

Name: Swapnil

Group: 2CS12

Roll Number: 102016108

Artificial Intelligence

UCS411

Assignment-1

Question-1: Find the sum of the series $(1 + x + \frac{x^2}{2!} + \dots + \frac{x^n}{n!})$. Number x and n should be entered at run time.

Code:

```
● ● ●

def factorial(n):
    if n == 0:
        return 1
    else:
        return n * factorial(n-1)

n=int(input("Enter the value of n: "))
x=int(input("Enter the value of x: "))
sum = float(0)
for i in range(0,n+1):
    sum+=float((x**i)/factorial(i))
print((sum))
```

Output:

```
● ● ●

PS C:\Users\Omen\Desktop\DS\Sem 4\College-Assessments> python -u
"c:\Users\Omen\Desktop\DS\Sem 4\College-Assessments\UCS411\Assignment-
1\1.py"
Enter the value of n: 2
Enter the value of x: 3
8.5

PS C:\Users\Omen\Desktop\DS\Sem 4\College-Assessments> python -u
"c:\Users\Omen\Desktop\DS\Sem 4\College-Assessments\UCS411\Assignment-
1\1.py"
Enter the value of n: 5
Enter the value of x: 2
7.266666666666667
```

Question-2 WAP to create a list of 100 random numbers between 100 and 900.
Count and print the:

Question-2(a): All odd numbers

Code:

```
● ● ●

import random
list=[]
odd=[]
for i in range(100,901):
    if i%2!=0:
        list.append(i)
random.shuffle(list)
for i in range (0,100):
    odd.append(list[i])
print(f"the number of elements in the list are: {len(odd)}")
a=input("And if you want to print the elements of the list enter Y or N ")
if a=="Y" or a=="y":
    print(odd)
else:
    print("Thank you")
```

Output:

```
● ● ●

PS C:\Users\Omen\Desktop\DS\Sem 4\College-Assessments> python -u
"c:\Users\Omen\Desktop\DS\Sem 4\College-Assessments\UCS411\Assignment-
1\tempCodeRunnerFile.py"
the number of elements in the list are: 100
And if you want to print the elements of the list enter Y or N Y
[899, 697, 781, 229, 593, 561, 375, 373, 155, 591, 215, 787, 791, 135,
313, 453, 323, 889, 573, 141, 383, 103, 797, 881, 637, 161, 123, 455,
569, 461, 643, 615, 419, 185, 109, 255, 737, 769, 877, 851, 579, 811,
203, 227, 219, 359, 277, 379, 711, 873, 855, 157, 365, 409, 357, 775,
885, 673, 393, 295, 437, 861, 567, 753, 369, 501, 731, 433, 723, 341,
445, 291, 465, 511, 231, 175, 181, 281, 363, 399, 439, 471, 875, 497,
349, 779, 671, 469, 755, 707, 257, 745, 309, 807, 307, 133, 595, 417,
695, 631]
```

Question-2(b): All even numbers

Code:

```
● ● ●

import random
list=[]
even=[]
for i in range(100,901):
    if i%2==0:
        list.append(i)
random.shuffle(list)
for i in range (0,100):
    even.append(list[i])
print(f"the number of elements in the list are: {len(even)}")
a=input("And if you want to print the elements of the list enter Y or N ")
if a=="Y" or a=="y":
    print(even)
else:
    print("Thank you")
```

Output:

```
PS C:\Users\Omen\Desktop\DS\Sem 4\College-Assessments> python -u "c:\Users\Omen\Desktop\DS\Sem 4\College-Assessments\UCS411\Assignment-1\tempCodeRunnerFile.py"
the number of elements in the list are: 100
And if you want to print the elements of the list enter Y or N Y
[800, 690, 320, 500, 750, 442, 262, 200, 300, 852, 418, 176, 706, 722,
266, 832, 354, 590, 824, 346, 702, 780, 848, 250, 332, 744, 836, 822,
386, 362, 384, 352, 104, 878, 638, 640, 900, 792, 360, 600, 128, 184,
242, 420, 864, 618, 364, 306, 506, 424, 172, 592, 326, 532, 538, 666,
696, 114, 468, 400, 554, 460, 622, 766, 586, 740, 778, 116, 862, 118,
208, 886, 714, 796, 322, 888, 694, 394, 846, 244, 304, 566, 710, 550,
816, 510, 344, 662, 232, 636, 616, 552, 798, 214, 648, 178, 564, 688,
308, 298]
```

