LAB ASSIGNMENTS
PYTHON PROGRAMMING LAB
MCA 1st Year 1st Semester, 2022
Subject Code: MCAP1112

Day 4

1. Write a function *display_student*() that accepts student name, and her/his degree and display both. If the degree is missing in the function call, assign default value 'MCA' to it.
2. Write a function *attached*() that takes three parameters, the first a required parameter that is a number, the second a required parameter that is a string, and the third an optional parameter whose default is " ". Returned value will be the first parameter, concatenated with the second, using the third.
3. Define a function called *nums*() that has three parameters, the first, an integer, is required, the second parameter *mult_int* is optional with a default value of 10, the final parameter *switch*, is also optional with a default value of False. The function should multiply the two integers together, and if switch is True, should change the sign of the product before returning it.
4. Write a function *add_mult*() that will accept two numbers and calculate the result of addition and multiplication of them and return both results in a single return statement.
5. Write a function to return a tuple containing all the numbers in a list passed as an argument.
6. *sin*(x) can be calculated approximately by summing the terms of the infinite series as follows

$$\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} \ldots$$

   where x is expressed in radians. Write function(s) to calculate the value of sin x, accepting x as degree from user. Compare your results with that of math.sin().
7. Write a function that accepts a list and returns a new list with unique elements of the first list.
8. Write a function that accepts a comma separated string of words as input and returns a colon-separated string of words after sorting them alphabetically.
9. Write a function *last_char*() that takes a string as input, and returns only its last character. Use this function to sort list of strings by the last character of each string, from highest to lowest.

   Sample Input: ['150', '23', '781', '19', '3478', '12', '9005', '84', '9817', '96']

   Output: ['19', '3478', '9817', '96', '9005', '84', '23', '12', '781', '150']
10. Redo assignment 9. with lambda.
11. Sort a list of numbers based on their absolute values, writing your own function for calculating absolute value of a number and (i) using it in sorted() without lambda, (ii) using it in sorted() with lambda.

    Sample Input: [-5, -7, 4, -2, -9]

    Output: [-2, 4, -5, -7, -9]
12. Sort a list of words first by their length, smallest to largest, and then alphabetically to break ties among words of the same length (using sorted() and lambda).

    Sample Input: ['mtech', 'btech', 'mca', 'bca', 'diploma', 'dsc']

Output: ['bca', 'dsc', 'mca', 'btech', 'mtech', 'diploma']

13. Sort a list of words first by their length, largest to smallest, and then alphabetically to break ties among words of the same length (using sorted() and lambda).

    Sample Input: ['mtech', 'btech', 'mca', 'bca', 'diploma', 'dsc']

    Output: ['diploma', 'btech', 'mtech', 'bca', 'dsc', 'mca']

14. Given a dictionary as stated in the sample input, use lambda to

    Sample Input: {"Kerala": ["Kannur", "Palakkad", "Thalassery"],

    "Maharastra": ["Bhandara", "Nagpur", "Wardha"],

    "West Bengal": ["Asansol", "Basirhat", "Tamluk"]}

    (i) sort the states in order by the first city name. (['West Bengal', 'Maharastra', 'Kerala'])

    (ii) sort the states by the length of the second city name, break ties of equal length by name of the second cities. (['Maharastra', 'West Bengal', 'Kerala'])

    (iii) sort the states in order by the number of cities having length greater than 6. (['Maharastra', 'Kerala', 'West Bengal'])

15. Write a function that takes a string as a parameter and returns a list of the five most frequent characters in the string.

16. Use lambda to sort a list of roll numbers by the last three digits of the roll number.

    Sample Input: [20223005, 20222342, 20229000, 20220002, 20222345, 20229329]

    Output: [20229000, 20220002, 20223005, 20229329, 20222342, 20222345]

17. Use lambda to sort a list of names alphabetically by last name.

    Sample Input: ['Ales Bialiatski', 'Alain Aspect', 'Anton Zeilinger', 'Douglas Diamond']

    Output: ['Alain Aspect', 'Ales Bialiatski', 'Douglas Diamond', 'Anton Zeilinger']

18. Write a recursive function to get the list sum.

    [Test Data: [1, 2, [3,4], [5,6]] , Expected Result: 21]

19. Write a recursive function to get the sum of digits of a non-negative integer.

20. Write a recursive function to find the greatest common divisor (gcd) of two integers.

21. Write a program to find number of characters, words, spaces and lines in a file.

22. Write a program to obtain the line number in which a given word is present.

23. Write a program to read the given (i)CSV file *student_marks.csv*, (ii) tab separated file *student_marks.txt*.

24. Write a program to accept string/sentences from the user till the user enters “END”. Save the data in a text file and then display only those sentences which begin with ‘T’.

25. The sample file *student.txt* contains one line for each student. The student’s name is the first thing on each line, followed by some exam scores. The number of scores might be different for each student. Using the text file *student.txt* write a program that prints out the names of students those have a total score more than 500.