

CA Lab-V LAB on Python Programming

Assignment 1. Develop programs to understand the control structures of python

```
print("Select your Choice:")
```

```
print("1. For Loop")
```

```
print("2. While Loop")
```

```
choice = int( input() )
```

```
if( choice == 1 ):
```

```
    for x in range(1,8,2):
```

```
        print(x)
```

```
elif( choice == 2 ):
```

```
    count=1;
```

```
    while( count< 8):
```

```
        print(count)
```

```
        count+=2;
```

```
else:
```

```
    print( "Ok" )
```

Output: -

Select your Choice:

1. For Loop

2. While Loop

1

1

3

5

7

Assignment 2. Develop programs to learn different types of structures (list, dictionary, tuples) in python

```
print("Select your Choice:")
print("1. List")
print("2. Dictionary ")
print("3. Tuple")
choice = int( input() )
if( choice == 1 ):
    my_list = [1, 2, 3, 'example', 3.132] #creating list with data
    print(my_list)
    my_list.append([555, 12]) #add as a single element
    print(my_list)
    my_list.extend([234, 'more_example']) #add as different elements
    print(my_list)
    my_list.insert(1, 'insert_example') #add element
    print(my_list)
    del my_list[5] #delete element at index 5
    print(my_list)
    my_list.remove('example') #remove element with value
    print(my_list)
    a = my_list.pop(1) #pop element from list
    print('Popped Element: ', a, ' List remaining: ', my_list)
    my_list.clear() #empty the list
    print(my_list)
    my_list = [1, 2, 3, 'example', 3.132, 10, 30]
    for element in my_list: #access elements one by one
        print(element)
    print(my_list) #access all elements
    print(my_list[3]) #access index 3 element
    print(my_list[0:2]) #access elements from 0 to 1 and exclude 2
    print(my_list[::-1]) #access elements in reverse
    my_list = [1, 2, 3, 10, 30, 10]
    print(len(my_list)) #find length of list
```

```

    print(my_list.index(10)) #find index of element that occurs first
    print(my_list.count(10)) #find count of the element
    print(sorted(my_list)) #print sorted list but not c
elif( choice == 2 ):
    my_dict = {1: 'Python', 2: 'Java'} #dictionary with elements
    print(my_dict)
    my_dict = {'First': 'Python', 'Second': 'Java'}
    print(my_dict)
    my_dict['Second'] = 'C++' #changing element
    print(my_dict)
    my_dict['Third'] = 'Ruby' #adding key-value pair
    print(my_dict)
    my_dict = {'First': 'Python', 'Second': 'Java', 'Third': 'Ruby'}
    a = my_dict.pop('Third') #pop element
    print('Value:', a)
    print('Dictionary:', my_dict)
    b = my_dict.popitem() #pop the key-value pair
    print('Key, value pair:', b)
    print('Dictionary', my_dict)
    my_dict.clear() #empty dictionary
    print(my_dict)
    my_dict = {'First': 'Python', 'Second': 'Java'}
    print(my_dict['First']) #access elements using keys
    print(my_dict.get('Second'))
    my_dict = {'First': 'Python', 'Second': 'Java', 'Third': 'Ruby'}
    print(my_dict.keys()) #get keys
    print(my_dict.values()) #get values
    print(my_dict.items()) #get key-value pairs
elif( choice == 3 ):
    my_tuple = (1, 2, 3) #create tuple
    print(my_tuple)
    my_tuple2 = (1, 2, 3, 'edureka') #access elements
    for x in my_tuple2:
        print(x)

```

```

print(my_tuple2)
print(my_tuple2[0])
print(my_tuple2[:])
print(my_tuple2[3][4])
my_tuple = (1, 2, 3)
my_tuple = my_tuple + (4, 5, 6) #add elements
print(my_tuple)
my_tuple = (1, 2, 3, ['hindi', 'python'])
my_tuple[3][0] = 'english'
print(my_tuple)
print(my_tuple.count(2))
print(my_tuple.index(['english', 'python']))
else:
    print( "Ok" )