Question-2(c): All Prime numbers

Code:

```
● ● ●

import random
def prime(start, end):
    prime=[]
    for i in range(start, end+1):
        if i==0 or i==1:
            continue
        else:
            for j in range(2,int(i/2)+1):
                if i%j==0:
                    break
                else:
                    prime.append(i)
    return prime

prime=prime(100,900)
random.shuffle(prime)
list=[]
for i in range(0,100):
    list.append(prime[i])

print(f"the number of elements in the list are: {len(list)}")
a=input("And if you want to print the elements of the list enter Y or N ")
if a=="Y" or a=="y":
    print(list)
else:
    print("Thank you")
```

Output:

```
PS C:\Users\Omen\Desktop\DS\Sem 4\College-Assessments> python -u "c:\Users\Omen\Desktop\DS\Sem 4\College-Assessments\UCS411\Assignment-1\tempCodeRunnerFile.py"
the number of elements in the list are: 100
And if you want to print the elements of the list enter Y or N Y
[397, 467, 379, 887, 421, 541, 353, 163, 347, 773, 487, 839, 823, 491,
193, 419, 653, 461, 389, 743, 431, 659, 863, 811, 829, 107, 709, 233,
179, 479, 149, 271, 449, 157, 619, 577, 251, 757, 443, 503, 499, 167,
401, 593, 439, 281, 457, 661, 109, 173, 859, 307, 857, 293, 521, 239,
151, 673, 311, 367, 751, 797, 787, 223, 613, 601, 727, 257, 523, 463,
587, 643, 821, 331, 269, 359, 283, 547, 127, 641, 827, 227, 557, 691,
677, 101, 103, 509, 211, 131, 761, 313, 373, 229, 631, 881, 571, 683,
241, 569]
```

Question-3: Find the prime numbers between two given numbers

Code:

```
import random
def prime(start, end):
    prime=[]
    for i in range(start, end+1):
        if i==0 or i==1:
            continue
        else:
            for j in range(2,int(i/2)+1):
                if i%j==0:
                    break
                else:
                    prime.append(i)
    return prime
start=int(input("Enter the start value: "))
end=int(input("Enter the end value: "))
print(prime(start,end))
```

Output:

```
PS C:\Users\Omen\Desktop\DS\Sem 4\College-Assessments> python -u
"c:\Users\Omen\Desktop\DS\Sem 4\College-
Assessments\UCS411\Assignment-1\tempCodeRunnerFile.py"
Enter the start value: 1
Enter the end value: 10
[2, 3, 5, 7]
```

Question-4: Find the common elements from two lists.**Code:**

```
def common_elements(x,y):
    a_set=set(x)
    b_set=set(y)
    if len(a_set.intersection(b_set))>0:
        return(a_set.intersection(b_set))
    else:
        return("No common elements")

list1=[]
list2=[]
size_of_list1=int(input("Enter the size of list1: "))
size_of_list2=int(input("Enter the size of list2: "))
for i in range (0,size_of_list1):
    list1.append(int(input("Enter the element in list1: ")))
for i in range (0,size_of_list2):
    list2.append(int(input("Enter the element in list2: ")))
print(f"The common elements are: {common_elements(list1,list2)}")
```

Output:

```
PS C:\Users\Omen\Desktop\DS\Sem 4\College-Assessments> python -u "c:\Users\Omen\Desktop\DS\Sem 4\College-Assessments\UCS411\Assignment-1\4.py"
Enter the size of list1: 5
Enter the size of list2: 5
Enter the element in list1: 1
Enter the element in list1: 2
Enter the element in list1: 3
Enter the element in list1: 4
Enter the element in list1: 5
Enter the element in list2: 1
Enter the element in list2: 2
Enter the element in list2: 4
Enter the element in list2: 6
Enter the element in list2: 8
The common elements are: {1, 2, 4}
```

Question-5: Print the leap years between any two years. The limit of the years should be entered at execution time.

