CSE-B

ROLL.NO: 20701A0592

EXERCISE-2

2)a. single dimensional arrays.

```
import numpy as np
 a=np.array([1,2,3])
 print('My Array is:',a)
```

OUTPUT:

```
 My Array is: [1 2 3]
```

2)b)addition,subtraction and multiplication of matrices for integers ,floating point and complex numbers

```
arr1=np.arange(1,5).reshape(2,2)
print('arr1:',arr1)
print('Addition:',arr1+4)
 print('Subtraction:',arr1-4)
print('Multiplication:',arr1*2)
print('Division:',arr1//2)
a=np.array([[2+3j,1+3j]],[[1+3j,2+3j]])
b=np.array([[1+3j,2+3j]],[[2+3j,1+3j]])
print('Addition of complex matrix:')
print(np.add(a,b))
print('subtraction of matrices for integers:')
c=np.array([[1,2],[3,4]])
d=np.array([[4,5],[6,7]])
print(np.sutraction(c,d))
print(print(np.sutraction(c,d))’)
print('multiplication of matrices for integers:')

r=np.dot(c,d)
print(r)
```

OUTPUT:

arr1: [[1 2] [3 4]]

Addition: [[5 6] [7 8]]

Subtraction: [[-3 -2] [-1 0]]

Multiplication: [[2 4] [6 8]]

Division: [[0 1] [1 2]]

Addition of complex matrix:

[[3+6j 3+6j]

[3+6j 3+6j]]

'subtraction of matrices for integers:

[[-3 -3]

[-3 -3]]

'multiplication of matrices for integers:

[[16 19]

[36 43]]

2)c.performing slicing of matrix

```
#Slicing
arr1=np.arange(10,19)
print('arr1:',arr1)
 print('arr1[1:5]:',arr1[1:5])
print('arr1[3:]',arr1[3:])
 print('arr1[:3]',arr1[:3])
print('arr1[1:6:2]:',arr1[1:6:2])
print('arr1[::2]:',arr1[::2])
print('arr1[::-1]:',arr1[::-1])
```

OUTPUT: arr1: [10 11 12 13 14 15 16 17 18]

arr1[1:5]: [11 12 13 14]

arr1[3:] [13 14 15 16 17 18]

arr1[:3] [10 11 12]

arr1[1:6:2]: [11 13 15]

arr1[::2]: [10 12 14 16 18]

arr1[::-1]: [18 17 16 15 14 13 12 11 10]

2)d.transpose of a matrix

```
matrix=[(1,2,3),(4,5,6),(7,8,9),(10,11,12)]
for row in matrix:
        print(row)
print("\n")
t_matrix = zip(*matrix)
for row in t_matrix:
        print(row)
```

OUTPUT:

[1, 2]

[3, 4]

[5, 6]

[1, 3, 5]

[2, 4, 6]

EXERCISE-3

#max and min,sum,mean and standard deviation

```
a=np.array([3.3,4.5,1.2,5.7,0.3])
print('Sum:',a.sum())
#np.sum(a)
print('Min:',a.min())
print('Max:',a.max())
print('Mean:',a.mean())
print('Std:',a.std())
```

OUTPUT:

Sum: 15.0

Min: 0.3

Max: 5.7

Mean: 3.0

Std: 2.0079840636817816

EXERCISE-4

#Reading and Writing Array Data on Files #Saving Data in Binary Files
data=np.arange(12).reshape(4,3)

print('Data is:\n',data)

print('Saving data to saved_data.npy file. ')

np.save('saved_data',data)

mydata=np.load('saved_data.npy')

print('Loaded data is:\n',mydata)

OUTPUT:

Data is:

[[0 1 2]

[3 4 5]

[6 7 8]

[9 10 11]]

Saving data to saved_data.npy file.

Loaded data is:

[[0 1 2]

[3 4 5]

[6 7 8]

[9 10 11]]

data = np.genfromtxt('sample.csv', delimiter=',', names=True)

print('Data form Sample.csv file is:\n',data)

data = np.genfromtxt('sample.csv', delimiter=',', names=True,dtype=('i2,S6,S20,i8'))

print('Data form Sample.csv file is:\n',data)

OUTPUT:

Data form Sample.csv file is:

[(3001., nan, nan, 1.00000000e+10) (3002., nan, nan, 8.88888889e+09)

(3003., nan, nan, 7.77777778e+09) (1241., nan, nan, 9.96605283e+09)]

Data form Sample.csv file is: [(3001, b'ABC', b'abc@gmail.com', 9999999999)

(3002, b'XYZ', b'xyz@gmail.com', 8888888888)

(3003, b'BBC', b'bbc@gmail.com', 7777777777)

(1241, b'PNR', b'pnr2830@gmail.com', 9966052830)]

