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Department of Computer Science & Engineering

Laboratory Manual

Subject: Introduction to Python Programming

Subject Code: CS1005-2

Course Title ***Introduction to Python Programming***	*Course Code****: CS1005-2***
*Total Teaching Hours :****26***	*Course Type:* ***PLC***
CIE Marks : ***50***	*Credits :* ***3***
*Lab Manual Author****: Ms. Vaishali***	*Duration of MSE:* ***2 Hours***

Marks Distribution

CIE Marks Distribution

Lab CIE	Distribution of Marks
Average marks of record	10
Conduction	10
Lab MSE	30
Total	50

MSE Marks Distribution

	Marks Distribution
Write Up	10
Execution	20
Viva	10
Total	50

List of Programs

1.	a. Write a python program to check whether the number is palindrome or not. b. Write a python program to print all prime numbers in an interval.
2.	a. Write a python program to check given sentence is pangram or not. b. Write a python program to find the sum of digits of the given number
3.	a. Write a python program to check if a 3-digit number is an Armstrong number or not. b. Write Python Programs to generate the Fibonacci series.
4.	Write a Python program to implement Rock, Paper, Scissor game by taking input from the user and display the winner with a suitable message.
5.	a. Write a python program to find distance between two points. b. Write a python program to find the factorial of a number using recursion
6.	Write a python program to perform bubble sort on a given set of numbers.
7.	Write a Python Program to print the following patterns: 
8.	Write a python program to find the largest and smallest digit of a number and find their sum and difference.
9.	a. Write a python program to make string from first two and last two characters from given string. b. Write a python program to perform binary search on a list of integers.
10.	. Write a program that simulates a traffic light. The program should consist of the following: 1. A user defined function trafficLight( ) that accepts input from the user, displays an error message if the user enters anything other than RED, YELLOW, and GREEN.

	Function light() is called and following is displayed depending upon return value from light(). a. "STOP, your life is precious" if the value returned by light() is 0. b. "Please WAIT, till the light is Green " if the value returned by light() is c. "GO! Thank you for being patient" if the value returned by light() is 2. 2. A user defined function light() that accepts a string as input and returns 0 when the input is RED, 1 when the input is YELLOW and 2 when the input is GREEN. The input should be passed as an argument. 3. Display "SPEED THRILLS BUT KILLS" after the function traffic Light( ) is executed.
11.	Write a python program that that calculates the grades of students in a class. The program should take in a list of dictionaries which has to be taken from user, with each dictionary representing a student and their grades in various subjects. The program should then calculate the average grade for each student and print out their name along with their average grade. The program should also calculate the average grade for the entire class and print it out. Utilize functions to accomplish this task. (Note: Minimum 3 subjects must be taken from the user).
12.	a. Write a Python program to read a list of n integers (positive as well as negative). Create 2 new lists, one having all positive numbers and others having all negative numbers from the given list. Print all 3 lists. b. Write a Python program to convert list of tuples into dictionary using function.
13.	a. Write a Python program to circulate n numbers using list slicing operation. b. Write a Python program that takes a sentence as input from the user, calculates and prints the total number of characters in the sentence, and creates a dictionary containing the frequency of letters and digits in the sentence.
14.	Write a Python program that takes a string input from the user and performs the following operations: a. Count the number of characters in the string and display the result. b. Convert all characters in the string to uppercase and display the result.

	c. Check if the string contains the word "python" (case-insensitive) and display the result as True or False. d. Split the string into a list of words and display the result. e. Join the list of words using a hyphen "-" as a separator and display the result. f. Reverse the order of the characters in the string and display the result.
15.	a. Write a python program to get the full path of the current working directory. b. Write a python program to create a CSV file, insert the contents (USN, Name, Phone number, marks in a subject) related to five students to the file. Sort the contents based on USN and display the top scorer of the subject.

