MAR GREGORIOS COLLEGE OF ARTS & SCIENCE

(Approved by the Govt. of Tamil Nadu and Affiliated to University of Madras)

Block No.8, Mogappair West, Chennai-600037.

DEPARTMENT OF COMPUTER SCIENCE

LAB RECORD

ADVANCED PYTHON PROGRAMMING LAB

November - 2023

Name :

Register Number :

MASTER OF COMPUTER SCIENCE , SHIFT - I

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This is certified to be bonafide record of practical work done by _____Register No._____of I Year Master of Computer Science in_____subject during NOVEMBER-2023.

Head of the Department **Lecturer In-Charge**

Submitted for the University Examination held in_____at Mar Gregorios College.

Date:_____ Examiners

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2)

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ADVANCED PYTHON PROGRAMMING LAB

LAB RECORD

NOVEMBER-2023.

COMPLETED

No. of Experiments : ..... Signature

Date : .....

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EXCEPTION

(a) Program to catch following exception

(1) VALUE ERROR

```
import math
x = int(input("Enter positive number :"))
try
print('square root of',x,'is',math,squrt(x))
except value Error as ve:
print("Please enter the positive number")
```

OUTPUT

Enter positive number :2

square root of 2 is 1.414

Enter positive number :-2

Please enter the positive number

RESULT

Thus,the program was executed successfully.

(2) INDEX ERROR

```
import sys
try
my_list=[3,7,9,4,6]
   print(my_list[6])
except IndexError as e:
    print(e)
print(sys.executable)
```

OUTPUT

IndexError : List index out of range

RESULT

Thus,the program was executed successfully.

(3) NAME ERROR

```
def geek_message():
    try
        geek = “Geeks For Geeks”
        return geeksforgeeks
except NameError:
        return”NameError occurred same variable isn’t defined”
print(geek_message())
```

OUTPUT

NameError occurred same variable isn’t defined

RESULT

Thus,the program was executed successfully.

(4) TYPE ERROR

```
geeky_list=[“Geeky”,”GeeksforGeeks”,”SuperGeek”,”Gee
k”]
indices=[0,1,”2”,3]
for i in range(len(indices)):
    try:
        print(geeky_list[indices[i]])
        except TypeError:
print(“TypeError:check,list of indices”)
```

OUTPUT

Geeky

GeeksforGeeks

TypeError:check list of indices

Geek

RESULT

Thus,the program was executed successfully.

(5) DIVIDE ZERO ERROR

```
def sample(num)
try:
   div=1/num
except ZeroDiisionError:
print("We cannot divide by zero")
else:
print(div)
num=int(input("Enter the number :"))
sample(num)
```

OUTPUT

Enter the number : 0

We cannot divide by zero

RESULT

Thus,the program was executed successfully.

(b) Python program to create user defined exception

```
class PercentageError(Exception):
    pass
class InvalidPercentageError(Percentage Error):
    def_init_(self):
super()._init_("percentage is invalid")
class LessPercentageError(PercentageError)
    def_init_(self):
super()._init_("The percentage is lesser then the cut-off,Please try again:")
    class checkPercentage(PercentageError):
        def_init_(self.per):
        if per<80:
            raise LessPercentageError
        if per>100:
            raise InvalidPercentageError
       print("Congrats you're Enrolled")
```

```
try:
        print(“For percentage:93”)
       checkPercentage(93)
       except Exception as e:
                print(e)
try:
      print(“\n For Percentage: 102”)
      checkPercentage(102)
      except Exception as e:
                print(e)
try:
        print(“\n For percentage:58”)
        checkPercentage(58)
        except Exception as e:
                 print(e)
```

OUTPUT

For percentage:93

Congrats you’re Enrolled

For percentage:102

Percentage is invalid

For percentage:58

The percentage is lesser then the cut-off,please try again

RESULT

Thus,the program was executed successfully.

(c) Python program to understand the use of else and finally block with try block

```
try:
X=int(input("Enter a number :"))
except:
print("An error occurred!")
else
print("The number entered is",X)
finally:
print("Program ended")
```

OUTPUT

```
Enter a number : a
An error occurred!
Program ended
Enter a number : 20
The number entered is 20
Program ended
```

RESULT

Thus,the program was executed successfully.

