Exercise Programs on while and for loops

write a program to calculate the sum and average of first 10 numbers
```
i=0
s=0
while(i<=10):
        s=s+i
        i=i+1
avg=float(s)/10
print("The sum of first 10 numbers is:",s)
print("the average of first 10 numbers is: ",avg)
```


Write a program to print reverse of a number

```
num=int(input("Enter any number"))
s=0
while(num!=0):
        temp=num%10

        s=(s*10)+temp
        num=num//10
 print (s)
```


Write a program that accept any number and prints the number of digits and sum of digits in that number

```
number = int(input('Enter number : '))
digit_count = 0
total=0
while(number!=0):
        digit_count +=1
        total=total+(number%10)
        number = int(number/10)

print('Number of digits : ',digit_count)
print("Sum of digits of the given number: ",total)
```

Python program to check if the number provided by the user is an Armstrong number or not
```
num=int(input("Enter any number"))
sum = 0
# find the sum of the cube of each digit
temp = num
l=len(str(num))
while temp > 0:
  digit = temp % 10
  sum += digit ** l
  temp //= 10

# display the result
if num == sum:
  print(num,"is an Armstrong number")
else:
  print(num,"is not an Armstrong number")
#Armstring numbers are 1, 2, 3, 4, 5, 6, 7, 8, 9, 153, 370, 371, 407, 1634, 8208, 9474,
```

```
x,y,i=0,1,0
print (x)
while i<8:
    print(y)
    x,y = y,x+y
    i=i+1
#Program to di
```

```
while 1:
        x = int(input("Enter the first number : "))
        if(x==99):
                print("Congratulations...")
                break
        elif(x<99):
                print("Enter Again and Aim Higher...")
        else:
                print("Enter Again a Lower Number ....")
```

```
while 1:
        str = input("Enter a string : ")
        if(str=='QUIT'):
                break
        else:
                print(len(str))
```

```
while(1):
        num = int(input('Enter number : '))
        if(num == 999):
                break
        if(num>=0):
                print(bin(num))
```

```
n=int(input("Enter any number"))
s=0
for i in range(1,n+1):
        s=s+i
print("Sum of first",n,"natural numbers is",s)
```

```python
n = int(input("Enter the range : "))
for i in range(1,n):
        print(i, " ", i**2," ", i**3)
```

Write a program that displays all the numbers from 1-100 that are not divisible by 2 as well as by 3

```python
for i in range(1,100):
        if(i%2!=0 and i%3!=0):
                print(i)
```

Python Program to Find the Factorial of a Number
```python
num = int(input("Enter any number"))
# uncomment to take input from the user
#num = input("Enter a number: ")
factorial = 1
# check if the number is negative, positive or zero
if num < 0:
        print("Sorry, factorial does not exist for negative numbers")
elif num == 0:
        print("The factorial of 0 is 1")
else:
        for i in range(1,num + 1):
                factorial = factorial*i
        print("The factorial of",num,"is",factorial)
```

HCF of a given number

```python
x=int(input("Enter any number"))
y=int(input("Enter any number"))
if (x > y):
        smaller = y
else:
        smaller = x
for i in range(1, smaller+1):
        if((x % i == 0) and (y % i == 0)):
                hcf = i
print("HCF is",hcf)
```

Python program to check if the input number is prime or not
```python
num = int(input("Enter a number"))
# take input from the user
# num = int(input("Enter a number: "))
# prime numbers are greater than 1
if num > 1:
# check for factors
        for i in range(2,num):
                if (num % i) == 0:
                        print(num,"is not a prime number")
                        print("{}*{}={}".format(i,num//i,num))
                        break
        else:
                print(num,"is a prime number")
# if input number is less than
# or equal to 1, it is not prime
else:
        print(num,"is not a prime number")
```

#Write a program that prompts the user to enter five words. If the lenght of any word is less than 6 characters, then it asks the uder to enter it again. However , if the word is of 6 or more characters, then it displays it on the screen

```python
for i in range(5):
        str = input("Enter a string : ")
        if(len(str)<6):
                print("Enter again...")
                str = input("Enter a string : ")
        else:
                print(str)
```

```
*
* *
* * *
* * * *
* * * * *
```

```python
for i in range(1,6):
        print()
        for j in range(1,i+1):
                print('*',end=' ')
```