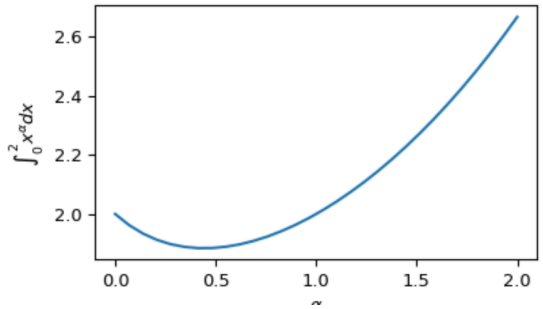
EXERCISE-5

#integration functions using scipy

Single integration functions

```
from scipy import integrate
>>> import numpy as np
>>> x2 = lambda x: x**2
>>> integrate.quad(x2, 0, 4)
(21.333333333333332, 2.3684757858670003e-13)
>>> print(4**3 / 3.)
21.3333333333 invexp = lambda x: np.exp(-x)
>>> integrate.quad(invexp, 0, np.inf)
(1.0, 5.842605999138044e-11)
f = lambda x, a: a*x
>>> y, err = integrate.quad(f, 0, 1, args=(1,))
>>> y
0.5
>>> y, err = integrate.quad(f, 0, 1, args=(3,))
>>> y
1.5
from scipy.integrate import quad_vec
>>> import numpy as np
>>> import matplotlib.pyplot as plt
>>> alpha = np.linspace(0.0, 2.0, num=30)
>>> f = lambda x: x**alpha
>>> x0, x1 = 0, 2
>>> y, err = quad_vec(f, x0, x1)
```

```
>>> plt.plot(alpha, y)
>>> plt.xlabel(r"$\alpha$")
>>> plt.ylabel(r"$\int_{0}^{2} x^\alpha dx$")
>>> plt.show()
```



#double integration

```
import numpy as np
>>> from scipy import integrate
>>> f = lambda y, x: x*y**2
>>> integrate.dblquad(f, 0, 2, 0, 1)
```

Output:

```
(0.6666666666666667, 7.401486830834377e-15)
```

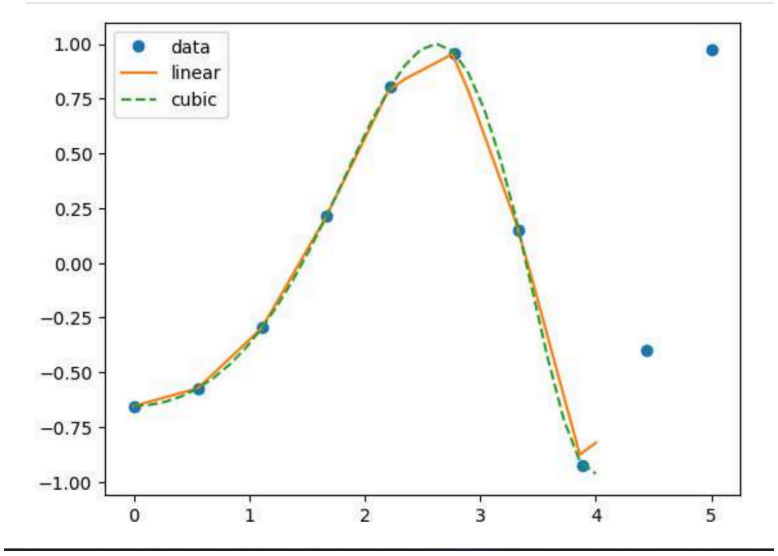
#triple integration

```
import numpy as np
>>> from scipy import integrate
>>> f = lambda z, y, x: x*y*z
>>> integrate.tplquad(f, 1, 2, 2, 3, 0, 1)
(1.8749999999999998, 3.3246447942574074e-14)
f = lambda z, y, x: x*y*z
integrate.tplquad(f, 0, 1, 0, lambda x: 1-2*x, 0, lambda x, y: 1-x-2*y)
(0.05416666666666668, 2.1774196738157757e-14)
f = lambda z, y, x, a: a*x*y*z
>>>
integrate.tplquad(f, 0, 1, 0, 1, 0, 1, args=(1,))
(0.125, 5.527033708952211e-15)
```