```

Output: -

Select your Choice:

1. List

2. Dictionary

3. Tuple

3

(1, 2, 3)

1

2

3

edureka

(1, 2, 3, 'edureka')

1

(1, 2, 3, 'edureka')

e

(1, 2, 3, 4, 5, 6)

(1, 2, 3, ['english', 'python'])

1

3

Assignment 3. Develop programs to learn concept of functions scoping, recursion and list mutability.

```
total = 0; # This is global variable. # Function definition is here
```

```
def sum( arg1, arg2 ):
    # Add both the parameters and return them."
    total = arg1 + arg2; # Here total is local variable.
    print ("Inside the function local total : ", total)
    return total;
```

```
def factorial(x):
    if x == 1:
        return 1
    else:
        return (x * factorial(x-1))
```

```
print("Select your Choice:")
print("1. Functions Scoping")
print("2. Recursion")
print("3. List Mutability")
choice = int( input() )
if( choice == 1 ):
    # Now you can call sum function
    sum( 10, 20 );
    print ("Outside the function global total : ", total)
elif( choice == 2 ):
    num = 4
    print("The factorial of", num, "is", factorial(num))
elif( choice == 3 ):
    my_list = [1, 2, 3, 'example', 3.132] #creating list with data
    print(my_list)
    my_list.append([555, 12]) #add as a single element
    print(my_list)
    my_list.extend([234, 'more_example']) #add as different elements
```

```

print(my_list)
my_list.insert(1, 'insert_example') #add element
print(my_list)
del my_list[5] #delete element at index 5
print(my_list)
my_list.remove('example') #remove element with value
print(my_list)
a = my_list.pop(1) #pop element from list
print('Popped Element: ', a, ' List remaining: ', my_list)
my_list.clear() #empty the list
print(my_list)
else:
    print( "Ok" )

```

Output: -

Select your Choice:

1. Functions Scoping
 2. Recursion
 3. List Mutability
- 3

[1, 2, 3, 'example', 3.132]

[1, 2, 3, 'example', 3.132, [555, 12]]

[1, 2, 3, 'example', 3.132, [555, 12], 234, 'more_example']

[1, 'insert_example', 2, 3, 'example', 3.132, [555, 12], 234, 'more_example']

[1, 'insert_example', 2, 3, 'example', [555, 12], 234, 'more_example']

[1, 'insert_example', 2, 3, [555, 12], 234, 'more_example']

Popped Element: insert_example List remaining: [1, 2, 3, [555, 12], 234, 'more_example']

[]

Assignment 4. Develop programs to understand object oriented programming using python.

```
class Parent:      # define parent class
    parentAttr = 100
    def __init__(self):
        print ("Calling parent constructor")
    def parentMethod(self):
        print ("Calling parent method")
    def setAttr(self, attr):
        self.parentAttr = attr
    def getAttr(self):
        print ("Parent attribute :", self.parentAttr)
```

```
class Child(Parent): # define child class
    def __init__(self):
        print ("Calling child constructor")
    def childMethod(self):
        print ("Calling child method")
```

```
c = Child()
c.childMethod()
c.parentMethod()
c.setAttr(200)
c.getAttr()
```

Output:-

```
Calling child constructor
Calling child method
Calling parent method
Parent attribute : 200
```

