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| **ASSIGNMENT-1** | |
|  | Write a Python Program to print “Hello World” using Script Mode and Interactive Mode. |
|  | Write a Python Program to input Name, Roll No and Branch from a user and display it. |
|  | Write a Python program that takes a user's name as input and prints a greeting message using string formatting. For example, if the user enters "John," the program should output "Hello, John!" |
|  | Write a Python program that calculates the sum of a series of integers entered by the user. The user should be able to input numbers until they enter a specific sentinel value (e.g., 0), and then display the sum. |
|  | Write a Python program that converts an integer to a float and vice versa. Display the data type before and after conversion. |
|  | Write a Python program that demonstrates the use of logical operators (and, or, not) with boolean values to simulate real-world scenarios. |
|  | Write a Python program to declare and initialize variables to store the following information: your name, age, and favorite programming language. |
|  | Write a Python program that takes two numbers as input and performs addition, subtraction, multiplication, and division operations. Display the results with appropriate messages. |
|  | Write a Python program that converts a temperature in Celsius to Fahrenheit. Prompt the user to enter a temperature in Celsius and then display the result. Ensure proper formatting of the output. |
|  | Write a Python program that swaps the values of two variables with and without using a temporary variable. |

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| **ASSIGNMENT-2** | |
|  | Write a Python program that prompts the user to enter the coefficients of a quadratic equation (a, b, and c) and solves the equation, displaying the roots (real or complex) as output. |
|  | Write a Python program that asks the user for their age and uses conditional statements (if, elif, else) to determine if they are a child, teenager, adult, or senior citizen. |
|  | Write a Python program that checks if a given year is a leap year or not. Use conditional statements to determine leap year criteria. |
|  | Write a Python program that create a menu-driven program that allows the user to perform various operations (e.g., add, subtract, multiply, divide). Use conditional statements to navigate between options. |
|  | Write a Python program that generate and display the multiplication table of a given number using a loop. Allow the user to specify the number. |
|  | Develop a Python program that calculates the factorial of a non-negative integer entered by the user using a while loop. |
|  | Write a Python program to generate and display the first N terms of the Fibonacci sequence using a for loop. Allow the user to specify the value of N. |
|  | Write a Python program that checks if a given integer is prime or not. |
|  | Write a python program to check the validity of a password given by the user. The password should satisfy the following criteria:   1. Contain at least 1 letter between a and z 2. Contain at least 1 number between 0 and 9 3. Contain at least 1 letter between A and Z 4. Contain at least 1 character from $, #, @ 5. Minimum length of password: 6 6. Maximum length of password: 12   Based on above criteria checks password strength (weak, moderate, strong). |
|  | Given an input file which contains a list of names and phone numbers separated by spaces in the following format:   1. Phone Number contains a 3- or 2-digit area code and a hyphen followed by an 8-digit number. 2. Find all names having phone numbers with a 3-digit area code using regular expressions. |

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| **ASSIGNMENT-3** | |
|  | Write a Python program to define a function called greet that takes a person's name as an argument and prints a greeting message. Demonstrate calling this function with different names. |
|  | Write a Python program by creating a function **‘calculate\_area’** that calculates and returns the area of a rectangle. The function should take two parameters: length and width. Test the function with different values. |
|  | Write a Python program to create a function power that raises a number to a specified power. Make the power parameter optional with a default value of 2. |
|  | Write a Python program to define a function **‘divide\_and\_remainder’** that takes two numbers as input and returns both the quotient and remainder when the first number is divided by the second. |
|  | Write a Python program that demonstrates the difference between global and local variables inside and outside a function. |
|  | Write a Python program to implement a recursive function to calculate the factorial of a non-negative integer. |
|  | Write a Python program to create a Python decorator called timer that calculates and prints the execution time of a function. Apply this decorator to a sample function. |
|  | Write a Python program that define two functions, **square(x)** and **double(x)**, that perform mathematical operations on a number. Use function composition to create a new function called **‘square\_and\_double(x)’** that squares the number and then doubles the result. |
|  | Write a Python program to create a function called average that calculates the average of any number of arguments passed to it. Test the function with different numbers of arguments. |
|  | Write a function **‘get\_math\_function(operation)’** that takes an operation (e.g., "add," "subtract") and returns the corresponding mathematical function. Use this function to perform operations on numbers. |