EXERCISE-6

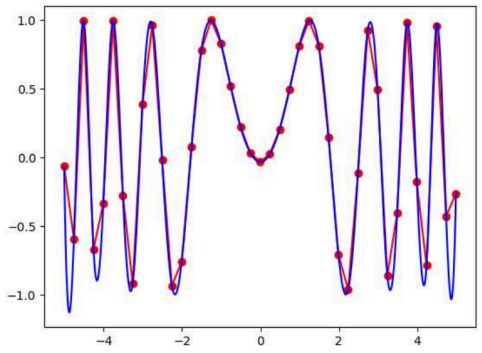
#interpolation fumction using scipy

In [3]:
```
import numpy as np
from scipy.interpolate import interp1d
import matplotlib.pyplot as plt
x = np.linspace(0, 5, 10)
y = np.cos(x**2/3+4)
fun1 = interp1d(x, y,kind = 'linear')
fun2 = interp1d(x, y, kind = 'cubic')
xnew = np.linspace(0, 4,30)
plt.plot(x, y, 'o', xnew, fun1(xnew), '-', xnew, fun2(xnew), '--')
plt.legend(['data', 'linear', 'cubic','nearest'], loc = 'best')
plt.show()
```



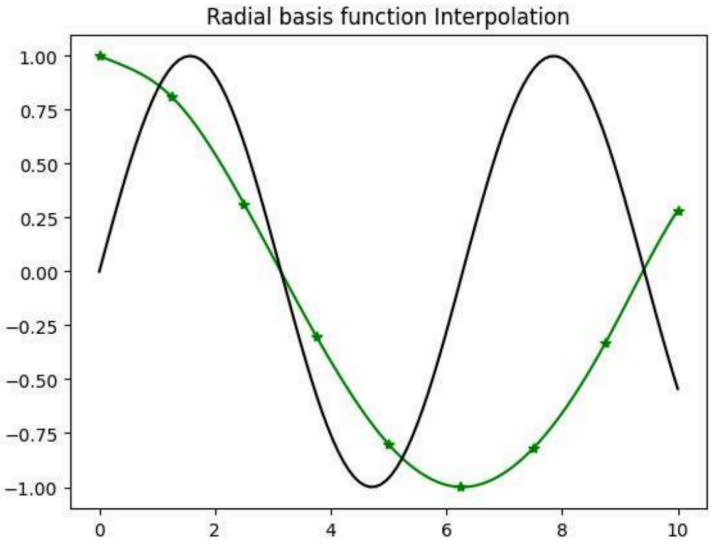
In [9]:
```
import numpy as np
from scipy import interpolate
import matplotlib.pyplot as plt
x = np.arange(-5.01, 5.01, 0.25)
y = np.arange(-5.01, 5.01, 0.25)
xx, yy = np.meshgrid(x, y)
z = np.sin(xx**2+yy**2)
f = interpolate.interp2d(x, y, z, kind='cubic')
xnew = np.arange(-5.01, 5.01, 1e-2)
ynew = np.arange(-5.01, 5.01, 1e-2)
znew = f(xnew, ynew)
plt.plot(x, z[0, :], 'ro-', xnew, znew[0, :], 'b-')
plt.show()
```

```
C:\Users\JKCLabSys\AppData\Local\Temp\ipykernel_13536\2495500341.py:7: Deprecation
Warning: `interp2d` is deprecated!
`interp2d` is deprecated in SciPy 1.10 and will be removed in SciPy 1.12.0.

For legacy code, nearly bug-for-bug compatible replacements are
`RectBivariateSpline` on regular grids, and `bisplrep`/`bisplev` for
scattered 2D data.

In new code, for regular grids use `RegularGridInterpolator` instead.
For scattered data, prefer `LinearNDInterpolator` or
`CloughTocher2DInterpolator`.

For more details see
`https://gist.github.com/ev-br/8544371b40f414b7eaf3fe6217209bff`

  f = interpolate.interp2d(x, y, z, kind='cubic')
C:\Users\JKCLabSys\AppData\Local\Temp\ipykernel_13536\2495500341.py:10: Deprecatio
nWarning:         `interp2d` is deprecated!
        `interp2d` is deprecated in SciPy 1.10 and will be removed in SciPy 1.12.
0.

        For legacy code, nearly bug-for-bug compatible replacements are
        `RectBivariateSpline` on regular grids, and `bisplrep`/`bisplev` for
        scattered 2D data.

        In new code, for regular grids use `RegularGridInterpolator` instead.
        For scattered data, prefer `LinearNDInterpolator` or
        `CloughTocher2DInterpolator`.

        For more details see
        `https://gist.github.com/ev-br/8544371b40f414b7eaf3fe6217209bff`

  znew = f(xnew, ynew)
```



In [6]:

```python
import numpy as np
from scipy.interpolate import Rbf
import matplotlib.pyplot as plt

# setup the data values
x = np.linspace(0, 10, 9)
y = np.cos(x/2)
xi = np.linspace(0, 10, 110)

# Interpolation using RBF
rbf = Rbf(x, y)
fi = rbf(xi)
plt.plot(x, y, '*', color="green")
plt.plot(xi, fi, 'green')
plt.plot(xi, np.sin(xi), 'black')
plt.title('Radial basis function Interpolation')
plt.show()
```