Assignment 5. Develop programs for data structure algorithms using python – searching, sorting and hash tables.

```
def LinearSearch(lys, element):
```

```
    for i in range (len(lys)):
```

```
        if lys[i] == element:
```

```
            return i
```

```
    return -1
```

```
def BinarySearch(lys, val):
```

```
    first = 0
```

```
    last = len(lys)-1
```

```
    index = -1
```

```
    while (first <= last) and (index == -1):
```

```
        mid = (first+last)//2
```

```
        if lys[mid] == val:
```

```
            index = mid
```

```
        else:
```

```
            if val<lys[mid]:
```

```
                last = mid -1
```

```
            else:
```

```
                first = mid +1
```

```
    return index
```

```
def bubblesort(list):
```

```
# Swap the elements to arrange in order
```

```
    for iter_num in range(len(list)-1,0,-1):
```

```
        for idx in range(iter_num):
```



```

    if list[idx]>list[idx+1]:

        temp = list[idx]

        list[idx] = list[idx+1]

        list[idx+1] = temp

def merge_sort(unsorted_list):

    if len(unsorted_list) <= 1:

        return unsorted_list

# Find the middle point and divide it

    middle = len(unsorted_list) // 2

    left_list = unsorted_list[:middle]

    right_list = unsorted_list[middle:]

    left_list = merge_sort(left_list)

    right_list = merge_sort(right_list)

    return list(merge(left_list, right_list))

# Merge the sorted halves

def merge(left_half, right_half):

    res = []

    while len(left_half) != 0 and len(right_half) != 0:

        if left_half[0] < right_half[0]:

            res.append(left_half[0])

            left_half.remove(left_half[0])

        else:

            res.append(right_half[0])

            right_half.remove(right_half[0])

```

```

if len(left_half) == 0:

    res = res + right_half

else:

    res = res + left_half

return res

def insertionSort(arr):

    if (n := len(arr)) <= 1:

        return

    for i in range(1, n):

        key = arr[i]

        # Move elements of arr[0..i-1], that are

        # greater than key, to one position ahead

        # of their current position

        j = i-1

        while j >=0 and key < arr[j] :

            arr[j+1] = arr[j]

            j -= 1

        arr[j+1] = key

def selectionSort(array, size):

    for ind in range(size):

        min_index = ind

        for j in range(ind + 1, size):

            # select the minimum element in every iteration

            if array[j] < array[min_index]:

```

```

        min_index = j

    # swapping the elements to sort the array

    (array[ind], array[min_index]) = (array[min_index], array[ind])

print("Select your Choice:")

print("1. Linear Search")

print("2. Binary Search")

print("3. Bubble Sort")

print("4. Merge Sort")

print("5. Insertion Sort")

print("6. Selection Sort")

print("7. Hash Table")

choice = int( input() )

if( choice == 1 ):

    print(LinearSearch([1,2,3,4,5,2,1], 5))

elif( choice == 2 ):

    print(BinarySearch([10,20,30,40,50], 40))

elif( choice == 3 ):

    list = [19,2,31,45,6,11,121,27]

    bubblesort(list)

    print(list)

elif( choice == 4 ):

    unsorted_list = [64, 34, 25, 12, 22, 11, 90]

    print(merge_sort(unsorted_list))

```

```

elif( choice == 5 ):

    arr = [12, 11, 13, 5, 6]

    insertionSort(arr)

    print(arr)

elif( choice == 6 ):

    arr = [-2, 45, 0, 11, -9,88,-97,-202,747]

    size = len(arr)

    selectionSort(arr, size)

    print(arr)

elif( choice == 7 ):

    # Declare a dictionary

    dict = {'Name': 'Zara', 'Age': 7, 'Class': 'First'}

    # Accessing the dictionary with its key

    print ("dict['Name']: ", dict['Name'])

    print ("dict['Age']: ", dict['Age'])

    dict['Age'] = 8; # update existing entry

    dict['School'] = "DPS School"; # Add new entry

    print ("dict['Age']: ", dict['Age'])

    print ("dict['School']: ", dict['School'])

    dict = {'Name': 'Zara', 'Age': 7, 'Class': 'First'}

    del dict['Name']; # remove entry with key 'Name'

    dict.clear();    # remove all entries in dict

    del dict ;      # delete entire dictionary

    print ("dict['Age']: ", dict['Age'])