1. a) Write a python program to check whether the number is palindrome or not.

```
n=int(input("Enter number:"))
temp=n
rev=0
while(n>0):
    dig=n%10
    rev=rev*10+dig
    n=n//10
if(temp==rev):
    print("The number is a palindrome!")
else:
    print("The number isn't a palindrome!")
```

Output 1:

```
Enter number:12221
The number is palindrome!
```

Output 2:

```
Enter number:1234
The number isn't a palindrome!
```

b) Write a python program to print all prime numbers in an interval.

```
start = int(input("Enter starting range"))
end = int(input("Enter ending range"))
c=0
print("Prime numbers between", start, "and", end, "are:")

for num in range(start, end+1):
   # all prime numbers are greater than 1
   if num > 1:
       for i in range(2, num):
           if (num % i) == 0:
               break
       else:
            c=c+1
            print(num)
if(c==0):
            print("There are no prime numbers in the range")
```

Output 1:

```
Enter starting range1
Enter ending range20
Prime numbers between 1 and 20 are:
2
3
5
7
11
13
17
19
There are 8 prime numbers in the range
```

Output 2:

```
Enter starting range26
Enter ending range28
Prime numbers between 26 and 28 are:
There are no prime numbers in the range
```

2. a) Write a python program to check given sentence is pangram or not.

```
inputString = input("Enter the string : ")
allAlphabets = 'abcdefghijklmnopqrstuvwxyz'
flag = 0
#iteration for all the characters in the allAlphabets variable
for char in allAlphabets:
       if char not in inputString.lower():
                flag = 1
                break
#checking flag value and pring the result
if flag == 1:
    print("This is not a pangram string");
else:
    print("It is a pangram string")
```

Output 1:

```
Enter the string : The quick brown fox jumps over the lazy dog
It is a pangram string
```

Output 2:

```
Enter the string : A sentence containing all the letters of the alphabet is call
ed a pangram.
This is not a pangram string
```

b) Write a python program to find the sum of digits of the given number.

```
num=int(input("Please Enter any Number: "))
Sum=0
while(num>0):
    Reminder=num%10
    Sum=Sum+Reminder
    num=num//10

print("Sum of the digits of Given Number=",Sum)
```

Output 1:

```
Please Enter any Number: 123412
Sum of the digits of Given Number= 13
```

3. a) Write a python program to check if a 3-digit number is an Armstrong number or not.

The Armstrong number in Python is the number in which the sum of each digit powered to the total number of digits is the same as the given number. i.e. for a given number say 153,$1^3+5^3+3^3=153$.

```
number = int(input("Enter number"))
temp = number
sum = 0
while temp != 0:
    k = temp % 10
    sum += k*k*k
    temp = temp//10
if sum == number:
    print('Given number is a three-digit Armstrong Number')
else:
    print('Given number is not an Armstrong Number')
```

Output 1:

```
Enter number 153
Given number is a three-digit Armstrong Number
```

Output 2:

```
Enter number 146
Given number is not an Armstrong Number
```

b) Write Python Programs to generate the Fibonacci series.

```
nterms = int(input("Enter number"))
n1, n2 = 0, 1
count = 0
if nterms <= 0:
   print("Please enter a positive integer")
elif nterms == 1:
   print("Fibonacci sequence upto",nterms,":")
   print(n1)
else:
   print("Fibonacci sequence:")
   while count < nterms:
       print(n1)
       nth = n1 + n2
       # update values
       n1 = n2
       n2 = nth
       count += 1
```

Output 1:

```
Enter number -3
Please enter a positive integer
```

Output 2:

```
Enter number 1
Fibonacci sequence upto 1 :
0
```

Output 3:

```
Enter number 10
Fibonacci sequence:
0
1
1
2
3
5
8
13
21
34
```

4. Write a Python program to implement Rock, Paper, Scissor game by taking input from the user and display the winner with a suitable message.

```
import random

while True:
    user_choice = input("Choose Rock, Paper, or Scissors: ").lower()

    if user_choice not in ["rock", "paper", "scissors"]:
        print("Invalid choice. Please choose Rock, Paper, or Scissors.")
        continue

    computer_choice = random.choice(["rock", "paper", "scissors"])

    print(f"You chose {user_choice}.")
    print(f"Computer chose {computer_choice}.")

    if user_choice == computer_choice:
        print("It's a tie!")
    elif (
        (user_choice == "rock" and computer_choice == "scissors") or
        (user_choice == "paper" and computer_choice == "rock") or
        (user_choice == "scissors" and computer_choice == "paper")):
        print("You win!")
    else:
        print("Computer wins!")

    play_again = input("Do you want to play again? (yes/no): ").lower()
    if play_again != "yes":
        break

print("Thanks for playing!")
```