Code:

```
def leap_year(start,end):
    leap_year=[ ]
    for i in range(start,end+1):
        if i%4==0 and i%100!=0 or i%400==0:
            leap_year.append(i)
    return leap_year
start=int(input("Enter the start value: "))
end=int(input("Enter the end value: "))
print(leap_year(start,end))
```

Output:

```
PS C:\Users\Omen\Desktop\DS\Sem 4\College-Assessments> python -u "c:\Users\Omen\Desktop\DS\Sem 4\College-Assessments\UCS411\Assignment-1\tempCodeRunnerFile.py"
Enter the start value: 2020
Enter the end value: 2030
[2020, 2024, 2028]
```

Question-6: Write a Python Program to input basic salary of an employee and calculate its Grosssalary according to following: Basic Salary <= 10000 : HRA = 20%, DA = 80% Basic Salary <= 20000 : HRA = 25%, DA = 90% Basic Salary > 20000 : HRA = 30%, DA =95%.

Code:

```
salery = int(input("Enter Salery:"))
if salery <= 10000:
    hra = (salery * 20) /100
    da = (salery * 80) /100
elif salery <= 20000:
    hra = (salery * 25) /100
    da = (salery * 90) /100
else:
    hra = (salery * 30) /100
    da = (salery * 95) /100

gross_salary = salery + da + hra
print(gross_salary)
```

Output:

```
PS C:\Users\Omen\Desktop\DS\Sem 4\College-Assessments> python -u  
"c:\Users\Omen\Desktop\DS\Sem 4\College-  
Assessments\UCS411\Assignment-1\tempCodeRunnerFile.py"  
Enter Salery:32000  
72000.0
```

Questvion-7: Write a Python program to check the validity of password input by users. **Validation:**

- At least 1 letter between [a-z] and 1 letter between [A-Z].
- At least 1 number between [0-9].
- At least 1 character from [\$#@].
- Minimum length 6 characters. Maximum length 16 characters.

Code:

```
● ● ●

password=input("Enter the password: ")
l=0
u=0
d=0
s=0
if (len(password)>=8):
    for i in password:
        if (i.islower()):
            l+=1
        elif (i.isupper()):
            u+=1
        elif (i.isdigit()):
            d+=1
        elif (i=="_" or i=="^" or i=="$" or i=="#" or i=="@"):
            s+=1
    if (l>=1 and u>=1 and d>=1 and s>=1):
        print("Password is valid")
    else:
        print("Password is not valid")
```

Output:

Question-8:

Code:

```
● ● ●

L=[]
Number_of_elements_in_list=int(input("Enter the number of elements in
the list: "))
for i in range (0,Number_of_elements_in_list):
    L.append(int(input("Enter the element in the list: ")))
print(L)
```

Output:

```
PS C:\Users\Omen\Desktop\DS\Sem 4\College-Assessments> python -u
"c:\Users\Omen\Desktop\DS\Sem 4\College-
Assessments\UCS411\Assignment-1\tempCodeRunnerFile.py"
Enter the password: Swapnil00
Password is not valid

PS C:\Users\Omen\Desktop\DS\Sem 4\College-Assessments> python -u
"c:\Users\Omen\Desktop\DS\Sem 4\College-
Assessments\UCS411\Assignment-1\tempCodeRunnerFile.py"
Enter the password: Swapnil_00
Password is valid
```

Question-8: Create a List L having data as= [10, 20, 30, 40, 50, 60, 70, 80].

Code:

```
L=[]
Number_of_elements_in_list=int(input("Enter the number of elements
in the list: "))
for i in range (0,Number_of_elements_in_list):
    L.append(int(input("Enter the element in the list: ")))
print(L)
```

Output:

```
PS C:\Users\Omen\Desktop\DS\Sem 4\College-Assessments> python -u "c:\Users\Omen\Desktop\DS\Sem 4\College-Assessments\UCS411\Assignment-1\8.py"
Enter the number of elements in the list: 8
Enter the element in the list: 10
Enter the element in the list: 20
Enter the element in the list: 30
Enter the element in the list: 40
Enter the element in the list: 50
Enter the element in the list: 60
Enter the element in the list: 70
Enter the element in the list: 80
[10, 20, 30, 40, 50, 60, 70, 80]
```

Question-8(a): WAP to add 200 and 300 to L.

