

PYTHON PROGRAMMING LAB
(Common to CSE & AI&DS)
I Year – II Semester

Practical : 4

Internal Marks : 30

Credits : 2

External Marks : 70

Course Objectives

- To familiarize with the basic commands of the python.
- To develop python programs to solve problems.

Course Outcomes

Upon successful completion of the course, the students will be able to

- make use of control statements in decision making for various case studies.
- handle exceptional cases at run-time.
- use file handling operations for storing and retrieving of data.
- apply object-oriented concepts to develop reusable code.

List of Experiments

Exercise 1: Basics and operations

- Write a python program to find sum of two numbers using command line arguments.
- Write a Python program to compute distance between two points taking input from the user. Formula for Pythagorean theorem for compute distance between two points is: $\sqrt{((x2 - x1) ** 2) + ((y2 - y1) ** 2)}$.

Exercise 2: Selection statements

- Write a python program to test whether a given number is even or odd using if-else statement.
- To calculate grade of students in python, you have to ask from user to enter marks obtained in 5 subjects and calculate the sum of all the marks and then average marks to find the grade according to the average marks obtained by student as shown in the given below:

Percentage	Grade
≥ 90	O
≥ 80 & < 90	A+
≥ 70 & < 80	A
≥ 60 & < 70	B+
≥ 50 & < 60	B
≥ 40 & < 50	C
< 40	F

Exercise 3: Iterative Control Statements

- a) Write a python program to print out the decimal equivalents of $1/2$, $1/3$, $1/4$, \dots , $1/10$ using for loop.
- b) Write a python program to find the sum of all the primes below hundred.

Exercise 4: Functions

- a) Write a python program to compute cumulative product of a list of numbers (write function `cumulative_product`).
- b) Write a python program that uses function to find the sum of the even-valued terms in the Fibonacci sequence whose values do not exceed ten thousand.

Exercise 5: Packages and Modules

- a) Create and access a user defined package `ArithmeticPackage` where the package contains a module named `ArithmeticDemo`, which in turn contains a method called `sumtwo()`, `subtwo()`, `multtwo()` and `divtwo()` which takes two numbers as parameter and returns the result.
- b) Write a python program to compute GCD, LCM of two numbers (Each function shouldn't exceed one line use predefined module).

Exercise 6: Strings

- a) Write a python program to accept a string from a user and re-display the same after removing vowels from it.
- b) Write a python program to calculate the length of a string using recursion and check whether the given number is palindrome or not.

Exercise 7: Data Structures-Tuple, List and Dictionary

- a) Write a function `ball_collide` that takes two balls as parameters and computes if they are colliding. Your function should return a Boolean representing whether or not the balls are colliding. **Hint:** Represent a ball on a plane as a tuple of (x, y, r), r being the radius, if (distance between two balls centers) \leq (sum of their radii) then (they are colliding)
- b) Write a python program to find mean, median, mode for the given set of numbers in a list.
- c) Write a Python Program to count the number of characters in the string and store them in a dictionary.

Exercise 8: Exception Handling

- a) Write a python program to handle multiple errors with one except statement.
- b) Write a python program to create a user-defined exception named "ShortInputException" that raises when the input text length is less than 3.

Exercise 9: File Handling

- a) Write a program to print each line of a file in reverse order.
- b) To install the package pandas write a python program to calculate the mean and standard deviation for list of numbers stored in excel file named `data.xlsx`. (Use Jupyter Notebook or Spyder tool in Anaconda Navigator)

Exercise 10: Object Oriented Programming

- a) Write a python program to store the name and marks of students using classes. (Use list to store marks in 3 subjects).
- b) WeCare insurance company wants to calculate premium of vehicles. Vehicles are of two types – “Two-Wheeler” and “Four-Wheeler”. Each vehicle is identified by vehicle id, type, cost and premium amount. Premium amount is 2% of the vehicle cost for two wheelers and 6% of the vehicle cost for four wheelers. Calculate the premium amount and display the vehicle details. Write a Python program to implement the class chosen with its attributes and methods.

Note: 1. Consider all instance variables to be private and methods to be public
2. Include getter and setter methods for all instance variables.

References Books

1. “Python Programming – Using Problem Solving Approach “,Reema Thareja, Oxford University Press, 2014 Edition.
2. “Python Programming: A Modern Approach”, Vamsi Kurama, Pearson.

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