Output 1:

```
Choose Rock, Paper, or Scissors: rock1
Invalid choice. Please choose Rock, Paper, or Scissors.
Choose Rock, Paper, or Scissors:
```

Output 2:

```
Choose Rock, Paper, or Scissors: rock
You chose rock.
Computer chose rock.
It's a tie!
```

Output 3:

```
Choose Rock, Paper, or Scissors: rock
You chose rock.
Computer chose rock.
It's a tie!
Do you want to play again? (yes/no):
```

Output 4:

```
Choose Rock, Paper, or Scissors: paper
You chose paper.
Computer chose rock.
You win!
Do you want to play again? (yes/no): yes
Choose Rock, Paper, or Scissors: scissors
You chose scissors.
Computer chose rock.
Computer wins!
Do you want to play again? (yes/no): yes
Choose Rock, Paper, or Scissors: rock
You chose rock.
Computer chose scissors.
You win!
Do you want to play again? (yes/no): yes
Choose Rock, Paper, or Scissors: paper
You chose paper.
Computer chose scissors.
Computer wins!
Do you want to play again? (yes/no): yes
Choose Rock, Paper, or Scissors: scissors
You chose scissors.
Computer chose rock.
Computer wins!
Do you want to play again? (yes/no): no
Thanks for playing!
```

5. a) Write a python program to find distance between two points.

```
import math

# Input: Coordinates of two points
x1 = float(input("Enter the x-coordinate of the first point: "))
y1 = float(input("Enter the y-coordinate of the first point: "))
x2 = float(input("Enter the x-coordinate of the second point: "))
y2 = float(input("Enter the y-coordinate of the second point: "))

# Calculate the distance using the distance formula
distance = math.sqrt((x2 - x1)**2 + (y2 - y1)**2)

# Output the result
print(f"The distance between ({x1}, {y1}) and ({x2}, {y2}) is {distance}")
```

Output 1:

```
Enter the x-coordinate of the first point: 2
Enter the y-coordinate of the first point: 3
Enter the x-coordinate of the second point: 4
Enter the y-coordinate of the second point: 5
The distance between (2.0, 3.0) and (4.0, 5.0) is 2.8284271247461903
```

b) Write a python program to find the factorial of a number using recursion.

```
# Factorial of a number using recursion

def recur_factorial(n):
   if n == 1:
       return n
   else:
       return n*recur_factorial(n-1)

num =int(input("Enter the number"))

# check if the number is negative
if num < 0:
   print("Factorial does not exist for negative numbers")
elif num == 0:
   print("The factorial of 0 is 1")
else:
   print("The factorial of", num, "is", recur_factorial(num))
```

Output 1:

```
Enter the number -1
Factorial does not exist for negative numbers
```

Output 2:

```
Enter the number 0
The factorial of 0 is 1
```

Output 3:

```
Enter the number 5
The factorial of 5 is 120
```

6. Write a python program to perform bubble sort on a given set of numbers.

Ascending order:

```
a=[]
number=int(input("Please Enter the Total Elements : ")
for i in range(number):
    value=int(input("Please enter the %d Item : " %i))
    a.append(value)

for i in range(number-1):
    for j in range(number-i-1):
        if(a[j]>a[j+1]):
            temp=a[j]
            a[j]=a[j+1]
            a[j+1]=temp

print("The Result in Ascending Order : ", a)
```

Output 1:

```
Please Enter the Total Elements : 5
Please enter the 0 Item : 25
Please enter the 1 Item : 10
Please enter the 2 Item : 34
Please enter the 3 Item : 8
Please enter the 4 Item : 4
The Result in Ascending Order :  [4, 8, 10, 25, 34]
```