```

```
print ("dict['School']: ", dict['School'])  
  
else:  
  
    print( "Ok" )
```

Output:-

Select your Choice:

1. Linear Search
2. Binary Search
3. Bubble Sort
4. Merge Sort
5. Insertion Sort
6. Selection Sort
7. Hash Table

3

[2, 6, 11, 19, 27, 31, 45, 121]

Assignment 6. Develop programs to learn regular expressions using python.

```
import re
```

```
#Return a list containing every occurrence of "ai":
```

```
txt1 = "The rain in Spain"
```

```
x1 = re.findall("ai", txt1)
```

```
print(x1)
```

```
txt2 = "The rain in Spain"
```

```
x2 = re.search("\s", txt2)
```

```
print("The first white-space character is located in position:", x2.start())
```

```
#Split the string at every white-space character:
```

```
txt3 = "The rain in Spain"
```

```
x3 = re.split("\s", txt3)
```

```
print(x3)
```

```
#Replace all white-space characters with the digit "9":
```

```
txt4 = "The rain in Spain"
```

```
x4 = re.sub("\s", "9", txt4)
```

```
print(x4)
```

```
txt5 = "The rain in Spain"
```

```
x5 = re.search("ai", txt5)
```

```
print(x5)
```

```
#Search for an upper case "S" character in the beginning of a word, and print the word:
```

```
txt6 = "The rain in Spain"
```

```
x6 = re.search(r"\bS\w+", txt6)
```

```
print(x6.group())
```

Output:-

['ai', 'ai']

The first white-space character is located in position: 3

['The', 'rain', 'in', 'Spain']

The9rain9in9Spain

<re.Match object; span=(5, 7), match='ai'>

Spain

Assignment 7. Demonstrate the concept of exception handling using try/except/else Statement, Unified try/except/finally, try/finally Statement, raise Statement, assert Statement, catch multiple specific exceptions

```
# Python code to illustrate
# working of try()
def divide(x, y):
    try:
        # Floor Division : Gives only Fractional
        # Part as Answer
        result = x // y
    except ZeroDivisionError:
        print("Sorry ! You are dividing by zero ")
    else:
        print("Yeah ! Your answer is :", result)
    finally:
        # this block is always executed
        # regardless of exception generation.
        print("This is always executed")

# Look at parameters and note the working of Program
divide(3, 2)
divide(3, 0)
```

```
# A python program to create user-defined exception
# class MyError is derived from super class Exception
class MyError(Exception):
```

```
    # Constructor or Initializer
    def __init__(self, value):
        self.value = value

    # __str__ is to print() the value
    def __str__(self):
        return(repr(self.value))
```

```
try:
    raise(MyError(3*2))
```

```
# Value of Exception is stored in error
except MyError as error:
    print('A New Exception occurred: ', error.value)
x = "hello"
#if condition returns False, AssertionError is raised:
assert x == "goodbye", "x should be 'hello'"
```

Output: -

```
Yeah ! Your answer is : 1
This is always executed
Sorry ! You are dividing by zero
This is always executed
A New Exception occurred: 6
```



```
-----  
AssertionError                                Traceback (most recent call last)  
<ipython-input-1-dfedc9c43237> in <module>  
    38 x = "hello"  
    39 #if condition returns False, AssertionError is raised:  
---> 40 assert x == "goodbye", "x should be 'hello'"
```

AssertionError: x should be 'hello'