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| **ASSIGNMENT-4** | |
|  | Write a Python program that takes two strings as input from the user and concatenates them to create a new string. Display the result. |
|  | Write a Python program to create a function that calculates and returns the length of a given string without using the built-in **len**() function. |
|  | Write a Python program that reverses a given string and displays the reversed string as the output. |
|  | Given a string, write a Python program that extracts and displays the first three characters, the last three characters, and a substring from the middle of the string. |
|  | Write a Python program that asks the user to enter a sentence and then displays the sentence in all uppercase and all lowercase without using any bulit-in function. |
|  | Write a Python program that takes a sentence as input from the user and performs the following transformations using string functions:   1. Remove any leading or trailing whitespace from the input. 2. Convert the sentence to lowercase. 3. Replace all spaces with underscores ('\_'). 4. Display the transformed sentence as the output.   For example, if the user enters " This is a Sample String ," the program should output "this\_is\_a\_sample\_string." |
|  | Write a Python program to create function called **‘capitalize\_words’** that takes a string as input and returns the same string with the first letter of each word capitalized. Use string functions to achieve this. |
|  | Write a Python program that checks if a given string is a palindrome (reads the same forwards and backwards) and returns a boolean result. |
|  | Write a Python program to create a function that takes a string as input and counts the frequency of each character (case-insensitive). Display the results in a dictionary. |
|  | Write a Python program that removes all vowels from a given string and displays the modified string. |

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| **ASSIGNMENT-5** | |
|  | Write a Python program to create a function that takes a list of numbers as input and calculates and returns the sum of all the numbers in the list. |
|  | Write a Python program that concatenates two lists and displays the resulting list. For example, if you have lists [1, 2, 3] and [4, 5, 6], the program should return [1, 2, 3, 4, 5, 6]. |
|  | Write a Python function that takes a list and returns a new list with its elements reversed. Do not use the reverse() method. |
|  | Given a list of numbers, write a python program that extracts and displays a portion of the list (a slice) based on user-defined start and end indices. |
|  | Write a Python program to create a function that takes a list of numbers with duplicates and returns a new list with duplicates removed while preserving the original order. |
|  | Write a Python program that sorts a list of strings in ascending order and displays the sorted list. Ensure the original list remains unchanged. |
|  | Write a Python program that transposes a given 2D list (matrix) by converting its rows into columns and columns into rows. |
|  | Develop a python program that takes two lists and returns a new list containing elements that are common between the two input lists. |
|  | Write a Python program to create a function that rotates the elements of an array (list) to the right by a given number of positions. |
|  | Write a Python program that finds and displays the largest and smallest elements in a list without using built-in functions. |

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| **ASSIGNMENT-6** | |
|  | Write a Python program that creates a new text file named "sample.txt" and writes the text "Hello, World!" to it. Ensure that the file is properly closed after writing. |
|  | Write a Python program that reads and displays the contents of the "sample.txt" file created in the previous question. |
|  | Extend the previous program to append the text "Appending to the file" to the end of the "sample.txt" file without overwriting its existing content. |
|  | Write a Python program that copies the content of one text file (e.g., "source.txt") to another text file (e.g., "destination.txt"). Ensure that the program works for files of different sizes. |
|  | Develop a Python program that deletes the "sample.txt" file if it exists. Check if the file exists before attempting to delete it. |
|  | Write a Python program that reads a text file and counts the number of words in it. Display the word count as the output. |
|  | Write a Python program that reads a text file and counts the frequency of each character (letters, digits, symbols) in the file. Display the results in a dictionary. |
|  | Write a Python program that reads the contents of a text file, reverses the order of lines, and writes the reversed lines to a new file. |
|  | Write a Python program that reads a text file and replaces all occurrences of a specified word or phrase with another word or phrase. Save the modified text to a new file. |
|  | Write a program that searches for a specific word or phrase in all text files within a specified directory and its subdirectories. Display the list of matching files. |