(d) Python program that user raise and exception class to throw an exception

```
try:
  a = int(input("Enter a positive integer :")
  if a<=0:
      raise ValueError("This is not a positive integer!")
except ValueError as e:
      print(e)
```

OUTPUT

```
Enter a positive integer : -1
This is not a positive integer!
```

RESULT

Thus,the program was executed successfully.

NUMPY LIBRARY

(a) Create a numpy array rom list,tuple with float type

```
import numpy as np
npArray=np.array([1.3,2.6,3.4,4.3,5.4,6.8,7.2,8.5,9.3]dtype=floa
t)
print("Contents of the npArray:",npArray)
print(npArray[2:5])
print(npArray[:4])
print(npArray[5:])
print(npArray[:])
#tuple
tuple1=([8.5,4.2.6],[1,2,3.5])
array2=np.asarray(tuple1)
print(array2)
s=np.array([0,1,2,3,4,5,6,7,8,9])
print(s[2:5])
print(s[:4])
print([6:1])
print([:])
```

OUTPUT

Contents of the
npArray:[1.3,2.6,3.4,4.3,5.4,6.8,7.2,8.5,9.3]

[3.4,4.3,5.4]

[1.3,2.6,3.4,4.3]

[7.2,8.5,9.3]

[1.3,2.6,3.4,4.3,5.4,6.3,7.2,8.5,9.3]

[3,4,5]

[0,1,2,3,4]

[7,8,9]

[0,1,2,3,4,5,6,7,8,9]

RESULT

Thus,the program was executed successfully**.**

(b) Python program to demonstrate slicing integer and Boolean array indexing

```
import numpy as np
arr=np.array([[1,2,0,-4],[4,6,7,0],[3,-7,8,5]])
#Slicing array
temp=arr[:2,::2]
print("Array with first 2 rows and alternate columns (0and2):\n",temp)
#indexing array
temp=arr[[0,1,2,1],[3,2,1,0]]
print("\n Elements at indices(0,2),(1,2),(2,1),(2,0):\n",temp)
```

OUTPUT

Array with first 2 rows and alternate columns (0and2):[[1 0] [4 7]]

Elements at indices(0,2),(1,2),(2,1),(2,0): [-4 7 -7 4]

RESULT

Thus,the program was executed successfully**.**

(c) Python program to find min,max,sum,cumulative sum of array

```
import numpy as np
x=np.array([[0,1],[2,3]])
print("Original array:")
print(x)
print("Minimum element of an array:")
print(np.min(x))
print("Maximum element of an array:")
print(np.max(x))
print("Sum of all element:")
print(np.sum(x))
print("Sum of each column:")
print(np.sum(x,axis=0))
print("Sum of each row:")
print(np.sum(x,axis=1))
print("Cumulative sum of an array:")
print(np.cumsum(x))
```

OUTPUT

Original array:[[0 1] [2 3]]

Minimum element of an array: 0

Maximum element of an array: 3

Sum of all element: 6

Sum of each column: [2 4]

Sum of each row: [1 5]

Cumulative sum of an array: [0 1 3 6]

RESULT

Thus,the program was executed successfully.

(d) Python program to demonstate use of ndim,shape,size,dtype

```
import numpy as np
a=np.array([[[1,2,3],[4,5,6],[7,8,9],[10,11,12]]])
print(“Dimension of the given Ndarray=”,a.ndim)
print(“Shape of the given Ndarray=”,a.shape)
print(“Size of the given Ndarray=“,a.size)
print(“Data type of the given Ndarray=”,a.dtype)
print(“Size of the each element in Ndarray=”,a.itemsize)
```

OUTPUT

Dimension of the given Ndarray=3

Shape of the given Ndarray=(1,4,3)

Size of the given Ndarray=12

Data type of the given Ndarray=int32

Size of the each element in Ndarray=4

RESULT

Thus,the program was executed successfully.

