PYTHON PRACTICAL  
  
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ROLL- 22/25081

1) Write a Python program to calculate the factorial of a number.

def factorial(n):

if n == 0 or n == 1:

return 1

else:

return n \* factorial(n - 1)

# Get user input

num = int(input("Enter a number: "))

# Check if the number is negative

if num < 0:

print("Factorial is not defined for negative numbers.")

else:

result = factorial(num)

print(f"The factorial of {num} is: {result}")

output:-

Enter a number: 5

The factorial of 5 is: 120

2) Write a Python program to generate prime numbers between 1 to n, where n is provided as input by the user.

def is\_prime(num):

if num < 2:

return False

for i in range(2, int(num\*\*0.5) + 1):

if num % i == 0:

return False

return True

def generate\_primes(n):

primes = [num for num in range(2, n+1) if is\_prime(num)]

return primes

n = int(input("Enter a value of n: "))

if n < 0:

print("Please enter a non-negative number.")

else:

prime\_numbers = generate\_primes(n)

print(f"Prime numbers between 1 and {n}: {prime\_numbers}")

output:-

Enter a value of n: 19

Prime numbers between 1 and 19: [2, 3, 5, 7, 11, 13, 17, 19]

3) Write a Python program to find the sum and average of numbers of a given list.

def calculate\_sum\_and\_average(numbers):

total = sum(numbers)

average = total / len(numbers) if len(numbers) > 0 else 0

return total, average

input\_numbers = input("Enter a list of numbers separated by spaces: ")

numbers = [float(x) for x in input\_numbers.split() if x.replace(".", "", 1).isdigit()]

if not numbers:

print("Please enter at least one valid number.")

else:

sum\_result, average\_result = calculate\_sum\_and\_average(numbers)

print(f"Sum: {sum\_result}")

print(f"Average: {average\_result}")

output:-

Enter a list of numbers separated by spaces: 4 6 7 3 5

Sum: 25.0

Average: 5.0

4) Given two sets, set1 and set2, write a Python program to find their union, intersection, and difference.

set1 = {1, 2, 3, 4, 5}

set2 = {3, 4, 5, 6, 7}

union\_set = set1.union(set2)

print(f"Union of set1 and set2: {union\_set}")

intersection\_set = set1.intersection(set2)

print(f"Intersection of set1 and set2: {intersection\_set}")

difference\_set1 = set1.difference(set2)

print(f"Difference of set1 and set2: {difference\_set1}")

difference\_set2 = set2.difference(set1)

print(f"Difference of set2 and set1: {difference\_set2}")

output:-

Union of set1 and set2: {1, 2, 3, 4, 5, 6, 7}

Intersection of set1 and set2: {3, 4, 5}

Difference of set1 and set2: {1, 2}

Difference of set2 and set1: {6, 7}

5) Given a list of numbers, write a Python program to count the number of times an element occurs in a list and create a dictionary with element:count as key:value pairs.

def count\_elements(lst):

element\_count\_dict = {}

for element in lst:

if element in element\_count\_dict:

element\_count\_dict[element] += 1

else:

element\_count\_dict[element] = 1

return element\_count\_dict

numbers\_list = [1, 2, 3, 1, 2, 4, 1, 3, 5]

element\_count\_dictionary = count\_elements(numbers\_list)

print("Original List:", numbers\_list)

print("Element Count Dictionary:", element\_count\_dictionary)

output:-

Original List: [1, 2, 3, 1, 2, 4, 1, 3, 5]

Element Count Dictionary: {1: 3, 2: 2, 3: 2, 4: 1, 5: 1}

6) Write a Python program to swap the first two and last two characters of a given string.

def swap\_first\_and\_last\_two\_chars(input\_str):

if len(input\_str) < 2:

return input\_str

first\_two\_chars = input\_str[:2]

last\_two\_chars = input\_str[-2:]

middle\_chars = input\_str[2:-2]

swapped\_str = last\_two\_chars + middle\_chars + first\_two\_chars

return swapped\_str

input\_string = input("Enter a string: ")

result\_string = swap\_first\_and\_last\_two\_chars(input\_string)

print("Original String:", input\_string)

print("Swapped String:", result\_string)

output:-

Enter a string: python language

Original String: python language

Swapped String: gethon languapy

7) Write a Python program to create a text file having names of ten Indian cities.

cities = ["Mumbai", "Delhi", "Bangalore", "Hyderabad", "Chennai", "Kolkata", "Ahmedabad", "Pune", "Jaipur", "Lucknow"]

file\_name = "indian\_cities.txt"

with open(file\_name, 'w') as file:

for city in cities:

file.write(city + '\n')

print(f"The file '{file\_name}' has been created with the names of ten Indian cities.")

output:-

The file 'indian\_cities.txt' has been created with the names of ten Indian cities.