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

```python
for i in range(1,6):
        print()
        for j in range(1,i+1):
                print(j,end=' ')
```

```
A
A B
A B C
A B C D
A B C D E
```

```python
for i in range(1,6):
        print()
        for j in range(1,i+1):
                print(chr(j+64),end=' ')
```

```
* * * * *
* * * *
* * *
* *
*
```

```python
for i in range(1,6):
        print()
```

```
        for j in range(i,6):
                print('*',end=' ')
```
1 2 3 4 5
2 3 4 5
3 4 5
4 5
5

```
for i in range(1,6):
        print()
        for j in range(i,6):
                print(j,end=' ')
```

A B C D E
A B C D
A B C
A B
A

```
for i in range(1,6):
        print()
        k=1
        for j in range(i,6):
                print(chr(k+64),end=' ')
                k=k+1
```

Assignment programs on while and for

Using while loop:

Write a program to read the numbers until -1 is encountered also count the negative, positive, zero entered by the user?

```
negative=positive=zeros=0
print("Enter -1 to exit...")
while(1):
        num=int(input("Enter any number :"))
        if(num==-1):
                break
        if(num==0):
                zeros=zeros+1
        elif(num>0):
                positive=positive+1
        else:
                negative=negative+1
print("count of positive: ",positive)
print("count of negative: ",negative)
print("count of zeros: ",zeros)
```

Write a program that counts the number of lower case characters, upper case characters and digits entered by the user?

```
upper=lower=digit=0
while(1):
        x = input("Enter the first number : ")
        if(x.lower()=="exit"):
```

```
                    break
          if(x.isalpha() and x.isupper()):
                    upper=upper+1
          elif(x.isalpha() and x.islower()):
                    lower=lower+1
          elif(x.isdigit()):
                    digit=digit+1
print("Upper case letters count : ",upper)
print("Lower case letters count : ",lower)
print("digits count : ",digit)
```

write a program that reads integer until the user wants to stop. When the user stop entering numbers, display the largest of all the numbers entered?

```
ch = 'y'
largest = 0
while(ch == 'y'):
          num = int(input('Enter number : '))
          if(num > largest):
                    largest = num
          ch = input('cont(y/n)..')
print('Largest number is ',largest)
```

Write a program that prompts the user to enter numbers. Once the user enters -1 it display the counts, sum and average of the even numbers and odd numbers?

```
number=count_even=count_odd=sum_even=sum_odd=0
while(number!=-1):
          number = int(input('Enter number(-1 to finish) : '))
          if(number==-1):
                    break
          if(number%2==0):
                    count_even+=1
                    sum_even+=number
          else :
                    count_odd+=1
                    sum_odd+=number
print('Odd count : %d' %count_odd)
print('Even count : %d' %count_even)
print('Sum even : %d' %sum_even)
print('Sum odd : %d' %sum_odd)
if(count_even>1 and count_odd>1):
          print('Average even : %f' %(sum_even/count_even))
          print('Average odd : %f' %(sum_odd/count_odd))
```

A video library rents new videos for 75 rupees a day and old movie for 50 rupees a day. Write a program to calculate the total charge for a customer's video rentals. The program should prompt the user for the number of each type of video and output the total cost.

Using for loop:

Write a program that prompts user to enter five words if the length of any word is less than six characters then it asks the user to enter it again. However if the word is of six or more characters then it display it on screen?

```
for i in range(5):
          str = input("Enter a string : ")
```

```
        if(len(str)<6):
                print("Enter again...")
                str = input("Enter a string : ")
        else:
                print(str)
```

Write a program that prompts users to enter numbers. The process will repeat until user enters -1. Finally, the program prints the count of prime and composite numbers entered?

```
total_prime=0
total_composite=0
while(1):
        num=int(input("Enter no."))
        if(num==-1):
                break
        is_composite=0
        for i in range(2,num):
                if(num%i==0):
                        is_composite=1
                        break
        if(is_composite):
                total_composite+=1
        else:
                total_prime+=1
print("total composite :",total_composite)
print("total prime",total_prime)
```

Write a program to print the following pattern
```
*
**
***
****
*****
****
***
**
*
```

```
size = int(input('Enter size : '))
for i in range(1,size+1):
        print()
        for j in range(1,i+1):
                print('*', end = ' ')
for i in range(size,1,-1):
        print()
        for j in range(i,1,-1):
                print('*', end = ' ')
```