NUMBER LIBRARY-LINEAR ALGEBRA

(a) Python program to find rank,determinant and trace of an array

```
import numpy as np
mat=np.array([[50,29],[30,44]])
print("Numpy matrix is:")
print(mat)
det=np.linalg.det(mat)
print("\n Determinant of given 2*2 matrix:")
print(int(det))
rank=np.linalg.matrix_rank(mat)
print("Rank of the given matrix is:",rank)
print("Trace of the matrix:",mat,trace())
```

OUTPUT

Numpy matrix is:[[50 29] [30 44]]

Determinant of given 2*2 matrix:1330

Rank of the given matrix is:2

Trace of the matrix:94

RESULT

Thus,the program was executed successfully.

(b) Python program to find eigan values of matrices

```
import numpy as np
a=np.array([[3,1],[2,]])
w=np.linalg.eig(a)
print(w)
```

OUTPUT

Array([3.73205081,0.26794919]

RESULT

Thus,the program was executed successfully.

(c) Python program to find matrix and vector products matrix exponentiation

```
import numpy as np
from numpy.linalg import matrix_power
a=np.array([2,6])
b=np.array([3,10])
print("Vector:")
print("a=",b)
print("\n Inner product of vector a and b=")
print(np.inner(a,b))
print("\n Outer product of vector a and b=\n")
print("Matrix Exponentiation")
i=np.array([[0,1].[-1,0]])
print(matrix_power(i,3))
```

OUTPUT

Vector:a=[2 6] b=[3 10]

Inner product of vector a and b= 66

Outer product of vector a and b= [[6 20] [18 60]]

Matrix Exponentiation [[0 -1] [1 0]]

RESULT

Thus,the program was executed successfully.

(d) Python program to solve a linear matrix equation or system of linear scalar equation

```
import numpy as np
arr1=np.array([[1,2],[3,5]])
arr2=np.array([1,2])
print("Result…",np.linalg.solve(arr1,arr2))
```

OUTPUT

Result…[-1,1]

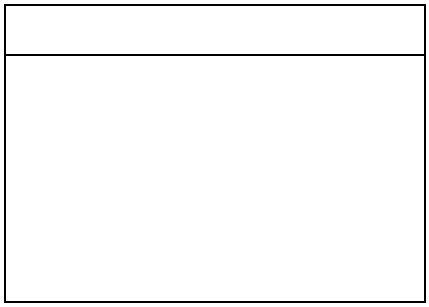
RESULT

Thus,the program was executed successfully.

(e) Create a white image using Numpy in python

```
#importing the libraries
import cv2
import numpy as np
#creating an array using np.full
#255 is code for white color
array_created=np.full((500,500,3),255,dtype=np.uint8)
#displaying the image
cv2.imshow(“image”,array_created)
```

OUTPUT



RESULT

Thus,the program was executed successfully.

(f) Convert a numpy array to an image and convert image to Numpy array

```
import numpy as np
from PIL import Image as im
def main():
        array=np.arange(0,737280,1,np.uint8)
        print(type(array))
        print(array.shape)
        array=np.reshape(array,(1024,720))
        print(array.shape)
        print(array)
        data=im.fromarray(array)
        data.save('gfg_dummy_pic.png')
if_name_==”_main_”:
main()
```

OUTPUT

```
<class 'numpy.ndarray'>
(737280,)
(1024,720)
[[  0     1     2   … 205 206 207]
 [208 209 210 … 157 158 159]
 [160 161 162 … 109 110 111]
  …
 [144 145 146 … 93  94  95]
 [ 96  97  98 … 45 46 47]
 [ 48  49  50 … 253 254 255]]
```

RESULT

Thus,the program was executed successfully.

(g) Perform sorting,searching and counting using numpy method

```
import numpy as np
Arr=np.array([[1,20,5],[21,4,3],[11,5,50]])
SortedArr=np.sort(Arr)
print(“Hello world”)
print(“Original Array:”)
print(“\n Sorted Array:”)
print(SortedArr)
CountingArr=np.sum(Arr)
Print(CountingArr)
```

OUTPUT

Hello world

Original Array:[[1 20 5] [21 4 3][11 5 50]]

Sorted Array:[[1 5 20] [3 4 21] [5 11 50]]

120

RESULT

Thus,the program was executed successfully.

h) Python program to demonstrate the use of reshape() method

```
import numpy as geek
array1 = geek.arange(4)
print(“Original array : \n”,array1)
array2 = geek.arange(4).reshape(2,2)
print(“\n array reshaped with 2 rows and 4 columns : \n”, array2)
```

OUTPUT :

Original array :

[0 1 2 3]

Array reshaped with 2 rows and 4 columns :

[[0 1]

[2 3]]

RESULT :

Thus the program was executed successfully.