Descending order:

```
a=[]
number=int(input("Please Enter the Total Elements : "))
for i in range(number):
    value=int(input("Please enter the %d Item : " %i))
    a.append(value)

for i in range(number-1):
    for j in range(number-i-1):
        if(a[j]<a[j+1]):
            temp=a[j]
            a[j]=a[j+1]
            a[j+1]=temp

print("The Result in Descending Order : ", a)
```

Output 1:

```
Please Enter the Total Elements :  6
Please enter the 0 Item : 32
Please enter the 1 Item : 12
Please enter the 2 Item : 5
Please enter the 3 Item : 55
Please enter the 4 Item : 78
Please enter the 5 Item : 11
The Result in Descending Order :  [78, 55, 32, 12, 11, 5]
```

7. Write a Python Program to print the following patterns:

```
a=int(input("Enter the number of rows: "))
for i in range(1,a+1):
    print(" "*(a-i),end="")
    for j in range(1,i+1):
        print("* ",end="")
    print(" "*((a-i)*2),end="")
    for k in range(1,i+1):
        print("* ",end="")
    print()
```

OR

Using functions:

```
def print_pyramid(rows):
    for i in range(1, rows + 1):
        # Print spaces before the stars on the left side of the pyramid
        print(" " * (rows - i), end="")

        # Print stars on the left side of the pyramid
        for j in range(1, i + 1):
            print("* ", end="")

        # Print spaces between the two halves of the pyramid
        print(" " * ((rows - i) * 2), end="")

        # Print stars on the right side of the pyramid
        for k in range(1, i + 1):
            print("* ", end="")

        # Move to the next line
        print()

# Get the number of rows from the user
a = int(input("Enter the number of rows: "))
print_pyramid(a)
```

Output:

```
Enter the number of rows: 5
    *         *
   * *       * *
  * * *     * * *
 * * * *   * * * *
* * * * * * * * * *
```

8. Write a python program to find the largest and smallest digit of a number and find their sum and difference.

```
num=int(input("Enter a number:"))
smallest_digit=9
largest_digit=0

while num>0:
    rem=num%10
    if smallest_digit>rem:
        smallest_digit=rem
    if largest_digit<rem:
        largest_digit=rem
    num=num//10

print("Largest digit:",largest_digit)
print("Smallest digit:",smallest_digit)
sum=largest_digit+smallest_digit
diff=largest_digit-smallest_digit
print("Sum is:",sum)
print("Difference is:",diff)
```

Output 1:

```
Enter a number: 34561
Largest digit: 6
Smallest digit: 1
Sum is: 7
Difference is: 5
```

9. a) Write a python program to make string from first two and last two characters from given string.

```
# Taking input from the user
inputString = input("Enter a string")

count=0

# Loop through the string
for i in inputString:
        count = count + 1
newString = inputString[0:2] + inputString[count-2:count]

# Printing the new String
print("Input string = " + inputString)
print("New String = "+ newString)
```

Output 1:

```
Enter a stringHello Good Morning
Input string = Hello Good Morning
New String = Heng
```

b) Write a python program to perform binary search on a list of integers.

```
nums = []
n=int(input("Enter number of elements:"))
for i in range(n):
    nums.insert(i, int(input("Please enter the %d Item : " %i)))
search = int(input("Enter a Number to Search:"))
first = 0
last = n-1
middle = (first+last)/2
middle = int(middle)
while first <= last:
    if nums[middle]<search:
        first = middle+1
    elif nums[middle]==search:
        print("The Number Found at Position:")
        print(middle+1)
        break
    else:
        last = middle-1
    middle = (first+last)/2
    middle = int(middle)
else:
    print("The Number is not Found in the List")
```

Output 1:

```
Enter number of elements:5
Please enter the 0 Item : 12
Please enter the 1 Item : 23
Please enter the 2 Item : 27
Please enter the 3 Item : 37
Please enter the 4 Item : 67
Enter a Number to Search:37
The Number Found at Position:
4
```