8) Write a Python program to create a text file having atleast five lines about your college using

writelines() function.

file\_name = "college\_description.txt"

college\_description = [

"Welcome to ARSD College!",

" ARSD College is known for its outstanding academic programs.",

"Our campus is equipped with state-of-the-art facilities and a vibrant student community.",

"Dedicated faculty members strive for excellence in teaching and research.",

"Join us at ARSD College and embark on a journey of knowledge and personal growth."

]

with open(file\_name, 'w') as file:

file.writelines(line + '\n' for line in college\_description)

print(f"The file '{file\_name}' has been created with a description of the college.")

output:-

The file 'college\_description.txt' has been created with a description of the college.

9) Write a Python program which reads the data from three input files having Employee Names and

merges them into one output file.

input\_files = ["input1.txt", "input2.txt", "input3.txt"]

output\_file = "merged\_output.txt"

def merge\_files(input\_files, output\_file):

with open(output\_file, 'w') as output:

for input\_file in input\_files:

with open(input\_file, 'r') as input\_data:

output.write(input\_data.read())

output.write('\n') # Add a newline between data from different files

merge\_files(input\_files, output\_file)

print(f"The data from {len(input\_files)} input files has been merged into '{output\_file}'.")

output:-

The data from 3 input files has been merged into 'merged\_output.txt'.

10) Write a Python program to count the number of vowels in a file and write the vowel: count in a

dictionary.

def count\_vowels(file\_path):

vowels = "aeiouAEIOU"

vowel\_count = {vowel: 0 for vowel in vowels}

try:

with open(file\_path, 'r') as file:

content = file.read()

for char in content:

if char in vowels:

vowel\_count[char] += 1

except FileNotFoundError:

print(f"File '{file\_path}' not found.")

return None

return vowel\_count

file\_path = "vowel.txt"

vowel\_count\_dict = count\_vowels(file\_path)

if vowel\_count\_dict is not None:

print("Vowel Count Dictionary:")

for vowel, count in vowel\_count\_dict.items():

print(f"{vowel}: {count}")

output:-

Vowel Count Dictionary:

a: 8

e: 2

i: 0

o: 2

u: 0

A: 1

E: 0

I: 1

O: 0

U: 0

11) Write a Python program to create a CSV file having student data: Roll\_No, Enrollment No, Name,Course, Semester.

import csv

students\_data = [

{"Roll\_No": 101, "Enrollment\_No": "EN12345", "Name": "John Doe", "Course": "Computer Science", "Semester": 3},

{"Roll\_No": 102, "Enrollment\_No": "EN67890", "Name": "Jane Smith", "Course": "Electrical Engineering", "Semester": 2},

{"Roll\_No": 103, "Enrollment\_No": "EN54321", "Name": "Alice Johnson", "Course": "Mechanical Engineering", "Semester": 4},

{"Roll\_No": 104, "Enrollment\_No": "EN98765", "Name": "Bob Williams", "Course": "Civil Engineering", "Semester": 1},

]

csv\_file\_name = "student\_data.csv"

with open(csv\_file\_name, mode='w', newline='') as csv\_file:

fieldnames = ["Roll\_No", "Enrollment\_No", "Name", "Course", "Semester"]

writer = csv.DictWriter(csv\_file, fieldnames=fieldnames)

writer.writeheader()

writer.writerows(students\_data)

print(f"The CSV file '{csv\_file\_name}' has been created with student data.")

output:-

The CSV file 'student\_data.csv' has been created with student data.

12) Write a Python program library to read the CSV file created in the above program and filter out

records of II semester students.

import csv

def filter\_semester\_records(csv\_file\_path, target\_semester):

filtered\_records = []

with open(csv\_file\_path, 'r') as csv\_file:

reader = csv.DictReader(csv\_file)

for row in reader:

if int(row["Semester"]) == target\_semester:

filtered\_records.append(row)

return filtered\_records

csv\_file\_path = "student\_data.csv"

target\_semester = 2

filtered\_records = filter\_semester\_records(csv\_file\_path, target\_semester)

if filtered\_records:

print(f"Records for {target\_semester} semester:")

for record in filtered\_records:

print(record)

else:

print(f"No records found for {target\_semester} semester.")

output:-

Records for 2 semester:

{'Roll\_No': '102', 'Enrollment\_No': 'EN67890', 'Name': 'Jane Smith', 'Course': 'Electrical Engineering', 'Semester': '2'}