Module 2 – Functions

1. Create a function which accepts two inputs from the user and compute nCr

```
#Program to take two inputs from users and calculate the
nCr
def ncr():
     print("nCr is", fact(n)/(fact(r)*fact(n-r)))


def fact(n):
    result=1
    for i in range(1,n+1,1):
        result=result*i
    return result

n=int(input("Enter value of n"))
r=int(input("Enter value of r"))

ncr()
```

2. Recursive function to compute GCD of 2 numbers

```
#Recursive function to caluclate GCD of two numbers

def gcd(a, b):
    if a==0:
        return 0
    if b==0:
        return 0
    if a<b:
        return gcd(b,a)
    if a>b:
        return (a-b, b)
```

```
a=12
b=8
gcd(a,b)
```

3. Recursive function to find product of two numbers

```
#Calculate product of two numbers using recursive function
def prod(n1, n2):
    if (n1==0):
        return 0
    elif n1==1:
        return n2
    else:
        return n2+prod(n1-1,n2)



n1=int(input("Enter n1"))
n2=int(input("Enter n2"))
prod(n1, n2)
```

4. Recursive function to generate Fibonacci series

```
# Recursive function to display the Fibonacci series

def fib(n):
   if n<=1:
       return n
   else:
       return(fib(n-1)+fib(n-2))

nterms = int(input("How many terms? "))
```

```
if nterms<=0:
   print("Plese enter a positive integer")
else:
   print("Fibonacci sequence:")
   for i in range(nterms):
       print(fib(i))
```

5. Program to print a specified list after removing the 0th, 4th and 5th elements. Sample List : ['Red', 'Green', 'White', 'Black', 'Pink', 'Yellow'] Expected Output : ['Green', 'White', 'Black']

```
#Program to print a specified list after removing the 0th, 4th and 5th elements

colours=['Red', 'Green', 'White', 'Black', 'Pink', 'Yellow']
colours.pop(0)
del colours[3:5]
print("List after editing:", colours)
```

6. Program to get the difference between the two lists

```
#Program to get the difference between the two lists.

list_a=set([1114,1120,1240,1296])
list_b=set([1114,580,999,1120])
list_c=list(list_a-list_b)

print("Difference between both the lists is", list_c)
```

7. Program to find the second smallest number and second largest number in a list.

```
#Program to find the second smallest number and second
largest number in a list.

list_a=[3,6,11,4,77,456,1,0,7,54,23]
list_a.sort()
print("Second smallest number is : ", list_a[1])
print("Second largest number is : ", list_a[-2])
```

8. Given a list of numbers of list, write a Python program to create a list of tuples having first element as the number and second element as the square of the number.

```
'''Given a list of numbers of list, write a Python program
to create a list of tuples having first element as the
number
and second element as the square of the number.'''

list1 = [1, 2, 5, 6]
res = [(val, pow(val, 2)) for val in list1]
print(res)
```

9. Given list of tuples, remove all the tuples with length K. Input : test_list = [(4, 5), (4,), (8, 6, 7), (1,), (3, 4, 6, 7)], K = 2 Output : [(4,), (8, 6, 7), (1,), (3, 4, 6, 7)] Explanation : (4, 5) of len = 2 is removed.

```
test_list = [(4, 5), (4, ), (8, 6, 7), (1, ), (3, 4, 6,
7)]

length=int(input("Enter the length"))

for ele in test_list:
    if len(ele)==length:
```

```
        test_list.remove(ele)

print("List after removing", test_list)
```

10. Program to generate and print a dictionary that contains a number (between 1 and n) in the form (x, x*x). Sample Input: (n=5) : Expected Output : {1: 1, 2: 4, 3: 9, 4: 16, 5: 25}

```
#Program to generate and print a dictionary that contains
a number (between 1 and n) in the form (x, x*x).

squares=dict()
n=int(input("Enter the number"))

for i in range(0,n+1,1):
    squares[i]=i*i

print(squares)
```

11. Program to remove a key from a dictionary

```
#Program to remove a key from a dictionary
student={'name':["Siddarth, Aaditya"],
'pin':[123,456,789],'ph no':[987654321,1234567890]}

#To remove a spefified key
del student['name']
print("After removing the specified key", student)

#To remove the last key
student.popitem()
print("After removing the last key", student)
```

12. Program to get the maximum and minimum value in a dictionary.

```
#Program to get the maximum and minimum value in a
dictionary

student={'D':[586873652893746],
'F':[123876489273642 87],'C':[987654321,1234567890]}

key_max = max(student.keys())
key_min = min(student.keys())


print("Maximum Value : ", student[key_max])
print("Minimum Value : ", student[key_min])
```

13. Program to perform operations on string using unicodes ,splitting of string,accessing elements of string using locations

```
#Program to perform operations on strings like accessing
characters and splitting the string

string="programming"

#Accessing and slicing the string
print('The string is ', string)
print("First character is ", string[0])
print("Last character is ", string[-1]) #the indexing of
characters from the last will start from -1 and continue
negatively
print("Penultimate characrter is ",string[-2] )
print("The part of the string is", string[2:6]) #printing
a range of characters from a string  #slicing
print("The part of the string is", string[0:4:2])
print("The part of the string is", string[2:])

#Splitting the string
a="programming is good".split()
```

```
print("String after splitting is ", a)
```

14. Program for Counting occurrence of a certain element in a string, getting indexes that have matching elements.For ex -.In Rabbit count how many times b has occurred . Example-I have to go to a doctor and get myself checked. Count the number of occurrences of ‘to’.

```
str=input("Enter a string")
str1=input("Enter the character or word you want to
check")
a=str.split()

count=0

#For multiword string
if len(a)>1:
    for i in range(0,len(a),1):
        if a[i]==str1:
            count+=1

#For single word string
else:
    for i in range(0,len(str),1):
        if str[i]==str1:
            count+=1
print("Number of occurences : ", count)
```

15. Program for replacing one substring by another For example - Rabbit - Replace ‘bb’ by ‘cc’

```
#Replacing substring in a string with another

str=input("Enter a string")
substring=input("Enter the substring you want to replace")
replacing_string=input("Enter the substring you want to
replace with")
```

```
new_str=str.replace(substring,replacing_string)
print(new_str)
```

16. Program to Acronym generator for any user input (ex-input is Random memory access then output should be RMA).Example - Random number (RN)

```
'''
Program to Acronym generator for any user input (ex-input
is Random memory access
then output should be RMA).Example - Random number (RN)
'''

string=input("Enter a phrase: ")

l=list(string.split())

for i in range (0,len(l)):
    print(l[i][0].upper(),end=".")
```

17. Python function that accepts a string and calculates the number of uppercase letters and lowercase letters.

```
#Python function that accepts a string and calculates the
number of uppercase letters and lowercase letters.
str=input("Enter the string")
upper=0
lower=0
for i in range(0,len(str),1):
    if str[i].isupper():
        upper+=1
    elif str[i].islower():
        lower+=1

print("Lower case characters : ", lower)
print("Upper case characters : ", upper)
```

18. Program to count the number of strings where the string length is 2 or more and the first and last character are same from a given list of strings Sample List : ['abc', 'xyz', 'aba', '1221'] Expected Result : 2

```
'''Program to count the number of strings where the string
length is 2 or more
and the first and last character are same from a given
list of strings'''

sample_list=['abc', 'xyz', 'aba', '1221']


count=0
for i in range(0,4,1):
    if len(sample_list[i])>2:
        if(sample_list[i][0]==sample_list[i][-1]):
            count+=1

print(count)
```