Output 2:

```
Enter number of elements:5
Please enter the 0 Item : 22
Please enter the 1 Item : 45
Please enter the 2 Item : 78
Please enter the 3 Item : 90
Please enter the 4 Item : 100
Enter a Number to Search:43
The Number is not Found in the List
```

10. Write a program that simulates a traffic light. The program should consist of the following:

1) **A user defined function trafficLight( ) that accepts input from the user, displays an error message if the user enters anything other than RED, YELLOW, and GREEN. Function light() is called and following is displayed depending upon return value from light().**
   - **a) "STOP, your life is precious" if the value returned by light() is 0.**
   - **b) "Please WAIT, till the light is Green " if the value returned by light() is 1.**
   - **c) "GO! Thank you for being patient" if the value returned by light() is 2.**
2) **A user defined function light() that accepts a string as input and returns 0 when the input is RED, 1 when the input is YELLOW and 2 when the input is GREEN. The input should be passed as an argument.**
3) **Display "SPEED THRILLS BUT KILLS" after the function traffic Light( ) is executed.**

```
def trafficLight():
    signal = input("Enter the colour of the traffic light: ")
    if (signal not in ("RED","YELLOW","GREEN")):
        print("Please enter a valid Traffic Light colour in CAPITALS"
    else:
        value = light(signal) #function call to light()
        if (value == 0):
            print("STOP, Your Life is Precious.")
        elif (value == 1):
            print ("PLEASE GO SLOW.")
        else:
            print("GO!,Thank you for being patient.")
def light(colour):
    if (colour == "RED"):
        return(0);
    elif (colour == "YELLOW"):
        return (1)
    else:
        return(2)
trafficLight()
print("SPEED THRILLS BUT KILLS")
```

Output 1:

```
Enter the colour of the traffic light: red1
Please enter a valid Traffic Light colour in CAPITALS
SPEED THRILLS BUT KILLS
```

Output 2:

```
Enter the colour of the traffic light: RED
STOP, Your Life is Precious.
SPEED THRILLS BUT KILLS
```

Output 3:

```
Enter the colour of the traffic light: YELLOW
PLEASE GO SLOW.
SPEED THRILLS BUT KILLS
```

Output 4:

```
Enter the colour of the traffic light: GREEN
GO!,Thank you for being patient.
SPEED THRILLS BUT KILLS
```

11. Write a python program that calculates the grades of students in a class. The program should take in a list of dictionaries which has to be taken from user, with each dictionary representing a student and their grades in various subjects. The program should then calculate the average grade for each student and print out their name along with their average grade. The program should also calculate the average grade for the entire class and print it out. Utilize functions to accomplish this task:(Note: Minimum 3 subjects must be taken from the user)

```
def calculate_average(grades):
    return sum(grades) / len(grades)

def calculate_student_grades(student):
    name = student['name']
    grades = [student['math'], student['english'], student['science']]
    average_grade = calculate_average(grades)
    #simlpe print statement also works here
    return f"{name}: {average_grade:.2f}"

def calculate_class_average(students):
    total_grades = 0
    num_grades = 0
    for student in students:
        for key, value in student.items():
            if key != 'name':
                total_grades += value
                num_grades += 1
    return total_grades / num_grades

    # Get input from the user
students = []
num_students = int(input("Enter the number of students: "))
for i in range(num_students):
    name = input(f"Enter the name of student {i+1}: ")
    math_grade = float(input("Enter the math grade: "))
    english_grade = float(input("Enter the english grade: "))
    science_grade = float(input("Enter the science grade: "))
    student = {'name': name, 'math': math_grade, 'english': english_grade, 'science': science_grade}
    students.append(student)
```

```
    # Print out the grades for each student
print("Grades for each student:")
for student in students:
    print(calculate_student_grades(student))

    # Print out the class average
class_average = calculate_class_average(students)
print(f"\nClass average: {class_average:.2f}")
```

Output 1:

```
Enter the number of students: 2
Enter the name of student 1: Arjun
Enter the math grade: 95
Enter the english grade: 88
Enter the science grade: 78
Enter the name of student 2: Om
Enter the math grade: 98
Enter the english grade: 77
Enter the science grade: 88
Grades for each student:
Arjun: 87.00
Om: 87.67

Class average: 87.33
```