PANDAS LIBRARY

a) Python program to implement pandas series with labels

```
import pandas as pd
import numpy as np
data = np.array(['g','e','e','k','f','o','r','g','e','e','k','s'])
ser = pd.series(data,index = [10,11,12,13,14,15,16,17,18,19,20,21,22])
print(ser[18])
```

OUTPUT :

g

RESULT :

Thus the program was executed successfully.

b) Create a pandas series from a dictionary

```
import pandas as pd
dictionary = {‘A’:10,’B’:63,’C’:32}
s = pd.series(dictionary)
print(s)
```

OUTPUT :

A 10

B 63

C 32

RESULT :

Thus the program was executed successfully.

c) Creating a pandas data frame

```
import pandas as pd

data = {‘key’:[‘k0’,’k1’,’k2’,’k3’,’k4’],
’Name’:[‘ram’,’uma’,’tom’,’tim’,’jim’] ,‘Age’:[22,23,21,24,32];
‘Qualification’:[‘mca’,’msc’,’ma’,’mba’,’phd’]}

df = pd.DataFrame(data)

print(df)
```

OUTPUT :

	Key	Name	Age	Qualification
0	k0	ram	22	mca
1	k1	uma	23	msc
2	k2	tom	21	ma
3	k3	tim	24	mba
4	k4	jim	32	phd

RESULT :

Thus the program was executed successfully.

d) Program which make use of following pandas methods

i) describe( ) tail ( )

```
import pandas as pd
#define a dictionary containing employee data
data = {‘Name’:’jai’,’princi’,’gaurav’,’anuj’],’Age’:’27’,’24’,’22’,23’],
‘Qualification’:’Msc’,’MA’,’MCA’,’Phd’]}
#convert the dictionary into dateframe
df = pd.DtaeFrame(data)
address = [‘Delhi’,’Bangalore’,’Chennai’,’Patna’]
df[‘Address’]=address
df.drop([“Qualification”], axis=1, inplace=True)
print(df.describe( ))
df.tail(2)
```

OUTPUT :

	Name	Age	Address
2	Gaurav	22	Chennai
3	Anuj	32	Patna

RESULT :

Thus the program was executed successfully.

ii) head( )

```
import pandas as pd

#define a dictionary containing employee data

data =
{‘Name’:[‘jai’,’princi’,’gaurav’,’anuj’],’Age’:[27,24,22,32],’Qualification’:[‘
Msc’,’MA’,’MCA’,’Phd’]}

#convert the dictionary into DataFrame

df=pd.DataFrame(data)

address=[‘Delhi’,’Bangalore’,’Chennai’,’Panta’]

df[‘Address’]=address

df.drop([“Qualification”],axis=1, inplace=True)

df.head(2)
```

OUTPUT :

	Name	Age	Address
0	Jai	27	Delhi
1	Princi	24	Bangalore

RESULT :

Thus the program was executed successfully.

e) Convert data frame to numpy array

```
#initialize a dataframe
df=pd.DataFrame([[1,2,3],[4,5,6],[7,8,9,],[10,11,12]], columns=['a','b','c'])
#convert dataframe to numpy array
arr = df.to_numpy( )
print('\nNumpy Array \n----------\n', arr)
print(type(arr))
```

OUTPUT :

```
Numpy Array
[ [ 1  2  3]
  [4  5   6]
  [7  8  9]
  [10  11  12]]
<class ‘numpy.ndarray’>
```

RESULT :

Thus the program was executed successfully.