Write a program to print the following pattern
```
*****
*   *
*   *
*   *
*****
```

```
size = int(input('Enter size : '))
for i in range(1, size):
        for j in range(1,size):
```

```
                        if(i==1 or i==(size-1) or j==1 or j==(size-1)):
                                print('*',end= ' ')
                else:
                                print(' ',end = ' ')
            print('\n')
```

Write a program using for loop to calculate the value of an investment input an initial value of investment and annual interest, and calculate the value of investment over time?

```
initval=float(input("Enter the initial value"))
ROI=float(input("Enter the rate of interest"))
years=int(input("Enter the number of years for which investment has to be done:"))
futureval=initval
print("\tYear\t\t Value")
for i in range(1,years+1):
        futureval=futureval*(1+ROI/100.0)
        print(i,"\t\t",round(futureval,2))
```

Exercise Programs on Lists

Write a program that creates a list of words by combininig the words in two individual lists

```
words=[]
for x in["hello","world"]:
        for y in ["python","programming"]:
                word=x+y
                words.append(word)
print("Combining words are", words)
```

Write a program that forms a list of first character of every word in another list

```
list1=["Hello","welcome","to","the","world","of","python"]
letters=[]
for word in list1:
        letters.append(word[0])
print(letters)
```

 Write a program to print index at which a particular value exists. If the value exist at multiple locations in the list, then print all the indices. Also, count the number of times that value is repeated in the list

```
list1=[1,2,3,4,5,6,5,4,3,2,1]
num=int(input("Enter the value to be searched"))
for i in range(0,len(list1)):
        if(num==list1[i]):
                print(num,"found at location",i)

print  (num, "appears",list1.count(num),"times in the list")
```

Write a Python program to get the frequency of the elements in a list.

```
mylist = [10,10,10,10,20,20,20,20,40,40,50,50,30]
list1=[]
matchlist=[]
for i in mylist:
        if i in matchlist:
                continue
```

```
            matchlist.append(i)
            c=mylist.count(i)
            list1.append("{}:{}".format(i,c))
print list1
```

Write a program to remove all duplicates from a list

```
a = [10,20,30,20,10,50,60,40,80,50,40]
uniq_items = []
for x in a:
    if x not in uniq_items:
        uniq_items.append(x)
print(uniq_items)
```

Write a Python program to insert a given string at the beginning of all items in a list.

```
new=[]
num = [1,2,3,4]
for i in num:
        new.append("emp{}".format(i))
print new
```

Write a program to insert a value in a list at the specified location using while loop?

```
List = [1,2,3,4,6,7,8]
i = 0
l = len(List)
val = int(input("Enter a number : "))
pos = int(input("Enter the position : "))
j = pos
List.append(List[l-1])
while(j<=l):
        List[l] = List[l-1]
        l-=1
List[pos-1] = val
print(List)
```

Write a program that prompts the user to enter an alphabet. Print all the words in the list that starts with that alphabet?

```
List = ['ant', 'bat', 'cat','apple', 'bug', 'cake']
c = input("Enter a character (a/b/c) : ")
for word in List:
        if(word.startswith(c)):
                print(word)
```

Write a program that print all constants in a string using list comprehension

```
str1 = input("Enter a string : ")
l1=[]
new=str1.lower()
for i in new:
        if(i not in (['a','e','i','o','u'])):
                l1.append(i)
print (l1)
```

Write a program that prompts a number from user and adds it in a list.If the value entered by user is greater than 100, then add "Excess" in the list

```python
List = []
for i in range(5):
        num = int(input("Enter a number : "))
        if(num>100):
                List.append("EXCESS")
        else:
                List.append(num)
print(List)
```

Exercise Programs on tuples

Write a Python program to count the elements in a tuple and add the elements to a new tuple until an element is a tuple.Print the sum of nested tuple in the tuple?

```python
t=(1,2,3,(1,2,3),4)

s=0

for i in t:

        if(type(i)==tuple):

                break

        s=s+i

print(s)
```

Write a Python program to replace last value of tuples in a list with A,B,C grades?