Code:

```
L=[]
Number_of_elements_in_list=int(input("Enter the number of elements in the list: "))
for i in range (0,Number_of_elements_in_list):
    L.append(int(input("Enter the element in the list: ")))
print("How many elements you want to add in the list: ")
Number_of_elements_to_add=int(input())
for i in range (0,Number_of_elements_to_add):
    L.append(int(input("Enter the element in the list: ")))
print(L)
```

Output:

```
PS C:\Users\Omen\Desktop\DS\Sem 4\College-Assessments> python -u "c:\Users\Omen\Desktop\DS\Sem 4\College-Assessments\UCS411\Assignment-1\8a.py"
Enter the number of elements in the list: 8
Enter the element in the list: 10
Enter the element in the list: 20
Enter the element in the list: 30
Enter the element in the list: 40
Enter the element in the list: 50
Enter the element in the list: 60
Enter the element in the list: 70
Enter the element in the list: 80
How many elements you want to add in the list:
2
Enter the element in the list: 200
Enter the element in the list: 300
[10, 20, 30, 40, 50, 60, 70, 80, 200, 300]
```

Question-8(b): WAP to remove 10 and 30 from L.

Code:

```
L=[]
Number_of_elements_in_list=int(input("Enter the number of elements in the list: "))
for i in range (0,Number_of_elements_in_list):
    L.append(int(input("Enter the element in the list: ")))
print("How many elements you want to add in the list: ")
Number_of_elements_to_add=int(input())
for i in range (0,Number_of_elements_to_add):
    L.append(int(input("Enter the element in the list: ")))
print("How many elements you want to remove from the list: ")
Number_of_elements_to_remove=int(input())
for i in range (0,Number_of_elements_to_remove):
    L.remove(int(input("Enter the element in the list: ")))
print(L)
```

Output:

```
PS C:\Users\Omen\Desktop\DS\Sem 4\College-Assessments> python -u
"c:\Users\Omen\Desktop\DS\Sem 4\College-Assessments\UCS411\Assignment-
1\8b.py"
Enter the number of elements in the list: 8
Enter the element in the list: 10
Enter the element in the list: 20
Enter the element in the list: 30
Enter the element in the list: 40
Enter the element in the list: 50
Enter the element in the list: 60
Enter the element in the list: 70
Enter the element in the list: 80
How many elements you want to add in the list:
0
How many elements you want to remove from the list:
2
Enter the element in the list: 10
Enter the element in the list: 30
[20, 40, 50, 60, 70, 80]
```

Question-8(c): WAP to sort L in ascending order.

Code:

```
L=[]
Number_of_elements_in_list=int(input("Enter the number of elements in the list: "))
for i in range (0,Number_of_elements_in_list):
    L.append(int(input("Enter the element in the list: ")))
print("How many elements you want to add in the list: ")
Number_of_elements_to_add=int(input())
for i in range (0,Number_of_elements_to_add):
    L.append(int(input("Enter the element in the list: ")))
print("How many elements you want to remove from the list: ")
Number_of_elements_to_remove=int(input())
for i in range (0,Number_of_elements_to_remove):
    L.remove(int(input("Enter the element in the list: ")))
L.sort()
print(L)
```

Output:

```
PS C:\Users\Omen\Desktop\DS\Sem 4\College-Assessments> python -u
"c:\Users\Omen\Desktop\DS\Sem 4\College-
Assessments\UCS411\Assignment-1\tempCodeRunnerFile.py"
Enter the number of elements in the list: 8
Enter the element in the list: 10
Enter the element in the list: 20
Enter the element in the list: 30
Enter the element in the list: 40
Enter the element in the list: 50
Enter the element in the list: 60
Enter the element in the list: 70
Enter the element in the list: 80
How many elements you want to add in the list:
2
Enter the element in the list: 1
Enter the element in the list: 9
How many elements you want to remove from the list:
2
Enter the element in the list: 80
Enter the element in the list: 50
[1, 9, 10, 20, 30, 40, 60, 70]
```

Question-8(d): WAP to sort L in descending order.