f) Python that demonstrate the column selection, column addition and column deletion

```
#import pandas package

import pandas as pd

#Define a dictionary containing employee data

data = {‘Name’:’jai’,’princi’,’gaurav’,’anuj’],’Age’:’27’,’24’,’22’,23’],
‘Qualification’:’Msc’,’MA’,’MCA’,’Phd’]}

#convert the dictionary into dateframe

df = pd.DtaeFrame(data)

address = [‘Delhi’,’Bangalore’,’Chennai’,’Patna’]

df[‘Address’]=address

df.drop([“Qualification”], axis=1, inplace=True)

#select two columns

print(df[[‘Name’,’Address’]])
```

OUTPUT :

	Name	Address
0	Jai	Delhi
1	Princi	Bangalore
2	Gaurav	Chennai
3	Anuj	Patna

RESULT :

Thus the program was executed successfully.

g) Program that demonstrate the row selection, row deletion and deletion

```
import pandas as pd

import numpy as np

dict={‘name’:[‘sneha’,’logi’,’vini’,’sri’,’vidhya’],’address’:[‘kanpur’,’luckno
w’,’chennai’,’ponneri’,’redhills’],’tamil’:[90,88,76,44,22],’english’:[88,90,65,
44,35],’maths’:[45,67,89,98,67]}

df=pd.DataFrame(dict)

print(df)

print(“after selecting 4th row”)

print(df.iloc[3])

df2={‘name’:’kala’,’address’:’lucknow’,’tamil’:88,’english’:90,’maths’:67}

df=df.append(df2,ignore_index=True)

print(df)

print(“after deleting”)

df=df.drop(df.index[1])

print(df)
```

OUTPUT :

	Name	Address	tamil	english	maths
0	sneha	Kanpur	90	88	45
1	logi	lucknow	88	90	67
2	vini	Chennai	76	65	89
3	sri	ponneri	44	44	98
4	vidhya	redhills	22	35	67

After selecting 4th row

Name sri

Address ponneri

Tamil 44

English 44

Maths 98

Name	Address	tamil	english	maths
0 sneha	Kanpur	90	88	45
1 logi	lucknow	88	90	67
2 vini	Chennai	76	65	89
3 sri	ponneri	44	44	98
4 vidhya	redhills	22	35	67
5 kala	lucknow	88	90	67

After deleting

0	sneha	Kanpur	90	88	45
2	vini	Chennai	76	65	89
3	sri	ponneri	44	44	98
4	vidhya	redhills	22	35	67
5	kala	lucknow	88	90	67

RESULT :

Thus the program was executed successfully.

h) Get n-largest and n- smallest values from a particular columns

```
import pandas as pd

df=pd.DataFrame([[10,20,30,40],[7,14,21,28],[55,15,8,12],[15,14,1,8],[7,1,1,
8],[95,4,9,2]],
columns=['apple','orange','banana','pear'],index=['basket1','basket2','baske
t3','basket4','basket5','basket6'])

print("\n--------nsmallest----------\n")

print(df.nsmallest(2,['aple']))

print("\n--------nlargest----------\n")

print(df.nlargest(2,['aple']))
```

OUTPUT :

--------nsmallest----------

	Apple	Orange	Banana	Pear
Basket 6	5	4	9	2
Basket 2	7	14	21	20

----------nlargest----------

	Apple	Orange	Banana	Pear
Basket 3	55	15	8	12
Basket 4	15	14	1	8

RESULT :

Thus the program was executed successfully.

VISUALIZATION

a) Write a program to demonstrate us of group by ( ) method

```
import pandas as pd
#creating the dataframe
df=pd.read_csv(nba.csv")
#first grouping based on "Team"
#within each team we are grouping base on "Position"
gkk = df.groupby(['Team','Position'])
#print the first value in each group
gkk.first( )
```

OUTPUT :