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| **ASSIGNMENT-7** | |
|  | Write a Python program that asks the user to input two numbers and handles the "ZeroDivisionError" exception if the second number is zero. Display an error message in such cases. |
|  | Write a Python program that attempts to open and read a file ("data.txt") and handles the "FileNotFoundError" exception if the file does not exist. Display an appropriate message. |
|  | Implement a Python program that asks the user to input a number and handles the "ValueError" exception if the input cannot be converted to an integer. Ask the user to try again. |
|  | Write a Python program that attempts to access an element in a list using an index that is out of range and handles the "IndexError" exception. Display an error message. |
|  | Create a Python program that opens a file, reads its contents, and performs some operations on the data. Handle both "FileNotFoundError" and "IOError" exceptions and display relevant messages. |
|  | Write a Python class called "Student" with attributes like "name" and "age." Create an instance of the class and display its attributes. |
|  | Define a class "Rectangle" with methods to calculate the area and perimeter of a rectangle. Create an instance of the class and calculate these values. |
|  | Create a class called "Person" with a constructor to initialize the name and age of a person. Display the person's details using an object of the class. |
|  | Define a base class "Animal" with attributes like "name" and "species." Create a derived class "Dog" that inherits from "Animal" and adds a "breed" attribute. Display the attributes of a "Dog" object. |
|  | Write a class "BankAccount" that uses encapsulation to protect the account balance. Implement methods for deposit, withdrawal, and displaying the balance. |

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| **ASSIGNMENT-8** | |
|  | Create a Python module (e.g., math\_operations.py) that contains functions for addition, subtraction, multiplication, and division. Write a program that imports this module and uses its functions to perform arithmetic operations. |
|  | Write a Python program that imports the "math" module and calculates the square root of a number using the alias "m" for the module. |
|  | Create a module with several functions, and then write a program that imports only a specific function from that module and uses it in python. |
|  | Define a package with multiple submodules, and then write a program that imports a specific function from one of the submodules using python. |
|  | Create a Python module that contains mathematical constants (e.g., pi, e). Write a program that imports the module and uses these constants to calculate the circumference of a circle. |
|  | Create a custom Python package with at least two modules. Write a program that imports and uses functions or classes from different modules within the package. |
|  | Create a python program with a variable named "x" in the global namespace and a module with a function that also uses a variable named "x." Demonstrate how the namespace conflict is resolved. |
|  | Write a Python program that defines a variable in the global scope, and then defines a function with a local variable of the same name. Demonstrate how the local scope affects variable access. |
|  | Create a Python package with an \_\_init\_\_.py file. Write a program that imports and uses a module from within the package. |
|  | Write a Python program that uses the "requests" library to make an HTTP GET request to a URL and displays the response content. |

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| **ASSIGNMENT-9** | |
|  | Write a Python program to print the current working directory then change the current working directory to a specified path using the os module. |
|  | Create a program that deletes a file from a specified path using the os module. |
|  | Write a Python program using the os module to list all files in a given directory and counts the number of files in that given directory. |
|  | Create a program that deletes a file from a specified path using the os module. |
|  | Create a program that calculates and prints the total size of all files in a specified directory (including subdirectories) using the os module. |
|  | Implement a program that renames all files in a directory by adding a prefix or suffix to their names using the os module. |
|  | Write a program that sorts all files in a directory based on their size and date modified using the os module. |
|  | Create a program that lists all files with a specific extension in a given directory using the os module. |