Code:

```
L=[ ]  
Number_of_elements_in_list=int(input("Enter the number of elements in  
the list: "))  
for i in range (0,Number_of_elements_in_list):  
    L.append(int(input("Enter the element in the list: ")))  
print("How many elements you want to add in the list: ")  
Number_of_elements_to_add=int(input())  
for i in range (0,Number_of_elements_to_add):  
    L.append(int(input("Enter the element in the list: ")))  
print("How many elements you want to remove from the list: ")  
Number_of_elements_to_remove=int(input())  
for i in range (0,Number_of_elements_to_remove):  
    L.remove(int(input("Enter the element in the list: ")))  
L.sort(reverse=True)  
print(L)
```

Output:

```
PS C:\Users\Omen\Desktop\DS\Sem 4\College-Assessments> python -u
"c:\Users\Omen\Desktop\DS\Sem 4\College-
Assessments\UCS411\Assignment-1\tempCodeRunnerFile.py"
Enter the number of elements in the list: 8
Enter the element in the list: 10
Enter the element in the list: 20
Enter the element in the list: 30
Enter the element in the list: 40
Enter the element in the list: 50
Enter the element in the list: 60
Enter the element in the list: 70
Enter the element in the list: 80
How many elements you want to add in the list:
2
Enter the element in the list: 56
Enter the element in the list: 21
How many elements you want to remove from the list:
2
Enter the element in the list: 30
Enter the element in the list: 70
[80, 60, 56, 50, 40, 21, 20, 10]
```

Question-9: D is a dictionary defined as D= {1:"One", 2:"Two", 3:"Three", 4: "Four", 5:"Five"}.

- (i) WAP to add new entry in D; key=6 and value is "Six"
- (ii) WAP to remove key=2.
- (iii) WAP to check if 6 key is present in D.
- (iv) WAP to count the number of elements present in D.
- (v) WAP to add all the values present in D.

Code:

```
● ○ ●
D = {
    1: "One",
    2: "Two",
    3: "Three",
    4: "Four",
    5: "Five"
}
print(D)
# add key 6
D[6] = "Six"
print(D)
# remove key 2
del D[2]
print(D)
# check key 6 is present or not
if(6 in D.keys()):
    print("Yes Present")
else:
    print("Not Present")
print(D.keys())
print("Number of counts in the list is ", len(D))

# sum(str(D.values()))
for data in D.values():
    print(data + " ", end="")
```

Output:

```
PS C:\Users\Omen\Desktop\DS\Sem 4\College-Assessments> python -u "c:\Users\Omen\Desktop\DS\Sem 4\College-Assessments\UCS411\Assignment-1\tempCodeRunnerFile.py"
{1: 'One', 2: 'Two', 3: 'Three', 4: 'Four', 5: 'Five'}
{1: 'One', 2: 'Two', 3: 'Three', 4: 'Four', 5: 'Five', 6: 'Six'}
{1: 'One', 3: 'Three', 4: 'Four', 5: 'Five', 6: 'Six'}
Yes Present
dict_keys([1, 3, 4, 5, 6])
Number of counts in the list is 5
One Three Four Five Six
```

Question-10(a): Write a function which takes principal amount, interest rate and time. This function returns compound interest. Call this function to print the output.

Code:

```
def compound_interest(p, r, t):
    A = p * (1 + r / 100) ** t
    Compaound_interest = A - p
    return Compaund_interest
principle = int(input("Enter the principle amount: "))
rate = float(input("Enter the rate: "))
time = int(input("Enter the time: "))
print("Compound interest is: ", compound_interest(principle, rate, time))
```

Output:

```
PS C:\Users\Omen\Desktop\DS\Sem 4\College-Assessments> python -u "c:\Users\Omen\Desktop\DS\Sem 4\College-Assessments\UCS411\Assignment-1\Q10a.py"
Enter the principle amount: 12000
Enter the rate: 12
Enter the time: 1
Compound interest is: 1440.0000000000018
```

Question-10(b): Save this function (as a module) in a python file and call it in another python file.

Code:

```
from Q10a import *
principle = int(input("Enter the principle amount: "))
rate = float(input("Enter the rate: "))
time = int(input("Enter the time: "))
print("Compound interest is: ", compound_interest(principle, rate, time))
```

Output:

```
PS C:\Users\Omen\Desktop\DS\Sem 4\College-Assessments> python -u  
"c:\Users\Omen\Desktop\DS\Sem 4\College-  
Assessments\UCS411\Assignment-1\Q10b.py"  
Enter the principle amount: 12000  
Enter the rate: 12  
Enter the time: 1  
Compound interest is: 1440.0000000000018
```