EXERCISE-7

#linear systems of equations using scipy

In [7]:
```
import numpy as np
from scipy import linalg

# The linear algebra system which is given as

# 3x + 2y = 2

# x - y = 4

# 5y + z = -1

#We need to find values of x,y and z for which all these equations are zero

# Creating the input array
a = np.array([[3, 2, 0], [1, -1, 0], [0, 5, 1]])

# Providing the solution Array
b = np.array([[2], [4], [-1]])

# Solve the linear algebra
x = linalg.solve(a, b)

# Printing the result
print(x)

# Checking the result
np.dot(a, x) == b
```

```
[[ 2.]
 [-2.]
 [ 9.]]
```

Out[7]:
```
array([[ True],
       [ True],
       [ True]])
```

In [8]:
```
import numpy as np
from scipy import linalg

#x + 2y - 3z = -3

#2x - 5y + 4z = 13

#5x + 4y - z = 5
# Creating the input array
a = np.array([[1, 2, -3], [2, -5, 4], [5, 4, -1]])

# Providing the solution Array
b = np.array([[-3], [13], [5]])

# Solve the linear algebra
x = linalg.solve(a, b)

# Printing the result
print(x)

# Checking the result
np.dot(a, x) == b
```

```
[[ 2.]
 [-1.]
 [ 1.]]
```

Out[8]:
```
array([[ True],
       [ True],
       [ True]])
```

EXERCISE-8

#pandas#pandas series#pandas data frames

```
import pandas as pd
s=pd.Series([15,-2,3,1],index=['x','y','z','w'])
print(s[0:2]) print(s[['y','w']])
```

OUTPUT:

```
X  15
y   -2
 dtype: int64
y   -2
 w   1
 dtype: int64
 import pandas as pd
ser=pd.Series([5,-2,3,4])
 print(ser>2)
print(ser[ser>2])
```

OUTPUT:

```
0   True
1   False
2    True
3     True
dtype: bool 0 5 2 3 3 4
dtype: int64
```

#operations between series

```
 mydict={'red':2000,'yellow':500,'blue':300}
mydict1={'red':500,'yellow':700,'blue':500,'green':400}
ser=pd.Series(mydict)
ser1=pd.Series(mydict1)
 print(ser)
 print(ser1)
print("ser1+ser",ser1+ser,sep='\n')
```

OUTPUT:

```
 red    2000
 yellow  500
blue      300
 dtype: int64
red    500
yellow   700
blue      500
```

#pandas dataframe

```
mydict={'color':['red','yellow','green','blue','orange'],
'object':['ball','pen','book','scale','mug'],
 'price':[1.5,2.4,1.3,3.6,4.8]}
 frame=pd.DataFrame(mydict,index=['one','two','three','four','five'])
print(frame)
print()
 print(frame['color'],end="\n")
print(frame.price)
 print(frame.columns,frame.index,sep="\n")
print(frame.values)
```

OUTPUT:

```
           Color       object     price
 One       red           ball        1.5
two       yellow        pen        2.4
three     green         book      1.3
four         blue          scale       3.6
five         orange       mug        4.8
one         red
two         yellow
three       green
four         blue
five         orange
Name: color, dtype: object
```

One 1.5

two 2.4

three 1.3

four 3.6

five 4.8

Name: price, dtype: float64

Index(['color', 'object', 'price'], dtype='object') Index(['one', 'two', 'three', 'four', 'five'], dtype='object')

[['red' 'ball' 1.5]

['yellow' 'pen' 2.4]

['green' 'book' 1.3]

['blue' 'scale' 3.6]

['orange' 'mug' 4.8]]

EXERCISE-9

#reindexing

ser3=pd.Series([2,5,7,4],index=['one','two','three','four'])

print(ser3)

ser3.reindex(['three','four','five','one'])

one 2

two 5

three 7

four 4

dtype: int64

Out[12]:

three 7.0

four 4.0

five NaN

one 2.0

dtype: float6

#dropping

import pandas as pd

```
import numpy as np
 ser5=pd.Series(np.arange(4),index=['red','green','blue','white'])
print(ser5)
 print('dropping index green')
print(ser5.drop('green'))
 print(ser5.drop(['red','blue']))
 red     0
 green   1
 blue    2
 white   3
 dtype: int32
#dropping in dataframes
 frame4=pd.DataFrame(np.arange(16).reshape(4,4),
 index=['r','b','g','w'], columns=['ball','pen','pencil','book'])
 print(frame4)
print('dropping indexes blue , green')
print(frame4.drop(['b','g']))
 print('dropping columns')
print(frame4.drop(['pen','pencil'],axis=1))
         ball         pen      pencil         book
r        0             1          2             3
b         4             5          6            7
g         8             9          10           11
w         12           13          14           15
 dropping indexes blue , green
        ball       pen       pencil       book
r          0         1          2            3
w          12        13         14           15
dropping columns
          ball        book
r           0             3
```