Assignment 8. Demonstrate the concept of String-Based Exceptions, Class-Based Exceptions and Nesting Exception handlers.

```
#String-Based Exceptions
```

```
try:
    print(1 + '3')
except Exception as e:
    error_message = str(e)
    print(error_message)
    print(type(error_message))
```

```
#Class-Based Exceptions
```

```
class LowAgeError(Exception):
    def __init__(self):
        pass

    def __str__(self):
        return 'The age must be greater than 18 years'
```

```
class Employee:
    def __init__(self, name, age):
        self.name = name
        if age < 18:
            raise LowAgeError
        else:
            self.age = age

    def display(self):
        print("The name of the employee: " + self.name + ', Age: ' + str(self.age) + ' Years')
```

```
try:
    e1 = Employee('Subhas', 25)
    e1.display()

    e2 = Employee('Anupam', 12)
    e1.display()
except LowAgeError as e:
    print('Error Occurred: ' + str(e))
```

```
#Nested
x = 10
y = 0
```

```
try:
    print("outer try block")
    try:
        print("nested try block")
        print(x / y)
    except TypeError as te:
        print("nested except block")
```

```
        print(te)
except ZeroDivisionError as ze:
    print("outer except block")
    print(ze)
```

Output: -

```
unsupported operand type(s) for +: 'int' and 'str'
<class 'str'>
The name of the employee: Subhas, Age: 25 Years
Error Occurred: The age must be greater than 18 years
outer try block
nested try block
outer except block
division by zero
```

Assignment 9. Demonstrate implementation of the Anonymous Function Lambda.

```
# Finding the area of a triangle  
triangle = lambda m,n : 1/2 * m * n  
res=triangle(34,24)  
print("Area of the triangle: ",res)
```

Output: -
Area of the triangle: 408.0

Assignment 10. Demonstrate implementation functional programming tools such as filter and reduce

```
series = [23,45,57,39,1,3,95,3,8,85]
result = filter (lambda m: m > 29, series)
print('All the numbers greater than 29 in the series are :',list(result))
```

Output: -

All the numbers greater than 29 in the series are : [45, 57, 39, 95, 85]

```
from functools import reduce
series = [23,5,1,7,45,9,38,65,3]
sum = reduce (lambda m,n: m+n, series)
print('The total sum of all the elements in the list is :',sum)
```

Output: - The total sum of all the elements in the list is: 196

Assignment 11. Demonstrate the Module Creation, Module usage.

Step1: Click on New-Text File

Step2: Rename as module2.py

Step3: Write following code

```
def show(name):  
    print("Hello",name)
```

Step4: Click on New-Python3

Step5: Rename as Assignment11

Step6: Write following code

```
import module2  
module2.show("Manoj")
```

Step7: Run

Output: - Hello Manoj

Assignment 12. Demonstrate image insertion in python.

```
from PIL import Image  
myImage = Image.open("C:\\Users\\Admin\\Pictures\\d.png");  
myImage.show();
```

Output: -



Assignment 13. Demonstrate use of DataFrame method and use of .csv files.

Step1: Upload .csv file

Step2: Write code as follows

```
import pandas as pd
df=pd.read_csv("Ecommerce_Customers.csv")
df.head()
df.tail()
em = df["Email"]
print(em)
print(df.loc[1])
print(df.info())
```

Output:-

jupyter Assignment 13 Last Checkpoint: 5 minutes ago (autosaved) Logout

File Edit View Insert Cell Kernel Widgets Help Trusted Python 3

In [22]: 1 df.head()

Out[22]:

	Email	Address	Avatar	Avg. Session Length	Time on App	Time on Website	Length of Membership	Yearly Amount Spent
0	mstephenson@fernandez.com	835 Frank Tunnel\r\nWrightmouth, MI 82180-9605	Violet	34.497268	12.655651	39.577668	4.082621	587.951054
1	hduke@hotmail.com	4547 Archer Common\r\nDiazchester, CA 06566-8576	DarkGreen	31.926272	11.109461	37.268959	2.664034	392.204933
2	pallen@yahoo.com	24645 Valerie Unions Suite 582\r\nCobbborough,...	Bisque	33.000915	11.330278	37.110597	4.104543	487.547505
3	riverarebecca@gmail.com	1414 David Throughway\r\nPort Jason, OH 22070-...	SaddleBrown	34.305557	13.717514	36.721283	3.120179	581.852344
4	mstephens@davidson-herman.com	14023 Rodriguez Passage\r\nPort Jacobville, PR...	MediumAquaMarine	33.330673	12.795189	37.536653	4.446308	599.406092