Team	Position	Name	Number	Age	Height	Weight	College	Salary
Atlanta Hawks	C	AJ Horford	15.0	30	6-10	245.0	Florida	12000000.0D
	PF	Kris Humphriess	43.0	31	6-9	235.0	Minnesota	1000000.0D
	PG	Dennis Schroder	17.0	22	6-1	172.0	Wage forest	1763400.0D
	SF	Kent Bazemore	24.0	26	6-5	201.0	Old dominion	2000000.0D
	SG	Tim Hardaway Jr	10.0	24	6-6	205.0	Michigan	1304520.0D
Boston Cettics	C	Kelly Olynyk	41.0	25	7-0	238.0	Gonzage	2165160.0D
	PF	Jones Jerebko	8.0	29	6-10	231.0	LSU	5000000.0D
	PG	Avery Bradley	0.0	25	6-2	180.0	Texas	7730337.0D
	SF	Jae Crowder	99.0	25	6-6	235.0	Marquette	6796117.0D
	SG	John Holland	30.0	27	6-5	205.0	Boton university	1148640.0D
Brooklyn Nets	C	Brook Lopez	11.0	28	7-0	275.0	Stanford	19689000.0D
	PF	Chris McCullough	1.0	21	6-11	200.0	Syracuse	1140240.0D
	PG	Jarret Jack	2.0	32	6-3	200.0	Georgia tech	6300000.0D
	SG	Bojin Bogdanobic	44.0	27	6-8	216.0	Oklahoma state	3425510.0D
Charlote Horne	C	AJ Jefferson	25.0	31	6-10	289.0	Wisconsin	13500000.0D
	PF	Taylor Hansbrough	50.0	30	6-9	250.0	North Carolina	947276.0D
	PG	Jorge Gutierrtz	12.0	27	6-3	189.0	California	189455.0D
	SFf	Michael Kidd-Gilchr	14.0	22	6-7	232.0	Kentucky	6331404.0D

RESULT :

Thus the program was executed successfully.

b) Program to demonstrate pandas merging joining and concatenting

A) Merging :

```
#importing panda module

import  pandas as pd

#define a dictionary containing employee  data

data1={‘key’:[‘K0’,’K1’,’K2’,’K3’],‘Name’:[‘Jai’,’Princi’,’Gaurav’,’Anuj’], ‘Age’:[‘27’,’24’,’22’,32’]}

#define a dictionary containing employee  data

data1={‘key’:[‘K0’,’K1’,’K2’,’K3’],‘Address’:[‘Nagpur’,’Kanpur’,’Allahabad’,’Kannuaj’], ‘Qualification’:[‘Btech’,’BA’,’Bcom’,Bhons’]}

#convert the dictionary into DataFrame

df=pd.DataFrame(data1)

#convert the dictionary into DataFrame

df1=pd.DataFrame(data2)

print(df,”\n\n”,df1)
```

Run on IDE

Now we are using .merge() with one unique key combination

```
#using .merge( ) function
```

```
res=pd.merge(df, df1, on='key')
res
```

OUTPUT :

```
   Key  Name   Age
0  K0   Jai     27
1  K1   Princi  24
2  K2   Gaurav  22
3  K3   Anuj    32
```

```
   Key  Address    Qaulification
0  K0   Nagpur     Btech
1  K1   Kanpur     BA
2  K2   Allahabad  BCom
3  K3   Kannuaj    Bhons
```

	Key	Name	Age	Address	Qualification
0	K0	Jai	27	Nagpur	Btech
1	K1	Princi	24	Kanpur	BA
2	K2	Gaurav	22	Allahabad	Bcom
3	K3	Anuj	32	Kanuaj	Bhons

RESULT :

Thus the program was executed successfully

B) Ccncatenation:

```
#importing panda module

import  pandas as pd

#define a dictionary containing employee  data

data1={‘Name’:[‘Jai’,’Princi’,’Gaurav’,’Anuj’], ‘Age’:[‘27’,’24’,’22’,32’],
‘Address’:[‘Nagpur’,’Kanpur’,’Allahabad’,’Kannuaj’],
‘Qualification’:[‘Msc’,’MA’,’MCAaaaa’,Phd’]}

#define a dictionary containing employee  data

data2={‘Name’:[‘Abhi’,’Ayushi’,’Dhiraj’,’Hitesh’],
‘Age’:[‘17’,’14’,’12’,52’],
‘Address’:[‘Nagpur’,’Kanpur’,’Allahabad’,’Kannuaj’],
‘Qualification’:[‘Btech’,’BA’,’Bcom’,Bhons’]}

#convert the dictionary into DataFrame

df=pd.DateFrame(data1, index=[0,1,2,3])

#convert the dictionary into DataFrame

df=pd.DateFrame(data1, index=[4,5,6,7])

print (df, “\n\n”, df1)

#using a. concat( ) method

frames=[df, df1]

res1=pd.concat(frames)

res1
```