b	4	7
g	8	11
w	12	15

EXERCISE-10

#CSV data processing pandas

```
# Import pandas
import pandas as pd

# reading csv file
pd.read_csv("example1.csv")
output:
:
```

	total_bill	tip	sex	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4
5	25.29	4.71	Male	No	Sun	Dinner	4
6	8.77	2.00	Male	No	Sun	Dinner	2
7	26.88	3.12	Male	No	Sun	Dinner	4
8	15.04	1.96	Male	No	Sun	Dinner	2
9	14.78	3.23	Male	No	Sun	Dinner	2
10	10.27	1.71	Male	No	Sun	Dinner	2
11	35.26	5.00	Female	No	Sun	Dinner	4

Using usecols in read_csv()

```
df = pd.read_csv('example1.csv',

        header=0,

        usecols=["tip", "sex", "time"])

 df
```

OUTPUT:

]:

	tip	sex	time
0	1.01	Female	Dinner
1	1.66	Male	Dinner
2	3.50	Male	Dinner
3	3.31	Male	Dinner
4	3.61	Female	Dinner
5	4.71	Male	Dinner
6	2.00	Male	Dinner
7	3.12	Male	Dinner
8	1.96	Male	Dinner
9	3.23	Male	Dinner
10	1.71	Male	Dinner
11	5.00	Female	Dinner

Using index_col in read_csv()

Here, we use the **“sex”** index first and then the **“tip”** index, we can simply reindex the header with **index_col parameter**.

```
df = pd.read_csv('example1.csv',
        header=0,
        index_col=["sex", "tip"],
        usecols=["tip", "sex", "time"])
```

`df`**Output:**

[73]:

		time
sex	tip	
Female	1.01	Dinner
Male	1.66	Dinner
	3.50	Dinner
	3.31	Dinner
Female	3.61	Dinner
Male	4.71	Dinner
	2.00	Dinner
	3.12	Dinner
	1.96	Dinner
	3.23	Dinner
	1.71	Dinner
Female	5.00	Dinner

Using nrows in read_csv()

```
df = pd.read_csv('example1.csv',
        header=0,
        index_col=["tip", "sex"],
        usecols=["tip", "sex", "time"],
                nrows=5)
df
```

Output:

]:

		time
tip	sex	
1.01	Female	Dinner
1.66	Male	Dinner
3.50	Male	Dinner
3.31	Male	Dinner
3.61	Female	Dinner

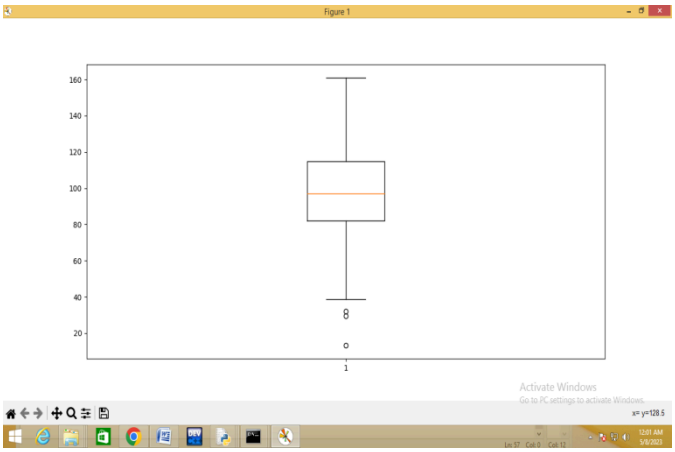
EXERCISE-11

#data visyalization using matplot lib

BOX PLOT:

```
import matplotlib.pyplot as plt
import numpy as np
np.random.seed(15)
dataSet = np.random.normal(100, 25, 200)
print(dataSet)
figure = plt.figure(figsize =(10, 8))
plt.boxplot(dataSet)
plt.show()
```

OUTPUT:

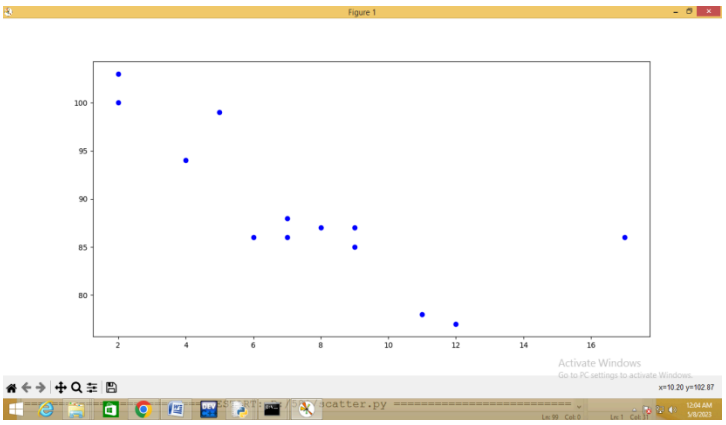


SCATTER PLOT:

```
import matplotlib.pyplot as plt
x =[5, 7, 8, 7, 2, 17, 2, 9,
        4, 11, 12, 9, 6]
y =[99, 86, 87, 88, 100, 86,
```

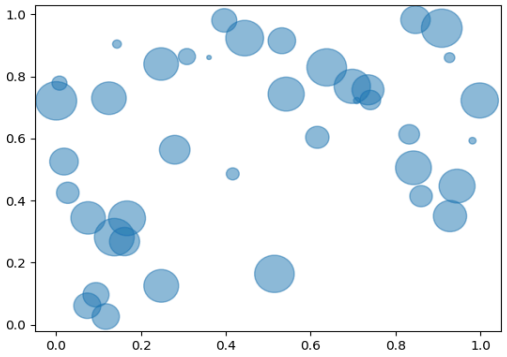
```
        103, 87, 94, 78, 77, 85, 86]
plt.scatter(x, y, c ="blue")
plt.show()
```

OUTPUT:



BUBBLE CHART:

```
import matplotlib.pyplot as plt
import numpy as np
x = np.random.rand(40)
y = np.random.rand(40)
z = np.random.rand(40)
plt.scatter(x, y, s=z*1000, alpha=0.5)
plt.show()
```

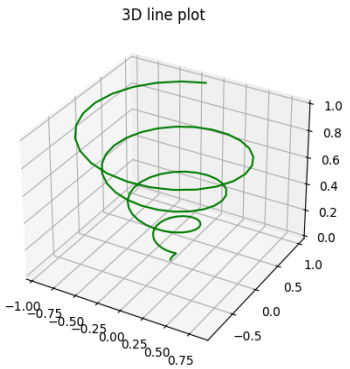


3DPLOTS:

```
from mpl_toolkits import mplot3d
import numpy as np
import matplotlib.pyplot as plt
fig = plt.figure()
ax = plt.axes(projection ='3d')
z = np.linspace(0, 1, 100)
x = z * np.sin(25 * z)
y = z * np.cos(25 * z)
ax.plot3D(x, y, z, 'green')
ax.set_title('3D line plot')
```

plt.show()

OUTPUT:



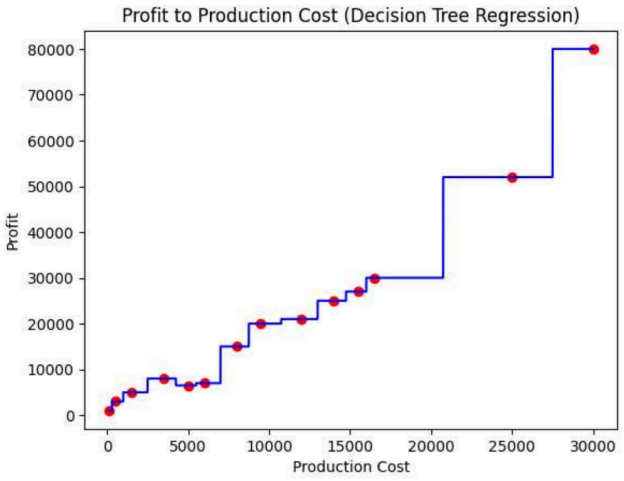
EXERCISE-12

#decision tree induction algorithm

In [4]:

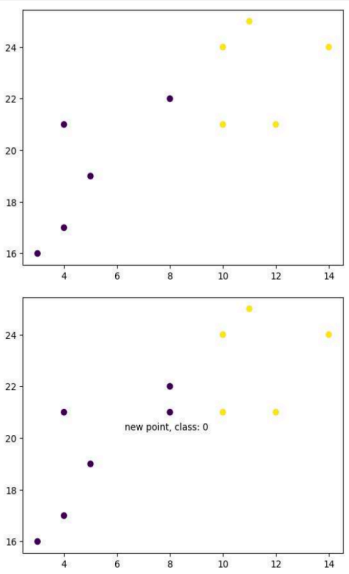
```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd

dataset = np.array(
[['Asset Flip', 100, 1000],
['Text Based', 500, 3000],
['Visual Novel', 1500, 5000],
['2D Pixel Art', 3500, 8000],
['2D Vector Art', 5000, 6500],
['Strategy', 6000, 7000],
['First Person Shooter', 8000, 15000],
['Simulator', 9500, 20000],
['Racing', 12000, 21000],
['RPG', 14000, 25000],
['Sandbox', 15500, 27000],
['Open-World', 16500, 30000],
['MMOFPS', 25000, 52000],
['MMORPG', 30000, 80000]
])
print(dataset)
X = dataset[:, 1:2].astype(int)
print(X)
y = dataset[:, 2].astype(int)
print(y)
from sklearn.tree import DecisionTreeRegressor
regressor = DecisionTreeRegressor(random_state = 0)
regressor.fit(X, y)
y_pred = regressor.predict([[1560]])
print("Predicted price: % d\n"% y_pred)

X_grid = np.arange(min(X), max(X), 0.01)
X_grid = X_grid.reshape((len(X_grid), 1))
plt.scatter(X, y, color = 'red')
plt.plot(X_grid, regressor.predict(X_grid), color = 'blue')
plt.title('Profit to Production Cost (Decision Tree Regression)')
plt.xlabel('Production Cost')
plt.ylabel('Profit')
plt.show()

# import export_graphviz
from sklearn.tree import export_graphviz
export_graphviz(regressor, out_file ='tree.DOT',feature_names =['Production Cost'])
```

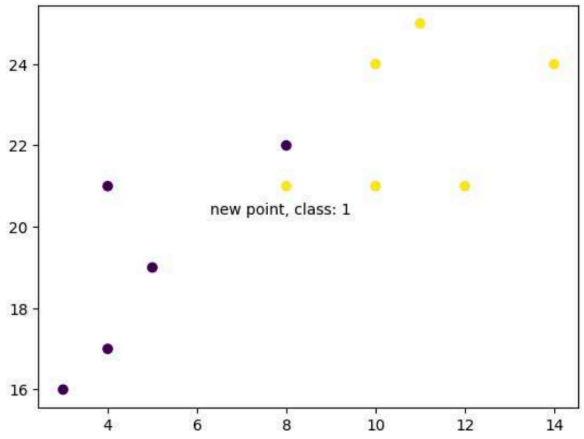
```
[['Asset Flip' '100' '1000']
 ['Text Based' '500' '3000']
 ['Visual Novel' '1500' '5000']
 ['2D Pixel Art' '3500' '8000']
 ['2D Vector Art' '5000' '6500']
 ['Strategy' '6000' '7000']
 ['First Person Shooter' '8000' '15000']
 ['Simulator' '9500' '20000']
 ['Racing' '12000' '21000']
 ['RPG' '14000' '25000']
 ['Sandbox' '15500' '27000']
 ['Open-World' '16500' '30000']
 ['MMOFPS' '25000' '52000']
 ['MMORPG' '30000' '80000']]
[[  100]
 [  500]
 [ 1500]
 [ 3500]
 [ 5000]
 [ 6000]
 [ 8000]
 [ 9500]
 [12000]
 [14000]
 [15500]
 [16500]
 [25000]
 [30000]]
[ 1000  3000  5000  8000  6500  7000 15000 20000 21000 25000 27000 30000
 52000 80000]
Predicted price:  5000
```



EXERCISE-13

In [2]:
```
import matplotlib.pyplot as plt
from sklearn.neighbors import KNeighborsClassifier
x = [4, 5, 10, 4, 3, 11, 14 , 8, 10, 12]
y = [21, 19, 24, 17, 16, 25, 24, 22, 21, 21]
classes = [0, 0, 1, 0, 0, 1, 1, 0, 1, 1]
plt.scatter(x, y, c=classes)
plt.show()

data = list(zip(x, y))
knn = KNeighborsClassifier(n_neighbors=1)
knn.fit(data, classes)

new_x = 8
new_y = 21
new_point = [(new_x, new_y)]

prediction = knn.predict(new_point)

plt.scatter(x + [new_x], y + [new_y], c=classes + [prediction[0]])
plt.text(x=new_x-1.7, y=new_y-0.7, s=f"new point, class: {prediction[0]}")
plt.show()


knn = KNeighborsClassifier(n_neighbors=5)
knn.fit(data, classes)
prediction = knn.predict(new_point)
plt.scatter(x + [new_x], y + [new_y], c=classes + [prediction[0]])
```





EXERCISE-14

#printing machine name and ipv4 adress

```
import socket
  def print_machine_info():
        host_name = socket.gethostname()
        ip_address = socket.gethostbyname(host_name)
        print ("Host name: %s" %host_name)
        print ("IP address: %s" %ip_address)


    if _name_ == '_main_':
        print_machine_info
```

output:

127.0.1.1

#creating an ipv4 adress to different formates

```
import socket
    from binascii import hexlify
def convert_ip4_address():
        for ip_addr in ['127.0.0.1', '192.168.0.1']:
            packed_ip_addr = socket.
                        inet_aton(ip_addr)
```

```
        unpacked_ip_addr = socket.inet_ntoa
                    (packed_ip_addr)
        print ("IP Address: %s => Packed: %s,
            Unpacked: %s" %(ip_addr,
            hexlify(packed_ip_addr),
            unpacked_ip_addr))

if _name_ == '_main_':
    convert_ip4_address()
```

output:

IP Address: 127.0.0.1 => Packed: 7f000001, Unpacked:

127.0.0.1

IP Address: 192.168.0.1 => Packed: c0a80001, Unpacked: 192.168.0.1

#finding service name ,given the port and protoicol

```
def find_service_name():
    protocolname = 'tcp'
    for port in [80, 25]:
        print ("Port: %s => service name: %s" %(port, socket.getservbyport(port,
protocolname)))


    print ("Port: %s => service name: %s" %(53, socket.getservbyport(53,
'udp')))


if _name_ == '_main_':
    find_service_name()
```

output:

Port: 80 => service name: http

Port: 25 => service name: smtp

Port: 53 => service name: domain

#convert integers to from host to network:

```
import socket


def convert_integer():
    data = 1234
    # 32-bit
    print ("Original: %s => Long  host byte order: %s, Network byte order: %s" %(data, socket.ntohl(data), socket.htonl(data)))
    # 16-bit
    print ("Original: %s => Short  host byte order: %s, Network byte order: %s" %(data, socket.ntohs(data), socket.htons(data)))



if _name_ == '_main_':
    convert_integer()
```

output:

Original: 1234 => Long host byte order: 3523477504,

Network byte order: 3523477504

Original: 1234 => Short host byte order: 53764,

Network byte order: 53764

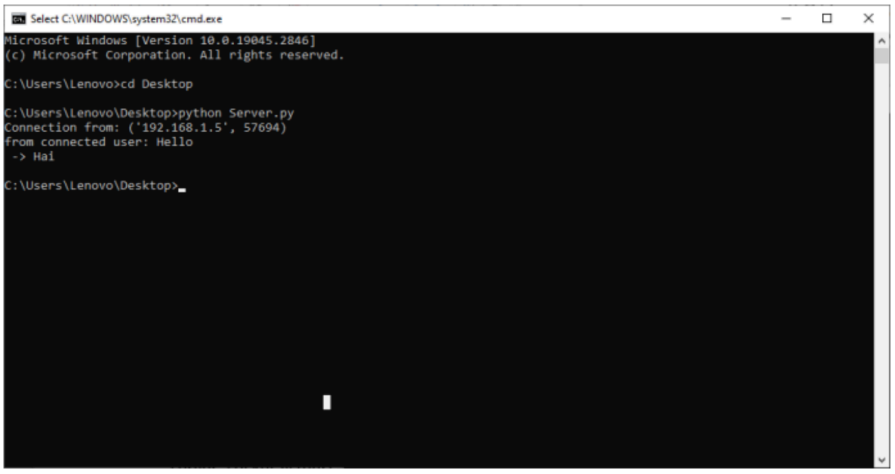
EXERCISE-15

#simple echo client /server application

Server.py:

```
import socket
def server_program():
      # get the hostname
       host = socket.gethostname()
      port = 5000
```

```
 # initiate port no above 1024

 server_socket = socket.socket()

 # get instance

 # look closely.The bind() function takes tuple as argument server_socket.bind((host, port)) # bind host address and port together # configure how many client the server can listen simultaneously server_socket.listen()

conn, address = server_socket.accept()

 # accept new connection

print("Connection from: " + str(address))

while True:

   # receive data stream. it won't accept data packet greater than 1024 bytes data = conn.recv(1024).decode() if not data: # if data is not received break break

 print("from connected user: " + str(data))

 data = input(' -> ')

conn.send(data.encode())

# send data to the client

conn.close()

 # close the connection

if __name__ == '__main__':

     server_program()
```



.

Client.py:

```
 import socket
```

```
def client_program():
    host = socket.gethostname()
     # as both code is running on same pc
    port = 5000
    # socket server port number
    client_socket = socket.socket()
# instantiate
client_socket.connect((host, port))
 # connect to the server
 message = input(" -> ")
 # take input while
message.lower().strip() != 'bye':
     client_socket.send(message.encode())
 # send message
data = client_socket.recv(1024).decode()
# receive response
 print('Received from server: ' + data)
 # show in terminal
message = input(" -> ")
 # again take input
client_socket.close()
# close the connection
 if __name__ == '__main__':
    client_program()
```