In [23]: 1 df.tail()

Out[23]:

	Email	Address	Avatar	Avg. Session Length	Time on App	Time on Website	Length of Membership	Yearly Amount Spent
44	christopher20@gmail.com	USNV Fuller\r\nFPO AE 32122-5711	Snow	32.044486	13.414935	36.112435	2.258686	448.229829
45	brianwilson@yahoo.com	448 Stewart Divide\r\nNew Ashleyfort, FM 84050	BurlyWood	34.555768	12.170525	39.131097	3.663105	549.860590
46	gonzaleskatie@gmail.com	70129 Darrell Spring\r\nThomasmouth, HI 39319-...	Moccasin	34.564558	13.146551	37.335446	3.876875	593.915003
47	lsmith@chung.com	412 Jackson River\r\nKleinburgh, KS 52039-7404	BlueViolet	32.726785	12.988510	36.462003	4.113226	563.672873
48	dongarcia@hotmail.com	546 Benjamin Lights Suite 421\r\nRomerofurt, N...	MediumBlue	33.117219	11.864126	36.582728	3.202531	479.731949

In [24]: 1 em = df["Email"]
2 print(em)

Assignment 14. Develop programs to learn GUI programming using Tkinter

```
from tkinter import *
import tkinter
def helloCallBack():
    print("Name=",t1.get())
    i=radio.get()
    if i==1:
        print("Gender=Male")
    else:
        print("Gender=Female")
    j=chk1.get()
    k=chk2.get()
    l=chk3.get()
    str=""
    if j==1:
        str=str+" "+"Red"
    if k==2:
        str=str+" "+"Green"
    if l==3:
        str=str+" "+"Blue"
    print("Color=",str)
    for i in lb1.curselection():
        print(lb1.get(i))

base = Tk()
base.geometry('600x600')
base.title("Registration Form")
l1 = Label(base, text="Enter Name",width=20,font=("bold", 10))
l1.place(x=90,y=55)
t1 = Entry(base)
t1.place(x=220,y=55)

radio=IntVar()
l2= Label(base, text="Select Gender",width=20,font=("bold", 10))
l2.place(x=94,y=93)
r1 = Radiobutton(base, text="Male", value=1,variable=radio)
r1.place(x=220,y=93)
r2 = Radiobutton(base, text="Female", value=2,variable=radio)
r2.place(x=280,y=93)

l3= Label(base, text="Select Class",width=20,font=("bold", 10))
l3.place(x=90,y=123)
lb1 = Listbox(base)
lb1.insert(1, "MCA-I")
lb1.insert(2, "MCA-II")
lb1.insert(3, "MCA-III")
lb1.place(x=230,y=123)
```

```

chk1=IntVar()
chk2=IntVar()
chk3=IntVar()
l4= Label(base, text="Select Color",width=20,font=("bold", 10))
l4.place(x=90,y=300)
c1 = Checkbutton(base,text = "Red",width = 20, onvalue=1,variable=chk1)
c1.place(x=220,y=300)
c2 = Checkbutton(base,text = "Green",width = 20,onvalue=2,variable=chk2)
c2.place(x=340,y=300)
c3 = Checkbutton(base,text = "Blue",width = 20,onvalue=3,variable=chk3)
c3.place(x=460,y=300)

b1 = Button(base, text ="Click", command = helloCallBack)
b1.place(x=190,y=380)
base.mainloop()

```

Output:-

Registration Form

Enter Name

Select Gender ☒ Male ☐ Female

Select Class

- MCA-I
- MCA-II
- MCA-III

Select Color ☒ Red ☒ Green ☐ Blue

Name= abc
 Gender=Male
 Color= Red Green
 MCA-I