 Example:mytuple=((1,2,70),(3,4,80),(5,6,90)

Output: ((1,2,'C'),(3,4,'B'),(5,6,'A))

```python
l = [(10, 20, 40), (40, 50, 60), (70, 80, 90)]

k=['A','B','C']

m=[]

for i in range(0,len(l)):

        m.append(l[i][:-1]+(k[i],))

print(m)
```

Write a Python program to check whether an element exists within a tuple or not without using any methods and functions?

```python
t=(1,2,3,4)

a=5
```

```
for i in t:

        if(i==a):

                print("found")

                break

else:

        print("not found")
```

List Assignment

Write a program that finds the sum of all the numbers in a list using while loop
```
mylist=[4,7,8,2,1]
i=0
s=0
while(i<len(mylist)):
        s=s+mylist[i]
        i=i+1
print("Sum is",s)
```

Write a program that finds sum of all even numbers in a list

```
mylist=[4,7,8,2,1]
s=0
for i in mylist:
        if(i%2==0):
                s=s+i
print("Sum of even numbers: ",s)
```

Write a program that reverse a list using a loop

```
mylist=[4,7,8,2,1]
new=[]
n=len(mylist)-1
while(n>=0):
        new.append(mylist[n])
        n=n-1
print(new)
```

Write a program to find whether a particular element is present in the list using a loop

```
mylist=[4,7,8,2,1]
n=int(input("Enter any element to search"))
for i in mylist:
        if(i==n):
                print("Element found")
                break
else:
        print("Element not found")
```

Write a program that counts the number of times a value appears in the list. Use a loop

```
mylist=[4,7,8,2,1,4,5]
n=int(input("Enter any element to search"))
count=0
for i in mylist:
        if(i==n):
                count=count+1
print("Total count of {} : {}".format(n,count))
```

Write a program that creates a list of numbers from 1-50 that is either divisible by 3 or divisible by 6.

```
mylist=[]
for i in range(1,51):
        if(i%3==0 or i%6==0):
                mylist.append(i)
print(mylist)
```

Create a list with a given size (minimum 10) of the list. Add the elements to the list of integer type elements with a combination of negative and positive.
   a.   Print the elements
   b.   Print the size of the list
   c.   Print first and last element
   d.   print duplicate elements in a list
   e.   Print last 3 elements
   f.   Print entire list except last 3
   g.   Update any index value with an user given element
   h.   Update 2 to 5 indexes with 100
   i.   print the updated list and new length of the list
   j.   Remove any element given by user
   k.   Delete elements from 3 to 6 locations
   l.   print the index of a element given by user
   m. check the list size if the size of the list is less than 10 then add remaining elements
   n.   print perfect elements from a list
   o.   Update all the list elements with character or string

```
mylist=[1, 2, -4, 3, 2, -5, 8, 1, -6, 10]
'''
n=int(input("How many elements you want insert into the list"))
for i in range(0,n):
        mylist.append(int(input("Enter any number")))'''
#Print the elements
print("list elements are: ",mylist)#[1, 2, -4, 3, 2, -5, 8, 1, -6, 10]
#Print the size of the list
print ("Size of the list: ",len(mylist))
#Print first and last element
print("first element is: ",mylist[0],"\n","Last element is: ",mylist[-1])
#print duplicate elements in a list
duplicate=[]
for i in mylist:
        if i not in duplicate:
                if(mylist.count(i)>1):
                        duplicate.append(i)
print("duplicate elements are",duplicate)
#Print last 3 elements
print("last 3 elements in a list: ",mylist[-3:])
#Print entire list except last 3
print("entire list except last 3 elements: ", mylist[0:-3])
```

```python
#Update any index value with an user given element
value=int(input("Enter any number to insert"))
index=int(input("Enter any index number to insert the value "))
mylist[index]=value#Update any index value with an user given element
#Update  2 to 5 indexes with 100
mylist[2:5]=[100]*(5-2)
#print the updated list and new length of the list
print(mylist)
print(len(mylist))
#Remove any element given by user
rval=int(input("Enter any number to remove"))
mylist.remove(rval)#Remove any element given by user
#Delete elements from 3 to 6 locations
del mylist[3:6]
#print the index of a element given by user
inval=int(input("Enter any number to know the index"))
print(mylist.index(inval))
#check the list size if the size of the list is less than 10 then add remaining elements
if(len(mylist)<10):
        for i in range(len(mylist),10):
                mylist.append(int(input("Enter any number")))
print(mylist)
#print perfect elements from a list
perfect=[]
for i in mylist:
        s=0
        for j in range(1,i):
                if(i%j==0):
                        s=s+j
        if(i==s):
                perfect.append(i)
print("Perfect elements are",perfect)
print("list elements are",mylist)
#Update all the list elements with character or string
mylist[:]=['A']*(len(mylist)-1)
print(mylist)
```

Tuple Assignment

Write a Python program to create a tuple with different data types and print one item.

