup. 2. Import csv file using pandas, find correlation and plot heatmap of correlation using seaborn, plot the scatter plot for any two highest correlated columns using matplotlib and plotly. 	Mr. Manjunath

Day 8 25-10-2022	<ul style="list-style-type: none"> • Load Images using pillow • Load audio files using scikit-learn(scipy.io) • Connecting DB's with Python • Working with DB's using Python • Accessing and Manipulating DB's • Creation of Python virtual Environment 	<ol style="list-style-type: none"> 1. Load an Image using Pillow library, Rotate the Image by 90 degrees State the use of convert and palette functions and use them on loaded image Split the image Import Different filters using 2. Create Python virtual environment. 3. Establish connection between MySQL/MSSQL and Python. 4. Load Data file using mysql query into python environment. 	Mr. Manjunath
Day 9 26-10-2022	R Programming <ul style="list-style-type: none"> - The R project for Statistical Computing - Why R - Introduction & Installation of R - R Basics, Finding Help, - Code Editors for R, - Exploring R Gui - Exploring RStudio - Basic Mathematical & Arithmetic operations in R - Data Objects- Data Types & Data Structures (e.g. lists. Arrays, matrices, data frames) - Packages in R - Working with Packages - Handling Data in R Workspace - Reading & Importing data from Text files, Excel files, Multiple databases - Exporting Data from R - 	<ol style="list-style-type: none"> 1. Write R program to compute sum, mean and product of a given vector elements. 2. Write R program to call the (built-in) dataset airquality. 3. Write R program to create a list of dataframes and access each of those data frames from the list. 4. Write R Program to create dataframe, Get the statistical Summary and nature of the data of dataframe Add new column in dataframe. Sort dataframe using multiple columns. Export Dataframe to excel file using writexl package. 	Mr. Manjunath
Day 10 27-10-2022	<ul style="list-style-type: none"> • Introduction to tidy verse (group of packages) 	<ol style="list-style-type: none"> 1. Load one XML file and one Json file in R studio, Print the data in both files one by one and get 	Mr. Manjunath

	<ul style="list-style-type: none"> • Manipulating and Processing Data in R • Creating, Accessing and Sorting data frames • Extracting, Combining, Merging, reshaping data frames • Functions • Built in functions in R (numeric, character, statistical) • Interactive reporting with R markdown • Case study 	<p>statistical summary of data.</p> <p>2. Extract Data from any website using R packages.</p> <p>3. Call the built in dataset “diamonds” in R and plot Pie chart and Bar graph</p> <p>4. Examine the built in ChickWeight data (the help gives background about the data). The function split will prove useful to do the following (as will a script).</p> <ul style="list-style-type: none"> • Construct a plot of weight against time for chick number 34. • For chicks in diet group 4, display box plots for each time point. • Compute the mean weight for chicks in group 4, for each time point. Plot this mean value against time. • Repeat the previous computation for group 2. • Add the mean for group 2 to the existing plot. • Add a legend and a title. • Copy and paste the graph into Word. 	
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