OUTPUT :

	Name	Age	Address	Qaulification
0	Jai	27	Nagpur	Msc
1	Princi	24	Kanpur	MA
2	Gaurav	22	Allahabad	MCA
3	Anuj	32	Kannuaj	Phd
4	Abhi	17	Nagpur	Btech
5	Ayusthi	14	Kanpur	BA
6	Dhiraj	12	Allahabad	BCom
7	Hitesh	52	Kannuaj	Bhons

	Name	Age	Address	Qaulification
0	Jai	27	Nagpur	Msc
1	Princi	24	Kanpur	MA
2	Guarav	22	Allahabad	MCA
3	Anuj	32	Kannuaj	Phd
4	Abhi	17	Nagpur	Btech
5	Ayusthi	14	Kanpur	BA
6	Dhiraj	12	Allahabad	BCom
7	Hitesh	52	Kannuaj	Bhons

RESULT :

Thus the program was executed successfully

C) Joining:

```
#importing padas module

Import pandas as pd

#define a dictionary containing employee details

data1={‘Name’:[’Jai’,’Princi’,’Gaurav’,’Anuj’], ‘Address’:
[‘Nagpur’,’Kanpur’,’Allahabad’,’Kanniaj’],
‘Qualification’:[‘Msc’,’MA’,’MCA’,’Phd’], ‘Mobile no’:[97,91,58,76]}

#define a dictionary containing employee details

data2={‘Name’:[’Gaurav’,’Anuj’,’Dhiraj’,’Hitesh’], ‘Age’:[22,32,12,52],
‘Address’: [‘Allahabad’,’Kannauj’,’Allahabad’,’Kannuaj’],
‘Qualification’:[’MCA’,’Phd’,’Bcom’,’Bhons’],
‘Salary’:[1000,2000,3000,4000]}

#convert the dictionary into DataFrame

df=pd.DataFrame(data1, index=[0,1,2,3]

#convert the dictionary into DataFrame

df=pd.DataFramedata2, index=[4,5,6,7]

print(df, “\n\n”, df1)

Run on IDE

Now we set axes join = inner for intersection of dataframe

#applying concat with axes

#join = ‘inner’

res2=pd.concat([df,df1],axis=1,join=’inner’)
```

OUTPUT :

	Name	Age	Address	Qualification	Mobile no
0	Jai	27	Nagpur	Msc	97
1	Princi	24	Kanpur	MA	91
2	Gaurav	22	Allahabad	MCA	58
3	Anuj	32	Kannuaj	Phd	76

	Name	Age	Address	Qualification	Salary
2	Gaurav	22	Allahabad	MCA	1000
3	Anuj	32	Kannuaj	Phd	2000
6	Dhiraj	12	Allahabad	Bcom	3000
7	Hitesh	52	Kannuaj	Bhons	4000

	Name	Age	Address	Qualification	Mobileno	Name	Age	Address	Qualification	Salary
2	Gaurav	22	Allahabad	MCA	58	Gaurav	22	Allahabad	MCA	1000
3	Anuj	32	Kannuaj	Phd	76	Anuj	32	Kannuaj	Phd	2000

RESULT :

Thus the program was executed successfully

c) Creating data frame from CSV and exel file

```
#importing pandas as pd
import pandas as pd
#creating the dataframe
df=pd.read_csv(“nba.csv)
#print the dataframe
df
```

OUTPUT :