Write a Python program to unpack a tuple in several variables.

Write a Python program to add an item in a tuple. Write the output clearly?

Write a Python program to convert a tuple to a string.

Write a Python program to get the 4th element and 4th element from last of a tuple.

Write a Python program to find the repeated items of a tuple.

Write a Python program to check whether an element exists within a tuple.

Write a Python program to convert a list to a tuple.

Write a Python program to remove an item from a tuple.

Write a Python program to slice a tuple.

Write a Python program to find the index of an item of a tuple.

Write a Python program to find the length of a tuple.

Write a Python program to reverse a tuple.

Write a Python program to replace last value of tuples in a list.
Sample list: [(10, 20, 40), (40, 50, 60), (70, 80, 90)]
Expected Output: [(10, 20, 100), (40, 50, 100), (70, 80, 100)]

Write a Python program to sort a tuple by its float element.
Sample data: [('item1', '12.20'), ('item2', '15.10'), ('item3', '24.5')]
Expected Output: [('item3', '24.5'), ('item2', '15.10'), ('item1', '12.20')]
Write a Python program to count the elements in a list until an element is a tuple.

```
#Write a Python program to create a tuple with different data types and print one item.
mytuple=("abc",20,'A')
print(mytuple[1])
#Write a Python program to unpack a tuple in several variables.
name,age,grade=mytuple
print("name: ",name)
print("age: ",age)
print("grade: ",grade)
#Write a Python program to add an item in a tuple. Write the output clearly?
mylist=list(mytuple)
mylist.append(90)
mytuple=tuple(mylist)
print(mytuple)
#Write a Python program to convert a tuple to a string.
print(str(mytuple))
#Write a Python program to get the 4th element and 4th element from last of a tuple.
mytuple=(21,31,90,21,65,50,21,65,78,90)
print(mytuple)
print("4th element is: ",mytuple[3])
print("4th element from last is: ",mytuple[-4])
#Write a Python program to find the repeated items of a tuple.
new_tuple=[]
for i in mytuple:
        if i not in new_tuple:
                if(mytuple.count(i)>1):
                        new_tuple.append(i)
duplicate_tuple=tuple(new_tuple)
print("repeated items are",duplicate_tuple)
#Write a Python program to check whether an element exists within a tuple.
n=int(input("Enter any number to check"))
if(n in mytuple):
        print("element found")
else:
        print("element not found")
#Write a Python program to convert a list to a tuple.
mylist=[1,2,3,4]
print(tuple(mylist))
#Write a Python program to remove an item from a tuple.
mylist=list(mytuple)
```

```python
rval=int(input("Enter any number to remove"))
mylist.remove(rval)
mytuple=tuple(mylist)
#Write a Python program to slice a tuple.
print(mytuple[2:4])
#Write a Python program to find the index of an item of a tuple.
inval=int(input("Enter any number to know the position"))
print("index of {} is {}".format(inval,mytuple.index(inval)))
#Write a Python program to find the length of a tuple.
print("length of tuple is",len(mytuple))
#Write a Python program to reverse a tuple.
print(mytuple[::-1])
#Write a Python program to replace last value of tuples in a list.
#Sample list: [(10, 20, 40), (40, 50, 60), (70, 80, 90)]
#Expected Output: [(10, 20, 100), (40, 50, 100), (70, 80, 100)]
my_list=[(10, 20, 40), (40, 50, 60), (70, 80, 90)]
new=[]
for i in my_list:
        new.append(i[:-1]+(100,))
print(new)
#Write a Python program to sort a tuple by its float element.
#Sample data: [('item1', '12.20'), ('item2', '15.10'), ('item3', '24.5')]
#Expected Output: [('item3', '24.5'), ('item2', '15.10'), ('item1', '12.20')]
#Write a Python program to count the elements in a list until an element is a tuple.
mylist=[4,6,7,9,(1,2,3),10,11]
c=0
for i in mylist:
        if(type(i)==tuple):
                break
        c=c+1
print("count is",c)
```