Python Lab Journal

List of Programs

(Class: SEIT   Semester-IV   Academic Year: 2024-25)

Basic Programs

[1]. Basic Programming Elements (Data types, print (), input (), operators, if-else, looping, etc.)

- Print the grades of students after accepting the marks for 5 subjects from the user.
- Accept the range from the user and then display all prime numbers between the given range.
- Print an n digit number in reverse order
- Display, i) a pattern formed with numbers and, ii) a pattern formed with '*' using nested looping.

Advanced data types

[2] Python – LIST - Write Python program to....

- Display the count of elements of different data types present in a LIST.
- Check for a given value in the LIST; display total count of occurrences along with the index positions of each occurrence.
- Perform sorting of LIST elements; Press 1 for ascending order and, Press 2 for descending order.
- Add elements of List2 in List1, then display the updated List
- Demonstrate LIST comprehensions using two examples.
- Display count of vowels, consonants, blank spaces, special symbols and digits in a given **STRING**.

User defined functions

[3] Python – User Defined Functions (UDF)

Write Python program using UDF to....

- Calculate library fine based on 2 conditions, a) Book return date and b) Book condition
- Calculate and display the Net monthly salary for the two categories of employees, permanent and temporary, based on following inputs from the user – monthly salary, hourly rate, present/absent days' count, incentives/bonus, income tax, etc.
- Display Fibonacci series elements (n) using recursive method.
- Demonstrate passing and returning a List to/from a user defined function.

Exploring concept of modules and exception handling

[4] Python – User defined modules and exception handling

- Create a module having 3 functions – factorial (), primeNumber () and powNumber (). Import this module in the main menu driven program to access all the functions (accept input from the user).
- Write a program to demonstrate multiple exceptions handling, specifically, NameError, IndexError, and ZeroDivisionError.
- Write a program to implement multiple exceptions handling such as ValueError, KeyError, PermissionError, General exception within a standard LOGIN process (Login successful, User doesn't exist, Incorrect password, Too many attempts, etc.).

Object Oriented Programming

[5] Python – OOPs

- Write an object oriented program to demonstrate working of default and parameterized constructors.
- Write an object oriented menu driven program to perform banking operations (New account, Deposit, Withdraw, Balance, Show all, Exit).
- Write object oriented program to implement, i) Single level inheritance, and ii) Multilevel inheritance by considering appropriate real life scenarios (use super(), __init__, __str__, and __name__).

GUI & Database programming

[6] Python – GUI and Database Connection

- Design a working interface for the login and registration process with proper form validations and database connection using tkinter and SQLite
- Perform CRUD database operations using a menu driven program (User Management - Add, Show, Delete, Update and Search).

Python – File handling

[7] Python – File opening, reading, copying, content searching, etc

- Implement a program to accept file content from the user and then display/read file content using 3 different approaches.
- Implement a program that reads a large log file (e.g., server.txt), finds 'error' word and counts the occurrences and keeps track of line number for each occurrence, and finally saves extracted information into a new file called error.txt.

Python – Multithreading

[8] Python – Multithread programming

- Implement a program to demonstrate working of multiple-threads for a specific case scenario (food ordering, airport luggage management, ATM, etc.)
- Implement a multithreading program for banking scenario to demonstrate RACE condition – 1) without and, ii) with LOCK

Data Analysis and Visualization

[9] Python – Exploratory Data Analysis – pandas, dataframe, descriptive and correlation analysis, matplotlib, etc.

- Select an appropriate dataset (Kaggle) and perform EDA to answer/perform following. (Jupyter Notebook).
  - Number of independent and dependent variables
  - Display top 5 and last 5 rows from the selected dataset
  - Display descriptive statistics based on the whole dataset
  - Name of the independent variable having minimum average value
  - Name of the independent variable having high standard deviation
  - Find the total count of missing values in each column (independent variables). Visualize all missing values, and identify the independent variable having maximum number of missing values?
  - Choose one numeric independent variable having missing values and replace the missing values with the average value of the column.
  - Choose one independent variable and show frequency distribution using histogram
  - Name of the independent variable having outliers? Use Box-plot to visualize.
  - Select an independent variable to show the correlation using line chart
  - Display Correlation Matrix and find two pairs of independent variables, one having strong positive correlation and the other pair having strong negative correlation.
  - Use Scatter plots to visualize the correlation between independent and dependent variables (use same two pairs identified in previous question).

Please note: -

- *Students are required to strictly follow the prescribed structure for each program.*
- *In addition to the source code and a brief theory, students must include a few screenshots of sample outputs for each program.*
- *Each program must start from a new page.*
- *Students must refrain from distributing their programs to other students to avoid negative marking. The content similarity checks will be performed on each submitted journal.*
- *Students must avoid copy-paste from any Gen AI tools.*
- ***Journal submission date – 20th April 2025***

Python Lab Journal (Front page)

Name: ________________ Roll No. _____
Course/Lab: _____________ (CODE ______)
Semester: _______________________
Academic Year: _________________

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------------Followed by the Index page--------------

Python Lab Journal - Program Layout

Programs included in lab journal must have following structure with proper indentation, variable names, comments, etc.

....

1. **Title: [Program statement]**

....

2. **Theory:**

[Brief description of the concept implemented and programming element used to solve the program statement]

....

3. **Source Code:**

   [Source code]

....

4. **Sample Output:**

   [Input and Output]

....