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| **ASSIGNMENT-10** | |
|  | Write a Python program to create a NumPy array from list, tuple with float type |
|  | Write a Python program to demonstrate ndim, shape, size, dtype, slicing, integer and boolean array indexing. |
|  | Write a Python program to find min, max, sum, cumulative sum, rank, determinant, and trace of array. |
|  | Write a Python program to find eigenvalues and eigenvectors of a square matrix using NumPy. |
|  | Write a Python program to find matrix and vector products (dot, inner, outer, product), matrix exponentiation. |
|  | Write a Python program to solve a linear matrix equation, or system of linear scalar equations. |
|  | Write a Python program to perform Sorting, Searching and Counting using NumPy methods. |
|  | Write a Python program to demonstrate the use of the reshape() method. |
|  | Write a Python program to concatenate two NumPy arrays along a specified axis |
|  | Write a Python program to generate a NumPy array of size 5x5 with random integer values between 1 and 100, then invert it. |
|  | Write a Python program to generate a NumPy array with datetime values representing timestamps for the last seven days. |
|  | Write a Python program to Reshape a 1D NumPy array generated using random number into a 2D array of shape (5,5) and then transpose it. |
|  | Write a Python program to create two NumPy arrays of the same size and perform element-wise addition, subtraction, multiplication, and division. |

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| **ASSIGNMENT-11** | |
|  | Write a Python program to create a Pandas Series from a dictionary. |
|  | Write a Python program that Create a NumPy array with random integer values representing temperatures for 100 different days. Convert this array into a Pandas DataFrame with columns 'Day' and 'Temperature' and store it in a excel sheet. |
|  | Write a Python program which make use of following Pandas methods   * 1. describe()   2. head()   3. tail() |
|  | Write a Python program to get n-largest and n-smallest values from a particular column in Pandas DataFrame |
|  | Write a Python program to create a Pandas DataFrame from a dictionary of lists containing student data (Name, Age, Grade). |
|  | Write a Python program to merge two Pandas DataFrames based on a common key, such as a student ID, and display the combined DataFrame. |
|  | Write a Python program to read a time-series data that are previously created and perform basic time series analysis, such as calculating rolling averages. |
|  | Write a Python program to group a DataFrame by a specific column (e.g., Grade) and calculate the average age and maximum grade within each group. |
|  | Write a Python program to calculate descriptive statistics (mean, median, standard deviation) for numeric columns in a Pandas DataFrame. |
|  | Write a Python program that convert categorical data to numerical representation using Pandas for a DataFrame with a categorical column. |
|  | Write a Python program to create a pivot table from a Pandas DataFrame containing sales data, summarizing the total sales for each product and region. |
|  | Write a Python program using pandas that finds Missing Data and replace missing data. |

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| **ASSIGNMENT-12** | |
|  | Write a Python program to create a scatter plot using Matplotlib and Seaborn to visualize the relationship between two numerical variables and add a regression line to the scatter plot using Seaborn. |
|  | Write a Python program to and read a dataset containing categorical variables using a Pandas DataFrame. Create a bar chart using Seaborn to show the count of each category. Use the 'hue' parameter in Seaborn to differentiate the bars by another categorical variable. |
|  | Write a Python program to generate some random data, then create a box plot using Seaborn to show the distribution of each variable. Identify and mark the outliers on the box plot. |
|  | Write a Python program to create a box plot using Seaborn to show the distribution of each variable. Identify and mark the outliers on the box plot. |
|  | Write a Python program to load a dataset with multiple numerical variables into a Pandas DataFrame.  Create a figure with multiple subplots using Matplotlib. Plot histograms for each variable in separate subplots. |
|  | Write a Python program to create a line plot using Seaborn to visualize the trend over time. Customize the plot to include labels, titles, and any additional relevant information. |
|  | Write a Python program to create a plot of your choice (scatter, line, bar, etc.) using Seaborn or Matplotlib. Apply customization and styling options (change colors, add titles, adjust axis labels) to make the plot visually appealing. |