Scientific Computing Lab 1

August 22, 2024

[ ]:
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LAB 1
BASIC FUNCTIONS IN PYTHON
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[2]:
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#PROGRAM 1
print("This is my first python program")
```

```
This is my first python program
```

[22]:
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#PROGRAM 2
#Average of 2 numbers(display as integer and float)
num1 = float(input("Enter First Number"))
num2 = float(input("Enter Second Number"))
average = (num1 + num2)/2
print("The average of {0} and {1} in int format is {2}".
 ↪format(num1,num2,int(average)))
print("The average of {0} and {1} in float format is {2}".
 ↪format(num1,num2,average))
```

```
Enter First Number 10
Enter Second Number 15

The average of 10.0 and 15.0 in int format is 12
The average of 10.0 and 15.0 in float format is 12.5
```

[41]:
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#PROGRAM 3
# Explore various data types such as string, int ,float, list, tuple.

string = "James"
print("Data Type : ",type(string))
#Initialized through double or single quotes, string is a character array in␣
 ↪python

integer = 123
print("Data Type : ",type(integer))

decimal = 123.456
print("Data Type : ",type(decimal))
```

```
list_ex = [1,2,3,"4","5",[6,7,8,"9",[10]]]
print("Data Type : ",type(list_ex))

tuple_ex = (1,2,3,4,5)
print("Data Type : ",type(tuple_ex))

# Lists and Tuples
# List is a mutable non hashable data set in python that functions as an array␣
 ↪but with much more capabilities due to lists being objects in python .
# Tuple is an immutable hashable data set in python .

# Both are capable of storing non homogenous data types.
```

```
Data Type :  <class 'str'>
Data Type :  <class 'int'>
Data Type :  <class 'float'>
Data Type :  <class 'list'>
Data Type :  <class 'tuple'>
```

[8]:
```
#PROGRAM 4
#Multiples of 3 from 40 to 0 in decreasing order
for i in range(40,0,-1): #range(start,stop,step)
    if i % 3 == 0:
        print(i)
```

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39
36
33
30
27
24
21
18
15
12
9
6
3
```

[32]:
```
#PROGRAM 5
#Program to display first 50 prime numbers
def is_prime(num):
    for i in range(2,num):
        if num % i == 0:
            return False
    return True
```

```
def main():
    #numbers = list(filter(is_prime,list(range(2,50))))
    count = 0
    number = 2
    while count < 50:
        if is_prime(number):
            print(number)
            count += 1
        number += 1

main()
```

```
2
3
5
7
11
13
17
19
23
29
31
37
41
43
47
53
59
61
67
71
73
79
83
89
97
101
103
107
109
113
127
131
137
139
149
151
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157
163
167
173
179
181
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197
199
211
223
227
229
```

[25]:
```
#PROGRAM 6
#Guess my number game
import random
random_number = random.randint(0,100)
while(1):
    user_choice = int(input("Enter Your Guess"))
    if random_number == user_choice :
        print("Game Won")
        break
    elif random_number >= user_choice :
        print("Go Higher")
    elif random_number <= user_choice :
        print("Go Lower")
```

```
Enter Your Guess 51

Go Higher

Enter Your Guess 61

Go Higher

Enter Your Guess 71

Go Higher

Enter Your Guess 81

Game Won
```

[2]:
```
#PROGRAM 7
#Reverse the digits of a number
i = int(input("Enter the number to be reversed : "))
rev = 0
while i > 0:
    rem = i % 10
```

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    rev = rev * 10 + (rem)
    i = int(i/10)
print(rev)
```

```
Enter the number to be reversed :  123456789
```

```
987654321
```

[6]:
```
#PROGRAM 8
#Calculate factorial of a number
n = int(input("Enter the factorial to be calculated : "))
def factorial(n):
    fact = 1
    while n > 1:
        fact *= n
        n = n - 1
    return fact
print(factorial(n))
```

```
Enter the factorial to be calculated :  8
```

```
40320
```

[10]:
```
#PROGRAM 9
#Accept a filename and print extension
file_name = input("Enter filename : ")
a = list()
for i in range(0,len(file_name)):
    if file_name[i] == '.':
        a.append(file_name[i:])

for i in a:
    print(i)
```

```
Enter filename :  test.py
```

```
.py
```

[13]:
```
#PROGRAM 10
#Python program to display the first and last colours from the following list
color_list = ['Red','Green','White','Black']
print(color_list[0])
print(color_list[-1])
```

```
Red
Black
```

[18]:
```
#PROGRAM 11
#Python program to accept radius from user and compute area
radius = float(input("Enter the radius : "))
pi = 22/7
```

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print("Area of the circle is",round(pi*radius*radius,3))
```

```
Enter the radius :  7

Area of the circle is 154.0
```

[20]:
```
#PROGRAM 12
#Python program which accepts user's first and last name and print them in␣
 ↪reverse order
first_name = input("Enter your first name : ")
last_name = input("Enter your last name : ")
print(last_name,first_name)
```

```
Enter your first name :  vaishnav
Enter your last name :  vinod

vinod vaishnav
```

[21]:
```
#PROGRAM 13
#Python program to print current date and time
import time
print(time.ctime())
```

```
Wed Aug 21 23:05:10 2024
```

[36]:
```
#PROGRAM 14
#Python program to calculate number of days between 2 dates
from datetime import date

year1 = int(input("Enter Start Year : "))
month1 = int(input("Enter Start Month : "))
day1 = int(input("Enter Start Day : "))

year2 = int(input("Enter End Year : "))
month2 = int(input("Enter End Month : "))
day2 = int(input("Enter End Day : "))

date1 = date(year1,month1,day1)
date2 = date(year2,month2,day2)

print("Number of Days : ",(date2-date1).days)
```

```
Enter Start Year :  2024
Enter Start Month :  8
Enter Start Day :  24
Enter End Year :  2024
Enter End Month :  8
Enter End Day :  30

Number of Days :  6
```

[24]:
```
#PROGRAM 15
#Pattern Printing Function called show_stars(rows)
def show_stars(rows):
    for i in range(0,rows+1):
        print("*"*i)

show_stars(5)
```

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**
***
****
*****
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[29]:
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#PROGRAM 16
#Program to get the python version you are using
import sys
print(sys.version)
```

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3.11.3 (tags/v3.11.3:f3909b8, Apr  4 2023, 23:49:59) [MSC v.1934 64 bit (AMD64)]
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[ ]:
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