12. a) Write a Python program to read a list of n integers (positive as well as negative). Create 2 new lists, one having all positive numbers and others having all negative numbers from the given list. Print all 3 lists.

```
# Read a list of n integers
n = int(input("Enter the size of the list: "))
num_list = []
for i in range(n):
    num = int(input("Enter number " + str(i+1) + ": "))
    num_list.append(num)

# Create two new lists for positive and negative numbers
positive_nums = []
negative_nums = []
for num in num_list:
    if num >= 0:
        positive_nums.append(num)
    else:
        negative_nums.append(num)

# Print all three lists
print("Original list: ", num_list)
print("Positive numbers list: ", positive_nums)
print("Negative numbers list: ", negative_nums)
```

Output 1:

```
Enter the size of the list: 6
Enter number 1: 23
Enter number 2: 12
Enter number 3: -45
Enter number 4: -6
Enter number 5: 88
Enter number 6: 90
Original list:  [23, 12, -45, -6, 88, 90]
Positive numbers list:  [23, 12, 88, 90]
Negative numbers list:  [-45, -6]
```

b) Write a Python program to convert list of tuples into dictionary using function.

```
def list_of_tuples_to_dict(tuple_list):
    # Initialize an empty dictionary
    result_dict = {}

    # Iterate through the list of tuples
    for item in tuple_list:
        # Check if the tuple has exactly two elements
        if len(item) == 2:
            key, value = item
            result_dict[key] = value
        else:
            print(f"Skipping tuple {item} as it does not contain exactly two elements.")

    return result_dict

# Example list of tuples
tuple_list = [("a", 1), ("b", 2), ("c", 3), ("d",4)]

# Convert the list of tuples to a dictionary
result_dict = list_of_tuples_to_dict(tuple_list)

# Print the resulting dictionary
print(result_dict)
```

Output 1:

```
{'a': 1, 'b': 2, 'c': 3, 'd': 4}
```

13. a) Write a Python program to circulate n numbers using list slicing operation.

```
a=list(input("Enter the list"))
print(a)
for i in range(1,len(a),1):
    print(a[i:]+a[:i])
```

Output 1:

```
Enter the list1234
['1', '2', '3', '4']
['2', '3', '4', '1']
['3', '4', '1', '2']
['4', '1', '2', '3']
```

b) Write a Python program that takes a sentence as input from the user, calculates and prints the total number of characters in the sentence, and creates a dictionary containing the frequency of letters and digits in the sentence.

```
sentence = input("Enter a sentence: ")
sentence=sentence.lower()
char_count = {}
print("total number of characters in the sentence are : ",len(sentence))
for char in sentence:
    if char.isalnum():
        if char in char_count:
            char_count[char] += 1
        else:
            char_count[char] = 1
print(char_count)
```

Output 1:

```
Enter a sentence: Hi I am from NMAMIT, Nitte
total number of characters in the sentence are :  26
{'h': 1, 'i': 4, 'a': 2, 'm': 4, 'f': 1, 'r': 1, 'o': 1, 'n': 2, 't': 3, 'e': 1}
```

14. Write a Python program that takes a string input from the user and performs the following operations:

a. Count the number of characters in the string and display the result.

b. Convert all characters in the string to uppercase and display the result.

c. Check if the string contains the word "python" (case-insensitive) and display the result as True or False.

d. Split the string into a list of words and display the result.

e. Join the list of words using a hyphen "-" as a separator and display the result.

f. Reverse the order of the characters in the string and display the result.

```
string = input("Enter a string: ")

# count the number of characters in the string
count = len(string)
print("Number of characters in the string:", count)

# convert all characters to uppercase
uppercase_string = string.upper()
print("Uppercase string:", uppercase_string)

# check if the string contains the word "python"
contains_python = "python" in string.lower()
print("Contains the word 'python':", contains_python)

# replace all occurrences of the word "python" with "Py3"
replaced_string = string.lower().replace("python", "Py3")
print("Replaced string:", replaced_string)

# split the string into a list of words
word_list = string.split()
print("List of words:", word_list)

# join the list of words using a hyphen as a separator
hyphenated_string = "-".join(word_list)
print("Hyphenated string:", hyphenated_string)

# reverse the order of the characters in the string
reversed_string = string[::-1]
print("Reversed string:", reversed_string)
```