	Name	Team	Number	Position	Age	Height	Weight	College	Salary
0	Avery Bradley	Boston Cellics	0.0	PG	25.0	6-2	180.0	Texas	
1	Jae Crowder	Boston Cellics	99.0	SF	25.0	6-6	235.0	Maruette	
2	John Holland	Boston Cellics	30.0	SG	27.0	6-5	185.0	Boston	
3	RJ Hunter	Boston Cellics	28.0	SG	22.0	6-5	231.0	Georgia state	
4	Jonas Jerebko	Boston Cellics	8.0	PF	29.0	6-10	240.0	NaN	
5	Amir Johnson	Boston Cellics	90.0	PF	29.0	6-9	235.0	NaN	
6	Jordan mickey	Boston Cellics	55.0	PF	21.0	6-8	238.0	LSU	
7	Kelly Chynyk	Boston Cellics	41..0	C	25.0	7-0	190.0	Gonzaga	
8	Terry Rozler	Boston Cellics	12.0	PG	22.0	6-2	220.0	Louisville	
9	Marcus smart	Boston Cellics	36.0	PG	22.0	6-4	260.0	Okshamo state	
10	Jared sullinger	Boston Cellics	7.0	C	24.0	6-9	185.0	Ohio state	
11	Isaiah Thomas	Boston Cellics	4.0	PG	27.0	5-9	220.0	Washington	
12	Evan tumer	Boston Cellics	11.0	SG	27.0	6-7	215.0	Ohio state	
13	James young	Boston Cellics	13.0	SG	20.0	6-6	253.0	Kentucky	
14	Tyler zeller	Boston Cellics	44.0	C	26.0	7-0	216.0	North Carolina	
15	Bojan Bogdano	Boston Cellics	44.0	SG	27.0	6-8	251.0		

RESULT :

Thus the program was executed successfully

OBJECT ORIENTED PROGRAMMING

a) Python program for BMI result

```
class person:
  def init (self,name=’’ age=0,height=0,weight=0):
self.name=’name’
self.age=age
self.height=height
self.weight=weight
def BMI_result(self):
self.BMI=self.weight/(self.height/100)**2
print(“your body mass index is”,self.BMI)
if self.BMI<=18.5:
print(“oops! You are under weight”)
elif self.BMI<=24.9:
print(“awesome you are healthy”)
elif self.BMI<=29.9:
```

```
print(“Eee! you are over weight”)
else:
print(“seesh! You are obese”)
p1=person()
p1.init(‘priya’,21,159,45)
p1.BMI_result( )
```

OUTPUT:

Your body mass index is 17.799928800284796

Oops! You are under weight

RESULT :

Thus the program was executed successfully

b)Write a python program to to demonstrate various kind of inheritance

```
class calculation1:
 def summation(self, a, b):
return a=b;
class calculation2:
 def multiplication(self, a, b):
return a*b
class derived(calculation1, calculation2):
def divide(self, a, b):
return a/b;
d=derived( )
print(d.summation(10,20))
print(d.multiplication(10,20))
print(d.divide(10,20))
```

OUTPUT :

30

200

0.5

RESULT :

Thus the program was executed successfully

c) Write a program to demonstrate operator overloading

```
class bubble:
def__init__(self,volume):
self.volume=volume
def__add__(self, other):
volume=self.volume + other.volume
return volume
b1=bubble(20)
b2=bubble(30)
b3=bubble(“hai”)
b4=bubble(“welcome”)
print(b1+b2)
print(b3+b4)
```

OUTPUT :

50

haiwelcome

RESULT :

Thus the program was executed successfully

MULTITHREADING

Python program to create two threads to keep count of numbers

```
from time import sleep, perf_counter
from threading import Thread
numbers=(1,2,3,4,5,6,7,8,9)
count_odd=0
count_even=0
for x in numbers:
if not x%2:
count_even+=1
else:
count_odd+=1
def task( 0):
print(‘starting a task…’)
print(“number of even numbers:”, count_even)
sleep(1 9)
```

```
print(“number of odd numbers:”, count_odd)
start_time=perf_counter( )
t1=Thread(target=task)
t1.start( )
t1.join( )
end_time=perf_counter( )
print(f‘it  took {end_time-start_time:0.2f} second(s) to complete.’)
```

OUTPUT :

Starting a task….

Number of even numbers : 4

Number of odd numbers : 5

It took 1.03 second(s) to complete.

RESULT :

Thus the program was executed successfully