Output 1:

```
Enter a string: Introduction to Python Programming
Number of characters in the string: 34
Uppercase string: INTRODUCTION TO PYTHON PROGRAMMING
Contains the word 'python': True
Replaced string: introduction to Py3 programming
List of words: ['Introduction', 'to', 'Python', 'Programming']
Hyphenated string: Introduction-to-Python-Programming
Reversed string: gnimmargorP nohtyP ot noitcudortnI
```

8. a) Write a python program to get the full path of the current working directory.

```
import os

# Get the current working directory
current_directory = os.getcwd()

# Print the current working directory
print("Current Working Directory:", current_directory)
```

Output 1:

```
Current Working director: C:\Users\Aishwarya\AppData\Local\Programs\Python\Python311\Aish
```

b) Write a python program to create a CSV file, insert the contents (USN, Name, Phone number, marks in a subject) related to five students to the file. Sort the contents based on USN and display the top scorer of the subject.

```
import csv
# Function to input student data
def input_student_data():
    student_data = []
    for i in range(5):
        usn = input("Enter USN for student {}:".format(i + 1))
        name = input("Enter Name for student {}:".format(i + 1))
        phone_number = input("Enter Phone Number for student {}:".format(i + 1))
        marks = float(input("Enter Marks for student {}:".format(i + 1)))
        student_data.append({'USN': usn, 'Name': name, 'Phone Number': phone_number, 'Marks': marks})
    return student_data

# Function to write student data to a CSV file
def write_to_csv(student_data, filename):
    with open(filename, mode='w', newline='') as file:
        fieldnames = ['USN', 'Name', 'Phone Number', 'Marks']
        writer = csv.DictWriter(file, fieldnames=fieldnames)
        writer.writeheader()
        for student in student_data:
            writer.writerow(student)

filename = "student_info.csv"
student_data = input_student_data()
write_to_csv(student_data, filename)

top_scorer=max(student_data, key=lambda x: x['Marks'])
print("\nStudent Data (Sorted by USN):")
for student in student_data:
    print(student)
print("\nTop Scorer:")
print(top_scorer['Name'], "with USN", top_scorer['USN'], "scored", top_scorer['Marks'], "marks.")
```

Output 1:

```
Enter USN for student 1:CS001
Enter Name for student 1:Akash
Enter Phone Number for student 1:9888754435
Enter Marks for student 1:78
Enter USN for student 2:CS002
Enter Name for student 2:Amulya
Enter Phone Number for student 2:7456789122
Enter Marks for student 2:89
Enter USN for student 3:Cs003
Enter Name for student 3:Chethan
Enter Phone Number for student 3:8978684544
Enter Marks for student 3:67
Enter USN for student 4:CS004
Enter Name for student 4:Sneha
Enter Phone Number for student 4:8899771234
Enter Marks for student 4:99
Enter USN for student 5:CS005
Enter Name for student 5:Ramya
Enter Phone Number for student 5:7788654311
Enter Marks for student 5:67

Student Data (Sorted by USN):
{'USN': 'CS001', 'Name': 'Akash', 'Phone Number': '9888754435', 'Marks': 78.0}
{'USN': 'CS002', 'Name': 'Amulya', 'Phone Number': '7456789122', 'Marks': 89.0}
{'USN': 'Cs003', 'Name': 'Chethan', 'Phone Number': '8978684544', 'Marks': 67.0}
{'USN': 'CS004', 'Name': 'Sneha', 'Phone Number': '8899771234', 'Marks': 99.0}
{'USN': 'CS005', 'Name': 'Ramya', 'Phone Number': '7788654311', 'Marks': 67.0}

Top Scorer:
Sneha with USN CS004 scored 99.0 marks.
```